Application for a Mining Right and Associated Environmental Authorisation and Waste Management Licence (WML) for proposed Manganese and Iron Ore on the Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436 in the Tsantsabane Local Municipality, Northern Cape Province

Draft EIA/EMPr Report

DMR Reference Number: NC30/5/1/2/2/10207MR

Report Prepared for

Midtron Minerals (Pty) Ltd

Report Prepared by

GEOLOGICAL CONSULTING SERVICES PTY (LTD)

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Title:	*Draft Environmental Impact Assessment and Environmental Management Programme (EIA/EMPr) Report for a Mining Right and Associated Environmental Authorisation and Waste Management Licence (WML) for proposed Manganese and Iron Ore on the Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436 in the Tsantsabane Local Municipality, Northern Cape Province*
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Executive Summary

Introduction

Midtron Minerals (Pty) Ltd (Midtron) applied for a Mining Right (MR) from the Department of Mineral Resources for the proposed mining of Iron and Manganese Ore on a Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436 in Tsantsane Local Municipality, Northern Cape Province. The proposed mining project will cover an area of 1 584.198 hectares and is located approximately 15km north of the town of Postmasburg, approximately 40km southeast of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province.

Exploration work and historical mining conducted on the proposed mining area led to the identification of Iron and Manganese Ore deposits that are deemed feasible to mine. Midtron is therefore applying for a MR in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA) from the Department of Mineral Resources (DMR) Northern Cape Province Regional Office for the proposed Iron and Manganese Ore mining on a Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436. Before the MR will be granted, Midtron must also undertake the Environmental Authorisation (EA) and Waste Management Licence (WML) processes in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA). Since the proposed mining project triggers activities listed in Listing Notice 1 and 2 of the NEMA, a full Environmental Impact Assessment (EIA) including scoping and impact assessment phases will be required per the requirements of the NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017 and 21 June 2021).

A separate application for an Integrated Water Use Licence (IWUL) will also be submitted to the Department of Water and Sanitation (DWS).

Who is conducting the EIA?

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Midtron as the independent Environmental Assessment Practitioner (EAP) to conduct the Mining Right Application (MRA)/EA/WML application process for the project.

The reports and documentation for the integrated EA/WML application process will be compiled and finalised for submission to the DMR for the EA/WML in terms of the NEMA for consideration and decision making. The DMR will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

Who will evaluate the EIA?

Before the proposed development can proceed, approval must be obtained from the appropriate regulatory authorities. The Scoping Report was submitted to the DMR for review, which was accepted, allowing the current impact assessment phase of the project to proceed. The impact assessment phase entailed detailed specialist investigations, reporting and further stakeholder involvement. Currently the process in its draft EIA/EMPr Report stage where the draft reports will need to be submitted to the stakeholders for review and comment. Comments received will then be incorporated into the Final EIA/EMPr Report. Only once a Final EIA/EMPr Report has been submitted to DMR can a decision be taken by the Department as to whether the project may proceed or not.

Description of the Proposed Development

The MR/EA/WML applications are for the proposed mining of iron and manganese ore. There are 6 mining areas that have been identified for the proposed mining project where present vegetated soil overlying the *planned mining areas is to be stripped prior to mining and stockpiled on dedicated stockpile areas next to each mining area which will be used for rehabilitation purposes at a later stage.*

The proposed mining area is currently disturbed due to the previous prospecting activities and historical mining activities that have been taking place. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The ores will be loaded onto the dump trucks from the open excavations by excavator and hauled to the crushing and screening plant. Blasting is required when extreme hard materials are to be mined out of the pits.

Due to the proximity and the nature of the orebodies, mining will be done by conventional opencast mining method, which is designed based on the nature of the orebodies on the mine. Each mining area will be treated as a separate pit. Mining will be done on three ore bodies at most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

The mining process will include drilling, blasting, loading, hauling and quality control. The Reverse Circulation (*RC) drill machine will be utilized to drill holes for prospecting resources as well as blasting. Drilling will be conducted on a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.*

After drilling, explosives provided by service providers are placed down the holes using trucks designed for such purposes. The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted. Once the materials have been blasted, excavators and Front-End Loaders (*FELs) will load the minerals onto the dump trucks and Articulated Dump Trucks* (*ADTs). Wastes and ROMs will be loaded separately onto different trucks and hauled to designated areas.*

Infrastructure to be built on the mine will include, but no limited to:

- *Processing plants for manganese and iron ore;*
- *Static jaw crushing, cone crushing and screening plant magnetic separating plant*
- *Second stage cone crushing plant*
- *Weighbridges (x3)*
- *Diesel tanks (3* 23m^3)*
- *Water dams (2* 250m^3)*
- *Washbay*
- *Workshop (20m*100m)*
- *Gensets (2*300kVA, 2*500kVA)*
- *Feeder bay and substation (3MVA)*
- *Offices*
- *Storerooms*
- *Laboratory*
- *Ablution facilities*
- *Security control point*

The initial processing will be a dry process, with the wet process commencing during year 4 of operation. The required processing plants are as follows:

- *Processing Plant for the processing of Iron Ore: Dry crushing and screening plant as well as wet magnetic separation process; and*
- *Processing Plant for the processing of Manganese Ore: Dry crushing and screening plant.*

Ore <600mm is fed to the primary JAW crusher where ore is crushed down to 140mm. Ore is then fed to the primary cone crusher where it is crushed down to 25mm. From here the ore is fed to the secondary cone crusher where it is crushed down to -15mm. The ore is then fed to a vibrating three deck screen. The first deck separates the -25mm +15mm material from the +25mm material. The +25mm material is conveyed back to the secondary cone crusher for re-crushing. The second deck screens out the -15mm +6mm material and the third deck screens out the -6mm material. The -25mm +15mm and -15mm +6mm ore goes through a dry magnetic separation process. The -6mm ore goes through another magnetic separation process. After this process there are three stockpiles, each consisting of a different size.

The waste that is screened out is dumped on a temporary tailings stockpile from where waste is either used for back-filling of excavations or hauled to the waste rock dump. Throughout the production process, at various times during mining of the ore and from the stockpiles at the completion of the plant process, the ore is sampled and analyzed in order to maintain the correct manganese grade.

The mining right and EA/WML will be required for a period of thirty (30) years.

Motivation for the Proposed Project

The mining industry is of great importance to the South African economy. Manganese ore is a key element in carbon steel production, while electrolytic manganese dioxide is an important ingredient in lithium-ion batteries for EVs and other applications, as well as alkaline and zinc-manganese batteries. Data by Research and Market and the Observatory of Economic Complexity placed South Africa as the world's largest producer and exporter of manganese ore in 2019, accounting for 30% of global production and almost 50% of global exports. In that year, South Africa exported approximately R3.297 billion in manganese ore (StatsSA, 2021). In 2021, South Africa's production of iron ore amounted to an estimated 61 million metric tons. South Africa is one of the world's largest producers of iron ore. As of 2021, South Africa was the ninth-largest iron ore producing country in the world R 9.409 billion ((StatsSA, 2021).

Implementation of the project will result in socio-economic impacts at local, regional and national level as follows:

- *Local and Regional:*
    - *Employment: Midtron intends to employ about 80 employees in total, of which 76 will be HDIs.*
    - *Midtron Minerals will implement a Skills Development Plan that focuses on equipping employees with the skills to enhance their progression and development in the mining industry. The Midtron Minerals Skills Development Plan links with Skills Development legislation and includes the annual submissions of a Workplace Skills Plan (WSP) and Annual Training Reports (ATR) including payment of Skills Development levies to relevant authorities.*
    - *Recruitment of labour will be guided by Midtron Minerals recruitment policies which promote the employment of local labour by the mine as well as by any appointed contractors. A local employment procedure and recruitment process will be developed in consultation with local authorities and representatives. Midtron Minerals will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise. Positions will be reserved and earmarked for both Historically Disadvantage Persons (HDPs) or Historically Disadvantage People (HDP) (as per Mining Charter 2018) and women in mining to ensure that the targets of Mining Charter 2018 of women and HDSAs/HDPs in all management levels are met. Midtron Minerals will use recruitment to meet the targets as set forth in its Social and*

Labour Plan. Positions will be reserved and earmarked for both HDSA's and women in mining to ensure that the targets of 10% of women in mining and 40% of HDSA in all management levels are met.

- *Midtron Minerals will formulate and implement a Skills Development Plan which will focus on the transfer of skills to employees, to further their capacity in the mining industry, and equip them with alternative skills for after mine closure. The skills development plan will be used to assess and formally document the levels of skills and education of all employees to adequately base the Human Resources related planning. Skills development will address any skills and competency gaps that may arise and provide for the training needs of HDSA's, the fast tracking of individuals within the talent pool, and the various career-pathing and mentoring programmes. In this regard, Midtron Minerals will submit a workforce skills plan and an annual training report as per the SETA requirements for the mining Project each year after granting of the mining right. Midtron Minerals will also submit an application for the workplace skills plan grant every year*
- *Planned Adult Education and Training (AET): The AET programme will be offered to employees as part of the Midtron Minerals Human Resource Development. AET for the community will be prioritised by Midtron Minerals and will ensure that the employees and communities are offered the opportunity to become functionally literate and numerate. AET programme will be offered on a full-time and part-time basis to accommodate employees who work certain shifts. All venues will be accredited by MQA, and programmes will be approved by Education and Training Development SETA. It is anticipated that AET training will amount to R 12 000.00 per year starting in year 2 (total R 48 000.00) for Midtron Employees and R 12 000.00 from year 2 to year 5 (total R48 000.00) for surrounding communities*
- *Operational Core business training: Core business training will be offered to Midtron employees to equip them with the required capacity and skills to progress to higher levels of employment within Midtron Minerals. The primary focus of the skills Programmes is on training individuals in skills required by the Mine, to enable employees' individual Career Progression and to ensure safe and productive operations. The total cost of core business training over a 5-year period will be R 150 000.00 (R 30 000.00 per annum commencing in year 1).*
- *Learnerships: Midtron Minerals undertakes to provide Learnership opportunities to both employees (18.1) as well as nonemployees (18.2). The placement of learners, particularly 18.2's will be determined by the existence of employment opportunities at the time of their completion. Provision has been for a total of R 288 000 for Midtron Employee learnerships and R 288 000.00 for non-employees.*
- *Career Progression Plan: Midtron Minerals will actively promote Career Progression and succession opportunities among its employees and will use its Career Progression Programme as a primary mechanism to empower its employees with potential and meet the employment needs of the company. Provision has been for a total of R 120 000.00 for Midtron to implement its Career Progression Plan over a 5-year period.*
- *Portable skills programmes: Midtron Minerals will continue offering skills training Programmes throughout the life of the Mine. A high level of focus will be when there is a possibility of retrenchment, downscaling and possible closure of the mine. The programme aims to equip employees with alternative skills to utilise outside the mining environment. It is anticipated that the portable skills programme implementation will amount to a total of R 80 000.00 over a 5-year period.*
- *Mentorship: It is the strategic intent of the Mine management to achieve full performance of all employees throughout the organization and a mentorship programme is regarded as a key*

instrument. The proposed mentorship model is to have internal mentorship whereby lower-level employees are paired with higher-level employees for a transfer of skills to take place and external mentorship which will involve coaching of outside BEE companies who have an interest in being involved in mining. Midtron Minerals Mentorship Plan will represent a carefully planned and professional intervention to facilitate a larger initiative to support employee and Skills Development within the Operation.

  - *Internships and Bursaries: Midtron Minerals is aware of the need not only to assist its own employees with development opportunities but also members of the local community to access tertiary education (bursaries) and experiential work (internships). The bursary and internship plan help to develop individuals, thus supplying the operation with its required skills. Apart from business related qualifications, Midtron Minerals is also aware of the need to develop qualified individuals from other sectors of the economy, whose communities will be affected by the mine. The bursaries to be awarded will amount to R 100 000.00 for non-employees and R 150 000 for employees over a 5-year period. An estimated budget of R 200 000.00 has been allocated to internships.*
  - *Employment Equity Plan: Midtron Minerals fully subscribes to the principles of the Mining Charter and strives to achieve more than the minimum requirements. The Company believes that Employment Equity is an integral part of building an effective and representative workforce to ensure equality among its employees. Efforts will be directed to identify those HDSAs with talent, and then to provide accelerated training and development initiatives to assist their progression when suitable vacancies arise. Transformation within Midtron Minerals is guided by the South African Constitution and the MPRDA, which promotes equity and fairness, dignity, transparency and accountability.*

- *National: Loss opportunities in foreign exchange for South Africa will be incurred as the potential to sell the granite internationally will be lost.*

These benefits must be offset against the costs of the project, including the impacts to landowners. Further to the above, it has been determined that the mining project activities will not have a conflict with the spatial development plans for the Tsantsabane LM and ZF Mgcawu DM, their Integrated Development Plans and the Environmental Management Framework (EMF). The mineral extraction at the Midtron mining project is considered by Midtron to be in the best interest of the public at large by generating earning power both locally and internationally.

Alternatives Considered

The alternatives considered were as follows:

- *Property/Location: The location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). Exploration on the mining right area has proven that there is iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property also has manganese resources estimated to be approximately 50 million tons as well as iron ore resources estimated to1 373 075 tons. The site is therefore regarded as the preferred site and as such, no property alternatives were viable to be considered for this project.*
- *Type of Activity: An alternative to the type of activity would be leaving the project area with no viable economic activities taking place. The current landuse associated with the project area are mining related (prospecting and historical mining). A socio-economic impact assessment of the proposed Midtron project will be included in the impact assessment phase and the land use alternatives will also be investigated in more detail in the EIA phase once specialist investigations have been completed.*

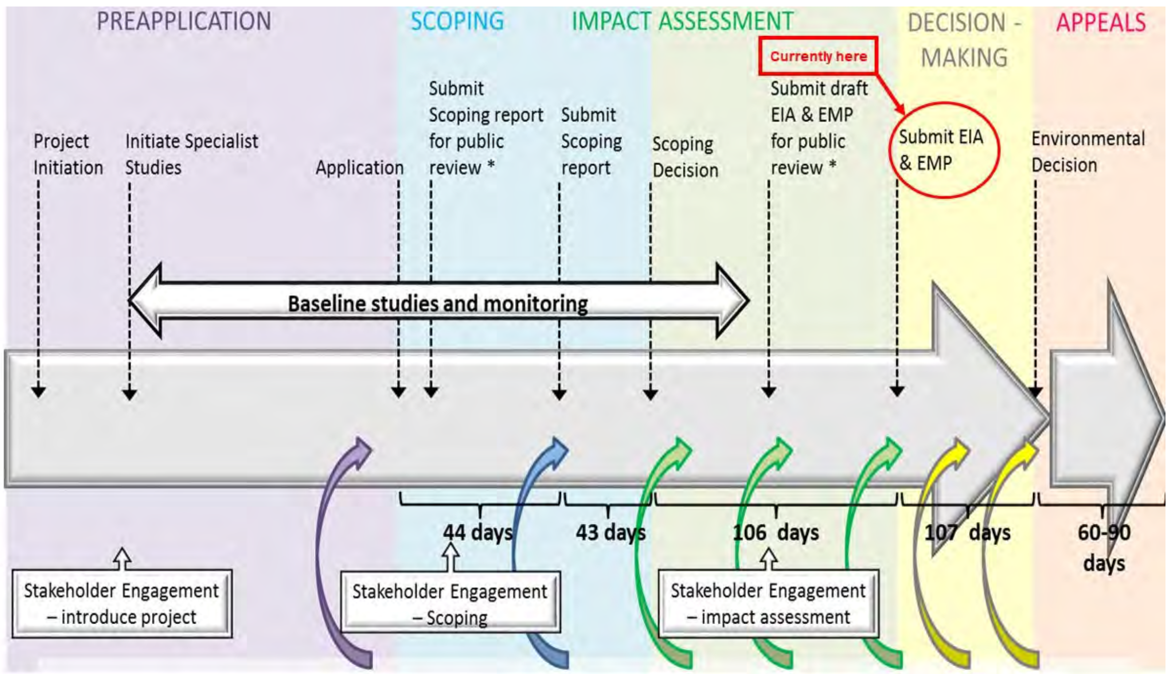
- *Design or Layout of the Activity: The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource. It is expected that mining and rehabilitation will be undertaken sequentially to keep disturbed areas to a minimum. The scoping assessment that has been conducted for the project shows that there are no fatal flaws associated with the project location. However, should sensitive environments such as heritage resources, SCC etc be affected by the project layout, the site layout plan will be revised. The significance of the impacts will be investigated in depth during the impact assessment phase of the project.*
- *The Technology to be used in the Activity: It's possible that only mobile screening and crushing plants, which can process 300 tons of raw materials per hour may be used, instead of the fixed plants, due to the high capital costs of the fixed plants. In this case, three (3) sets of mobile screening and crushing plants will be positioned at different locations to crush all materials to proper sizings, from 6mm to 25mm, which will be removed to the magnetic beneficiation plant for further beneficiation.*
- *The Operation Aspects of the Activity: The operational plan for the mine is based on demand of iron and manganese ore. Access to the site is by a secondary gravel road turning from the R325. There is a number of gravel roads traversing the property, which are either farm roads or that were created by prospecting activities. At this moment, it is proposed that existing access roads be used for mining activities. More roads are to be built as the mine develops. The final iron ore product will be transported by road to Postmasburg Iron ore siding, and then will be transported by rail to the Saldanha harbour, or the iron ore will be hauled by road to the Saldanha harbour. The final manganese ore product will be transported to the Lohatla load-out station where it will be loaded into containers and railed to the Port Elizabeth harbour. Where required, access roads to be used will need to be negotiated with the landowners affected by the MRA.*
- *No-go Option: The no-go alternative would entail not mining the iron and manganese ore and leaving the landuse in the area as historical mining. By not implementing this project the local economic and employment opportunities and revenue as well as the mined iron and manganese ore which could potentially have benefitted the economy would be lost. The Tsantsabane Local Municipality Integrated Development Plan (IDP) identified mining as the major contributor to the municipality's GDP. The socio-economic impacts of no implementing the project include local, regional and more than likely national impacts:*
    - *Local and regional: planned socio-economic initiatives within the surrounding communities (Section 7.3) would not be able to go ahead; and*
    - *National: Loss opportunities in foreign exchange for South Africa will be incurred as the potential to sell the iron and manganese ore internationally will be lost.*

The assessment also included the "no-go "option. All the identified alternatives have been assessed in detail in the specialist studies and impact assessment section of this report.

Environmental Impact Assessment Process

An EIA seeks to identify the environmental consequences of a proposed project from the beginning, and helps to ensure that the project, over its life cycle, will be environmentally acceptable, and integrated into the surrounding environment in a sustainable way. The project triggers activities listed in GNR984 (Listing Notice 2) of the NEMA and requires that a full EIA (scoping and impact assessment phases) be conducted.

A summary of this process is shown in Figure ES-1.



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MIDTRON MRA

SIMPLIFIED EIA PROCESS

Figure ES-1: Illustration of the EIA process followed

Stakeholder Engagement Process

Activities that were undertaken for the public involvement process during the scoping phase are:

- *Announcement of the proposed project via advertisements, notification letters and onsite notices;*
- *Development of a stakeholder database:*
- *The Draft Scoping Report was made available for a 30-day commenting period.*
- *Public meeting to discuss the scoping report and plan of study; and*
- *Compilation of the comments and responses summary table.*

During the EIA phase, stakeholder engagement entailed:

- *Notification of the availability of the Draft EIA/EMPr Report for review and comment:*
- *The 30-day review and comments period;*
- *Public Meeting; and*
- *Updating of the comments and responses summary table.*

Profile of the receiving environment

A summary of the main baseline aspects is included in Table ES-1, with more detail included in Section 10 of the report.

Table ES- 1:Summary of the Profile of the Receiving Environment

Aspect	***Description***
Geographical	*The proposed project area is situated in the Tsantsabane Local Municipality's area of jurisdiction, within the ZF Mgcawu District Municipality, Northern Cape Province. The affected property is located approximately 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu.*
Topography	*The topography around Postmasburg contains small variations in elevation, with a maximum elevation change of 80 metres and an average elevation above sea level of 1 327 MASL.* *The topography map of the proposed mining area shows that the altitude of the site varies from approximately 1 587 m.a.s.l to 1 440 MASL.*
Climate	*Postmasburg has a Subtropical desert climate (Classification: BWh).* *The average temperature data indicates that:* • *The highest maximum temperature is experienced during November, December, January and February.* • *The average maximum is around 31°C.* • *The coldest months of the year are June and July, where the average temperature drops to below 20°C.* *The average monthly rainfall data indicates that:* • *The highest rainfall months are November, December, January and February, March with an average well below 40mm;* • *January has a higher peak with just over 45mm;* • *While the dry months are May, June, July, August and September with an average of below 10mm.*
Geology	*The study area falls in the Postmasburg area which lies at the southern end of a domal structure termed the Maremane Anticline in which dolomites of the Campbell Rand Group are exposed. The Campbell Rand Group deposits in this area are overlain by the Kuruman Banded Iron Formation - the Kuruman Member of the Asbesheuwel Formation. The dolomite palaeosurface is karsted, leading to collapse structures where iron and manganese formation has fallen into karst cavities.* *The geology of the property is dominated by dolomitic limestone (puckered limestone) with subordinate coarsely crystalline dolomite, chert ad lenses of limestone (Vgl). To the middle of the property, small portions of banded ironstone with bands of amphibolites are observed (Vak). Banded chert and chert breccia, largely covered by rubble (Vgl) is mostly observed around the banded ironstone. Red to flesh coloured windblown sand; sand dune (Qs) covers some parts of the property. A small portion of coarse-grained brown quartzite and subgraywacke; conglomerate (Mmf) of the Olifantshoek Group is also observed towards the centre of the property and adjacent to it.*
Land use and land capability	*The majority of the affected area and surroundings are currently being used for prospecting and mining and agriculture.*
Biodiversity	• *Biomes: The proposed mining area is located in the Savanna Biome.*

Aspect	*Description*
	Bioregions: The proposed mining area is located in the Eastern Kalahari Bushveld Bioregion. *Vegetation Types: According to the SANBI remaining vegetation types database, there is no remaining natural vegetation on the affected area. The threatened ecosystems associated with the site are the Kuruman Mountain Bushveld and the Kuruman Thornveld. According to SANBI, the ecosystem is classified at Least Threatened.* *Regional Sensitivities: The regional sensitivities of the vegetation are summarised as follows:* *SVk 9 Kuruman Thornveld; The SVk 9 Kuruman Thornveld is classified as Least Threatened. According to Mucina and Rutherford, the conservation for this vegetation type is set at 16%, None of the SVk 9 Kuruman Thornveld in statutory conservation areas. An estimated 2% of the SVk 9 Kuruman Thornveld is already transformed. Erosion is very low.* *SVk 10 Kuruman Mountain Bushveld: The SVk 10 Kuruman Mountain Bushveld is classified as Least Threatened. According to Mucina and Rutherford, the conservation for this vegetation type is set at 16%. None conserved in statutory conservation areas. Very little transformed. Erosion is very low to low. Some parts in the north are heavily utilised for grazing.* *The flora assessment found the following:* *Flora assessment: The study found that the study site is characterised by Flat rocky plains and some sloping hills with very well- developed, closed shrub layer and well-developed open tree stratum consisting of Acacia erioloba.* *A number of species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) are known to be found in the area and were observed on the property.* *Ethnobotanical plant species: No medicinal plants were observed during the site inspection.* *Alien Invasive Plant Species: The site is infested by Opuntia species, this was observed during the site inspection.* *The fauna assessment found the following:* *Mammals - None of the sensitive mammals which were expected was spotted on site except for droppings of smaller mammals.* *Reptiles: The study site has a number of venous snakes such as Cape Cobra, Black Mamba and a number of other venous snake. All these have a high chance of occurring in the study area, based on habitat requirements and are most likely to occur in rocky habitats, either on rocky outcrops or in rocky, well wooded valleys. Field investigation findings: None of the expected reptiles was observed on site during the site visit.* *Avifauna: According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the Sekhukhuneland area; the majority of these birds are comprised of Bushveld, Grassland and Mountainous species. A few avifaunal species were spotted onsite during the site visit.*

Aspect	***Description***
	o *Invertebrates: There are a number of butterflies that are likely to be observed on the study site and the surrounding areas.*
Heritage Resources	• *Archaeological and Heritage Sites: The proposed mining right application site did not yield any confirmable archaeological sites or material. Based on the field study results and field observations, it is the considered opinion of the author that the receiving environment for the proposed mining right application site is low to medium potential to yield previously unidentified archaeological sites during mining.* • *Buildings and Structures older than 60 years: The study recorded more than 17 individual structures within the mining right site. Most of the buildings and structures are associated with the previous mining activities within the area. Due to a lack of information and their state of conservation, their ages could not be conclusively confirmed. However, it is assumed that most of the historical buildings have been destroyed or collapsed due to natural decay and what remains are foundations which from a heritage perspective are not very significant. Although the buildings and structures are in a bad state of conservation, they are still protected in terms of Section 34 of the NHRA. It looks like most of the affected structures have been avoided and therefore the mining right application may be approved subject to ensuring that no historic building may be destroyed without a permit from PHRA. Further investigation and mitigation are required if a heritage building is earmarked for demolition or alteration.*
Wetlands	*The SANBI data shows that there are no wetlands occurring on the study area. The study area consists of dry tributaries, however, due to the most rains, some of the tributaries were covered with stormwater. Water inputs in these systems are mainly from sub-surface flow and outflow is either very limited or through diffuse sub-surface and/or flow with no direct surface water connection to a stream channel (Kotze et al., 2008). The stream on the property is considered an NFEPA watercourse, meaning that the area is regarded as important for the conservation of biodiversity. Since the stream is currently dry, there are no direct benefits for humans that can be derived from the watercourse. Based on the EIS assessment of the watercourse, the overall EIS score was 1.5 which is categorised as Moderate. The moderate state of a aquatic habitat is interpreted as a aquatic habitat that is considered to be ecologically important and sensitive on a provincial or local scale. Figure 9 indicates the services performed by the stream when it's functional. It is very important to note that the watercourse is located within a very sensitive area, which plays a major role in managing Biodiversity.*
Conservation Plan	*According to the Northern Cape Provincial Biodiversity Conservation Plan (C Plan), a portion of the affected property is classified as an Ecological Support Area (ESA). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas (CBAs) and/or in delivering ecosystem services.*
Protected Areas	*The DFFE South African Conservation Areas Database (*SACAD*), South African Protected Areas Database (*SAPAD*) and the Important Biodiversity Area (IBA) database show that there are no protected areas or important bird areas affected by the proposed mining activities.*
Surface water	*The project is located within quaternary catchment D73A which is located within the Lower Vaal Water Management Area (WMA. Catchment D73A is drained by the Skeifontein Spruit in the east which drains the Kuruman Hills, the Groenwater Spruit in the central region and an unnamed drainage in the north-west which drains the*

Aspect	***Description***
	Langberg Mountains. The Groenwater and Skeifontein drainages join just before the southern boundary of the catchment where it runs into the Soutloop Drainage. These drainages only flow after flood events or during very wet cycles and are dry for most of the time. Catchment D73A has no official annual runoff figure as the water evaporates in the catchment (WR2012). There are drainage lines that traverse the project area
Groundwater	• *Hydrocensus: Groundwater sampling was conducted for 4 boreholes that were within the hydrocensus radius and only three boreholes' water quality samples were taken to Aquatico Lab for analysis.* • *Groundwater Use: Groundwater is mainly used for domestic supply, livestock watering, and watering of gardens. The borehole yields from the upper calcrete aquifer are relatively low and groundwater cannot be pumped in quantities sufficient for extensive crop irrigation purposes.* • *Aquifers: The hydraulic properties of the area are characterised by shallow dolomitic aquifers with high transmissivities. The lithologies below the dolomites are characterised by a host of interbedded chert, ironstones, chert breccias, quartzites, conglomerates and shales which would be indicative of primary and secondary aquifers. Groundwater flow will mainly be in the form of fracture flow. The geohydrological regime in the study area is likely made up of two aquifer systems. The first, the upper, semi-confined aquifer occurs in the calcrete or on the contact between the calcrete and underlying Kalahari clay formation, if the latter is present. This aquifer is, however, often poorly developed in the study area and only sustains livestock and domestic water supply. Where the upper aquifer is present, quarrying within the site boundary area will destroy it but the dewatering effects of the aquifer will not be so widespread due to its limited depth. The most significant dewatering effect as well as contamination, if present, will be on the deeper secondary aquifer with higher transmissive properties and more dynamic hydraulic properties.* • *The groundwater elevation contours are taken from the Hydrogeological Map Series (DWA, 2000) and show groundwater flow to be in a South to South Easterly direction. Measured groundwater levels indicate that the hydraulic gradient slopes towards the southeast along the course of the Groenwater Spruit River. It is thought that the groundwater flow follows the surface topography somewhat, flowing towards the Groenwater Spruit River and then in a south-westerly direction.* • *The quaternary catchment is within the Vegter Region 25 referred to as West Griqua Land as indicated in Figure 6. Two basic types of aquifer storage are assumed to exist in this region, namely the "Weathered /Jointed" (WZ) and Fractured" Zone (FZ). In fractured rock (FZ) aquifers the number of water-bearing fractures generally decreases with depth (Vegter, 1995) and this often results in a similar decline in aquifer storativity with depth. While saturated zone (WZ) is normally a relatively thin zone (i.e. 5 to 40m thick) with its upper surface formed by the water table, therefore making this portion of the aquifer semi-unconfined to unconfined. This zone is characterised by a large number of relatively low-yielding water strikes.* • *The project area had an abstraction borehole equipped with a pump and storage tank. According to the personal contact in the study area, the borehole had an average depth of 60 m with the submersible pump at 26 m below ground level.* • *Five water level monitoring boreholes belonging to DWS were identified within the boundaries of the project area. These boreholes had an average water level of 12 m below ground level. Many other boreholes within the catchment area were*

Aspect	Description
	identified on the WARMS database; these boreholes mainly belonged to the surrounding mines such as Beeshoek which is approximately 7 km southwest of the study area. Hydrocensus was conducted from the 27 to the 30th of March 2022 .and only 25 boreholes were visited, although most of them were closed and few are operational. • *The yield test data indicates that the property may sustainably abstract 40 564 m3/a from the aquifer system. The volume of water requested in the WULA is equal to this 10 000 m3/a and this is considered sustainable. The borehole abstraction rate and basic management guidelines are highly recommended. This is equal to the safe yields of the boreholes, and aquifer over-abstraction is unlikely to occur if these rates are adhered to. Note this is a conservative yield (for use throughout the year). However, to ensure that the yield is sustainable and does not impact the surrounding water level, the water level and abstraction should be monitored over time. This data should be reviewed on regular basis (suggested monthly) to ensure that the yield is sustainable.* • *Water Quality: The water quality results indicated that the water quality generally does not satisfies the drinking water standards of the country, compared to the SANS 241 standards for domestic use and the South African Water Quality Guidelines (SAWQG) irrigation targets. The water cannot be used for human consumption. For the BHO1 and BH02, the EC was slightly elevated but only exceeded the standard limits for the Domestic Water Limit. The TDS of all the boreholes are exceeding the Domestic Water Limit. The Chloride of BH03 exceeds the Domestic Water Limit, while BH01 and BH02 are within the acceptable range. Although the BH01 and BH02 are exceeding the Mine Health and Safety Act. The Calcium for all the boreholes is exceeding the Domestic Water Limit. Furthermore, magnesium is also exceeding the Domestic Water Limit for both BH01 and BH02 while Magnesium of BH03 is within the acceptable range. On the BH03, EC, NTU, Ecoli, and manganese are exceeding drinking water standards. There is a need for verification of the water quality before any use would be implemented in these cases. The results indicated that the water type for the BH01, BH02, and BH03 in the study area had a magnesium-calcium-bicarbonate (Mg-CaCO3) composition, clearly indicating that the BH01, BH02, and BH03 had a similar water type. Groundwater quality had its natural variations. Almost all the samples were clustered in the magnesium-calcium bicarbonate facies of the Piper diagram. That reflected the chemistry of the dolomite, indicating that the dissolution of dolomite was the dominant process controlling the chemistry of the groundwater or weathering of silicate minerals. As expected, groundwater from the dolomitic aquifers was of magnesium-calcium-bicarbonate nature due to the dolomite composition.*

Anticipated Impacts

Risks and potential impacts will be categorised according to the type of activity undertaken and the relation to each environmental variable. Findings from specialist studies will be incorporated into the EIA/EMPr Report. The following impacts as described in Table ES-2 are anticipated because of the construction, operation and decommissioning Phases of the project:

Table ES- 2: Anticipated Impacts

Element of Environment	Potential Impact Descriptions
Socio-Economic	*Possible job opportunities during the construction and operation.*

Element of Environment	***Potential Impact Descriptions***
Topography	*Changes in the topography in the area.*
Hydrogeology	*Possible groundwater contamination.*
Surface water	*Possible surface water contamination.*
Air Quality	*Possible impact on Air Quality in the area.*
Climate Change	*Possible contribution to climate change through emission of Green House Gases*
Noise	*Possible generation of noise during construction and operation.*
Visual	*Visual impact associated with the mine infrastructure and operation.*
Soils/Land Use/Land Capability	*Loss of soil resource and change in land capability and land use.*
Biodiversity	*Disturbance and loss of biodiversity, especially indigenous species.*
Wetland and aquatic ecology	*Possible loss, sedimentation and contamination of wetland areas.*
Heritage	*Possible impact on heritage and cultural resources (including graves) in the area.*
Traffic	*Potential safety issues due to the increased traffic.*
Cumulative Impacts	*Cumulative Impacts*

Specialist Studies

Specialist studies contained in the Scoping Report and Plan of study were conducted to assess the anticipated impacts. All specialists assessed the impact (including cumulative) of each proposed activity/aspect in relation to the construction, operational, closure and decommissioning phases and developed appropriate mitigation measures that can be implemented to reduce or eliminate the potential impacts identified.

Quantification of Impacts

The anticipated impacts associated with the proposed project were assessed according to Ndi Geological Consulting Services (Pty) Ltd's standardised impact assessment methodology which is presented Section 12. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

Summary of the Impact Assessment Process

This section contains the assessment of potentially positive and negative environmental impacts that could possibly be caused by the proposed mine.

The impacts are linked to the activities conducted for the proposed development, broadly relating to construction, operational and decommissioning phases. Specific emphasis was placed on any relevant environmental, social and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to identify mitigation measures that may be implemented to reduce the impacts to an acceptable level where required.

The impacts evident from the detailed impact assessment (Section 13) of the proposed project are both positive and negative in nature. The key positive and negative findings outlined below.

Key Positive Impacts After Mitigation

The main positive impacts identified for the project relate to socio-economic impacts that the construction and operation of the project will have. These impacts were determined to have a positive impact, either directly or through the spinoffs generated by the development and operation of the proposed project and associated infrastructure. These positive impacts are not listed per phase of the project, but as consolidated impacts during construction, operation and closure

In terms of local economy, there is the potential for multiple significant benefits to both local and regional businesses, as well as local employment opportunities. This would be highest during the construction phase, due to the requirement of contractor numbers (for services and materials). This has opportunities for both the formal and informal sectors, as smaller enterprises, including spaza shops, are likely to be established during the construction period to supply contractors and others with food and other amenities.

The proposed mining activities will ensure that the LM and communities in the area will benefit from the mine. The stimulation of the national economy will occur as a result of the investment into the mine and proceeding increase in production. The subsequent benefits are employment creation, a rise in consumption levels, new business sales, and a contribution to GDP.

It is expected that the mine will implement a policy allowing for preferential procurement for the local businesses and training of local Small, Medium and Micro-sized Enterprises (SMME) on procurement and business management. The mine is expected to have a positive socio-economic benefit through employment of locals. Recruitment of labour will be guided by Midtron's recruitment policies which are expected to promote the employment of local labour by the mine as well as by any appointed contractors. Midtron will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise.

The mine will use recruitment to meet the targets as set forth in the SLP. A projected total of 80 employees are envisaged to be employed at the mine, of which 76 will be HDIs. Where specialist and skilled labour is recruited from outside the local boundaries due to the skills scarcity, local residents will benefit through on the job training, where possible.

The skills programmes to be applied during mining operations at the Midtron Mine are considered to be holistic, given that they cover qualification attainment, basic education provision, on the job training, etc. If implemented accordingly, the skills levels particularly of the local community will improve and thus enable employees to acquire future employment.

Key Negative Impacts After Mitigation

The assessment found that there are a number of negative impacts that are expected as a result of the Midtron Mine. The most significant impacts identified were on the biodiversity, groundwater and surface water resources, including the loss of aquatic habitats and their associated functions.

The wetland delineation and aquatic habitat assessment found that there are no wetlands located on the affected property. The study area consists of dry tributaries, however, due to the most rains, some of the tributaries were covered with stormwater. The stream on the property is considered an NFEPA watercourse, meaning that the area is regarded as important for the conservation of biodiversity. The specialist noted that it is very important to note that the watercourse is located within a very sensitive area, which plays a major role in managing Biodiversity. The aquatic assessment concluded that based on the proposed activity and taking into consideration the present state of the aquatic habitats and their associated functionality and biodiversity status the largest and most effective mitigation measure to mitigate the foreseen impacts is to design the mine site layout to exclude the delineated aquatic habitat system inclusive of the regulated 100 m buffer zones.

The biodiversity assessment found that the proposed project is located in an area that is largely classified as natural, and certain portions of the study site are located within an Ecological Support Area (ESA). A number of species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) are known to *be found in the area and were observed on the property. The site consists of the Kuruman Thornveld and the Kuruman Mountain Bushveld vegetation types. Since endemism and species richness are highly relevant to the prioritisation of areas for conservation, the study site is regarded as particularly sensitive. Loss of endemic plant diversity in the study site will also result in a loss of faunal biodiversity and a resultant loss of faunal SSC. This is of specific relevance to invertebrates, since they are dependent on those plant species. Mining activities in the area will have direct negative ecological impacts, most notably vegetation clearing leading to habitat loss, degradation and fragmentation as well as proliferation of alien invasive plant species. Due to the nature of the proposed development, the impact is expected to be highly significant. In addition to the loss of important natural heritage, an alien invasion is expected to occur, resulting in the degradation of vegetation. However, if the proposed is executed as per the Environmental Management Programme will help minimise the impact by restricting the development to areas that are already disturbed and conserving the undisturbed sites. It is thus deemed essential that a cogently developed, documented and managed biodiversity management plan be implemented and maintained throughout the life of the proposed mine.*

Other negative impacts identified include:

- *Socio – Economic: Transportation of material to and from the study area will result in additional trucks and construction vehicles on the study area roads, which can cause damage to the road surface and increase the potential for accidents in the area. The influx of additional people looking for employment will result in impacts on the social dynamics in the area.*
- *Groundwater Impacts: Local spillages of hydrocarbons and chemicals used during the pre-construction and construction phase which may leach to groundwater. Groundwater contamination from activities identified in the operational phase such as the iron ore stockpiling, discard dumps and another surface infrastructure is expected during this phase. Pumping of groundwater for dewatering activity was expected to cease at this phase allowing groundwater levels to recover. Groundwater levels in the surrounding area which were drawn down due to the dewatering activity will subsequently return to close to the natural or pre-mining state. However, due to the low recharge influx, it may take a long time before groundwater levels return to pre-mining conditions.*
- *Surface Water: Movement and use of vehicles and machinery as well as improper storage of hazardous substance may have Impacts on surface water and groundwater quality due to accidental spillages of hazardous substances. Contaminated dirty water runoff from the mining area to surrounding areas resulting in the impact on local surface water quality. The removal or containment of dirty water will result in the removal of MAR from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.*
- *Aquatic habitat Impacts: The NFEPA database shows that there are no wetlands associated with the affected property, which was supported by the specialist studies undertaken. There are streams and tributaries located on the site of the proposed mine area , therefore, there is potential for impacts on these aquatic habitats located on the property. Indiscriminate movement into and access to aquatic habitats areas will result in:*
    - *Loss of aquatic habitat ecological structure as a result of site clearance activities and uncontrolled aquatic habitat degradation;*
    - *Impact on the aquatic habitats systems as a result of changes to the sociocultural service provisions*
    - *Impact on the hydrological functioning of the aquatic habitats*;
    - *Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of aquatic habitat and riparian resources; and*

  - *Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat and riparian habitat.*

- *Air Quality Impacts: The movement of vehicles in the area will have an impact on ambient air quality as follows:*
  - *Possible increase in dust generation, PM10 and PM2.5 as a result of bulk earthworks, operation of heavy machinery, and material movement.*
  - *Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.*
- *Blast and Vibration Impacts: Blasting during the operation of the opencast mining area will result in:*
  - *Impact of ground vibration resulting in possible damage to infrastructure;*
  - *Air blast impact resulting in possible damage to infrastructure;*
  - *Fly rock impact resulting in possible damage to infrastructure; and*
  - *Impact of fumes on nearby land occupiers and road users.*
- *Visual Impacts due to:*
  - *Visual intrusion as a result of the movement of machinery and the erection of contractor camps;*
  - *Scaring of the landscape as a result of the clearance of vegetation and preparation of the mine areas; and*
  - *Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.*
- *Noise Impacts: The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity. Mining activities will therefore result in an increase in ambient noise levels as a result of the mining activities. However, given that there are current mining activities taking place on site, it is expected that the additional noise impacts as a result of the project will be negligible.*
- *Soil, Land Use and Land Capability: The impacts on land capability are generally considered to be limited since there currently are mining activities in the area. The soil has already been significantly altered by previous mining activities and the potential of this land to be used for agriculture after rehabilitation is very limited. The opencast mining areas will result in permanent loss of land capability and result in a permanent change in landuse of the footprints of the pit areas. There is potential for chemical potential pollution of soils due to use of vehicles and machinery and storage of hazardous material at the mine. Other impacts include:*
  - *Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion;*
  - *Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint;*
  - *Handling and storage of building materials and different kinds of waste leading to soil sterilisation.*
- *Heritage Impacts: Although no graves were identified during the heritage assessment, there is potential that the proposed project has the potential to impact on local graves and sites of archaeological importance. within the area. According to the HIA, there are no major archaeological reasons why the proposed mining rights application should not be approved. Should any heritage*

resources be identified during construction and operation of the mine, implementation of the mitigation measures in Section 13 will results in protection of the resources.

- *Palaeontology Impacts: Sealing-in or destruction of the fossils during earth moving activity. Implementation of the mitigation measures in the specialist studies report and Section 13 of this report will reduce the potential for loss of fossils.*

Closure and Decommissioning

The residual risk associated with the proposed project will largely relate to water management and rehabilitation following the operational phase. The rehabilitation of the mining area as well as the latent water influx will need to be managed to as to prevent any residual impact in years following decommissioning. These monitoring requirements have been addressed in the EMPr.

The main impacts that will result from the closure phase will relate to the ineffectiveness of the construction and operational phases to eradicate alien vegetation, which will ultimately result in the loss of indigenous fauna and flora. In addition, the decommissioning activities may further impact on the established vegetation in the area, resulting in the loss of biodiversity species, habitats and ecological structure. All the impacts that may result from the decommissioning activities of the proposed project have been effectively addressed in the impact assessment in Section 13.3, as well as the EMPr.

The anticipated impacts were rated against a set impact rating methodology ranging from Low to High. The summary of the potentially significant impacts and risks can be found in Table ES- 3.

Table ES- 3: Summary of potentially significant impact and risk

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE
Site Establishment and site clearance for the construction of infrastructure: • Mining Right Application • Drilling and blasting • Excavations, open cast mining areas • Waste Rock Dump Areas • Water Dams • Tailings Stockpile Areas • Topsoil dump areas • Recycling Dams • Stormwater management infrastructure • Control Rooms • Diesel tank storage areas • Generators • Haul Roads • Offices areas • Parking areas • Processing Plant for the processing of Iron Ore • Processing Plant for the processing of Manganese Ore • Rapid Reloading Area • Explosive Magazine area • Safety Berms • Brake test ramp • Fenced salvage yard • Weigh bridges • Security access points • Tyre Bay area • Contractors laydown areas • Access Roads • Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank • Chemical Toilets • Wash Bay areas • Feeder Bay and substation • Waste storage areas • Water pipelines f • Water provision • Laboratory • Fencing • Borehole areas	Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation.	Flora	Construction and decommissioning	Medium-High (-)	Implementation of proper waste management strategies
	Impact of faunal species of conservational concern due to habitat loss and collision with construction vehicles	Fauna	Construction and decommissioning	Medium-High (-)	Relocation of affected faunal species of conservation importance Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Minimisation of project footprint areas
	Loss of habitat due to vegetation clearance, disturbance of soils and vehicle operation.	Flora and Fauna	Construction and decommissioning	High (-)	Minimise the impacted area and clear only what is required Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation Employ stormwater management measures
	Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Flora and Fauna	Construction and decommissioning	Medium-High (-)	Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Relocation of floral affected species of conservation importance
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping	Fauna	Construction, operation and decommissioning	Medium-High (-)	Relocation of affected faunal species of conservation importance Minimisation of project footprint areas
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources	Flora	Construction, operation and decommissioning	Medium-High (-)	Implementation of the stormwater management plan Separation of clean and dirty water around the site Minimisation of project footprint areas Control access to wetland and riparian areas and the regulated 500m buffer around wetlands
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat	Aquatic Ecosystems	Construction, operation and decommissioning	Medium-High (-)	Control access of vehicles in sensitive areas and in areas where soils are exposed Control access to aquatic habitat areas and the regulated 500m buffer around wetlands
	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	Social	Construction and decommissioning	Medium-High (-)	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel Management and maintenance of construction vehicles Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication
	Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Soil, Land Use and Land Capability Impacts	Construction and decommissioning	Medium-High (-)	Rehabilitation of areas cleared of vegetation Minimisation of project footprint areas
	Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.		Construction and decommissioning	Medium-High (-)	
	The proposed project has the potential to impact on sites of archaeological importance.	Heritage Resources	Construction and decommissioning	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist
	Sealing-in or destruction of the fossils during earth moving activity	Fossils	Construction and decommissioning	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE
	Removal of local geology as a result of the mining activities.	Geology	Construction	Medium-High (-)	Minimisation of project footprint areas
	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	Climate	Construction and decommissioning	Medium-High (-)	Air quality monitoring Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.
Blasting and drilling	Impact of ground vibration resulting in possible damage to infrastructure	Social	Operation	Medium-High (-)	Notification of blasting activities Storage of blasting and hazardous materials should adhere to prescribed regulation Measures suggested minimising the impact of fly-rock on surrounding roads and structure Relocation of structures close to mining operations
	Air blast impact resulting in possible damage to infrastructure	Social/human health			
Mining of ore (open cast) and operation of associated infrastructure	Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation	Human health and Social	Operation	Medium-High (-)	Management of influx of employees Implementation of the SLP Open and honest communication with surrounding communities
	Monitoring borehole on the border of the mining area may be a conduit of flow to the groundwater unless sealed.	Groundwater	Operation	Medium-High (-)	Monitoring of groundwater levels in the surrounding areas
	High rate of ground water ingress causing flooding of the Pits	Groundwater	Operation	High (-)	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr. Monitoring of pits for ingress
	The rainfall water within the designated dirty water area of the mining area that forms part of the MAR to the local water courses will be removed from the catchment. This will result in a lower intensity potential on the local surface water resource	Groundwater	Operation	Medium-High (-)	Development and implementation of a stormwater management plan
	Increase in volume of contaminated water that needs to be managed within the footprint	Surface Water	Operation	Medium-High (-)	Control through management and monitoring of spillages. Water quality monitoring Development and implementation of a stormwater management plan Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.
	Loss of habitat and wetland ecological structure as a result of continual disturbance and uncontrolled aquatic ecosystem degradation.	Aquatic ecology	Operation	Medium-High (-)	Control of access to wetland areas and within the 100 m regulated area. Minimisation of project footprint areas Where possible, avoid placement of infrastructure in wetland areas and within the 500 m regulated area
	Impact on the aquatic systems as a result of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and disturbance	Aquatic ecology	Operation	Medium-High (-)	
	Impact on the hydrological functioning of the aquatic ecology as a result of uncontrolled disturbance during maintenance activities	Aquatic ecology	Operation	Medium-High (-)	

ACTIVITY	***POTENTIAL IMPACT***	***ASPECTS AFFECTED***	***PHASE***	***SIGNIFICANCE if not mitigated***	***MITIGATION TYPE***
	Impacts on the hydrological functioning of the aquatic ecology as a result of the mining activities.	*Aquatic ecology*	*Operation*	*Medium-High (-)*	
	Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	*Air Quality, Social and Human Health*	*Operation*	*Medium-High (-)*	*Air quality monitoring* *Management through use of dust suppression techniques*
	Operation of opencast Pits, use of haul roads, and permanent displacement of soil from buildings will reduce the land capability and agricultural potential and sterilise the soils.	*Soil, landuse and land capability*	*Operation*	*Medium-High (-)*	*Minimisation of project footprint areas*
	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	*Soil, landuse and land capability*	*Operation*	*Medium-High (-)*	*Implementation of proper waste management strategies* *Control through management and monitoring of spillages.* *Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.*
	The proposed project has the potential to impact on sites of archaeological importance. Historic power line pylons are present within the proposed footprint.	*Heritage Resources*	*Operation*	*Medium-High (-)*	*Control through management and monitoring of heritage resources identified by the Specialist*
	Sealing-in or destruction of the fossils during earth moving activity	*Fossils*	*Operation*	*Medium-High (-)*	*Control through management and monitoring of heritage resources identified by the Specialist*
	Progressive mining of the area will ultimately alter the topography.	*Topography*	*Operation*	*Medium-High (-)*	*Minimisation of project footprint areas*
Transportation of ROM	*The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity*	*Social*	*Operation*	*Medium-High (-)*	*Management and maintenance of construction vehicles* *Management through the use of noise dissipating technologies e.g. noise mufflers* *Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication*
Closure and rehabilitation of mine and infrastructure sites Removal of equipment and infrastructure • *Mining Right Application* • *Drilling and blasting* • *Excavations, open cast mining areas* • *Waste Rock Dump Areas* • *Water Dams* • *Tailings Stockpile Areas* • *Topsoil dump areas* • *Recycling Dams* • *Stormwater management infrastructure* • *Control Rooms* • *Diesel tank storage areas* • *Generators* • *Haul Roads* • *Offices areas*	*Loss of employment* *Reduced regional economic development* *Reduced Mn and Fe supply* *Reduced community investment*	*Socio-Economic*	*Decommissioning and closure*	*Medium-High (-)*	*Ensure proper training of personnel prior to decommissioning to ensure they can be employed elsewhere* *Implementation of the SLP*
	Debris blocking watercourses if road continues to be used by the community.	*Surface Water*	*Decommissioning and closure*	*Medium-High (-)*	*Rehabilitation of areas cleared of vegetation* *Monitoring of water courses* *Control of access*
	Following mine closure and subsequent recovery (rebounding) of the local groundwater, the backfill material in the open pit will alter the local hydraulic properties down to the pit base resulting in permanently lowered groundwater	*Groundwater*	*Decommissioning and closure*	*High (-)*	*Monitoring of groundwater levels*

ACTIVITY	***POTENTIAL IMPACT***	***ASPECTS AFFECTED***	***PHASE***	***SIGNIFICANCE if not mitigated***	***MITIGATION TYPE***
• *Parking areas* • *Processing Plant for the processing of Iron Ore* • *Processing Plant for the processing of Manganese Ore* • *Rapid Reloading Area* • *Explosive Magazine area* • *Safety Berms* • *Brake test ramp* • *Fenced salvage yard* • *Weigh bridges* • *Security access points* • *Tyre Bay area* • *Contractors laydown areas* • *Access Roads* • *Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank* • *Chemical Toilets* • *Wash Bay areas* • *Feeder Bay and substation* • *Waste storage areas* • *Water pipelines f* • *Water provision* • *Laboratory* • *Fencing* • *Borehole areas*	*Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.*	*Visual and Social*	*Decommissioning and closure*	*Medium-High (-)*	*Removal of infrastructure must be done in a way that will minimise visual impacts* *Minimise the amount of time waste is left on site*
	Soil Compaction	*Soils, Land use and Land Capability*	*Decommissioning and closure*	*Medium-High (-)*	*Management and maintenance of vehicles.* *Management through the use of noise dissipating technologies e.g. noise mufflers* *Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication*
	Dust and Soil Erosion	*Soils, Land use and Land Capability*	*Decommissioning and closure*	*Medium-High (-)*	*Implementations of dust control measures* *Air quality monitoring* *Monitoring and management of soil erosion*
	Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of floral species diversity	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	*Monitoring of rehabilitated areas to ensure successful rehabilitation*
	Loss of floral habitat	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities within the project area	*Biodiversity*	*Decommissioning and closure*	*High (-)*	*Control and management of alien invasive vegetation* *Monitoring of rehabilitated areas to ensure successful rehabilitation*
	Increase in erosion as a result of disturbance leading to loss of floral habitat	*Biodiversity*	*Decommissioning and closure*	*High (-)*	*Minimisation of exposed areas* *Monitoring of rehabilitated areas to ensure successful rehabilitation* *Control and management of alien invasive vegetation*
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	*Biodiversity*	*Decommissioning and closure*	*High (-)*	
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	*Biodiversity*	*Decommissioning and closure*	*High (-)*	
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities.	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	*Biodiversity*	*Decommissioning and closure*	***High (-)***	
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	*Biodiversity*	*Decommissioning and closure*	***High (-)***	
	Continued decrease in faunal habitat, species abundance and diversity	*Biodiversity*	*Decommissioning and closure*	***High (-)***	
	Alien plant proliferation in disturbed areas leading to loss of faunal habitat	*Biodiversity*	*Decommissioning and closure*	***High (-)***	*Control and management of alien invasive vegetation* *Monitoring of rehabilitated areas to ensure successful rehabilitation*
	Reduced chance of faunal species recolonizing the disturbed areas	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	*Minimisation of exposed areas* *Monitoring of rehabilitated areas to ensure successful rehabilitation* *Control and management of alien invasive vegetation*

ACTIVITY	***POTENTIAL IMPACT***	***ASPECTS AFFECTED***	***PHASE***	***SIGNIFICANCE if not mitigated***	***MITIGATION TYPE***
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of faunal habitat and diversity in the region	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	*Monitoring of rehabilitated areas to ensure successful rehabilitation*
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered faunal habitat within the study area	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	*Minimisation of exposed areas* *Monitoring of rehabilitated areas to ensure successful rehabilitation* *Control and management of alien invasive vegetation*
	Ineffective rehabilitation may lead to permanent transformation of faunal habitat and species composition	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	
	Long term faunal habitat and species composition alteration in the region	*Biodiversity*	*Decommissioning and closure*	*Medium-High (-)*	

Environmental Management Programme

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate most of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

Midtron will be responsible for ensuring that all environmental obligations pertinent to the proposed project are met. The implementation of the EMPr and the meeting of the environmental objectives and targets is also the responsibility of Midtron

Conclusion and Recommendation

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed Midtron mining project in accordance with the requirements of the NEMA and National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA). This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Specialist input has been included for all key environmental aspects that were identified during the scoping phase of the process.

Various specialist studies were undertaken during the EIA Phase of the proposed project with the objective of identifying and weighing anticipated impacts and risks associated with the mining activities as well as in accordance to all relevant legislative requirements.

The findings of the impact assessment have shown that the proposed project will have negative impacts on the receiving environment, including:

- *Land use change;*
- *The loss of aquatic habitat and ecoservices for the creation of the open cast mining blocks and construction of infrastructure;*
- *Reduction in catchment yields as dirty water runoff within the mine will be contained;*
- *Loss of floral species and species diversity;*
- *Loss and fragmentation of habitat of faunal species and direct loss of fauna which will be expected to move from the area as a result of increased anthropogenic activities;*
- *Groundwater and surface water contamination due to chemical contamination from hazardous substance and fuel to be stored at the mine;*
- *Groundwater loss and flow from the pit will also contribute toward baseflow reduction; and*
- *Nuisance noise, dust and visual impacts.*

Where possible, mitigation and management measures, no-go areas, as well as further recommendations have been provided by specialists which will lead to a reduction in the significance of these impacts to medium and low significance, including:

- *Ensuring the layout of the mining infrastructure does not impact on the aquatic habitats and 100 m regulated buffer;*
- *Stormwater management plan must be developed and implemented;*
- *Re-vegetation of the rehabilitated areas with indigenous species;*

- *Where possible rehabilitation will be conducted in tandem with construction and operational phases of the project;*
- *Develop and implement a biodiversity management plan; and*
- *The land use and the overall land capability as the soil can be rehabilitated to be reused for agricultural purposes*.

Monitoring plans, which should be implemented throughout the life of the mine, have also been provided to ensure that adverse impacts are reduced, and continuous improvements are made.

With the correct and effective mitigation and management measures, including the protection of aquatic habitats located outside the footprints of the mining areas and infrastructure, the mining operations are feasible.

Furthermore, the indirect impacts from the proposed development could cause negative impacts on the surrounding natural environment, unless this is also managed and monitored in order to address adverse impacts immediately. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DFFE should monitor activities during the construction, operational and closure phases of the proposed mine.

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed Midtron mining project fulfils the process requirements of the NEMA and the NEM: WA. The EAP recommends that an EA/WML be issued by the DMR and that the construction and operation of the mine should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIA/EMPr Report as well as conditions that will be included in the EA/WML by the DMR.

YOUR COMMENT ON THE SCOPING REPORT

This Draft EIA/EMPr Report will be available for comment for a period of 30 days from 25 July 2022 to 25 August 2022. Copies of the EIA/EMPr Report have been made available at the following public places for review

Public Place	Locality	Telephone
Ndi Geological website	http://www.ndigeoservices.co.za/	053 842 0687

An electronic copy will also be available on CD on request from the stakeholder engagement officers. I&AP's are requested to provide comments and information on the following aspects of the proposed project:

1. Information on how I&AP's consider that the proposed activities will impact on them or their socio-economic conditions;
2. Written responses stating their suggestions to mitigate the anticipated impacts of each activity;
3. Information on current land uses and their location within the area under consideration;
4. Information on the location of environmental features on site to make proposals as to how and to what standard the impacts on site can be remedied; and
5. How to mitigate the potential impacts on their socio-economic conditions and to make proposals as to how the potential impacts on their infrastructure can be managed avoided or remedied.

DUE DATE FOR COMMENT

25 August 2022

Please submit comments to the EAP:

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street
Kimberley, 8301
Cell: 082 760 8420
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Disclaimer

The opinions expressed in this Report have been based on the information supplied to Ndi Geological Consulting Services (Pty) Ltd by Midtron. The opinions in this Report are provided in response to a specific request from Midtron to do so. Ndi Geological Consulting Services (Pty) Ltd has exercised all due care in reviewing the supplied information. Whilst Ndi Geological Consulting Services (Pty) Ltd has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. Ndi Geological Consulting Services (Pty) Ltd does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of Ndi Geological Consulting Services (Pty) Ltd.'s investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which Ndi Geological Consulting Services (Pty) Ltd had no prior knowledge nor had the opportunity to evaluate.

List of abbreviations

ABET:	Adult Basic Education and Training
CA:	Competent Authority
CRR:	Comments and Responses Register
DEA:	Department of Environmental Affairs
DENC:	Northern Cape Department of Nature Conservation
DMR:	Department of Mineral Resources
DMS:	Dense Media Separation
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
EC:	Electrical Conductivity
EIA:	Environmental Impact Assessment
EIAR:	Environmental Impact Assessment Report
EMPr:	Environmental Management Programme
EMPr:	Environmental Management Programme
ESA:	Early Stone Age
ESA:	Ecological Support Area
GDP:	Gross Domestic Product
HIA:	Heritage Impact Assessment
HPDE:	High Density Polyethylene Pipes
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plan
IWUL:	Integrated Water Use Licence
LM:	Local Municipality
LoM:	Life of Mine
Mamsl:	meters above mean sea level

MHSA:	Mine Health and Safety Act 29 of 1996
MPRDA:	Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002)
MQA:	Mining Qualifications Authority
MRA:	Mining Right Application
NC:	Northern Cape
NEM: WA:	National Environmental Management: Waste Act, 2008 (Act 59 of 2008)
NEMA:	National Environmental Management Act, 1998 (Act 107 of 1998)
NFEPA:	National Freshwater Ecosystems Priority Areas
PAIA:	Promotion of Access to Information Act (Act No. 2 of 2000)
PCD:	Pollution Control Dam
PES:	Present Ecological Status
PHRA:	Provincial Heritage Resources Agency
PoS:	Plan of Study
PPE:	Personal Protective Equipment
PVC:	Polyvinyl chloride
ROM:	Run of Mine
SAHRA:	South African Heritage Resources Agency
SANS:	South African National Standard
SARS:	South African Revenue Services
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
SDF:	Skills Development Facilitator
SLP:	Social and Labour Plan
SMMEs:	Small, Medium & Micro Enterprise Businesses
WMA:	Water Management Area
WML:	Waste Management Licence
WSP:	Workplace Skills Plan

mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH THE PROPOSED MINING OF MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

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

NAME OF APPLICANT	Midtron Minerals (Pty) Ltd
TEL NO	053 723 9800
FAX NO:	
POSTAL ADDRESS	Farm Lomoteng 669 Postmasburg, 8415
PHYSICAL ADDRESS	Farm Lomoteng 669 Postmasburg, 8415
FILE REFERENCE NUMBER SAMRAD	NC30/5/1/2/2/10207MR

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

   (i) nature, significance, consequence, extent, duration, and probability of the impacts occurring to inform identified preferred alternatives; and

   (ii) degree to which these impacts—

      (aa) can be reversed;

      (bb) may cause irreplaceable loss of resources, and

      (cc) can be avoided, managed, or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

1 Project background

Midtron Minerals (Pty) Ltd (Midtron) applied for a Mining Right (MR) from the Department of Mineral Resources for the proposed mining of Iron and Manganese Ore (DMR Ref: NC30/5/1/2/2/10207MR) on a Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436 in Tsantsane Local Municipality, Northern Cape Province. The proposed mining project will cover an area of 1 584.198 hectares and is located approximately 15km north of the town of Postmasburg, approximately 40km southeast of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province.

Exploration work and historical mining conducted on the proposed mining area led to the identification of Iron and Manganese Ore deposits that are deemed feasible to mine. Midtron is therefore applying for a MR in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 22 of 2002) (MPRDA) from the Department of Mineral Resources Northern Cape Province (DMR) Regional Office for Iron and Manganese Ore mining on a Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436. Before the MR will be granted, Midtron must also undertake an Environmental Authorisation (EA) and Waste Management Licence (WML) processes in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA). Since the proposed mining project triggers activities listed in Listing Notice 1 and 2 of the NEMA, a full Environmental Impact Assessment (EIA) including scoping and impact assessment phases will be required per the requirements of NEMA Government Notice Regulation (GNR) 982 (as amended by GNR325 of 7 April 2017 and 21 June 2021).

The Department of Forestry, Fisheries and the Environment (DFFE) has identified the need for the alignment of environmental authorisations and has promulgated a single environmental management system under NEMA whereby the DMR has become the competent authority for the authorisation of mining-related projects under the NEMA Environmental Impact Assessment (EIA) Regulations. This will result in simultaneous decisions in terms of NEMA and other environmental management Acts. The competent authority for the EA/WML process is the DMR.

Midtron appointed Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological) as the independent Environmental Assessment Practitioner (EAP) to facilitate the EA/WML process for the proposed iron and manganese ore mining project.

The reports and documentation for the integrated EA/WML application process will be compiled and finalised for submission to the DMR for the EA/WML in terms of the NEMA for consideration and decision making. The DMR will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

2 Purpose and context of this document

The project triggers activities listed in terms of Listing Notice 1 and 2 of the NEMA (as amended) and will require an EA) from the DMR. The proposed waste facilities will trigger activities listed in GNR 633 and 921 of the NEM: WA and will therefore require a WML from the DMR. An integrated application for an EA and WML will be conducted where a full Environmental Impact Assessment (EIA) including Scoping and Impact Assessment will be followed as stipulated in GNR 326 of the NEMA and GNR921 of the NEM: WA.

An Environmental Impact Assessment (EIA) is defined as the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made. The aim of the EIA is to prevent substantial damage to the environment. The objectives of this study are:

- To comply with the requirements of NEMA and NEM: WA and associated Regulations;
- Identify and assess the environmental (biophysical, socio-economic, and cultural) impacts of the construction, operation and closure of the proposed project. The cumulative impacts of the proposed development will also be identified and evaluated;
- Identify and evaluate potential management and mitigation measures that will reduce the possible negative impacts of the proposed development and enhance the positive impacts;
- Compile monitoring, management, mitigation and training needs in the EMPr; and
- Provide the decision-making authorities with sufficient and accurate information in order to make a sound decision on the proposed development and set conditions that must be adhered to.

2.1 Integrated Environmental Authorisation and Waste Management Licence Application Process

The first phase of the EA/WML application process was the Scoping Phase, which informed the Impact Assessment Phase. The Scoping Phase provided Interested and Affected Parties (I&APs) an opportunity to provide the EAP with issues and concerns with respect to the proposed project in order to inform the technical studies that were evaluated in this EIA phase of the project.

The Scoping Report provided a guide to the EIA process and specialist studies by:

- Providing an overview of the legal requirements with regard to the proposed project, the proposed project description and anticipated environmental and social issues and impacts that were further investigated in this impact assessment phase; and
- Setting out the scope of the EIA process and the Terms of Reference (ToR) for specialist studies (where applicable) and outlining the approach and methodologies to be used in the EIA process, e.g. the proposed impact rating methodology. The Scoping Report was submitted to the DMR for approval.

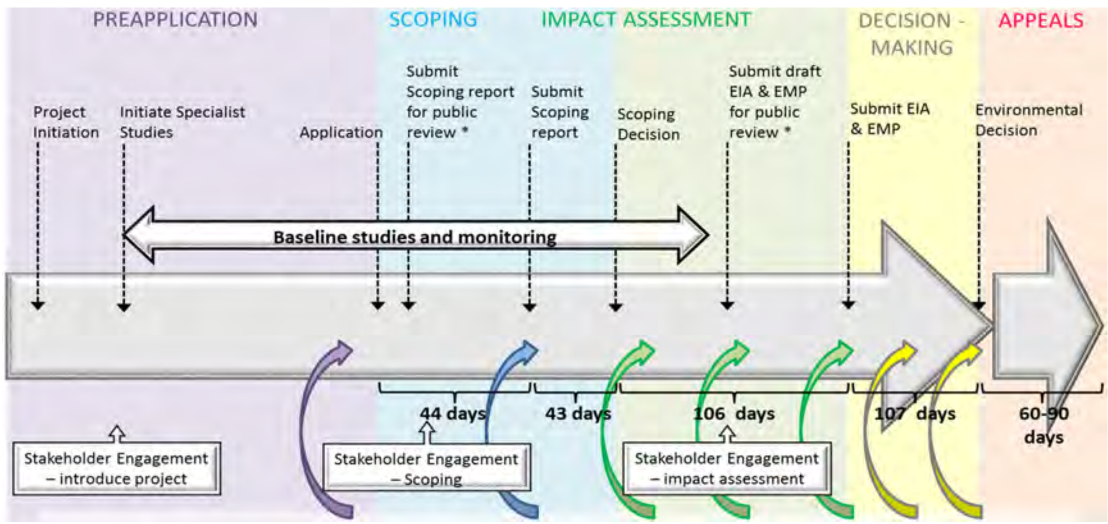
The DMR accepted the Scoping Report and accompanying Plan of Study, allowing the Impact Assessment Phase to commence. The EIA Phase entails the following:

- Incorporating specialist findings into the Draft EIA/EMPr as per the approved Plan of Study contained in the Scoping Report;
- Conducting a quantitative impact assessment;
- Compiling the EMPr; and

- Stakeholder Consultation

Stakeholder engagement is a key element of the environmental decision-making process, and stakeholder engagement formed part of the Scoping Phase and formed part of the Impact Assessment Phase as described in Section 9.

Figure 2-1 provides an illustration of the proposed EIA process that is being followed.



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OVERVIEW OF THE APPLICATION PROCESS

Figure 2-1: Overview the Environmental Impact Assessment Process

2.2 Report Index in Relation to the NEMA Regulations

Regulation 2, Appendix 3 of GNR 982 published in terms of NEMA stipulates the minimal requirements and issues that need to be addressed in the EIA. This report strives to address all these requirements as per regulations. **Table 2-1** indicates the regulations that have been addressed and the section of the EIA where these requirements can be found.

Table 2-1: Requirements of Appendix 3 of Regulation 2 of GNR 982

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (a)	Details of – the EAP who prepared the report; and the expertise of the EAP, including a curriculum vitae.	Section 3
Appendix 3 (b)	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 in items (i) and (ii) is not available, coordinates of the boundary of the property or properties.	Section 4

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (c)	A plan which locates the proposed activity or activities applied for 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.	Figure 5-1 Figure 5-2
Appendix 3 (d)	A description of the scope of the proposed activity, including – All listed and specified activities triggered; A description of the activities to be undertaken, including associated structures and infrastructure.	Section 5
Appendix 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 6
Appendix 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 7
Appendix 3 (g)	A motivation for the preferred development footprint within the approved site.	Section 8
Appendix 3 (h)	A full description of the process followed to reach the proposed preferred activity, site, and location within the site, including-	
	Details of the development footprint alternatives considered;	Section 8
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 9
	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 9.4
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 10
	The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed, or mitigated.	Section 13
	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Section 12
	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 geographic, physical, biological, social, economic, heritage and cultural aspects;	Section 13

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
	The possible mitigation measures that could be applied and level of residual risk;	Section 13
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	Section 15
	A concluding statement indicating the preferred alternative development location within the approved site.	Section 16
Appendix 3 (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures 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 and risk could be avoided or addressed by the adoption of mitigation measures;	Section 17
Appendix 3 (j)	An assessment of each identified potentially significant impact and risk, including- cumulative impacts; the nature, significance and consequences 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 and risk can be reversed; the degree to which the impact and risk may cause irreplaceable loss of resources; and the degree to which the impact and risk can be mitigated.	Section 13 Section 17.1
Appendix 3 (k)	Where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report.	Section 18
Appendix 3 (l)	An environmental impact statement which contains- i. a summary of the key findings of the environmental impact assessment; ii. 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 iii. a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Section 19
Appendix 3 (m)	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 as well as for inclusion as conditions of authorisation.	Section 20

Section of the EIA Regulations, 2014	Description of EIA Regulations Requirements for EIA	Section
Appendix 3 (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	Section 21
Appendix 3 (o)	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 22
Appendix 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 23
Appendix 3 (q)	A 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 24
Appendix 3 (r)	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 25
Appendix 3 (s)	An undertaking under oath or affirmation by the EAP in relation to: i. the correctness of the information provided in the reports; ii. the inclusion of comments and inputs from stakeholders and I&APs; iii. the inclusion of inputs and recommendations from the specialist reports where relevant; and iv. any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	Section 26
Appendix 3 (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	Section 27
Appendix 3 (u)	An indication of any deviation from the approved scoping report, including the Plan of study, including- v. any deviation from the methodology used in determining the significance of potential; vi. environmental impacts and risks; and vii. a motivation for the deviation.	Section 28
Appendix 3(v)	Any specific information that may be required by the competent authority.	Section 29
Appendix 3(w)	Any other matter in terms of Section 24(4)(a) and (b) of the NEMA.	Section 30

3 Contact Person and Correspondence

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Midtron as the independent Environmental Assessment Practitioner (EAP) to undertake the necessary environmental authorisation process and associated stakeholder engagement process to meet the requirements of NEMA and NEM: WA.

3.1 Details of EAP who prepared the report

The EAP involved in the compilation of this Scoping Report and contact details are provided in Table 3-1.

Table 3-1: EAP Contact Details

EAP Name	Contact Number	Fax Number	Email Address
Ndivhudzannyi Mofokeng	082 760 8420/ 053 842 0687	086 538 1069	atshidzaho@gmail.com ndi@ndigeoservices.co.za

3.2 Expertise of the EAP

3.2.1 Qualifications of the EAP

The qualifications of the EAP are provided for in Table 3-2 below, and copies of the qualifications are provided in Appendix 1.

Table 3-2: EAP Qualifications

EAP Name	Qualifications	Professional registration	Years' Experience
Ndivhudzannyi Mofokeng	BSc (Hons) Earth Sciences in Mining and Environmental Geology	EAPASA Reg Number 2020/1554 GSSA Prof Reg	12

Please refer to Appendix 1 for a copy of the EAP's Qualifications

3.2.2 Summary of EAPs past experience

The EAP, Mrs Ndivhudzannyi is a registered EAP (EAPASA Reg Number 2020/1554) with a BSc (Hons) Earth Sciences, majoring in Mining and Environmental Geology. She is a self-motivated and hardworking Geologist with 13 years of experience in environmental, mining exploration, open cast work and consulting in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and Percussion Drilling). Proven field experience in exploration, i.e. mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, supervisory duties in the field. Her responsibilities involve but are not limited to managing all Environmental matters: Environmental Impact Assessment and Environmental Management Programme, Environmental Authorizations, Environmental Auditing & Risk Assessment, Mine Closure & Rehabilitation, and conducting & reviewing Environmental specialists' studies. Ndivhudza also has experience in writing geological reports, including Prospecting Work Programmes and Mining Work Programmes Environmental Management Plans, handling Department of Mineral Resources and Energy documents in general like the submission of Mining & Prospecting Right Applications and Renewals.

Please refer to Appendix 2 for a copy of the EAP's Curriculum Vitae and Professional Registration Certificate.

The EAP team will be supported by suitably qualified specialists who will be conducting independent specialist studies.

4 Project Location

4.1 Property Description

The description of the affected property is provided in Table 4-1 and map showing the affected property is provided in Figure 4-1.

Table 4-1: Description of Properties affected by the Mining Project

Farm Name:	Remaining Extent of Kapstewel 436 Remaining Extent of Portion 3 of Kapstewel 436 Portion 5 of Kapstewel 436
Application area (Ha)	1 584.198 ha
Magisterial district:	Hay District Municipality
Distance and direction from nearest town	Kapstewel is situated approximately 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province.
21-digit Surveyor General Code for each farm portion	C03100000000043600000 C03100000000043600003 C03100000000043600005

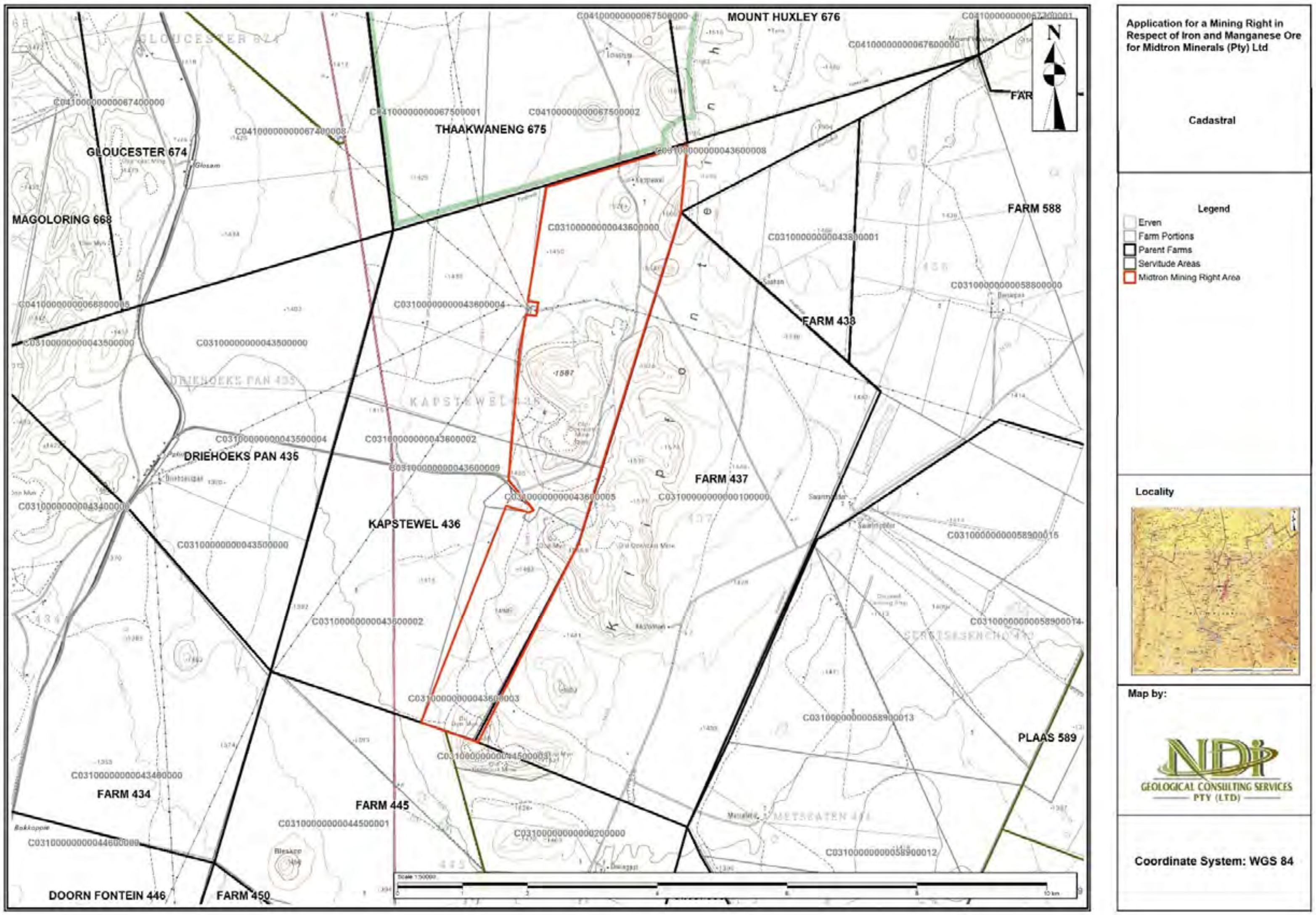

Figure 4-1: Cadastral Map

4.2 Locality map

The proposed Midtron Iron and Manganese Ore Mining project is located in the Northern Cape Province of South Africa, 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu, Tsantsabane Local Municipality.

A copy of the locality map is provided in Appendix 3.

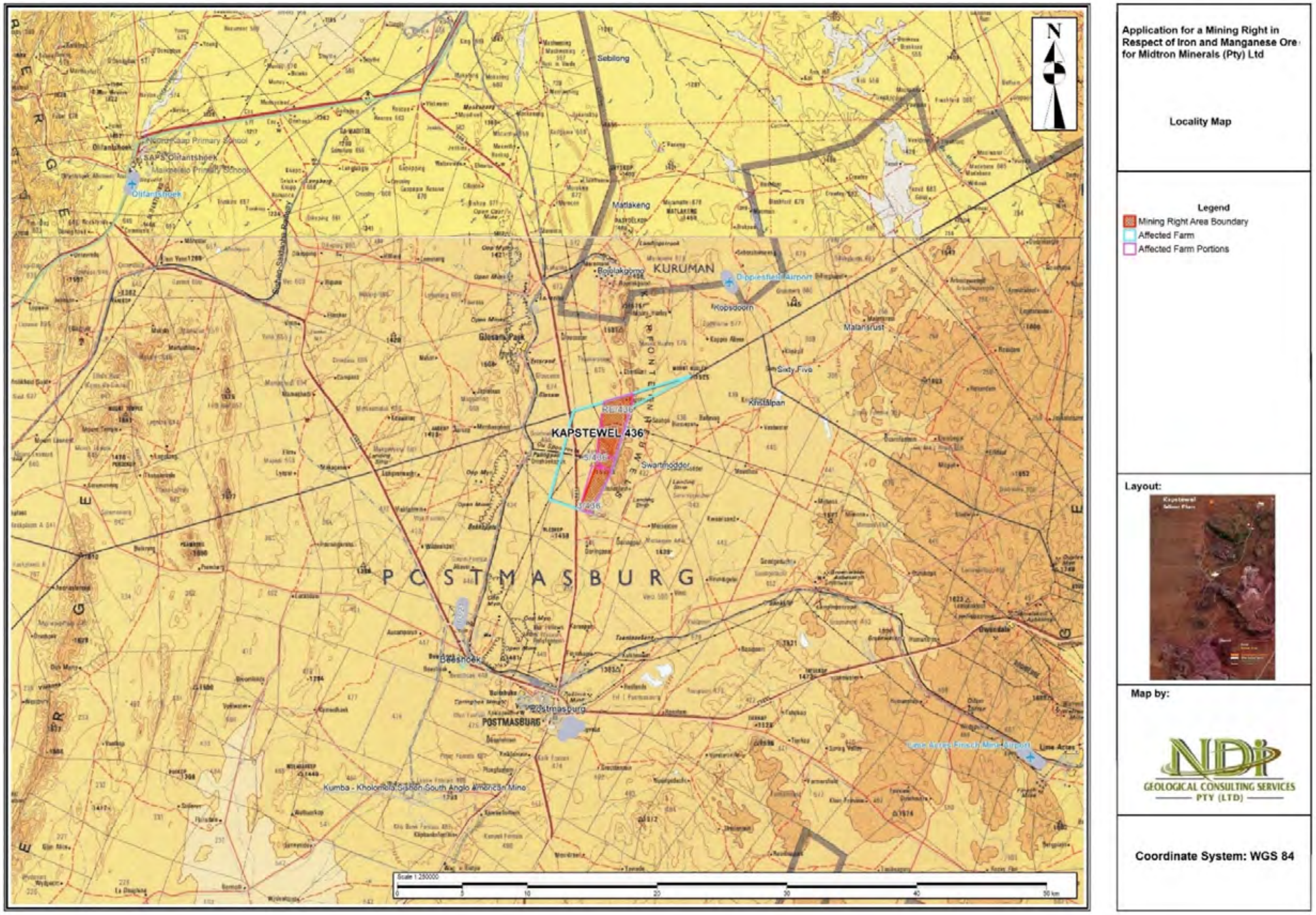

Figure 4-2: Locality Map

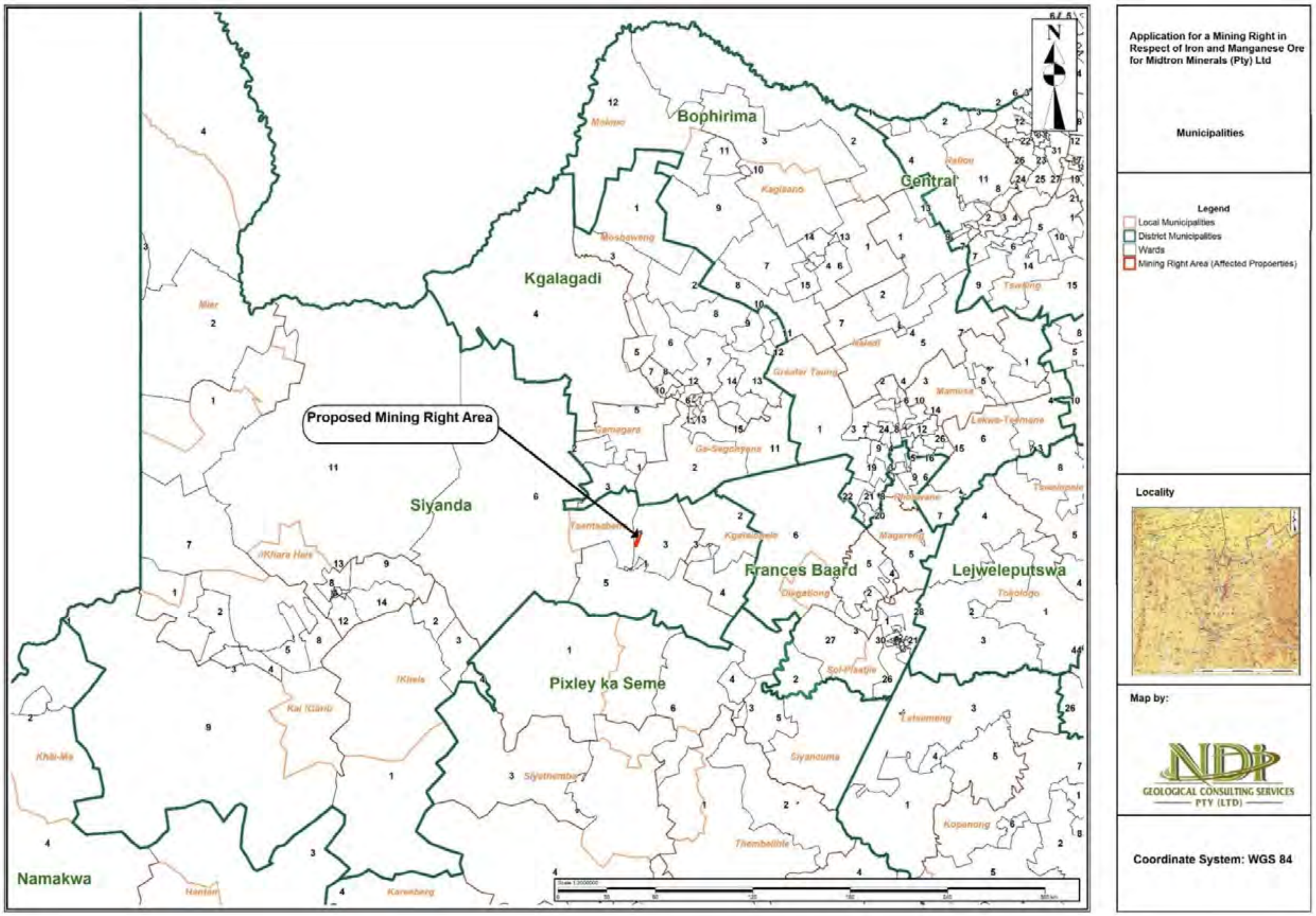

Figure 4-3: Locality Map (Municipality Boundaries)

5 Project description

5.1 Overview

The MR/EA/WML applications are for the proposed mining of iron and manganese ore. There are 6 mining areas that have been identified for the proposed mining project where present vegetated soil overlying the planned mining areas is to be stripped prior to mining and stockpiled on dedicated stockpile areas next to each mining area which will be used for rehabilitation purposes at a later stage (**Figure 5-1**).

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MINE DESIGN MAP

Figure 5-1: Kapstewel Mine design map

The proposed mining area is currently disturbed due to the previous prospecting activities and historical mining activities that have been taking place. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The ores will be loaded onto the dump trucks from the open excavations by excavator and hauled to the crushing and screening plant. Blasting is required when extreme hard materials are to be mined out of the pits.

5.2 Mining Methodology

Due to the proximity and the nature of the orebodies, mining will be done by conventional opencast mining method, which is designed based on the nature of the orebodies on the mine. Each mining area will be treated as a separate pit. Mining will be done on three ore bodies at most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

The mining process will include drilling, blasting, loading, hauling and quality control. The RC drill machine will be utilized to drill holes for prospecting resources as well as blasting. Drilling will be conducted on a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.

After drilling, explosives provided by service providers are placed down the holes using trucks designed for such purposes. The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted.

Once the materials have been blasted, excavators and Front-End Loaders (FELs) will load the minerals onto the dump trucks and Articulated Dump Trucks (ADTs). Wastes and ROMs will be loaded separately onto different trucks and hauled to designated areas.

5.3 Infrastructure Required

Infrastructure to be built on the mine will include, but no limited to:

- Processing plants;
- Static jaw crushing, cone crushing and screening plant magnetic separating plant
- Second stage cone crushing plant
- Weighbridges (x3)
- Diesel tanks (3* 23m^3)
- Water dams (2* 250m^3)
- Washbay
- Workshop (20m*100m)
- Gensets (2*300kVA, 2*500kVA)
- Feeder bay and substation (3MVA)
- Offices
- Storerooms
- Laboratory
- Ablution facilities
- Security control point

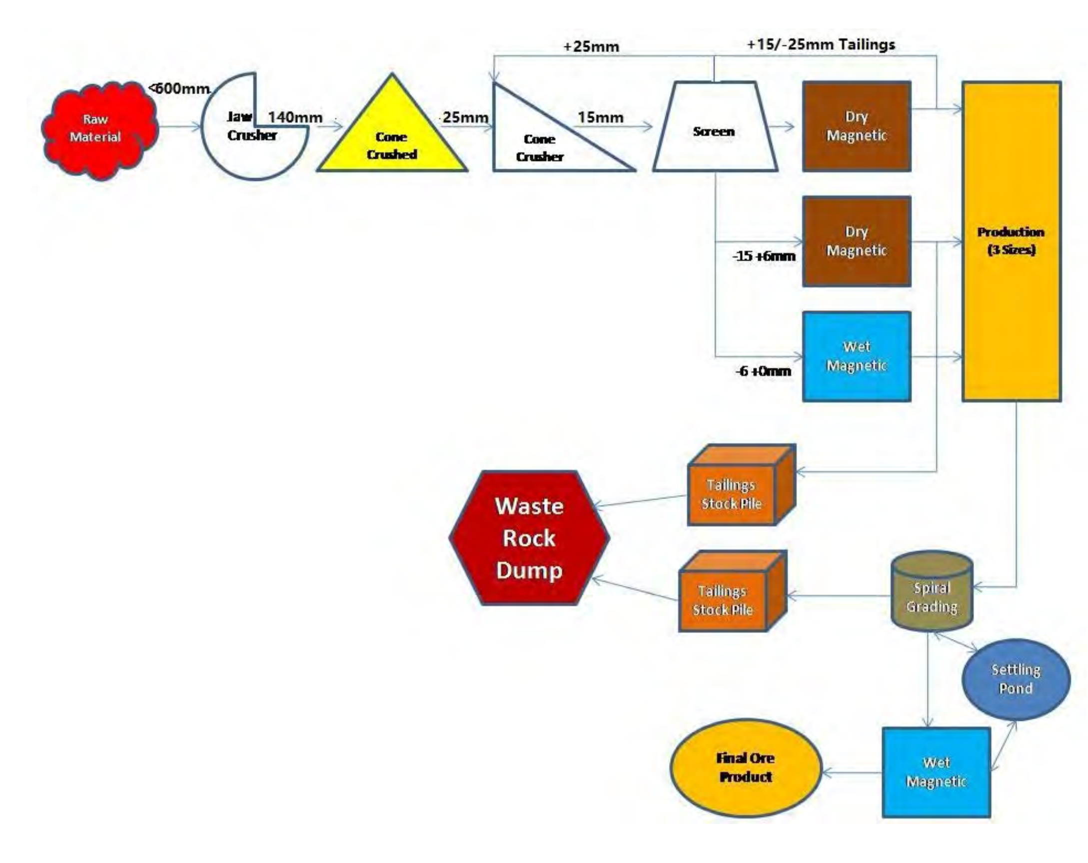
A detailed list and description of all the infrastructure required is included in Section 5.4.

5.3.1 Processing Plants

The initial processing will be a dry process, with the wet process commencing during year 4 of operation. The required processing plants are as follows:

- Processing Plant for the processing of Iron Ore: Dry crushing and screening plant as well as wet magnetic separation process; and
- Processing Plant for the processing of Manganese Ore: Dry crushing and screening plant.

The basic plant design is provided in Figure 5-2.



PROCESSING PLANT DESIGN

Figure 5-2: Processing Plant Design

Ore <600mm is fed to the primary JAW crusher where ore is crushed down to 140mm. Ore is then fed to the primary cone crusher where it is crushed down to 25mm. From here the ore is fed to the secondary cone crusher where it is crushed down to -15mm. The ore is then fed to a vibrating three deck screen. The first deck separates the -25mm +15mm material from the +25mm material. The +25mm material is conveyed back to the secondary cone crusher for re-crushing. The second deck screens out the -15mm +6mm material and the third deck screens out the -6mm material. The -25mm +15mm and -15mm +6mm ore goes through a dry magnetic separation process. The -6mm ore goes through another magnetic separation process. After this process there are three stockpiles, each consisting of a different size.

The waste that is screened out is dumped on a temporary tailings stockpile from where waste is either used for back-filling of excavations or hauled to the waste rock dump. Throughout the production process, at various times during mining of the ore and from the stockpiles at the completion of the plant process, the ore is sampled and analyzed in order to maintain the correct manganese grade.

Control Rooms for the processing plants will be required for the project.

5.3.2 Water Supply

It is anticipated that 20 tons of water will be used for dust suppression and other non- production purposes. This water will either be obtained from the Sedibeng Municipality or underground. The Department of Water and Sanitation (DWS) will be contacted to seek their recommendation on the use of water:

- Regarding the Section 21(a) WUL for abstraction of Groundwater;
- Regarding Schedule 1 water use where no WUL is required;
- Regarding Section 21(g) WUL Disposing of wastewater; and
- Regarding Section 21(b) WUL Storage of water

JoJo tanks will be used to water storage. The water from the JoJo tanks will be for potable use and use in the ablution facilities.

5.3.3 Power Supply

The mining project will make use of generators to supply power to the mine and plant areas. The upgrade of plants will make use of Eskom power, which is also applied for. The proposed project also makes provision for feeder bays and a 3MVA substation. The Eskom power lines traverse the application area, which should make access easier. The lines originate from the Mangnore Eskom Sub-station approximately 2km north of the application area

5.3.4 Access Roads

The proposed mining area already has existing roads through which it can be accessed. A secondary gravel road connecting from the R325 Road is currently being used to access the mining area. Other gravel roads in the area being used are farm roads and roads that were created during the time of prospecting.

The R325 Road will be used to transport the final iron ore product to Postmasburg Iron Ore Export Railway Siding, from which it will be railed or hauled to Saldanha Harbour. Manganese ore product will be transported to the Lohatlha Load-Out Station where it will be loaded into containers and railed to the Port Elizabeth Harbour.

5.3.5 Rail

Once the mining right has been approved, the applicant will apply for a railway slot on Lohatla Railway Sliding. The loading station is approximately 15km away from the proposed mining property.

5.3.6 Waste Management Areas

The dump areas will include:

- Waste Rock Dump Areas: The waste that is not used for backfilling will be hauled to the waste rock dump areas.

- Waste storage areas which will be bunded and have concrete floors for the temporary storage of waste.

5.3.7 Stockpile Areas

The required stockpile areas will include:

- Tailings Stockpile Areas: Temporary stockpile areas will be required from where waste will be used for back filling or hauled to waste rock dump areas; and
- Topsoil stockpile areas for the temporary storage of topsoil which will be used for rehabilitation of disturbed areas

5.3.8 Stormwater management infrastructure

Berms will be used for clean and dirty water separation around the mining area.

5.3.9 Offices, Workshops and other buildings

Existing building structures owned by the mine and farmer will be used as offices.

5.3.10 Laboratory

The process' efficiency is aided by ensuring that the chemical quality of the final products ispartly controlled by supplying the plant with a suitable mixture of run-of-mine ore. As part of quality control, samples are taken at regular intervals from the manganese ore that has been crushed and screened and chemically analyzed at the onsite laboratory to ensure that the final product contains the correct silica, potassium oxide, phosphorus, sulphur and alumina content. When the process is complete, a comprehensive record shall be kept of the samples analyses. The manganese ore that has been processed in the crushing and screening plant will be put through the magnetic separating plant to ensure that the final product's grade adheres to the customer specifications.

For this purpose, a laboratory will be constructed and operated as part of the mining operational activities.

5.3.11 Sewage Management

The proposed project will require four ablution facilities, each with an underground conservancy tank. Chemical toilets will also be provided for the management of sewage.

5.3.12 Blasting

The explosives provided by service providers will be placed down the holes using trucks designed for such purposes. The quantities of explosives will be determined by the purposes of the blasting and the nature of the materials to be blasted. An explosive Magazine area for the storage of TS3 magazines will be provided for in the mining area.

5.3.13 Drilling

The Mine will utilize a RC drill for prospecting resources as well as blasting. A typical drilling pattern is a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.

5.3.14 Safety

Safety Berms around the mining area to be used per the requirements of the Mine Health and Safety Act (MHSA).

5.4 Listed and specified activities

Section 16 of the MPRDA requires, upon request by the Minister that an Environmental Management Programme (EMPr) be submitted, and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that listed activities, which may potentially affect the environment negatively, must obtain an environmental authorisation from a relevant authority before the activities may commence.

Such activities are listed under the EIA Regulations (2014 which has been amended in 2017 and 2021) and consist of:

- EIA Process (Government Notice Regulation (GNR) 982);
- Listing Notice 1 GNR 983 – Basic Assessment process,
- Listing Notice 2 GNR 984 – Scoping and EIA process;
- Listing Notice 3 GNR 985 – Activities in specific identified geographical areas only.

GNR 982, 983, 984 and 985 have been amended in 2017 and in 2021 through GNR 324, 325, 326 and 327, respectively.

The purpose of these regulations is to avoid negative impacts on the environment, and where these cannot be avoided, ensure the mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

The proposed mining project activity triggers activities listed in NEMA Listing Notice 1 and 2. Table 5-1 provides a summary of the identified NEMA listed activities that will be triggered by the prospecting project.

Table 5-1: Applicable Activities

Name Of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Mining Right Application	1 584.198 ha	X	GNR 984 Activity 17	[redacted]
Offices: Existing building structures owned by the mine and farmer will be used as offices	Contractor Office near pit D: 17 m x 19 m =323 m^2	X		
Rapid Reloading Area for Explosives	<0.1ha	X		
Water provision: 10 X 10 000L JoJo tanks will be used to water storage. The water from the JoJo tanks will be for potable use and use in the ablution facilities.	$<4m^2$ x 10 (Total = $<40m^2$)	X		
Rehabilitation	Rehabilitation will be required for all disturbed areas	X		

Name Of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Explosive Magazine area for the storage of TS3 magazines	<0.1ha	X		[redacted]
Safety Berms around the mining area to be used per the requirements of the Mine Health and Safety Act (MHSA).	<0.2ha	X		[redacted]
Brake test ramp which will be used around the mine in compliance with the requirements of the MHSA	<0.1ha	X		[redacted]
Tyre Bay area	<0.1 ha	X		[redacted]
Fenced salvage yard	0.1ha	X		[redacted]
2 X Weigh bridges	4m x 3m each (Total 24m^2)	X		[redacted]
2 X security access points where mobile containers will be used as security offices for access control.	4m x 3m each (Total 24m^2)	X		[redacted]
Chemical Toilets, which will be required in addition to the ablution facilities. No more than 10 chemical toilets will be required at any given time.	10 X < 6m^2 (Total = <600m^2)	X		[redacted]
Wash Bay areas which will have a concrete floor and a flow off trench which will be used to direct dirty water to the underground conservancy tank.	<0.1 ha	X		[redacted]
Drilling: The Mine will utilize a RC drill for prospecting resources as well as blasting. A typical drilling pattern is a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.	>1ha	X	GNR 984 Activity 17 GNR 983 Activity 19 GNR 983 Activity 27 GNR983 Activity 30	[redacted]
Water Dams: 2 x 250m^3 water dams will be applicable for the processing plant from year 4 when the wet process	2 X 250m^3 (vegetation clearance < 0.1ha)	X	GNR 984 Activity 17 GNR 983 Activity 27	[redacted]

Name Of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
will be implemented. The initial processing process will be a dry process.			GNR983 Activity 12	[redacted]
Blasting: The explosives provided by service providers will be placed down the holes using trucks designed for such purposes. The quantities of explosives will be determined by the purposes of the blasting and the nature of the materials to be blasted.	Bench heights of between 8 – 10m will be required for blasting.	X	GNR 984 Activity 17 GNR 983 Activity 27 GNR983 Activity 30	[redacted]
Excavations, open cast mining. Six (6) mining areas have been identified and it is anticipated that no more than 10ha of excavations will be required at any given time.	6 x <10 ha (Total = <60 ha)	X	GN R 983 Activity 27 GNR 984 Activity 17 GNR 984 Activity 15 GNR 983 Activity 19	[redacted]
Waste Rock Dump Areas: The waste that is not used for backfilling will be hauled to the waste rock dump areas.	<3 ha	X	GNR 983 Activity 27 GNR 984 Activity 17	GNR 633 Activity 11
2X Tailings Stockpile Areas: Temporary stockpile areas will be required from where waste will be used for back filling or hauled to waste rock dump areas.	2 X <1 ha (Total = <2ha)	X	GNR 983 Activity 27 GNR 984 Activity 17	GNR 633 Activity 11
Stormwater management infrastructure. Berms will be used for clean and water separation around the mining area.	The sizes will be dependent on the topography of the and will be determined by a hydrologist during the EIA process.	X	GNR 984 Activity 17 GNR 983 Activity 27 GNR 983 Activity 19 GNR 983 Activity 12	[redacted]
Control Rooms for the processing plants. It is anticipated that no more than 10 control rooms will be required for the project.	10 X <18m^2 (Total = <180m^2)	X	GNR 984 Activity 17 GNR 984 Activity 21	[redacted]
Diesel tanks: Sealed tanks will be required for the storage of diesel at the mine.	Tanks with a capacity of 69 000 m^3. Will only utilize a	X	GNR 984 Activity 17 GNR 984 Activity 4	[redacted]

Name Of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
	maximum of 40 000m^3			
Electricity: The mine will make use of Eskom Power. Eskom Power Line travels across the property from the south-west to the north-east of the Farm Kapstewel 436. The Line originates from the Mangnore Eskom Sub-station approximately 2km north of the application area	N/A			
Generators: Gensets will be used for electricity provision. The Gensets will be placed on concrete floors in bunded areas.	>1ha 2 * 300kVA 2* 500kVA	X	GNR 984 Activity 17 GNR983 Activity 27	
Haul Roads haul roads will be required for the transportation of material from the open cast areas to the market areas.	<2ha	X	GNR 984 Activity 17 GNR983 Activity 27 GNR983 Activity 56 GNR983 Activity 24 GNR984 Activity 27	
Parking: Parking areas will be required.	<1ha	X	GNR 984 Activity 17 GNR983 Activity 27	
Processing Plant for the processing of Iron Ore: Dry crushing and screening plant as well as wet magnetic separation process	<2 ha	X	GNR 984 Activity 15 GNR 984 Activity 17 GNR 984 Activity 21 GNR 983 Activity 27	
Processing Plant for the processing of Manganese Ore: Dry crushing and screening plant	<1 ha	X	GNR 984 Activity 15 GNR 984 Activity 17 GNR 984 Activity 21 GNR 983 Activity 27	
Topsoil dump areas for the temporary storage of topsoil which will be used for rehabilitation of disturbed areas.	<0.5ha	X	GNR 984 Activity 17	GNR 633 Activity 11
Waste storage areas which will be bunded and have	<50m^2 each	X	GNR 984 Activity 17	Category C: GNR921 Activity 1

Name Of Activity	**Aerial Extent of The Activity**	**Listed Activity**	**Applicable Listing Notice**	**Waste Management Authorisation**
concrete floors for the temporary storage of waste.				
Feeder Bay and substation	3MVA (>0.1ha vegetation clearance required)	X	GNR 984 Activity 17 GNR 984 Activity 9	
Contractors laydown areas	<0.5 ha	X	GNR 984 Activity 17 GN R 983 Activity 27	
Access Roads: At this moment around 1000m X 10m access roads are built. More roads will be built as the mine develops	1ha	X	GNR 984 Activity 17 GNR983 Activity 27 GNR983 Activity 56 GNR983 Activity 24 GNR984 Activity 27	
Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank	6 X <50m^2 (Total = <300m^2)	X	GNR 984 Activity 17	
Water pipelines for the distribution of recycled/clean water for use around the mine.	<1000m	X	GNR 983 Activity 9 GNR 983 Activity 10 GNR 984 Activity 17 GNR 984 Activity 21	
Laboratory: Samples are taken at regular intervals from the manganese ore that has been crushed and screen and chemically analyzed at the onsite laboratory to ensure that the final product contains the correct silica, potassium oxide, phosphorus, sulphur and alumina content.	165m^2	X	GNR 984 Activity 17 GN R 983 Activity 27	
Fencing	<5ha	X	GN R 983 Activity 27 GNR 985 Activity 12 GN R 984 Activity 17	
4 boreholes for water abstraction. The mine will make use of existing, and where require will drill additional boreholes	4 X <1m^2 clearance for each borehole to be drilled (Total = <4m^2)		GN R 984 Activity 17 GNR 983 Activity 9	

Name Of Activity	Aerial Extent of The Activity	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Vegetation clearance	80 ha	X	GN R 983 Activity 27 GN R 984 Activity 15 GNR 984 Activity 17 GNR 985 Activity 12	
Hauling and Transport			Not Listed	
Dust Suppression			Not Listed	

The map below shows the plan contemplated in Regulation 2(2) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA), depicting the land to which application relates. The map also denotes the directly affected farms and the boundary coordinates of the application area. A copy of the listed activities map is included as Appendix 4.

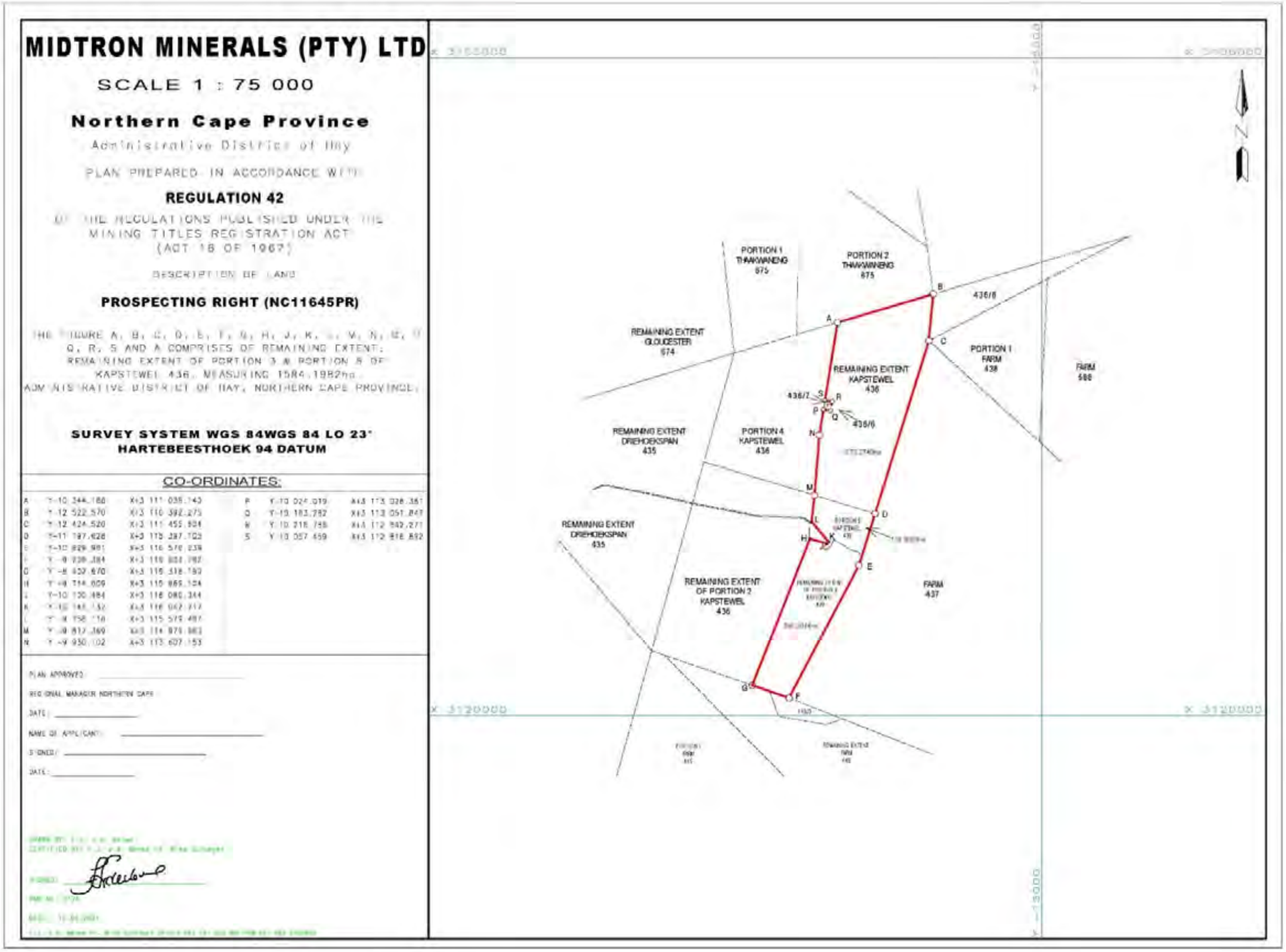


Figure 5-3: Mining Right Application Area - Regulation 42 Map

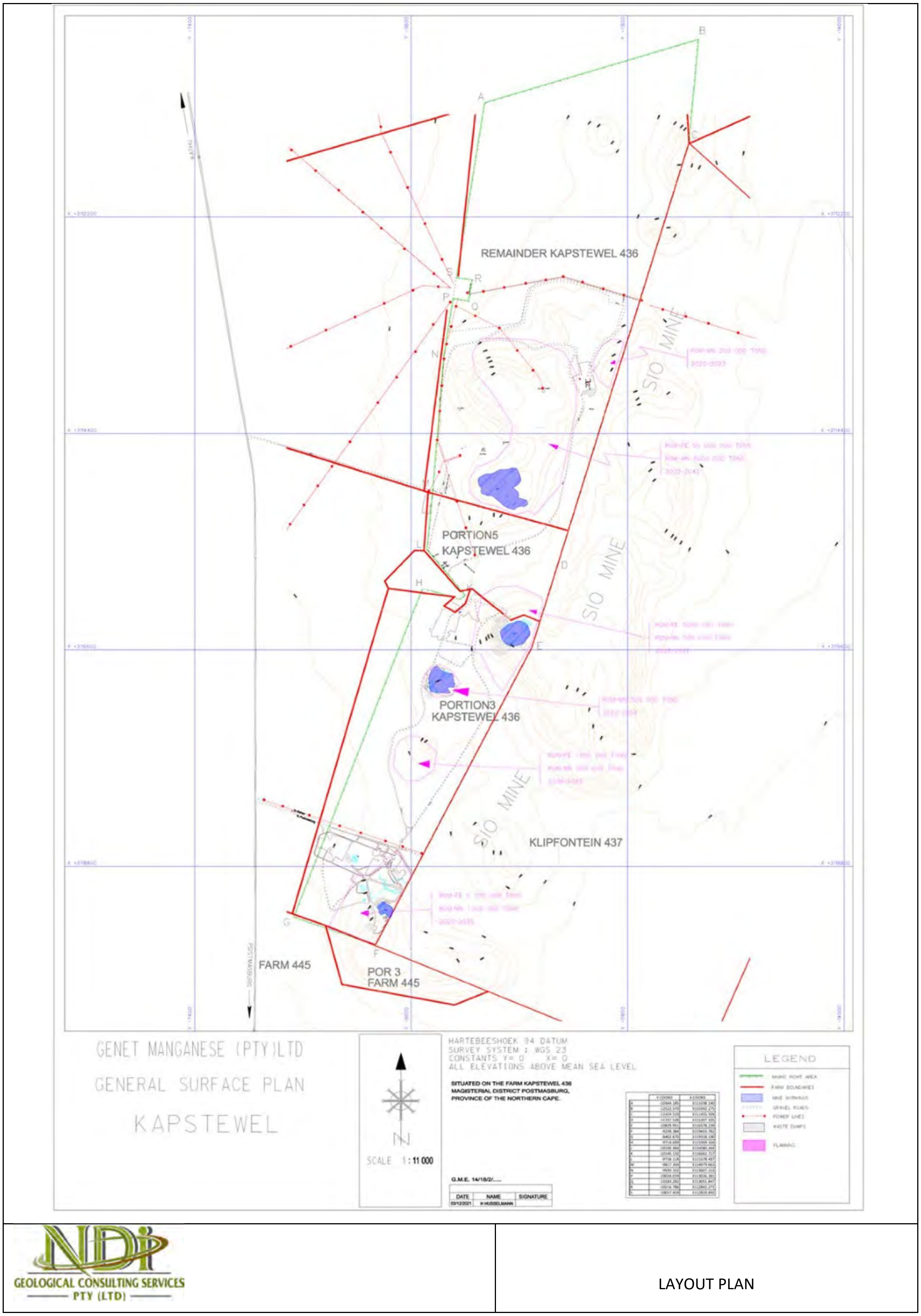


Figure 5-4: Project Layout Plan

6 Policy and legislative context

Table 6-1 lists the applicable legislation, policies and guidelines identified as relevant to the proposed project. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context, is provided. This list is not exhaustive but rather represents an indication of the most applicable pieces of legislation relevant to the project.

Table 6-1: Policy and Legislative Context of Proposed Project

Legislation	Description and Relevance	Authority
Constitution of the Republic of South Africa, (No. 108 of 1996)	Chapter 2 – bill of rights Section 24 – Environmental Rights The proposed activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together be avoided, they will be minimised and mitigated in order to protect the environmental rights of South Africans	N/A
Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA)	The Promotion of Access to Information Act (Act No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right. The EIA/EMPr process was undertaken in terms of the NEM: WA, NEMA and where required, the NWA. The associated stakeholder consultation process was aligned with the PAIA in the sense that all I&APs were given an opportunity to register as an I&APs prior to the initiation of the project and all registered stakeholders have in turn be provided a fair opportunity to review and comment on any reports submitted to the competent authorities for decision making.	N/A
Protection of Private Information Act 2021 (POPIA)	The POPIA aims to promote protection of personal information. The EIA Regulations, 2014 require, inter alia, transparent disclosure of registered stakeholders and their comments. In terms of the EIA Regulations, 2014, stakeholders who submit comment, attend a meeting or request registration in writing are deemed registered stakeholders who must be added to the project stakeholder database. By registering, stakeholders are deemed to give their consent for relevant information (including contact details) to be processed and disclosed, in fulfilment of the requirements of the EIA Regulations, 2014 and the National Appeal Regulations, 2014. The stakeholder engagement process was undertaken in a way to comply with the requirements of the new Protection of Personal Information Act (POPIA) which came into effect on 1 July 2021.	N/A
Minerals and Petroleum Resources Development Act 28 of 2002 (MPRDA)	The Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) makes provision for equitable access to and sustainable development of South Africa's mineral resources. The MPRDA requires that the environmental management principles set out in NEMA shall apply to all mining	

Legislation	Description and Relevance	Authority
	operations and serves as a guideline for the interpretation, administration and implementation of the environmental requirements of NEMA. The MPRDA requires that 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 authorization issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralized bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister. Section 22 of the MPRDA as amended by Section 18 of Act 49 of 2008 The proposed project requires a Mining Right from the DMR.	Department of Mineral Resources, Northern Cape Province
National Environmental Management Act (NEMA) (No. 107 of 1998)	Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment) Section 28 – Duty of care and remediation of environmental damage Environmental management principles have been incorporated into the EIA and EMPr, which the applicant will be required to comply with to ensure that negative impacts on the environment are avoided or kept to a minimum and that positive impacts are enhanced.	
National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA Regulations 2014 (Government Notice (GN) 984), as amended	The EIA Regulations (GNR 982) were promulgated in terms of Sections 24 of the NEMA, to manage the process, methodologies and requirements for the undertaking of an EIA. The GNR 982 stipulates that the applicant for activities listed under GNR 983, 984 or 985 must appoint an independent EAP to manage the EIA process. Listed Activities are activities identified in terms of Section 24 of the NEMA which are likely to have a detrimental impact on the environment, and which may not commence without an EA from the Competent Authority (CA). EA required for Listed Activities is subject to the completion of either a Basic Assessment (BA) process or full Scoping and Environmental Impact Assessment (S&EIA) with applicable timeframes associated with each process. The EA must be obtained prior to the commencement of those listed activities. The project triggers activities listed in Listing Notices 1 and 2 and will require an EA from the DMR. According to GNR 326 of the NEMA, activities listed in Listing Notice 2 require that a full S&EIA be undertaken. The applicable listed activities that will be triggered by the project is provided in Table 5-1.	

Legislation	Description and Relevance	Authority
Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805)	Environmental impacts will be generated primarily in the construction phase of this project with associated operational phase impacts. These will be assessed as part of the EIA process.	
Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004	A full EIA (scoping and impact assessment) is required for the proposed project as activities are triggered under Listing Notice 2.	
Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.		
DEA Integrated Environmental Management Guideline Series, Guideline 7: Public Participation in the Environmental Impact Assessment Process, 2012 (Government Gazette 807)	Public participation is a requirement of the Scoping/EIA Process and has been conducted for the proposed project as stipulated in Chapter 6 of the NEMA.	
National Water Act, 1998 (Act 36 of 1998)	It is anticipated that 20 tons of water will be used for dust suppression and other non- production purposes. This water will either be obtained from the Sedibeng Municipality or underground. The DWS will be contacted to seek their recommendation on the use of water: • Section 21(a) WUL for abstraction of Groundwater; • Schedule 1 water use where no WUL is required; • Section 21(g) WUL Disposing of wastewater; and • Section 21(b) WUL Storage of water • Section (c) and (I) for any activities located with 100 year floodlines or within 100m of a water and/or within 500m of a aquatic habitat and riparian area.	Department of Water and Sanitation (DWS), Northern Cape

Legislation	Description and Relevance	Authority
National Environmental Management Waste Act (Act No. 36 of 1998)	It is expected that activities listed in GNR921 and GNR 633 will be triggered for the waste facilities and will require a waste management licence. Table 5-1 provides a list of GNR921 activities triggered by the project. An integrated application process that incorporates the requirements of the NEMA and the NEM:WA has been undertaken for both the EA and WML.	DMR and DWS, Northern Cape through the integrated application process
National Environmental Management Air Quality Act (Act No. 39 of 2004)	Air quality management Section 32 – Dust control. Section 34 – Noise control. Section 35 – Control of offensive odours. The principles of the NEM: AQA, focusing on minimisation of pollutant emissions have been taken cognisance of in the development of the EMPr.	Department of Environmental Affairs and Tsantsabane Local Municipality
The National Forestry Act, 1998 (Act No. 84 of 1998) (NFA)	The NFA protects against the cutting, disturbance, damage, destruction or removal of protected trees. A biodiversity specialist study was undertaken for the application. The study includes an assessment of the significance of biodiversity impacts and mitigation measures which have been included in the EMPr. The assessment identified some protected species. Should these protected trees be affected by the project, Midtron will apply for the required permits for the removal and/or relocation of the trees.	Department of Agriculture, Forestry and Fisheries (DAFF)
The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM:BA)	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected The biodiversity assessment also includes an assessment of biodiversity hotspots and bioregions to determine the potential impacts that the project may have on the receiving environment. The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEM: BA. The NEM: BA ensures that provision is made by the site developer to remove any alien species, which have been introduced to the site or are present on the site. The EMPr includes management measures Midtron will be required to implement to manage and control alien species.	Department of Environmental Affairs

Legislation	Description and Relevance	Authority
Northern Cape Nature Conversation Act No. 9 of 2009	This Act provides sustainable utilization of wild animals, aquatic biota and plants to provide for them implementation of the convention on international trade in endangered species of wild fauna and flora. The Act provides for offenses and penalties of contravention Act, further provide for the appointment nature conservator to implement the provision of the Act. It also provides the issuing of the permits and other authorisations and provides matters connected therewith. The biodiversity assessment identified some NCNCA protected species. Should any of these protected trees be affected by the project, Midtron will apply for the required permit for the removal and/or relocation of the trees. This will be determined during the biodiversity assessment.	Northern Cape Department of Nature Conservation (DENC)
Mine Health Safety Act, 1996 (Act No. 29 of 1996) (MHSA)	The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa. Midtron will need to ensure that employees, contractors, sub-contractors and visiting personnel, adhere to this Act and subsequent amendment regulations on site.	Department of Mineral Resources (Northern Cape)
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Control measures for erosion Control measures for alien and invasive plant species The EMPr includes measures to control and manage alien invasive plant species.	Department of Agriculture Forestry and Fisheries
National Heritage Resources Act 25 of 1999	Heritage Permit for structures 60 years or older. A phase 1 heritage resources specialist study was conducted for the project. The Phase 1 Archaeological Impact Assessment found no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to the proposed development activities. The assessment of the proposed project has rated the potential impact to archaeological material as being very low. The possibility of locating significant pre-colonial archaeological heritage remains during implementation of the project is unlikely. It is unlikely, but unmarked human burials may be uncovered or exposed during earthmoving operations.	Northern Cape Heritage Resource Authority
Restitution of Land Rights Act, 1994 (Act No. 22 of 1994), as amended in 2014.	Land Claims. There are no land claims associated with the affected properties.	Department of Rural Development and Land Reform

6.1 Municipal Plans and Policies: Tsantsabane Integrated Development Plan

According to the Integrated Development Plan (IDP) for the Tsantsabane Local Municipality (2021/22), there are opportunities in mining, which is currently the largest contributor to the municipality's Gross Domestic Product (GDP). There is therefore a need to put more efforts in the current performance plans that will develop the municipality in the areas of mining.

The mining project will have socio-economic impacts that have been described in detail in Section 7. The extent to which the project will contribute to the economy will be assessed during the impact assessment phase of the process.

6.2 Other guidelines

Other guidelines that were consulted include:

- Northern Cape Provincial Biodiversity Conservation Plan;
- DWS, 2010. Operational Guideline: Integrated Water and Waste Management Plan. Resource Protection and Waste;
- Department: Water Affairs and Forestry, 2007. Best Practice Guideline A2: Water Management for Mine Residue Deposits;
- Department: Water Affairs and Forestry, 2007. Best Practice Guideline A4: Pollution control dams;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline A6: Water Management for Underground Mines.
- White paper on Integrated Pollution and Waste Management in South Africa, 2000;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G1 Storm Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G2: Water and Salt Balances;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline G3. Water Monitoring Systems;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline G4: Impact Prediction;
- Department of Water Affairs and Forestry, 2008. Best Practice Guideline H1: Integrated Mine Water Management;
- Department of Water Affairs and Forestry, 2006. Best Practice Guideline H3: Water Reuse and Reclamation;
- DEAT. 2002. Integrated Environmental Management, Information series 2: Scoping. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 3: Stakeholder Engagement. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 4: Specialist Studies. Department of Environmental Affairs and Tourism (DEAT. 2002);
- DEAT. 2002. Integrated Environmental Management, Information series 12: Environmental Management Programmes. Department of Environmental Affairs and Tourism (DEAT. 2002);

- DEA. 2012. Companion to the EIA Regulations 2010, Integrated Environmental Management Guideline Series 7, Department of Environmental Affairs; and

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

7 Motivation

7.1 Mining Benefits

The mining industry is of great importance to the South African economy. Manganese ore is a key element in carbon steel production, while electrolytic manganese dioxide is an important ingredient in lithium-ion batteries for EVs and other applications, as well as alkaline and zinc-manganese batteries. Data by Research and Market and the Observatory of Economic Complexity placed South Africa as the world's largest producer and exporter of manganese ore in 2019, accounting for 30% of global production and almost 50% of global exports. In that year, South Africa exported approximately R3.297 billion in manganese ore (StatsSA, 2021). In 2021, South Africa's production of iron ore amounted to an estimated 61 million metric tons. South Africa is one of the world's largest producers of iron ore. As of 2021, South Africa was the ninth-largest iron ore producing country in the world R 9.409 billion ((StatsSA, 2021).

Opportunities that exist within mining are as follows:

- Constant demand on the market for commodities;
- Establishment of a permanent working group between the municipality and the mine managers responsible from developing local economic development initiatives;
- Encourage local SMME's and entrepreneurs to take advantage of procurement;
- Develop a database of available labour and skills to encourage the employment of local people;
- Provide skills training and support programmes; and
- Instigate mining procurement opportunities in consultation with the mines, develop a database of such opportunities and ensure that this information is made available to local businesses and communities.

Exploration on the mining right area has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property has manganese resources estimated to 50 million tons as well as iron ore resources estimated to1 373 075 tons.

The markets for each product are as follows:

- Iron: According to Anglo American, out of all the metals that make modern life possible, steel is the most widely used – and iron ore is its main ingredient. Higher Iron ore grades are needed in improving Auto markets, Construction and other demanding types of specialised infrastructure. This is a prime reason for the great demand from maturing economies such as in China, Japan and Europe, and now increasingly in the Middle East and India. Export sales to China accounted for 61% of the Company's total exports. Exports to the rest of Asia remained at around 19% of the total, while Europe is 12%. Iron ore is also used in medicine, cosmetics, engineering, construction, paint and a whole range of other products we use in our daily lives. And technology is demanding increasingly sophisticated forms of steel.
- Manganese: Steel is not only made of iron but also made of manganese. Although the amount of manganese used to make a ton of steel is small, it is just as essential as iron to produce this fundamental building block of modern industrial societies. Put in simplest terms—one can't make steel without manganese. Domestic consumption of manganese is about 500,000 metric tons each year, predominantly by the steel industry. The United States is totally reliant on imports for this amount of manganese. Manganese is a common ferrous metal with atomic weight of 25 and the chemical symbol Mn. It constitutes roughly 0.1 percent of the Earth's crust, making it the 12th most abundant element. Its early uses were limited largely to

pigments and oxidants in chemical processes and experiments, but the significance of manganese to human societies exploded with the development of modern steelmaking technology in the 1860s. Because manganese is essential and irreplaceable in steelmaking and its global mining industry is dominated by just a few nations, it is considered one of the most critical mineral commodities for the United States.

- Product Consumers: Manganese and Iron ore products are sold to:
    - East Power Minerals Group Ltd and
    - Power Wave.

The two companies export the ore internationally.

7.2 Environmental responsibility

It is expected that the mining project will have negative environmental impacts, including, but not limited to the impacts that have been included in Section 13 of this report.

The impacts will be investigated in detail during the impact assessment phase of the project. Where possible, measures to mitigate the impacts of the project will be identified and finalised during the impact assessment phase of the project. The mitigation measures will include designs and management practices that will be embarked on, to prevent and/or minimise the identified impacts on the social, cultural and environmental aspects. For each potential significant impact identified, mitigation measures will be specified. High level mitigation measures have been included in Section 13 of this report. These mitigation measures will be described in more detail in the EMPr that Midtron will be required to comply with throughout the Life of Mine (LOM).

The EMPr will also include environmental monitoring programme that will allow Midtron to keep track of the impacts of the project on the environment and where required, to take remedial action.

7.3 Socio-economic benefits

A Social and Labour Plan (SLP) has been developed for the proposed iron and manganese mining project. The SLP includes community development which will be implemented by Midtron as part of the social responsibility programme. Through the Human Resources Development Program, Midtron will ensure that communities and HDI companies are offered an opportunity to develop educationally and economically.

Midtron Minerals takes full cognisance of the provisions of Section 101 of the MPRDA to include Core Contractors as part of the workforce. The targets and provision of the HRD Programme will apply to Midtron Minerals' permanent workforce and core contractors. For proper implementation of the HRD Programme, Midtron will utilise accredited training providers, where necessary, for their training needs. This will ensure the ongoing facilitation of transferable, accredited skills amongst employees.

According to its Draft SLP, Midtron proposes to undertake the following:

- Employment: Midtron intends to employ about 80 employees in total, of which 76 will be HDIs.
- Midtron Minerals will implement a Skills Development Plan that focuses on equipping employees with the skills to enhance their progression and development in the mining industry. The Midtron Minerals Skills Development Plan links with Skills Development legislation and includes the annual submissions of a Workplace Skills Plan (WSP) and Annual Training Reports (ATR) including payment of Skills Development levies to relevant authorities. The commitments made by Midtron include:
    - Undertaking employee skills and aspirations survey within 3 months after the identification of a workforce:

- AET Level 1, 2, 3 and 4 within 3 months of completion of the employee skills/aspiration surveys;
- Compilation of the workforce skills plan, the skills development plan, mentorship plan, internship and bursary plan, employment equity plan and career progression plan to commence during Mine Production

- Recruitment of labour will be guided by Midtron Minerals recruitment policies which promote the employment of local labour by the mine as well as by any appointed contractors. A local employment procedure and recruitment process will be developed in consultation with local authorities and representatives. Midtron Minerals will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise. Positions will be reserved and earmarked for both Historically Disadvantage Persons (HDPs) or Historically Disadvantage People (HDP) (as per Mining Charter 2018) and women in mining to ensure that the targets of Mining Charter 2018 of women and HDSAs/HDPs in all management levels are met. Midtron Minerals will use recruitment to meet the targets as set forth in its Social and Labour Plan. Positions will be reserved and earmarked for both HDSA's and women in mining to ensure that the targets of 10% of women in mining and 40% of HDSA in all management levels are met.
- Midtron Minerals will formulate and implement a Skills Development Plan which will focus on the transfer of skills to employees, to further their capacity in the mining industry, and equip them with alternative skills for after mine closure. The skills development plan will be used to assess and formally document the levels of skills and education of all employees to adequately base the Human Resources related planning. Skills development will address any skills and competency gaps that may arise and provide for the training needs of HDSA's, the fast tracking of individuals within the talent pool, and the various career-pathing and mentoring programmes. In this regard, Midtron Minerals will submit a workforce skills plan and an annual training report as per the SETA requirements for the mine Project each year after granting of the mining right. Midtron Minerals will also submit an application for the workplace skills plan grant every year
- Planned Adult Education and Training (AET): The AET programme will be offered to employees as part of the Midtron Minerals Human Resource Development. AET for the community will be prioritised by Midtron Minerals and will ensure that the employees and communities are offered the opportunity to become functionally literate and numerate. AET programme will be offered on a full-time and part-time basis to accommodate employees who work certain shifts. All venues will be accredited by MQA, and programmes will be approved by Education and Training Development SETA. It is anticipated that AET training will amount to R 12 000.00 per year starting in year 2 (total R 48 000.00) for Midtron Employees and R 12 000.00 from year 2 to year 5 (total R48 000.00) for surrounding communities
- Operational Core business training: Core business training will be offered to Midtron employees to equip them with the required capacity and skills to progress to higher levels of employment within Midtron Minerals. The primary focus of the skills Programmes is on training individuals in skills required by the Mine, to enable employees' individual Career Progression and to ensure safe and productive operations. The total cost of core business training over a 5-year period will be R 150 000.00 (R 30 000.00 per annum commencing in year 1).
- Learnerships: Midtron Minerals undertakes to provide Learnership opportunities to both employees (18.1) as well as nonemployees (18.2). The placement of learners, particularly 18.2's will be determined by the existence of employment opportunities at the time of their completion. Provision has been for a total of R 288 000 for Midtron Employee learnerships and R 288 000.00 for non-employees.
- Career Progression Plan: Midtron Minerals will actively promote Career Progression and succession opportunities among its employees and will use its Career Progression

Programme as a primary mechanism to empower its employees with potential and meet the employment needs of the company. Provision has been for a total of R 120 000.00 for Midtron to implement its Career Progression Plan over a 5-year period.

- Portable skills programmes: Midtron Minerals will continue offering skills training Programmes throughout the life of the Mine. A high level of focus will be when there is a possibility of retrenchment, downscaling and possible closure of the mine. The programme aims to equip employees with alternative skills to utilise outside the mining environment. It is anticipated that the portable skills programme implementation will amount to a total of R 80 000.00 over a 5-year period.
- Mentorship: It is the strategic intent of the Mine management to achieve full performance of all employees throughout the organization and a mentorship programme is regarded as a key instrument. The proposed mentorship model is to have internal mentorship whereby lower-level employees are paired with higher-level employees for a transfer of skills to take place and external mentorship which will involve coaching of outside BEE companies who have an interest in being involved in mining. Midtron Minerals Mentorship Plan will represent a carefully planned and professional intervention to facilitate a larger initiative to support employee and Skills Development within the Operation.
- Internships and Bursaries: Midtron Minerals is aware of the need not only to assist its own employees with development opportunities but also members of the local community to access tertiary education (bursaries) and experiential work (internships). The bursary and internship plan help to develop individuals, thus supplying the operation with its required skills. Apart from business related qualifications, Midtron Minerals is also aware of the need to develop qualified individuals from other sectors of the economy, whose communities will be affected by the mine. The bursaries to be awarded will amount to R 100 000.00 for non-employees and R 150 000 for employees over a 5-year period. An estimated budget of R 200 000.00 has been allocated to internships.
- Employment Equity Plan: Midtron Minerals fully subscribes to the principles of the Mining Charter and strives to achieve more than the minimum requirements. The Company believes that Employment Equity is an integral part of building an effective and representative workforce to ensure equality among its employees. Efforts will be directed to identify those HDSAs with talent, and then to provide accelerated training and development initiatives to assist their progression when suitable vacancies arise. Transformation within Midtron Minerals is guided by the South African Constitution and the MPRDA, which promotes equity and fairness, dignity, transparency and accountability.

7.4 No-go option

The no-go alternative would entail not mining the iron and manganese ore and leaving the landuse in the area as historical mining. By not implementing this project the local economic and employment opportunities and revenue as well as the mined iron and manganese ore which could potentially have benefitted the economy would be lost. The Tsantsabane Local Municipality Integrated Development Plan (IDP) identified mining as the major contributor to the municipality's GDP.

By not implementing this project the local economic and employment opportunities and revenue as well as the mined iron and manganese ore which could potentially have benefitted the economy would be lost.

The socio-economic impacts of no implementing the project include local, regional and more than likely national impacts:

- Local and regional: planned socio-economic initiatives within the surrounding communities would not be able to go ahead (Section 7.3); and

- National: Loss opportunities in foreign exchange for South Africa will be incurred as the potential to sell the iron and manganese ore internationally will be lost.

The additional potential negative impacts on the environment associated with the proposed iron and manganese ore mining will not exist should the project not be implemented. The environmental, social and economic impacts have been assessed in detail and are included in Section 13.

8 Motivation for the preferred development footprint

The identification and investigation of alternatives is a key aspect during the S&EIA process. All reasonable and feasible alternatives must be identified and assessed during the scoping phase to determine the most suitable alternatives to consider and assess during the EIA phase. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of this scope. Such constraints include social, financial and environmental issues, which will be discussed in the evaluation of the alternatives. The preferred option is to be highlighted and presented to the authorities.

Alternatives can typically be identified according to:

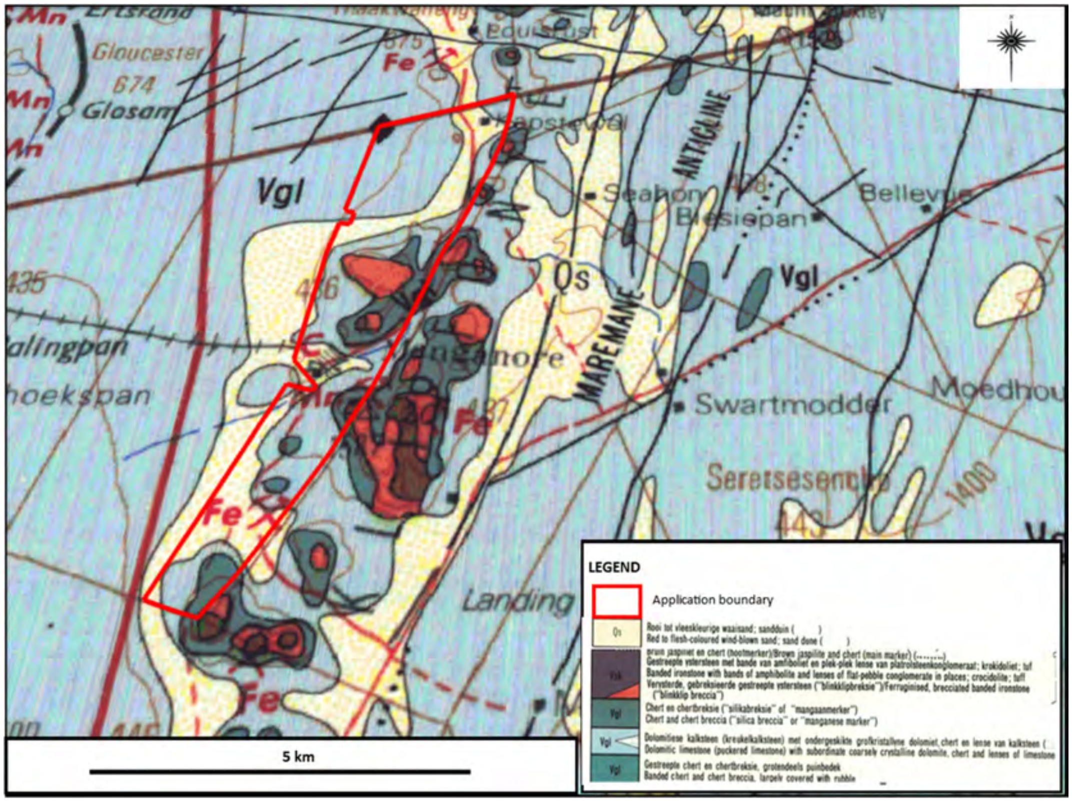
- Location alternatives;
- Process alternatives;
- Technological alternatives; and
- Activity alternatives (including the No-go option).

For any alternative to be considered feasible, such an alternative must meet the need and purpose of the development proposal without presenting significantly high associated impacts. The alternatives are described, and the advantages and disadvantages are presented. It is further indicated which alternatives are considered feasible from a technical as well as environmental perspective.

Incremental alternatives typically arise during the EIA process and are usually included as a means of addressing identified impacts. These alternatives are closely linked to the identification of mitigation measures and are not specifically identified as distinct alternatives. This section provides information on the development footprint alternatives, the properties considered, as well as the type of activity, activity layout, technological and operational aspects of the activity.

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

The study area falls in the Postmasburg area which lies at the southern end of a domal structure termed the Maremane Anticline in which dolomites of the Campbell Rand Group are exposed (Figure 8-1).



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GEOLOGY

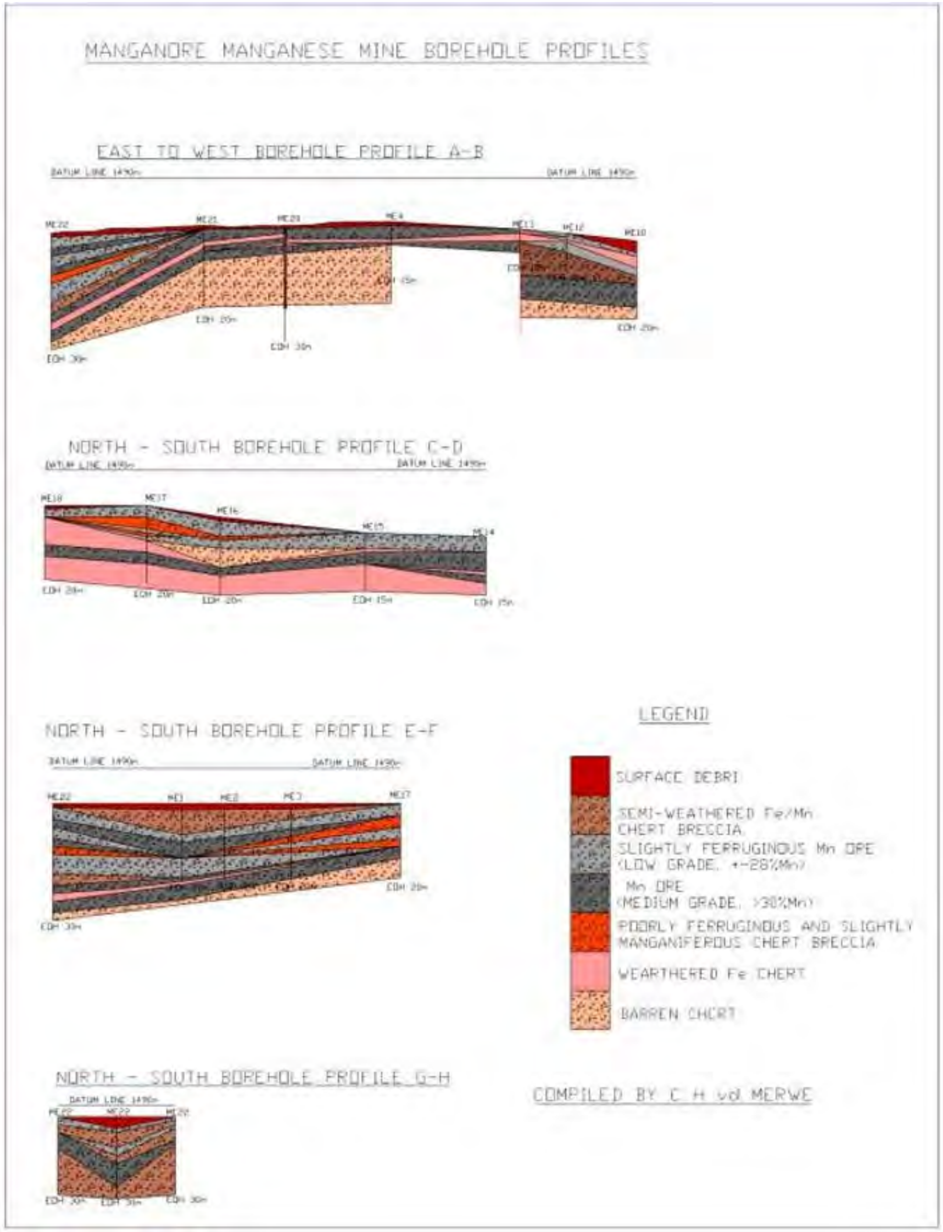
Figure 8-1: Geology of the Mining Area

The location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property has manganese resources estimated to 50 million tons as well as iron ore resources estimated to 1 373 075 tons. **Table 8-1** shows ore resource for manganese and iron ore in all three targets.

Table 8-1: Mineral resource for the areas in the mining right

Target	Category	Commodity	Grade (%)	Volume (ton)
All	Inferred	Manganese	30	50 million
All	Inferred	Iron	61.49	1.3 million

Mining activities are currently in progress within the target area, however, manganese mineralisation recorded during drilling and by surface outcrop mapping, suggest an area of Mn mineralization of 27 600m². Boreholes were drilled to a maximum depth of 20 meters. It is important to note that no dolomites were intersected during the drilling campaign. The cracked and jointed orebody is in places covered by, either manganese ore of a ferruginous nature, or by a ferruginous clayish lithology. Residue of these material and the brittle nature of the chert breccia, causes contamination as a result of vibration during percussion drilling. The above is well illustrated with borehole samples captured over the first four meters in borehole ME14. Drill intersections appear as slightly ferruginous manganese ore fragments and powdery ferruginous cherty material. Assay results of material mined in the area produced grades varying between 27% Mn and 30% Mn.



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PROSPECTING BOREHOLE PROFILES

Figure 8-2: Prospecting boreholes

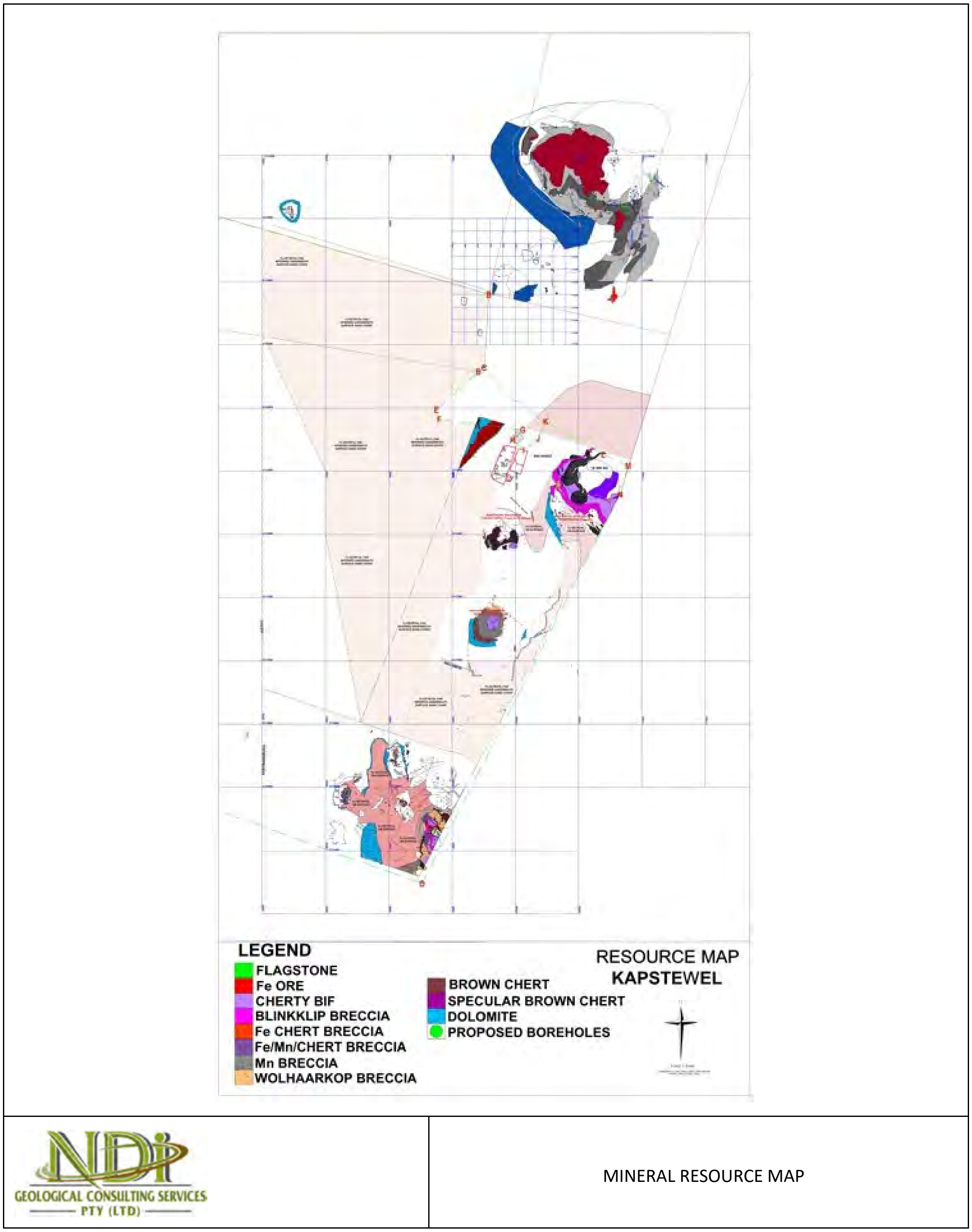


Figure 8-3: **Mineral resource map**

As such, the site is regarded as the preferred site and alternatives are not considered.

8.2 Type of Activity

An alternative to the type of activity would be leaving the project area with no viable economic activities taking place. The current landuse associated with the project area are mining related (prospecting and historical mining) and agricultural activities.

A socio-economic impact assessment of the proposed Midtron project includes as assessment of the land use alternatives.

8.3 Design or Layout of the Activity

The design or layout of a mining project is determined by the shape, position and orientation of the mineral resource. It is expected that mining and rehabilitation will be undertaken sequentially to keep disturbed areas to a minimum. The assessment that has been conducted for the project shows that there are no fatal flaws associated with the project location. The specialist studies found no sensitive environments such as heritage resources, SCC etc that are affected by the current project layout. The site layout plan therefore does not require to be revised.

The significance of the impacts has been investigated in depth and included in Section 13 of this report.

8.4 The Technology to be used in the Activity

It is possible that only mobile screening and crushing plants, which can process 300 tons of raw materials per hour may be used, instead of the fixed plants, due to the high capital costs of the fixed plants. In this case, three (3) sets of mobile screening and crushing plants will be positioned at different locations to crush all materials to proper sizings, from 6mm to 25mm, which will be removed to the magnetic beneficiation plant for further beneficiation.

8.5 The Operation Aspects of the Activity

The operational plan for the mine is based on demand of iron and manganese ore. Access to the site is by a secondary gravel road turning from the R325. There is a number of gravel roads traversing the property, which are either farm roads or that were created by prospecting activities. At this moment, it is proposed that existing access roads be used for mining activities. More roads are to be built as the mine develops. The final iron ore product will be transported by road to Postmasburg Iron ore siding, and then will be transported by rail to the Saldanha Harbour, or the iron ore will be hauled by road to the Saldanha Harbour. The final manganese ore product will be transported to the Lohatla load-out station where it will be loaded into containers and railed to the Port Elizabeth Harbour. Where required, access roads to be used will need to be negotiated with the landowners affected by the MRA.

8.6 The Option of Not Implementing the activity

The no-go alternative would entail not mining the iron and manganese ore and leaving the landuse in the area as historical mining. By not implementing this project the local economic and employment opportunities and revenue as well as the mined iron and manganese ore which could potentially have benefitted the economy would be lost. The Tsantsabane Local Municipality Integrated Development Plan (IDP) identified mining as the major contributor to the municipality's GDP. The socio-economic impacts of no implementing the project include local, regional and more than likely national impacts:

- Local and regional: planned socio-economic initiatives within the surrounding communities would not be able to go ahead (See Section 7.3); and
- National: Loss opportunities in foreign exchange for South Africa will be incurred as the potential to sell the iron and manganese ore internationally will be lost.

Although not fully assessed at this time, the additional potential negative impacts on the environment associated with iron and manganese ore mining would not exist should the project not be implemented. The environmental, social and economic impacts have been assessed in detail in this impact assessment phase to identify and address all negative impacts, where possible.

9 Public Participation Process

Stakeholder engagement is a key element of the environmental decision-making process, and stakeholder engagement forms part of the scoping phase as well as the impact assessment phase. The process is primarily aimed at affording I&APs the opportunity to gain an understanding of the proposed project. In addition, the purpose of consultation with the landowners, key stakeholders, and I&APs is to provide them with the necessary information about the proposed project so that they can make informed decisions as to whether the project will affect them and provide the EIA team with local knowledge of the area and raise concerns relating to the biophysical, socio-economic and cultural impacts that may arise.

The stakeholder engagement process will be conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA as summarised in Table 9-1.

Table 9-1: NEMA Stakeholder Guidelines

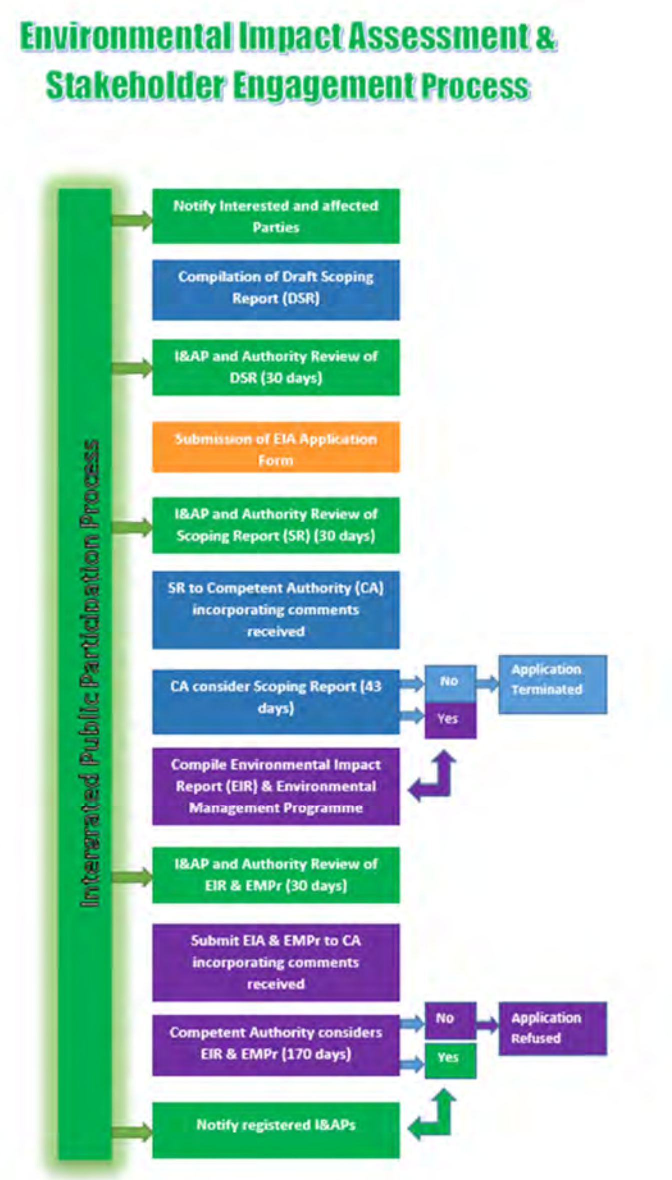
NEMA Section	Applicability to Stakeholder Engagement
Chapter 1	Outlines the principles of environmental management, several pertaining to public consultation (e.g., Chapter 1, subsections (2), (3), (4) (f), (g), (h), (k), (q) and (r).
Chapter 6,	Regulations 39 – 44 of the amended EIA Regulations GNR) 326, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA.
Section 24J of the NEMA	In 2017, the Minister of Environmental Affairs published, Section 24J of the NEMA in terms of**,** Public Participation Guidelines which guide the Public Participation Process in order to give effect to Section (2)(4)(f), (o) and 24 (1A) (C) of the NEMA.

In addition, the stakeholder engagement process will comply with the requirements of the new Protection of Personal Information Act (POPIA) which came into effect on 1 July 2021.#The POPIA aims to promote protection of personal information. The EIA Regulations, 2014 require, *inter alia*, transparent disclosure of registered stakeholders and their comments. In terms of the EIA Regulations, 2014, stakeholders who submit comment, attend a meeting or request registration in writing are deemed registered stakeholders who must be added to the project stakeholder database. By registering, stakeholders are deemed to give their consent for relevant information (including contact details) to be processed and disclosed, in fulfilment of the requirements of the EIA Regulations, 2014 and the National Appeal Regulations, 2014.

The application process will commence with a scoping phase which will inform the impact assessment phase. This scoping phase will provide Interested and Affected Parties (I&APs) an opportunity to provide the EAP with issues and concerns with respect to the proposed project in order to inform the technical studies so that they can evaluate these concerns during the EIA phase of the project.

The EIA Report will be made available for public review prior to submission to the DMR for authorisation. All the comments received were captured and addressed where feasible in the Scoping and EIA Reports.

Figure 9-1 provides a diagram of an Integrated Stakeholder Engagement Process for the proposed project.



NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)	MIDTRON MRA INTEGRATED EIA AND STAKEHOLDER ENGAGEMENT PROCESS

Figure 9-1: Integrated EIA and Stakeholder Engagement Process

All the above-mentioned guidelines have been incorporated into this stakeholder engagement process. The application will be submitted to the DMR for authorisation as the competent authority. Identified commenting authorities on this application include:

- DWS – Regional Office;
- SAHRA – Provincial;

- Tsantsabane Local Municipality;
- ZF Mgcawu District Municipality;
- Department of Agriculture; and
- Northern Cape Department of Nature Conservation (DENC).

9.1 Scoping Phase

All stakeholder engagement documents are included in Appendix 5 of this report.

9.1.1 Stakeholder Identification Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified using GIS and cadastral information to identify affected and adjacent properties. The affected and adjacent property owners were identified using the surveyor general website, www.deedsweb.gov.za. In addition, registered I&APs were also sourced from responses to the advertisements, site notices and written notification to I&APs associated with the project.

The I&APs register will be maintained for the duration of the study where the details of stakeholders are captured and automatically updated upon communication to the EAP. The identification, registration, and comments from I&APs will be an on-going activity.

The affected properties are provided in Table 9-2.

Table 9-2: List of Affected Farm and Farm Portions

Farm	Portions	21 Digit Surveyor General Code
Kapstewel 436	Remaining Extent	C03100000000043600000
Kapstewel 436	Remaining Extent of Portion 3	C03100000000043600003
Kapstewel 436	Portion 5	C03100000000043600005

The adjacent properties are provided in Table 9-3

Table 9-3: List of Adjacent Farm and Farm Portions

Farm	Portions	21 Digit Surveyor General Code
Kapstewel 436	1/436	C03100000000043600001
Kapstewel 436	2/436	C03100000000043600002
Kapstewel 436	3/436	C03100000000043600003
Kapstewel 436	4/436	C03100000000043600004
Kapstewel 436	6/436	C03100000000043600006
Kapstewel 436	7/436	C03100000000043600007
Kapstewel 436	8/436	C03100000000043600008
Kapstewel 436	9/436	C03100000000043600009
Farm 437	Re/437	C03100000000043700000
Farm 438	Re/438	C03100000000043800000
Farm 445	Re/445	C03100000000044500000
Farm 445	3/445	C03100000000044500003
Thaakwaneng 675	1/675	C04100000000067500001
Thaakwaneng 675	2/675	C04100000000067500002
Mount Huxley 676	RE/676	C04100000000067600000

A map of the affected and adjacent farm portions and farm portions of the site are illustrated in Figure 9-2

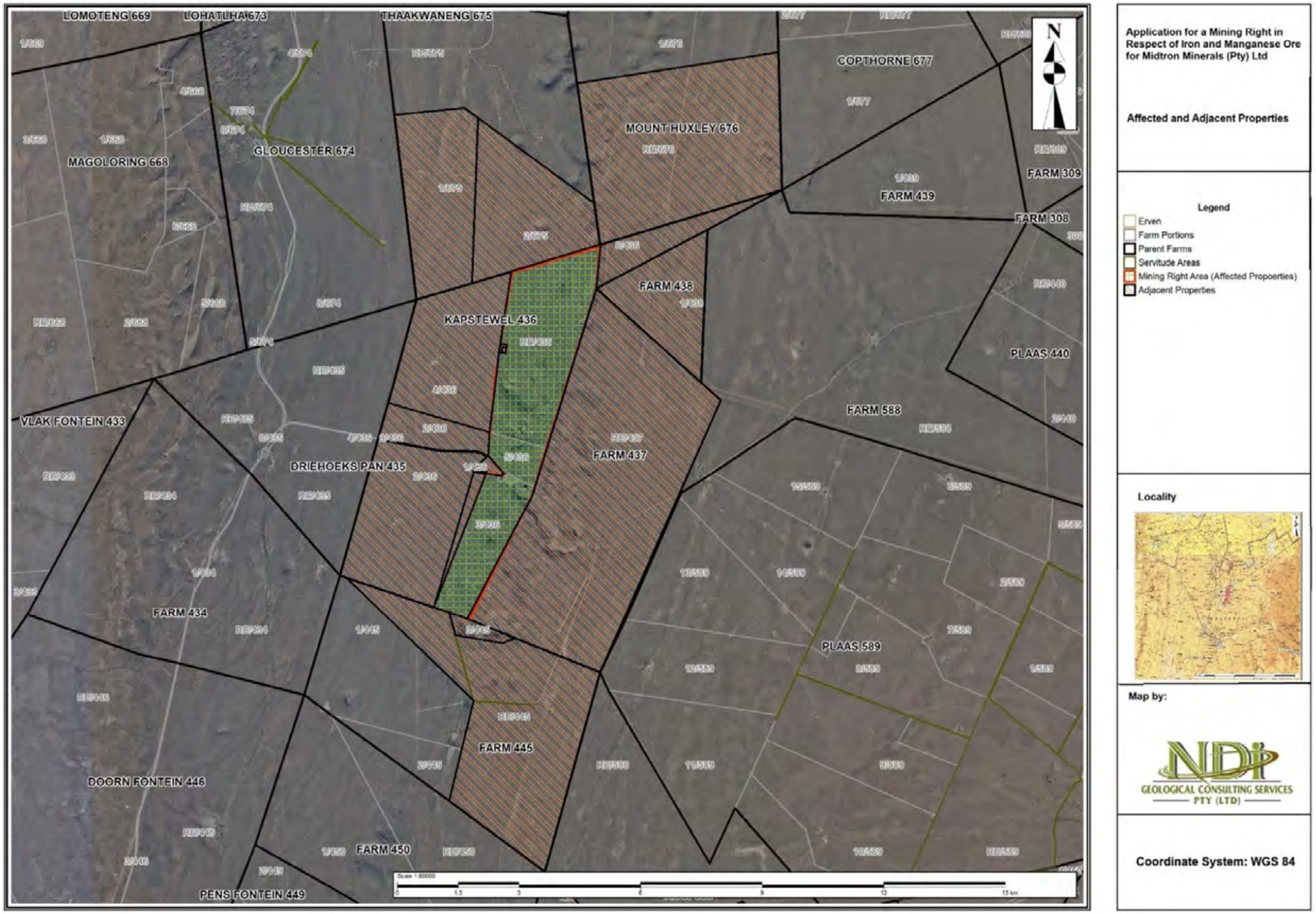


Figure 9-2: Affected and Adjacent Properties

9.1.2 Notification and Registration of the I&APs

Ndi Geological made use of various methods to inform stakeholder of Midtron's intention to undertake the required EA/WML process. Stakeholders were provided with the opportunity to participate and register as I&AP's during the announcement phase of the project.

Distribution of Notification Letters

Notification letters were sent to identified I&APs, informing them of the proposed project.

Site Notice Placements

Sites notice boards (Size A2: 600 mm X 420 mm) notifying stakeholders and I&APs of the proposed activity were placed at conspicuous places in the project area. These areas of placement were determined according to the quantity of potential I&APs that may pass by.

Newspaper Advertisements

Newspaper advertisements notifying stakeholders about the proposed project and the opportunity to participate in the EIA process were placed in the newspapers.

9.1.3 Notification of the Availability of the Draft Scoping Report

The availability of the DSR was announced by means letters, onsite notices, adverts, and emails to registered I&APs. The DSR, announcement letters and comment forms were made available for public viewing and comment in the same public places as for the project announcement phase.

9.1.4 Stakeholder commenting period

The Scoping Report will be made available for a 30-day commenting period from 3 May 2022 to 6 June 2022.

The Scoping Report was also made available to the competent and commenting authorities during the 30-day stakeholder review and commenting period. Stakeholders were encouraged to submit their written comments to the EIA team through the contact details provided. Stakeholders could also fill in comment forms at one of the public places and/or contact the EAP via telephone, email or fax to submit comments and to discuss any issues of concern.

All comments received thus far have been incorporated into the Scoping Report. All comments raised by stakeholders have been recorded and included in the Final Scoping Report and included in the comments and responses table in Section 9.3.

9.1.5 Public Meeting

Public meetings were held during the Scoping Phase of the project where the stakeholders had the opportunity to comment and discuss the report and plan of study and raise issues that may need to be included in the impact assessment phase. All comments received have been incorporated into the final Scoping Report.

9.2 Impact Assessment Phase

9.2.1 Notification Letter

A notification letter informing registered I&APs of the public comment period for the Draft EIA and details of the public meeting was distributed to I&APs via email and SMS.

9.2.2 Draft Report Commenting Period

The Draft EIA/EMPr will be made available to I&APs for a 30-day comment period on the Ndi Geological's website (http://www.ndigeoservices.co.za/). Hard copies will also be made available for perusal at the venues used for the Draft Scoping Report.

9.3 Summary of Issues Raised by I&APs

A summary of the comments received from the stakeholders and responses provided by the EAP is provided in Table 9-4. Comments received from the stakeholders have been attached in Appendix 5.

Table 9-4: Summary of the Issues Raised by the I&APs

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**	**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
AFFECTED PARTIES				
Mr Jaco Grobler		Good afternoon. Kindly find hereto a copy of the notice we observed at the entrance to Portion 4 of the Farm Vaalkop. Wego Africa (Pty) Ltd is the owners of the surface rights of portion 4. We note that the meeting was held on 3 June, but unfortunately only got knowledge thereof today. Can I kindly confirm that I as representative of Wego Africa (Pty) Ltd can be included in future correspondence with regards to the above application?	I would like to confirm that you have been registered as an Interest and Affected Party in the proposed mining project and noted the content of your email. As the registered Interested and Affected Party (I&APs) you will be provided with an opportunity to review and comment on the draft EIA/EMPr over a 30-day period. Comments from I&APs will be incorporated into the final EIA/EMPr and will be submitted to the DMR for decision making. Attached please find a copy of the draft SLP.	N/A
Landowner/s				
Municipal councillor				
Municipality				
No comments received to date.				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS				
Interested Parties				

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Communities: Maremane CPA					
Mr Boniface Masiane	X	4 June 2022	The chairman Mr Boniface Masiane indicated that, as community members of Maremane, they appreciate the information shared with them especially on the issue of study opportunities like bursaries that are going to be made available within their community. The speaker also said that they have requested this from the other mines that as the community of Maremane, they do not want their SLP to form part of the Municipality because most of the time, mining companies only focus on developing communities and towns like Postmasburg, and development never reach them.	Noted	N/A. The issues was in connection with the SLP and did not require action by the EAP
Mr Neo Moitaletsi	X	4 June 2022	The speaker indicated that it was not the first time that they had this type of meetings in their community, however requested that the next time these types of meeting take place, DMR must also be present. He requested for clarity regarding the applicant as he could not remember if it was announced.	She indicated that Midtron Minerals was the applicant and Kapstewel was the area of application (Mining area).	N/A
Mr Neo Moitaletsi	X	4 June 2022	Again, reiterated that the reason for insisting that the DMR be present was because they are the ones issuing licenses to mining companies and they were the right party to hold mining companies responsible for commitments made in their presence. He indicated that DMR was failing communities in this regard since most companies are none-compliant, but nothing is being done, to a point where one would think that DMR is	It was indicated in the opening stage of the meeting that transparency was very important. She made it clear that when Mr Olifant started with the presentation, he did indicate that the Mine Works Plan and the SLP are public documents and are available. Everything that Mr Neo Moitaletsi has mentioned was available for public review. She indicated that the SLP document was still a draft document and had not	N/A

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
			receiving brown envelopes from the non-compliant companies. His second point was that he has noted that the document that was recently presented was not inclusive in that what was mentioned on the document addresses only one component on the SLP which is the social aspect and there was no mention of the Enterprise development and the Labour component of the SLP. Mr Neo Moitaletsi also added that as the community they would like to be provided with the whole plan of what the mine is going to implement in the community of Maremane on an annual basis in terms of skills development, enterprise development and community development. This was for the community to be able to monitor the mining company based on the document provided to them as it seemed then that the consultant team was only there to consult and get the application submitted for approval/ granting. The bottom line was that as the community they wanted to know the numbers and budget allocated for each item listed on the SLP document, the consultant team needed to come back to the community with the plan so that they can agree with what is in the SLP before the right is granted.	yet been approved by the DMR, pointing out to the slide in the presentation which reflected the SLP financial provision. It was also mentioned that another very important issue to note was that the mines are expected to spend 1% of their annual profit on SLP, this includes all aspects in the SLP such as skills development and LED projects. Whatever it is that the mine will be committing itself to, will be based on projections of how the operation will perform financially. Ndi also confirmed that the meeting was recorded, and everything discussed was going to be submitted to the DMR in a form of minutes, and in that way DMR will be aware of everything that has been discussed. She also made Mr Neo Moitaletsi aware that as a member of the community of Maremane, he had every right to go and knock on the doors of DMR to make his voice heard.	
Mr Neo Moitaletsi	X	4 June 2022	Mr Neo Moitaletsi's other concern was that the mine must determine the skills that will be required for the mine to start operating and based on that train the community before the mine starts operating.	Midtron cannot implement anything until the right is granted as they are operating under a prospecting right. All that needed to be done was to speed up the process of the application of the mining right so that the mine can start operating under mining right and implement its commitments.	N/A

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Mr Neo Moitaletsi	X	4 June 2022	Mr Neo Moitaletsi said that the DMR which they as the community are being sent to, was a very useless department, DMR had failed them on several occasions. The meetings that were held between the community and the DMR were not fruitful to a point where the community even wrote to the Minister, but nothing was done still. Mr Neo Moitaletsi went on to advice the consultant team that the involvement of DMR in the project will result in failure. He alleged that DMR sold the community land to the mines that do not benefit anything to the community.	Ndi responded by saying that as an EAP, one of her responsibilities was to not take sides. Hearing what Mr Neo Moitaletsi said that all previous attempts with the department were in vain, they needed to keep trying. She promised to get them contact details for the DMR.	N/A
Elizabeth Mogabeng	X	4 June 2022	Elizabeth Mogabeng mentioned that she has been a resident of Maremane since 2007. She has expressed her anger on several issues related to housing and the road. She indicated that the mention of the word mines breaks her heart and angers her. What further breaks her heart is that during the apartheid era, most of them never got the opportunity to go to school and that they were basically illiterate. She expressed disappointment in the Maremane leadership which they referred to as the CPA and the mining companies around the community that were letting them down. Mines like Kitso, Future shine, Ladino etc are operational in the area but the community remain disadvantaged. No developments taking place in the community, people have been struggling to get water for the past 15 years, there's lack of infrastructure, there's totally nothing happening in Maremane. When people get sick, they are expected to seek medical attention in Postmasburg by hikes/taxis, while they are unemployed.	Ndi's response was that she cannot speak on behalf of other mines, but the community's comments have been noted. And that going forward, any letter that will be written, should be written by the community, and not the CPA to show unity.	N/A

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
			Elizabeth Mogabeng further expressed her disappointment with the mines in that when they want their applications to be successful, they make a lot promises to the communities that they never fulfil. She also added that she was temporarily blind because of the teargas that was used by the police on them and that her son was also walking around with rubber bullets because they were protesting the mines. She went on to say that she was living in poverty because she was uneducated, and that most of the kids in the community were unemployed and those that are working have been earning R3000.00 for the past 6 years. Hence, she said she was not sure if they were being failed by their CPA since they were meant to represent the community or if they were being failed by the mines themselves. The instruction was that when a mine is not serving the interest of the community, its right needs to be cancelled. The community has been there for 15 years and yet there was no school built for them. She indicated that they have been called for a meeting where they will need to express their needs but that is where it was going to end just like with the previous applicant, and that the current applicant may never come back again. The CPA leadership was again pleaded with to cancel the permit of mines that were not serving the community. Previous applicants or mining companies left the area without rehabilitating it, leaving it with diggings. In some instances, skeletons were also found in Maremane and were taken away, it is not clear what happened to that matter.		

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Mr M Moloka	X	4 June 2022	Mr Maloka thanked Ndi for her wonderful words but went on to say that everyone looking for work would say the same things. He made it clear that he does not believe that anything different will be done by the current applicant. They have never received any assistance from the mines even when they have requested for assistance, they would be told of the community that don't even know of. He complained that their kids must be up at 06: 00am to travel to school in Postmasburg. He also mentioned his doubt for DMR, that nothing good was going to out of their involvement. He gave an example of when the community called a government official to come and witness the dust that was being emitted from the area by the mines. Needless to say, that no assistance was received in that regard.	She promised to incorporate all their comments on the final scoping and EIA/EMPr. Ndi explained that the employees can approach department of labour for issues related to salaries, with issues related to SLP implementation they must approach DMR.	The issues raised will be incorporated into the EMPr and the SLP.
Mr Billy	X	4 June 2022	Should the community get any proof that the mine was not compliant in terms of its commitments, the community was going to put the mining operation to a halt. He did not understand why companies would be allowed to work with Prospecting right without committing to do anything for the communities. The state of roads was said to be bad and that there were a lot of trucks on the roads carrying a lot of minerals from the mines that have prospecting rights. He seemed to think that by the time companies with prospecting rights applied for mining right, mining companies are already full.	It is evident that Midtron doesn't want to repeat the same offence to continue to mine under a prospecting; hence the company recently lodged the mining right application in March 2022 even though their existing prospecting right allows them to prospect for five years.	N/A

Interested and Affected Parties **List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.**		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Section and paragraph reference in this report where the issues and or response were incorporated.**
Unnamed	X	4 June 2022	Who is the owner of all portions of Kapstewel where the mine is situated and who is the owner of the mine?	The owner of the proposed Mine is Midtron Minerals and the owners of Kapstewel portions are as follows: Remaining Extent of Kapsteewel 436- Victor Schalk Willem Remaining Extent of Portion 3 -Autumn Skies Resources and Logistics Portion 5 of Kapsteewel 436 -Sincerity Resources SA Pty Ltd	N/A
Dept. Land Affairs					
Traditional Leaders					
Dept. Environmental Affairs					
Other Competent Authorities affected					
OTHER AFFECTED PARTIES					

9.4 Notification of authority decision

Registered stakeholders will be advised in writing (mail, email, fax and SMS) of the authority decision on the EIA / EMPr, and details on the procedure to appeal the decision. Notification to registered stakeholders will summarise the authorities' decision and provide information according to legal requirements on how to lodge an appeal should they so wish.

10 Baseline Characterisation

This section provides a general overview of the status quo of the environmental and social context within which the proposed project is located. All of the proposed activities will take place within the affected properties. While most of the descriptions below are focused on the site itself, where necessary the regional context of the environmental features is also explained. For each environmental aspect discussed below, proposed environmental issues/impacts have been highlighted qualitatively where applicable.

These issues have been explored on a quantitative level in this EIA and included in Section 13 of this report.

10.1 Regional Setting

The proposed project area is situated in the Tsantsabane Local Municipality's area of jurisdiction, within the ZF Mgcawu District Municipality, Northern Cape Province. The affected property is located approximately 15km north of the town of Postmasburg, approximately 40km southeast of the town of Olifantshoek, approximately 50km south of the town of Kathu.

10.2 Topography

The topography around Postmasburg contains small variations in elevation, with a maximum elevation change of 80 metres and an average elevation above sea level of 1 327 mamsl.

The topography map of the proposed mining area shows that the altitude of the site varies from approximately 1 587 mamsl to 1 440 mamsl (Figure 10-1).

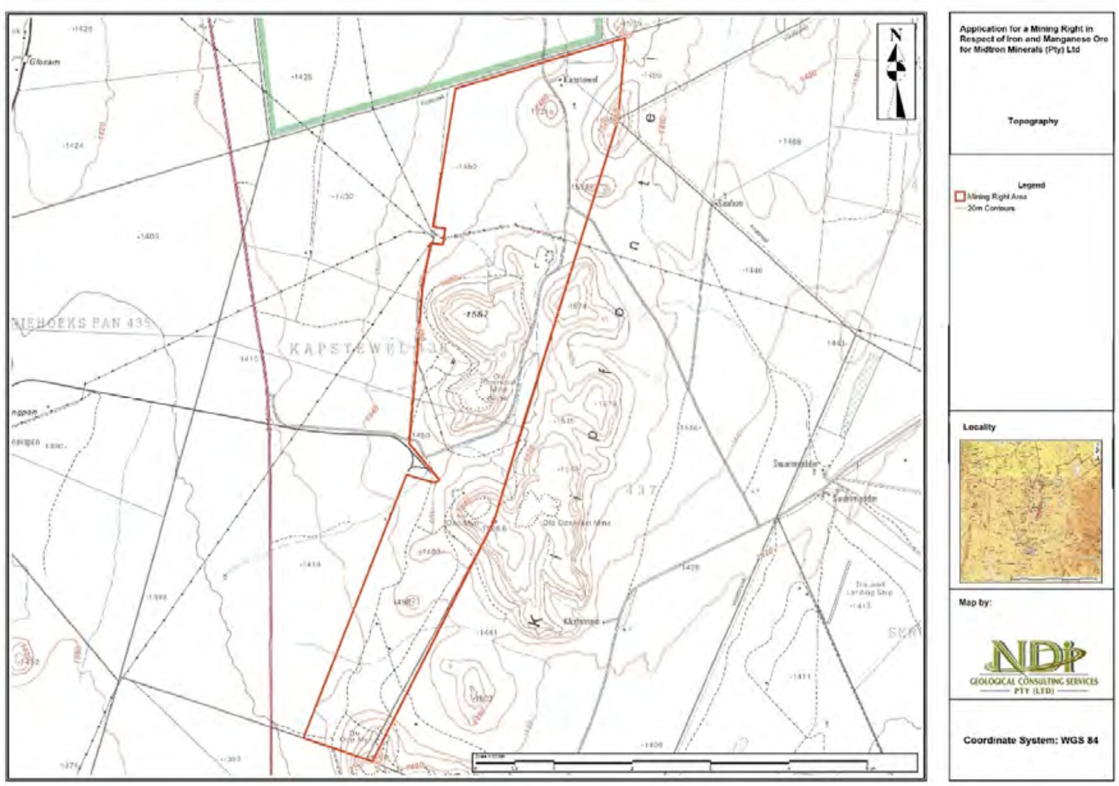


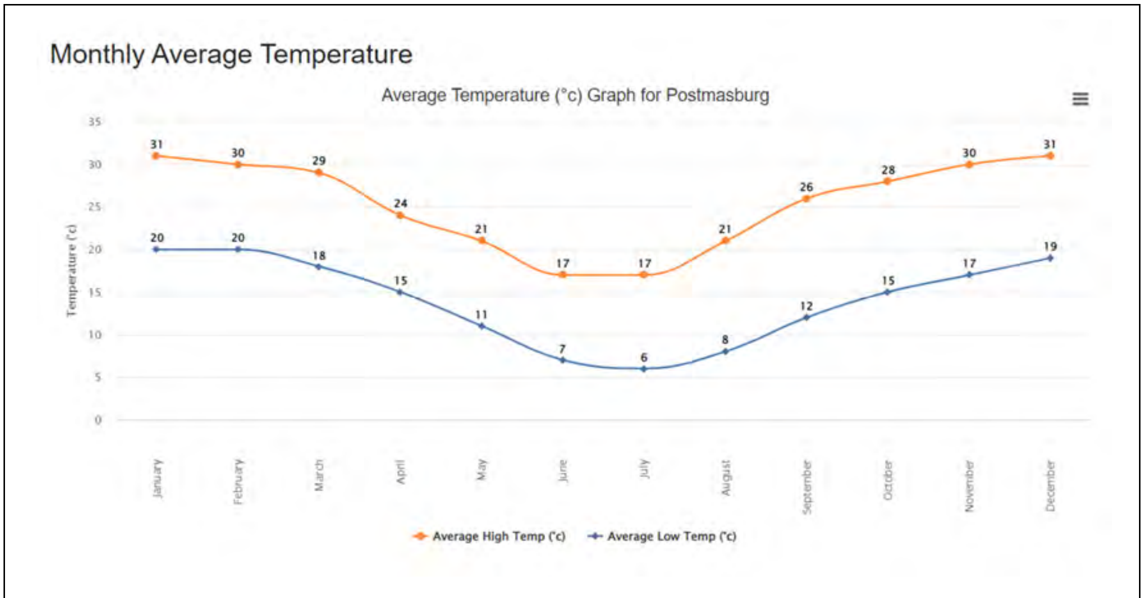
Figure 10-1: **Topography**

10.3 Climate

Postmasburg has a Subtropical desert climate (Classification: BWh).

10.3.1 Average Monthly Temperatures

Figure 10-2 indicates the average monthly temperature for Postmasburg.



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AVERAGE MONTHLY TEMPERATURES FOR KIMBERLEY

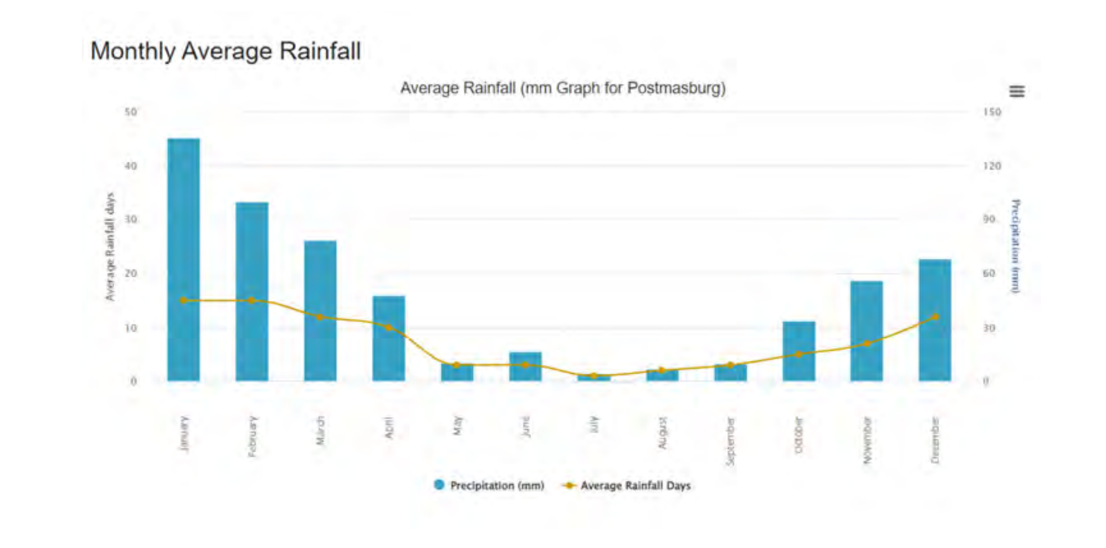
Figure 10-2: Average Monthly Temperatures for Postmasburg (Source: Weather SA)

The figure shows that:

- The highest maximum temperature is experienced during November, December, January and February.
- The average maximum is around 31°C.
- The coldest months of the year are June and July, where the average temperature drops to below 20°C.

10.3.2 Average Monthly Temperatures

Figure 10-3 indicates the average monthly rainfall for the region.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

AVERAGE MONTHLY RAINFALL FOR KIMBERLEY

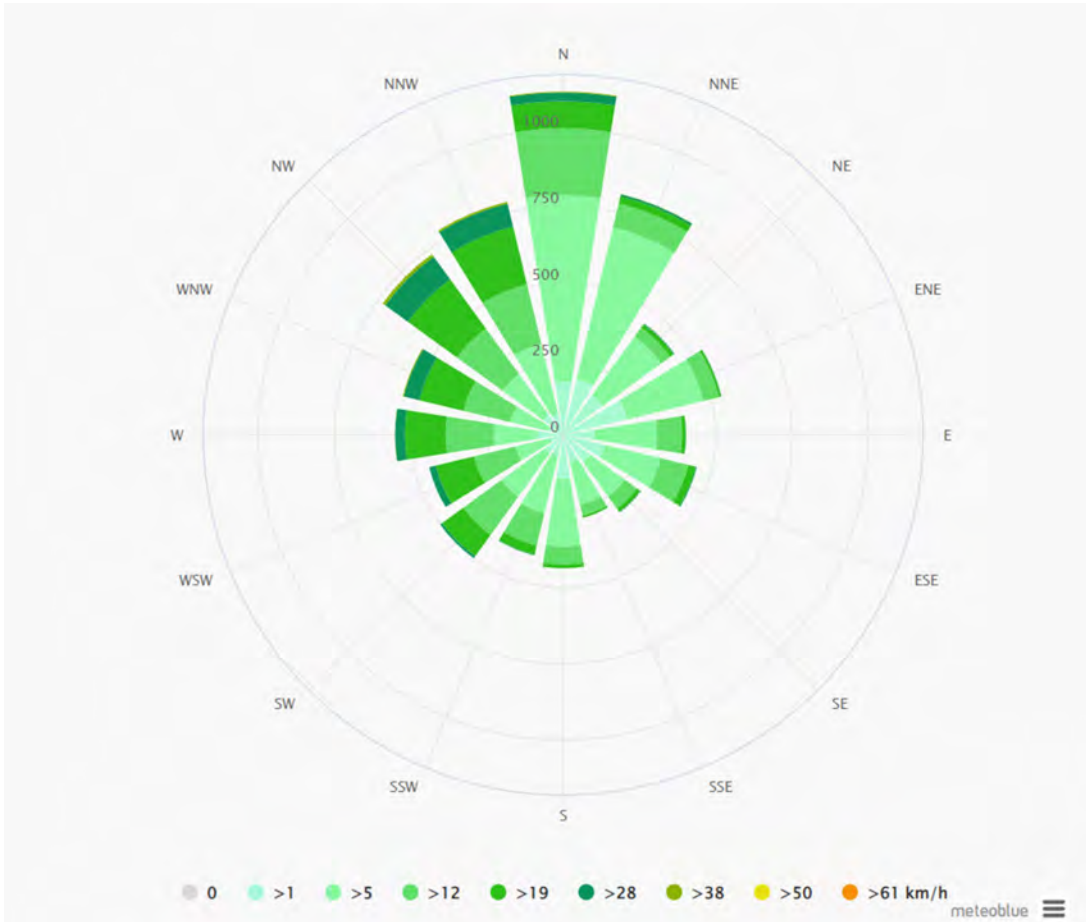
Figure 10-3: Average Monthly Rainfall for Postmasburg (Source: Weather SA.)

The average monthly rainfall data indicates that:

- The highest rainfall months are November, December, January and February, March with an average well below 40mm;
- January has a higher peak with just over 45mm;
- While the dry months are May, June, July, August September and with an average of below 10mm.

10.3.3 Wind Direction

The wind rose for Postmasburg shows that the predominant average hourly wind direction in Postmasburg varies throughout the year. The wind is most often from the north from January to September, with a peak in July (Figure 10-4).



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WIND DIRECTION

Figure 10-4: Wind Direction for Postmasburg (Source: Weather SA)

10.4 Geology

The study area falls in the Postmasburg area which lies at the southern end of a domal structure termed the Maremane Anticline in which dolomites of the Campbell Rand Group are exposed. The Campbell Rand Group deposits in this area are overlain by the Kuruman Banded Iron Formation - the Kuruman Member of the Asbesheuwel Formation. The dolomite palaeosurface is karsted, leading to collapse structures where iron and manganese formation has fallen into karst cavities.

In this area iron ore can be subdivided into an eastern and western belt that extends from Postmasburg northwards for 65km to Sishen. The area lies near the eastern Klipheuwel belt. The targeted ore bodies of this belt are in situ banded ironstone with bands of amphibolite and lenses of flat pebble conglomerate, ferruginised brecciated banded ironstone (Blinkklip breccia) and detrital iron ore which have been derived from pre-existing iron ore (thick- or thinly laminated or breccia) by processes of weathering and/or erosion.

To the immediate west, eastwards directed thrusting along the margins of the north south striking Kheis Orogenic Belt, brings younger Palaeoproterobufferc rocks of the Olifantshoek Supergroup over the Transvaal rocks. Restricted and now largely depleted bosies of high- grade manganese and iron ore are present along the Eastern belt of Postmastburg Manganese Field o the farms Kapstewel 436, Klipfontein 437 etc. (Anhaeusser and Wilson, 1989).

The geology of the property as shown in Figure 10-5, is dominated by dolomitic limestone (puckered limestone) with subordinate coarsely crystalline dolomite, chert ad lenses of limestone (Vgl). To the middle of the property, small portions of banded ironstone with bands of amphibolites are observed (Vak). Banded chert and chert breccia, largely covered by rubble (Vgl) is mostly observed around the banded ironstone. Red to flesh coloured windblow sand; sand dune (Qs) covers some parts of the property. A small portion of coarse-grained brown quartzite and subgraywacke; conglomerate (Mmf) of the Olifantshoek Group is also observed towards the centre of the property and adjacent to it.

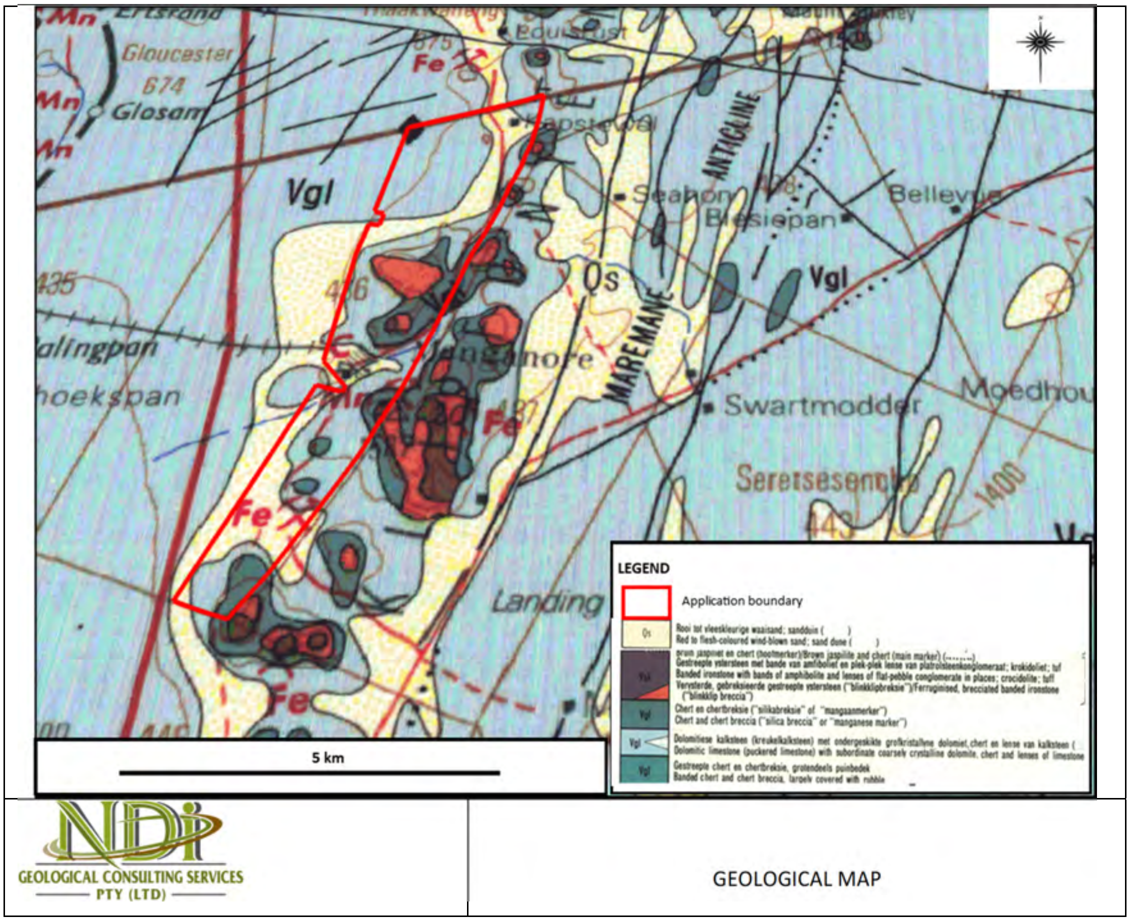


Figure 10-5: Geological Map

10.5 Surface Water and Hydrology

10.5.1 Catchment Areas and Rivers

The project is located within quaternary catchment D73A which is located within the Lower Vaal Water Management Area (WMA) (Figure 10-6). Catchment D73A is drained by the Skeifontein Spruit in the east which drains the Kuruman Hills, the Groenwater Spruit in the central region and an unnamed drainage in the north-west which drains the Langberg Mountains. The Groenwater and Skeifontein drainages join just before the southern boundary of the catchment where it runs into the Soutloop Drainage. These drainages only flow after flood events or during very wet cycles and are dry for most of the time. Catchment D73A has no official annual runoff figure as the water evaporates in the catchment (WR2012).

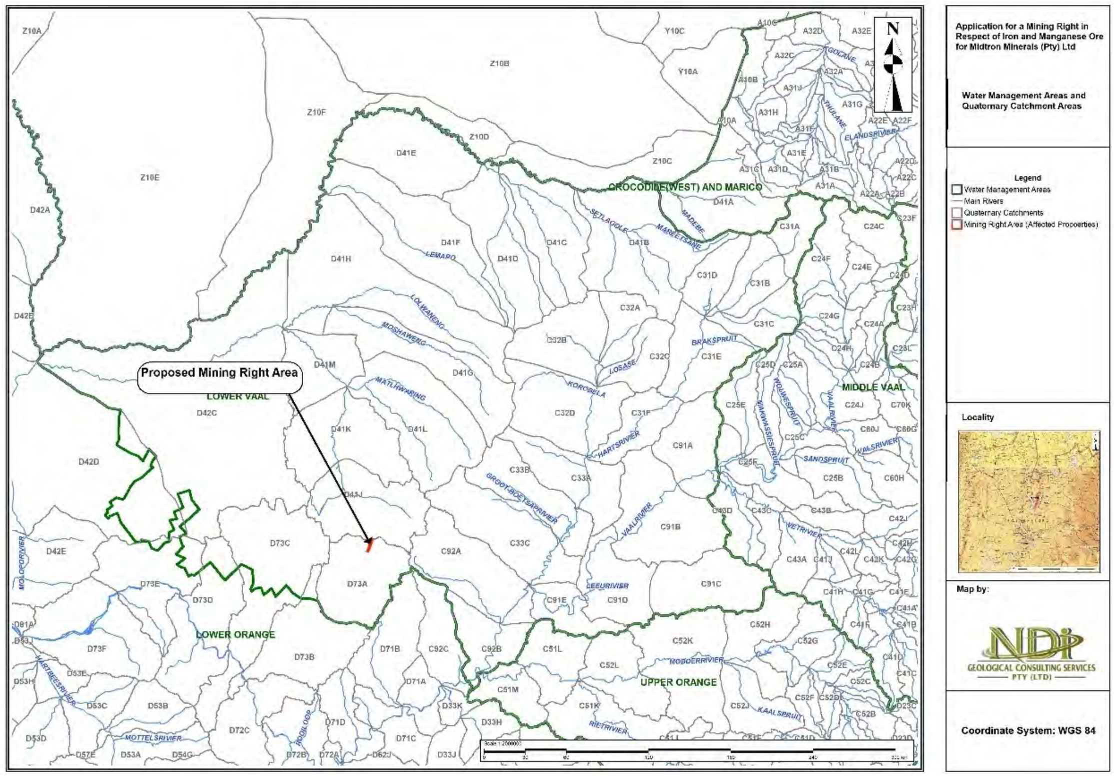


Figure 10-6: Water Management Areas and Quaternary Catchment Areas

The Groenwaterspruit River Basin (Figure 10-7) envelopes the entire project site and covers an area of 621 000 000 m² (621.00 km2). The catchment's properties are presented in Table 10-1.

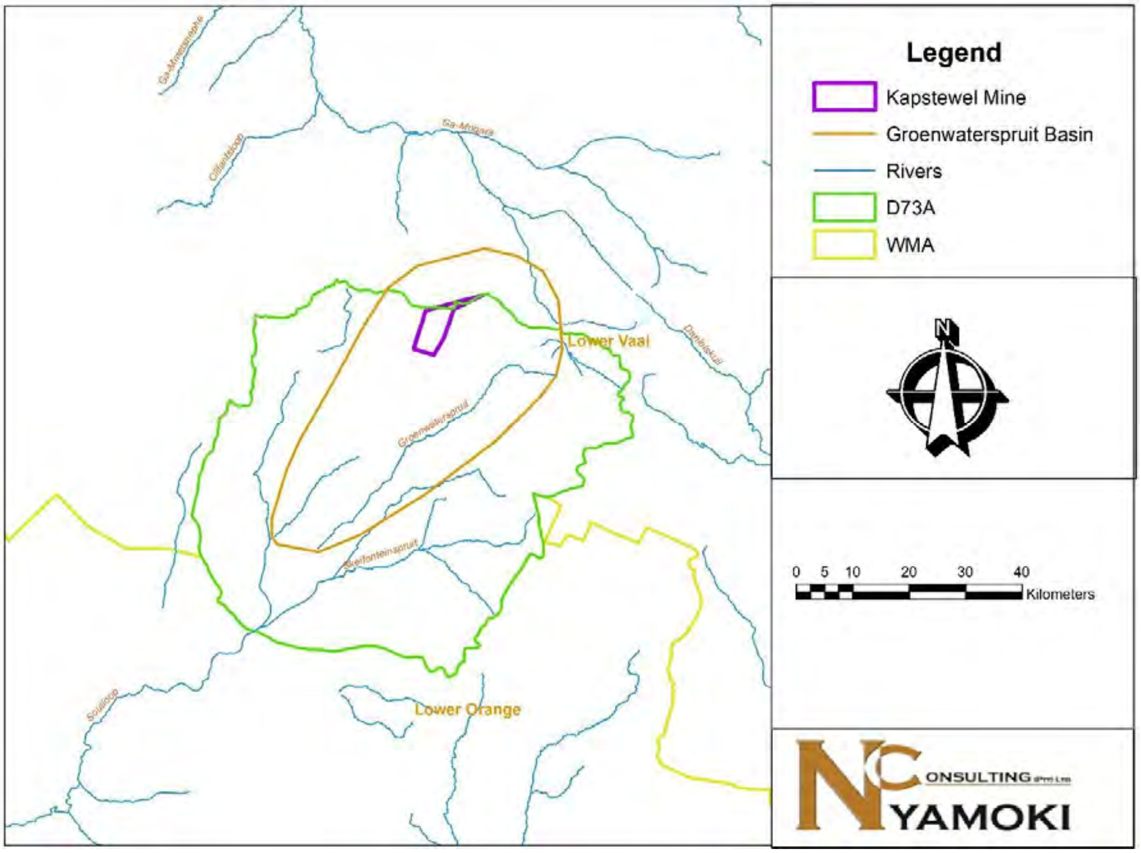


Figure 10-7: Groenwaterspruit River Basin within Quaternary Catchment D73A

Table 10-1: Catchment Properties

Catchment Area (km^2)	621
Length of Longest Watercourse (km)	56.52
Elevation Difference (m)	155 (1285–1440)
Mean Annual Precipitation (mm/annum)	323

There are drainage lines that traverse the project area (Figure 10-8).

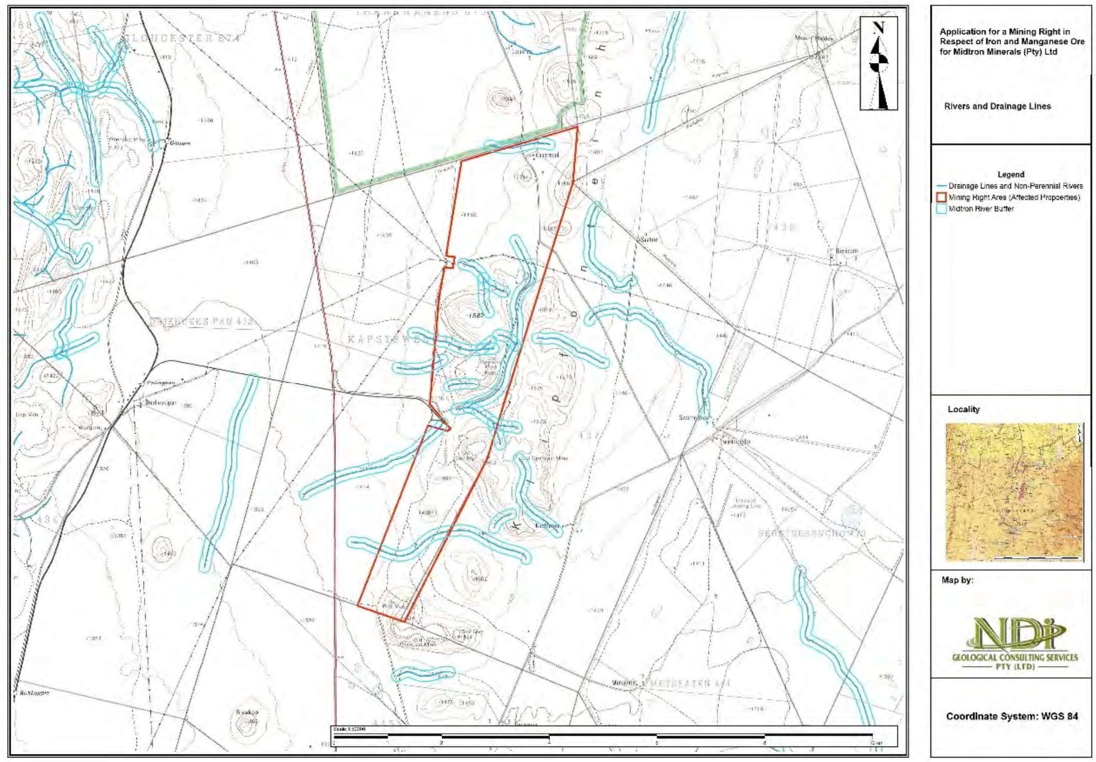


Figure 10-8: Rivers, Streams and Drainage Lines

According to the SANBI Aquatic habitat Inventory (2006) National Freshwater Ecosystem Priority Areas (NFEPA) (2011), the affected quaternary catchment area is not regarded as important in terms of fish sanctuaries, rehabilitation or corridors. In addition, the quaternary catchment area is not considered important in terms of translocation and relocation zones for fish.

10.5.2 Floodlines

A floodline determination analysis was undertaken by a hydrologist to determine the 1:50 year and 1:100-year floodline areas. The results of the assessment are provided in Figure 10-9 and Figure 10-10.

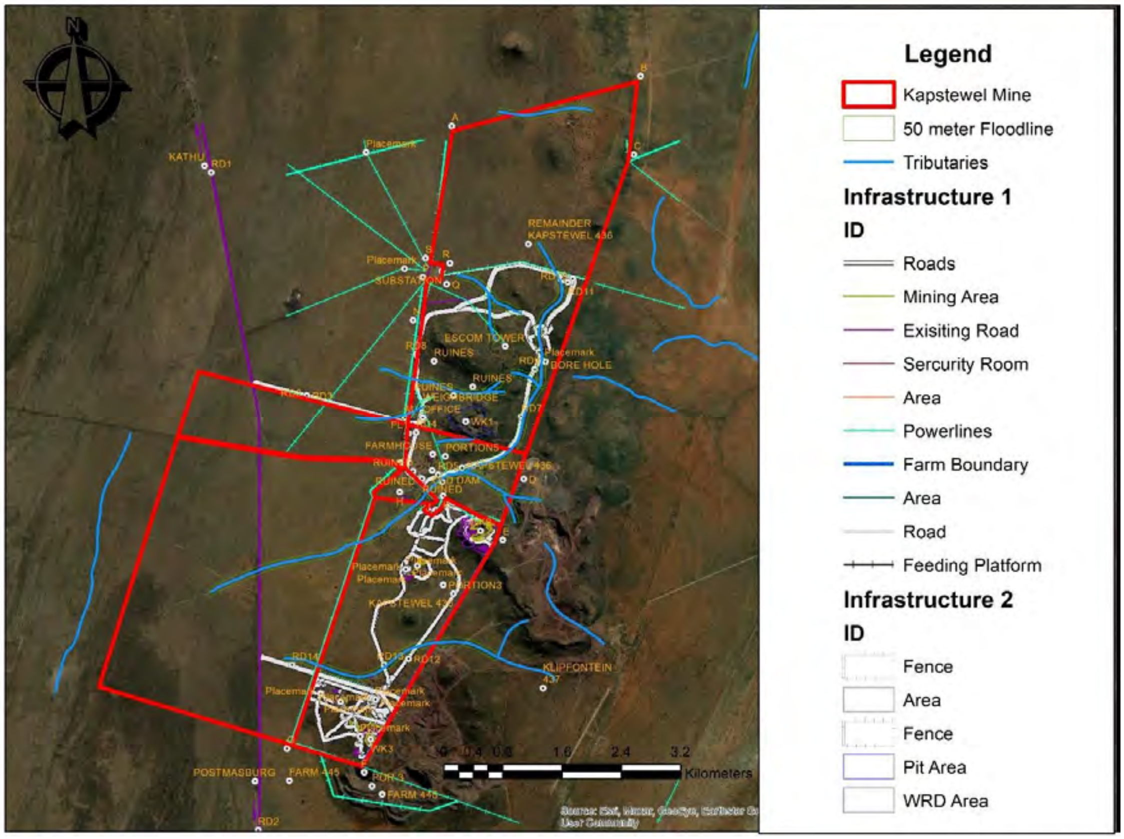


Figure 10-9: 1:50 year Floodlines

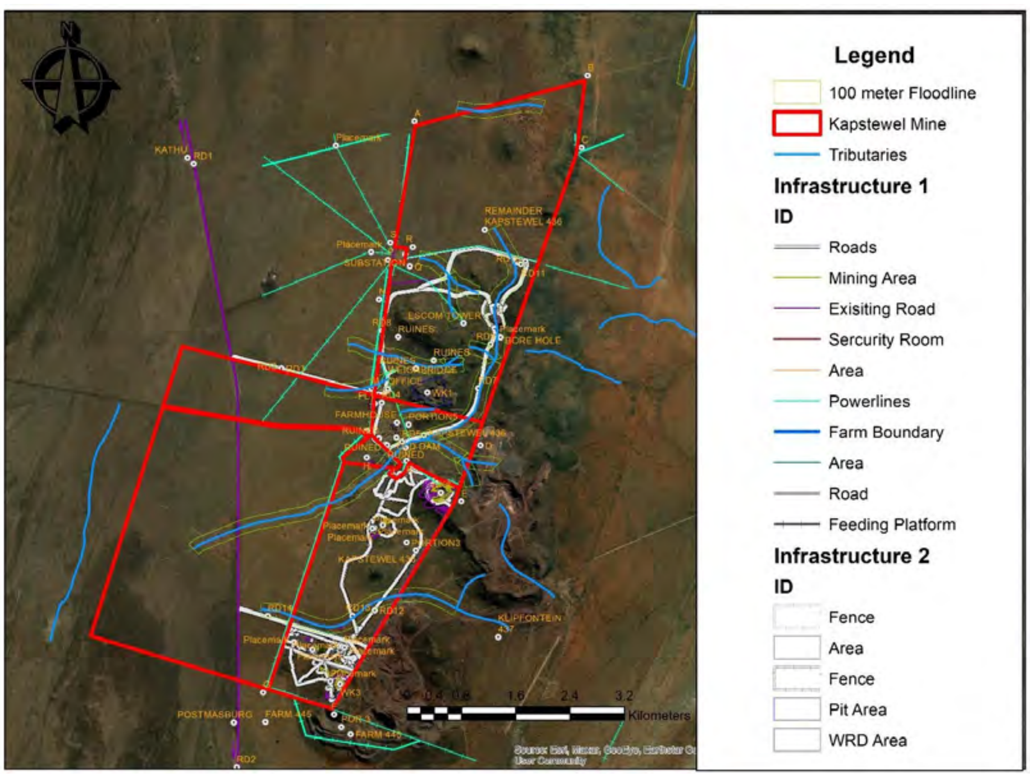


Figure 10-10: 1:100 Year Floodline

10.6 Conceptual Stormwater Management

Mining operations have the potential to impact on the natural water quality and quantity of an area in the following ways:

- Bulk earthworks that strip vegetation loosen and expose top soils and sub-soils. Stormwater flows are likely to erode and remove loosened soils thereby increasing the levels of TSS within local watercourses;
- Earthworks and mineral processing operations may expose elements naturally occurring within soils and geology, that would otherwise not have been exposed to stormwater, washing them into local watercourses;
- Storage and usage of process specific chemicals and vehicular related pollutants which, if not properly stored and managed, may be washed by stormwater into local watercourses;
- Runoff of polluted or improperly treated stormwater and / or process water into local watercourses may occur; and
- The velocity of stormwater runoff from impermeable and compacted areas, is most likely to be higher than that of pre-construction and needs to be managed to prevent erosion.

A negative impact on the baseline water quality by mining operations will affect aquatic ecosystems and local populations that depend on suitable water quality and quantity. In addition to the above, stormwater may pose a risk of flooding and unnecessary erosion if not managed correctly.

The purpose of the conceptual SWMP is to mitigate the above impacts, by fulfilling the requirements of the NWA, and more specifically Regulation 6 and 7 of GN704, pertaining to the separation of clean and dirty water and the protection of water resources.

The following design philosophy was used to guide the development of the SWMP, and is based on GN704 and the DWS Best Practice Guideline (BPG) G1: Storm Water Management:

- Confine or divert any unpolluted water to a clean water system, away from a dirty area;
- Runoff from dirty areas must be captured and contained;
- Clean and dirty water systems must be designed and constructed to prevent cross contamination;
- Dirty water must, as far as possible, be recycled and reused;
- Clean and dirty water systems must convey/contain the 50-year storm event, and should not lie within the 100 year floodline or within a horizontal distance of 100 m from any watercourse, whichever is the greater of the two; and
- Appropriate maintenance and management of stormwater related infrastructure should be ensured at all times.

10.6.1 Clean and Dirty Areas

Clean and dirty area catchments were delineated from the 5 m spatial resolution DEM, to calculate the 1:50 year peak flows that would need to be controlled at the Mine. Clean areas include all areas upslope of the proposed Mine infrastructure, as well as the topsoil dumps. Dirty areas are those areas that are in contact with mining activities and have a potential to contaminate surface water. Based on the surface infrastructure layout, the following areas were classified as dirty:

- Open Cast
- Waste dumps;

- Plant;
- Product stockpiles;
- ROM stockpiles; and

10.6.2 Proposed Stormwater Measures and Conceptual Designs

The proposed SWMPs for the Kapstewel Mine is presented in Figure 10-11. The SWMPs have been designed as a closed system (i.e. no discharge of dirty water to the environment). Stormwater measures proposed to separate clean and dirty water areas include channels (trenches) and berms. These are discussed below.

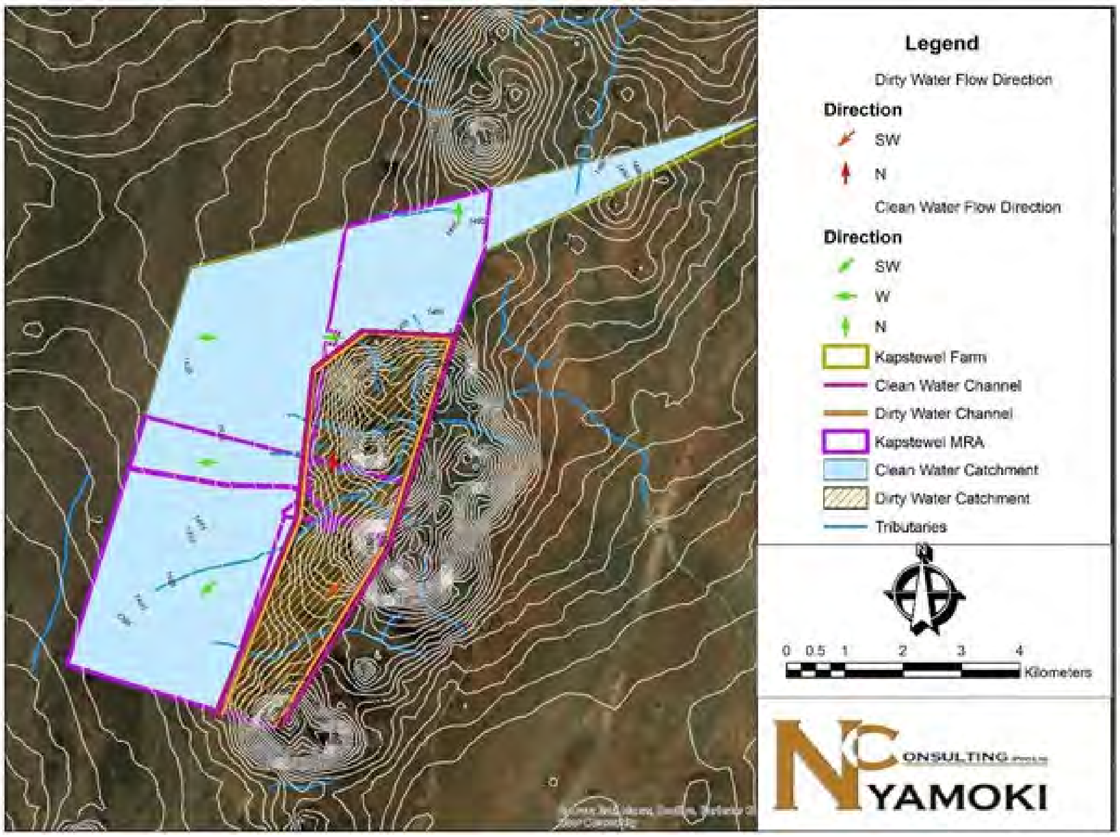


Figure 10-11: Proposed Stormwater Management Plan

10.6.3 Channels and Berms

It is proposed that the channels will be trapebufferdal in shape, with side slopes ranging from 1:2 to 1:3, according to best practices (Figure 10-12). The channels have, as far as practicably possible, been positioned to use the natural slope to convey clean and dirty water. Should space be an issue, then rectangular channels can be considered.

The clean water channels will be unlined but vegetated with indigenous grass species. The excavated material from the channel will be placed on the downslope side, to form a separation berm between clean and dirty areas. The separation berm must also be vegetated with grass. All clean water channels will discharge water into the nearest downslope watercourse.

Runoff from dirty areas will report to a nearby dirty water channel that will be lined to prevent seepage, as required by GN704. It is proposed that all dirty channels are concrete lined, and that they discharge into the nearest downslope dirty water containment facility.

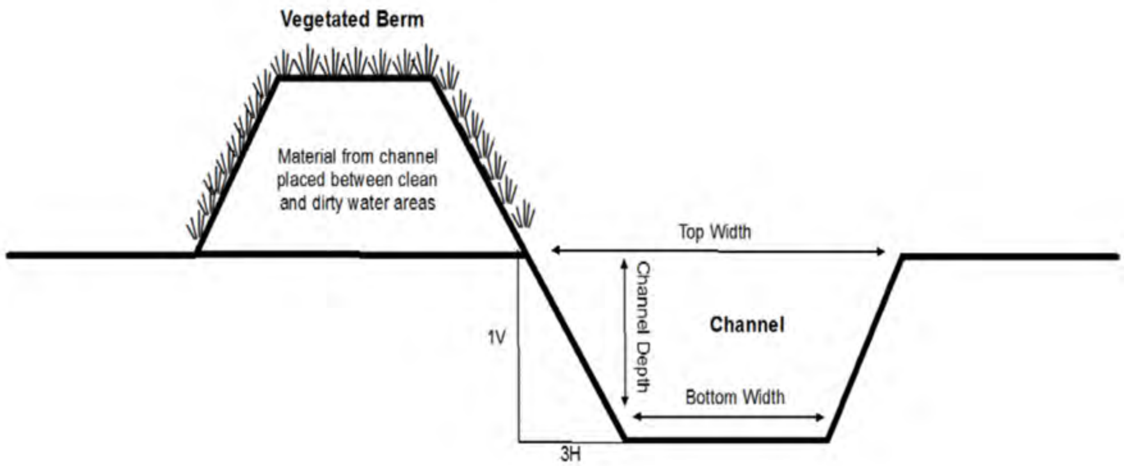


Figure 10-12: Proposed trapebufferdal channel design

10.7 Water Balance

A water balance was calculated for the proposed mine. The results of water balance assessment are presented in Table 10-2 to Table 10-4.

Table 10-2: Annual Water Balance for the planned Iron and Manganese Ore Mine on parts of the Kapstewel farm

	Water In		Water Out		
Process Units	Water Stream	Quantity m^3/ annum)	Water Stream	Quantity (m^3/ annum)	Balance
Pollution Control Dam	Runoff from stockpiles and waste dumps	-	Abstractions for Dust Suppression	13 845.39	
	Opencast Pit Dewatering	-	Spill to Open Cast Pit (when full)	-	
	Direct Rainfall	1 364.46	Evaporation Losses	10 349.59	
	Runoff from Workshop and Processing Plants Area	22 830.53			
Total		24 194.98		24 194.98	-
Opencast Pit	Direct Rainfall	40 683.65	Evaporation	211 770.50	
	Groundwater Ingress	194 616.90	Dewatering to PCDs	-	
	Spill water from the PCD	-	Other Losses	23 530.06	
Total		235 300.55		235 300.55	-
Office Block and other Buildings	Potable water from Municipality	459.90	Underground Conservancy Tank	459.90	
Total		459.90		459.90	-
Ablutions	Potable water from Municipality	1 916.25	Underground Conservancy Tank	1 916.25	
Total		1 916.25		1 916.25	-
Workshop Area	Direct Rainfall	1 615.00	Surface Runoff (To PCDs)	484.50	
			Losses (Evaporation, Seepage etc)	1 130.50	
Total		1 615.00		1 615.00	-
Processing Plants Area	Direct Rainfall	74 486.75	Surface Runoff (To PCDs)	22 346.03	
			Losses (Evaporation, Seepage, etc)	52 140.73	
Total		74 486.75		74 486.75	-
Topsoil Stockpile	Direct Rainfall	323.00	Surface Runoff (To PCDs)	-	
			Evaporation	290.70	
			Seepage Losses	32.30	
Total		323.00		323.00	-
Tailings Stockpile	Direct Rainfall	323.00	Surface Runoff (To PCDs)	-	
			Evaporation	290.70	
			Seepage Losses	32.30	

Total		323.00		323.00	-
Waste Rock Dump	Direct Rainfall	323.00	Surface Runoff (To PCDs)	-	
			Evaporation	290.70	
			Seepage Losses	32.30	
Total		323.00		323.00	-

Table 10-3: Monthly Water Balance for the planned Iron and Manganese Ore Mine on parts of the Kapstewel farm

	Water In		**Water Out**		
Process Units	**Water Stream**	**Quantity (m^3/ month)**	**Water Stream**	**Quantity (m^3/ month)**	**c e**
Pollution Control Dam	Runoff from stockpiles and waste dumps	-	Abstractions for Dust Suppression	1 153.78	
	Opencast Pit Dewatering	-	Spill to Open Cast Pit (when full)	-	
	Direct Rainfall	113.70	Evaporation Losses	862.47	
	Runoff from Workshop and Processing Plants Area	1 902.54			
Total		**2 016.25**		**2 016.25**	**-**
Opencast Pit	Direct Rainfall	3 390.30	Evaporation	17 647.54	
	Groundwater Ingress	16 218.07	Dewatering to PCDs	-	
	Spill water from the PCD	-	Other Losses	1 960.84	
Total		**19 608.38**		**19 608.38**	**-**
Office Block and other Buildings	Potable water from Municipality	38.33	Underground ConservancyTank	38.33	
Total		**38.33**		**38.33**	**-**
Ablutions	Potable water from Municipality	159.69	Underground Conservancy Tank	159.69	
Total		**159.69**		**159.69**	**-**
Workshop Area	Direct Rainfall	134.58	Surface Runoff (To PCDs)	40.38	
			Losses (Evaporation, Seepage, etc)	94.21	
Total		**134.58**		**134.58**	**-**
Processing Plants Area	Direct Rainfall	6 207.23	Surface Runoff (To PCDs)	1 862.17	
			Losses (Evaporation, Seepage, etc)	4 345.06	
Total		**6 207.23**		**6 207.23**	**-**
Topsoil Stockpile	Direct Rainfall	26.92	Surface Runoff (To PCDs)	-	
			Evaporation	24.23	
			Seepage Losses	2.69	

Total		**26.92**		**26.92**	**-**
Tailings Stockpile	Direct Rainfall	26.92	Surface Runoff (To PCDs)	-	
			Evaporation	24.23	
			Seepage Losses	2.69	
Total		**26.92**		**26.92**	**-**
Waste Rock Dump	Direct Rainfall	26.92	Surface Runoff (To PCDs)	-	
			Evaporation	24.23	
			Seepage Losses	2.69	
Total		**26.92**		**26.92**	**-**

Table 10-4: Daily Water Balance for the planned Iron and Manganese Ore Mine on parts of the Kapstewel farm

	Water In		**Water Out**		
Process Units	Water Stream	Quantity (m^3/ day)	Water Stream	Quantity (m^3/ day)	Balance
Pollution Control Dam	Runoff from stockpiles and waste dumps	-	Abstractions for Dust Suppression	37.91	
	Opencast Pit Dewatering	-	Spill to Open Cast Pit (when full)	-	
	Direct Rainfall	3.74	Evaporation Losses	28.34	
	Runoff from Workshop and Processing Plants Area	62.51		-	
Total		66.24		66.24	-
Opencast Pit	Direct Rainfall	111.39	Evaporation	579.80	
	Groundwater Ingress	532.83	Dewatering to PCDs	-	
	Spill water from the PCD	-	Other Losses	64.42	
Total		644.22		644.22	-
Office Block and other Buildings	Potable water from Municipality	1.26	Underground Conservancy Tank	1.26	
Total		1.26		1.26	-
Ablutions	Potable water from Municipality	5.25	Underground Conservancy Tank	5.25	
Total		5.25		5.25	-
Workshop Area	Direct Rainfall	4.42	Surface Runoff (To PCDs)	1.33	
			Losses (Evaporation, Seepage, etc)	3.10	
Total		4.42		4.42	-
Processing Plants Area	Direct Rainfall	203.93	Surface Runoff (To PCDs)	61.18	

			Losses (Evaporation, Seepage, etc)	142.75	
Total		203.93		203.93	-
Topsoil Stockpile	Direct Rainfall	0.88	Surface Runoff (To PCDs)	-	
			Evaporation	0.80	
			Seepage Losses	0.09	
Total		0.88		0.88	-
Tailings Stockpile	Direct Rainfall	0.88	Surface Runoff (To PCDs)	-	
			Evaporation	0.80	
			Seepage Losses	0.09	
Total		0.88		0.88	-
Waste Rock Dump	Direct Rainfall	0.88	Surface Runoff (To PCDs)	-	
			Evaporation	0.80	
			Seepage Losses	0.09	
Total		0.88		0.88	-

10.8 Aquatic habitats and Aquatic Ecosystem

The SANBI data shows that there are no aquatic habitats occurring on the study area as shown in Figure 10-13. This is supported by findings from the aquatic habitat delineation assessment that was undertaken as part of the process.

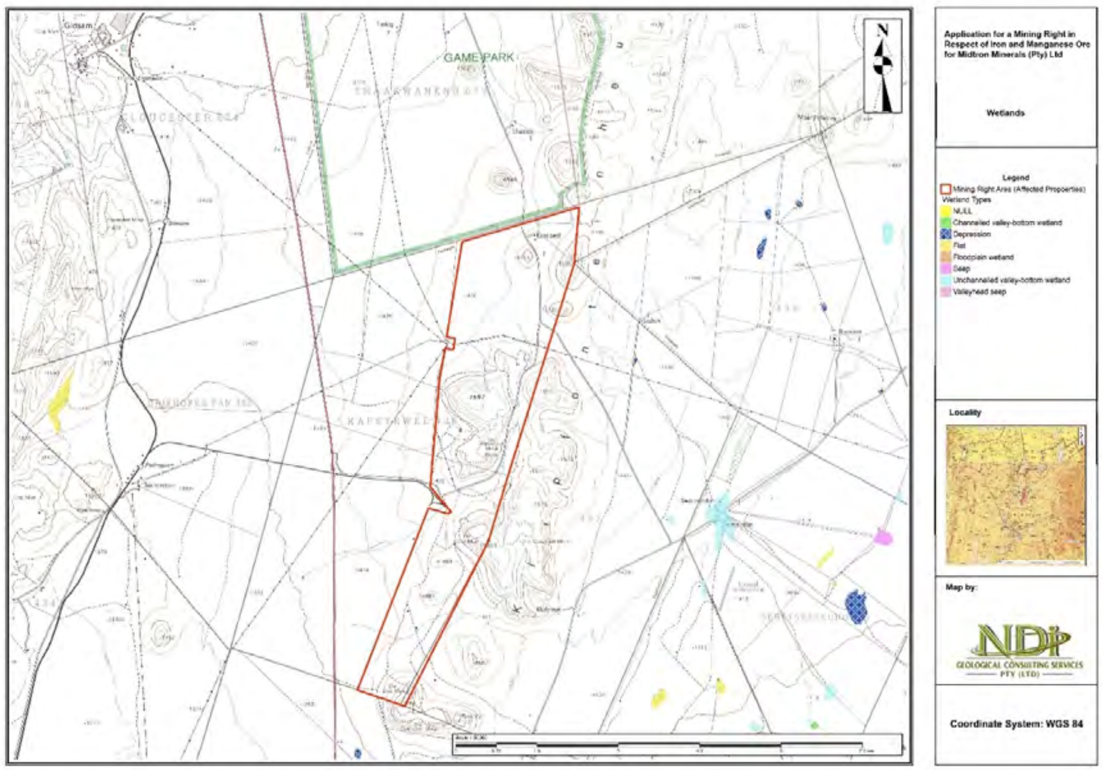


Figure 10-13: Aquatic habitat Types

The study area consists of dry tributaries, however, due to the most rains, some of the tributaries were covered with stormwater. Water inputs in these systems are mainly from sub-surface flow and outflow is either very limited or through diffuse sub-surface and/or flow with no direct surface water connection to a stream channel (Kotze et al., 2008). The stream on the property is considered an NFEPA watercourse, meaning that the area is regarded as important for the conservation of biodiversity. Since the stream is currently dry, there are no direct benefits for humans that can be derived from the watercourse. Based on the EIS assessment of the watercourse, the overall EIS score was 1.5 which is categorised as Moderate. The moderate state of a aquatic habitat is interpreted as a aquatic habitat that is considered to be ecologically important and sensitive on a provincial or local scale. Figure 10-14 indicates the services performed by the stream when it's functional. It is very important to note that the watercourse is located within a very sensitive area, which plays a major role in managing Biodiversity.

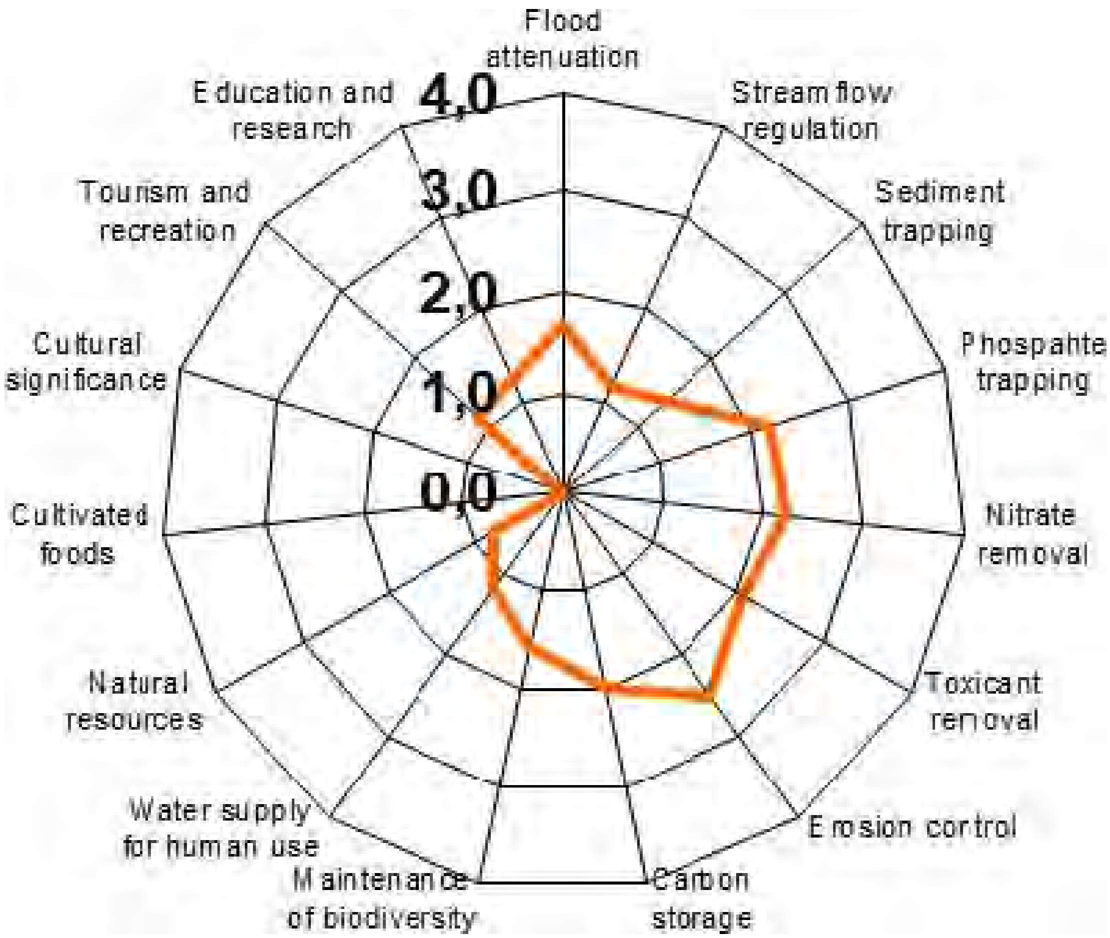


Figure 10-14: Spider diagram illustrating the importance of various ecosystem services provided by the Stream

10.9 Groundwater

10.9.1 Regional and Local Geohydrology

Pertinent geohydrological information as gathered from the DWS 1:500 000 Hydrogeological Map series of the Republic of South Africa, sheet 2722 Kimberly (2003) is presented in Table 10-5.

Table 10-5: Regional Characteristics - 1:500 000 Hydro-geological map.

Characteristics	EIA Area
Nature of the water bearing rocks/surface/sub-surface lithology	Predominantly carbonate rocks (dolomites and sub-ordinate limestone), shale and chert
Saturated interstice (storage medium) aquifer	Karst
Borehole yield class (median l/s) (excluding dry boreholes)	Ranges between 0.5/s to 2.0 l/s
Distribution of borehole data points per 1 minute grid	No borehole information for 11 to 20 boreholes
Elevation above sea level	1200 – 1600 m
Mean annual precipitation	300 – 400 mm

Characteristics	EIA Area
Groundwater quality	Electrical conductivity ranges between 70mS/m – 300mS/m Nitrate >10mg/l

10.9.2 Aquifer Characterisation

The geohydrological regime in the study area is likely made up of two aquifer systems. The first, the upper, semi-confined aquifer occurs in the calcrete or on the contact between the calcrete and underlying Kalahari clay formation, if the latter is present. This aquifer is, however, often poorly developed in the study area and only sustains livestock and domestic water supply.

Where thick clay layers are developed in this aquifer, a recharge lag time to the underlying aquifer(s) often occurs. The second, deeper aquifer is associated with fractures, fissures and joints and other discontinuities within the older hard rock geology of the Transvaal Supergroup and associated intrusives. The aquifer occurs at depths of between 20 m and 350 m or even deeper in the study area.

Where the upper aquifer is present, quarrying within the site boundary area will destroy it but the dewatering effects of the aquifer will not be so widespread due to its limited depth. The most significant dewatering effect as well as contamination, if present, will be on the deeper secondary aquifer with higher transmissive properties and more dynamic hydraulic properties.

The study area is approximately 2.5 km south of the undifferentiated linear structure which is probably dolerite or diabase dyke. Due to the considerable distance, pollution from the proposed activity will hardly reach this linear structure as provided in Figure 10-15.

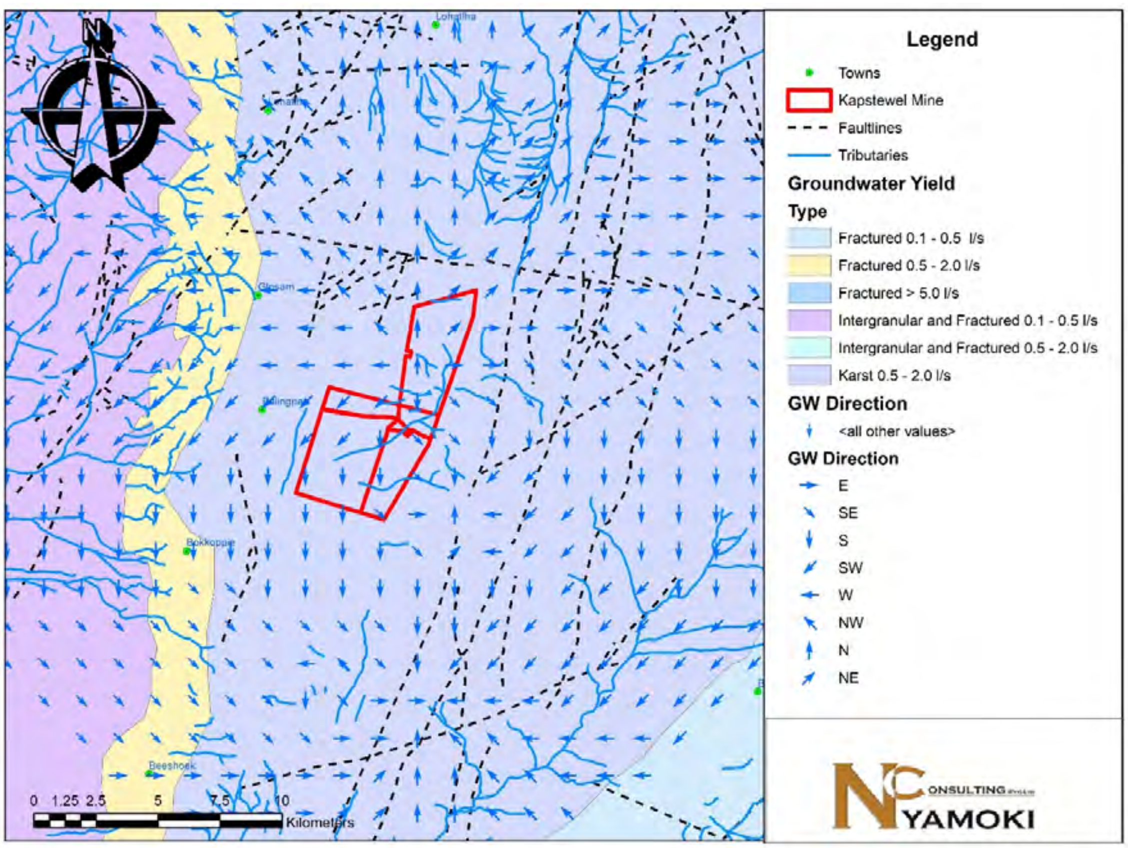


Figure 10-15: Aquifer type and yield

10.9.3 Groundwater levels and abstraction

In the Postmasburg area, static groundwater levels vary from zero meters (springs flowing out at the surface), usually in the topographically lower lying areas, to a maximum of approximately 75 meters below the surface to the northeast of Postmasburg. There are no definite groundwater level trends, apart from a possible distinction of deeper groundwater levels to the east and north-east of Postmasburg on the banded iron formation with shallower groundwater levels to the south-east on the Ghaap Plateau dolomites.

Groundwater is mainly used for domestic supply, livestock watering and watering of gardens. The borehole yields from the upper calcrete aquifer are relatively low and groundwater cannot be pumped in quantities sufficient for extensive crop irrigation purposes.

The Groundwater vulnerability of the majority of the area is considered to be high as shown Figure 10-16.

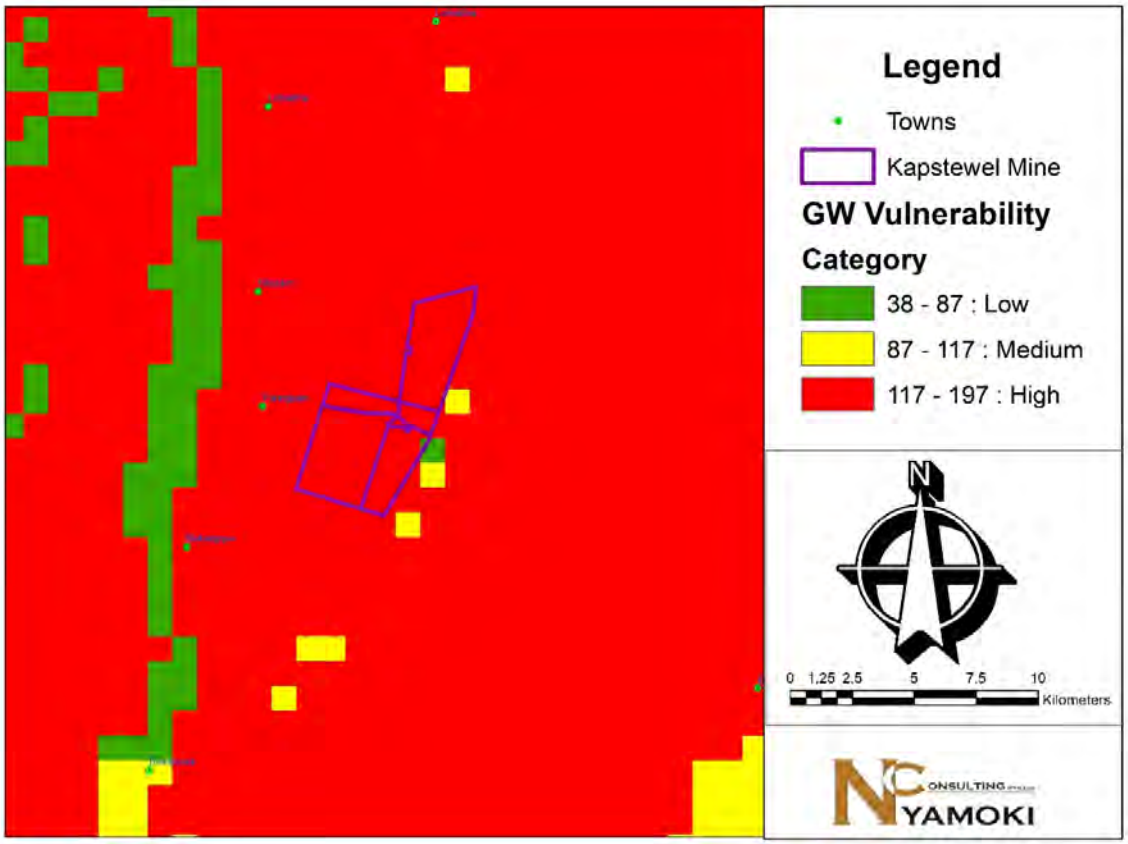


Figure 10-16: Groundwater Vulnerability of study area

10.9.4 Groundwater direction

Groundwater level measurements were taken wherever possible, and these are plotted as an elevation (mamsl) (Figure 10-17). The groundwater elevation contours are taken from the Hydrogeological Map Series (DWA, 2000) and show groundwater flow to be in a South-to-South Easterly direction. Measured groundwater levels indicate that the hydraulic gradient slopes towards the southeast along the course of the Groenwater Spruit River. It is thought that the groundwater flow follows the surface topography somewhat, flowing towards the Groenwater Spruit River and then in a south-westerly direction.

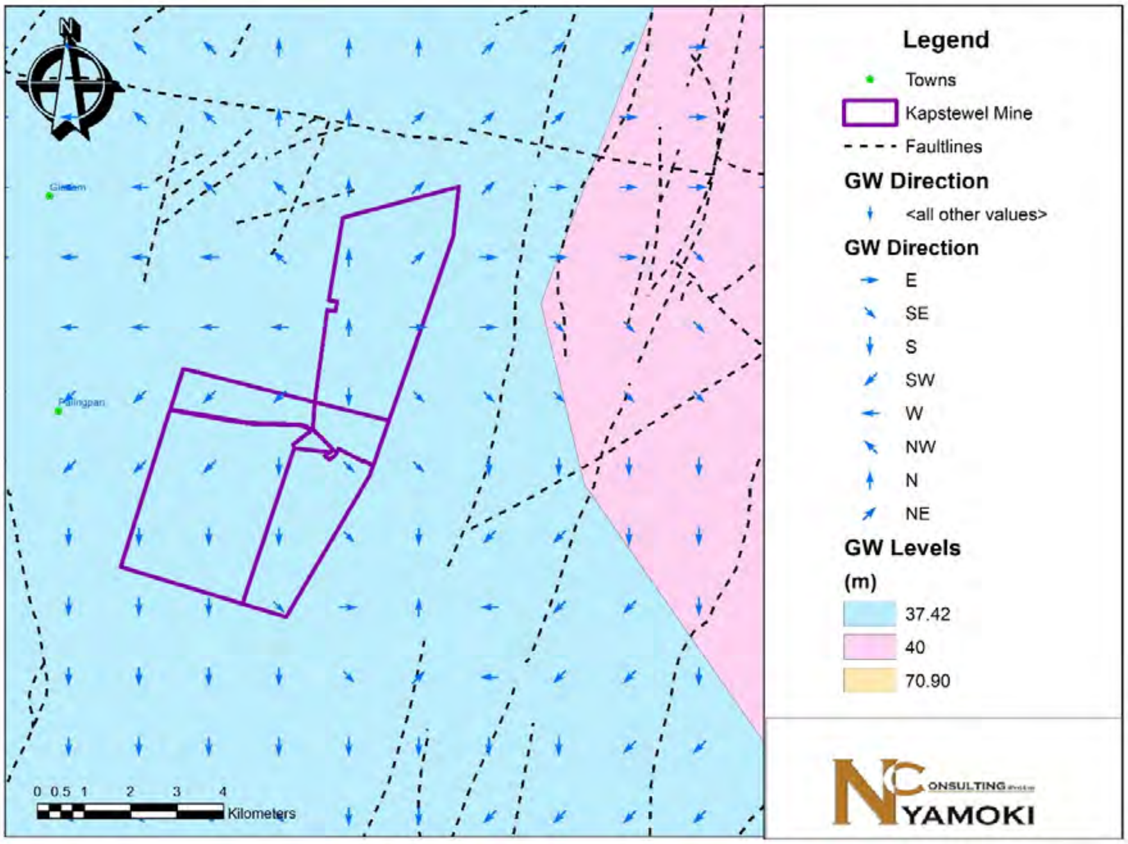


Figure 10-17: Groundwater flow direction

10.9.5 Groundwater Quality

Groundwater quality in the area is good and SRK (2009a) states that all field EC measurements were less than 150 mS/m, making it Class 1 water, suitable for long term human consumption. It was also stated that higher EC values can generally be linked to groundwater pollution from potential sources such as the WWTW, homesteads, kraals, overflowing dams and stock water points and pans (SRK, 2009a). Figure 10-18 presents the EC for the area taken from the Department of Water Affairs and Forestry (DWAF; now Department Water and Sanitation (DWS)) Hydrogeological Map Series (DWAF, 2000). This indicates that the regional EC is between 70 and 300 mS/m which agrees with previous literature.

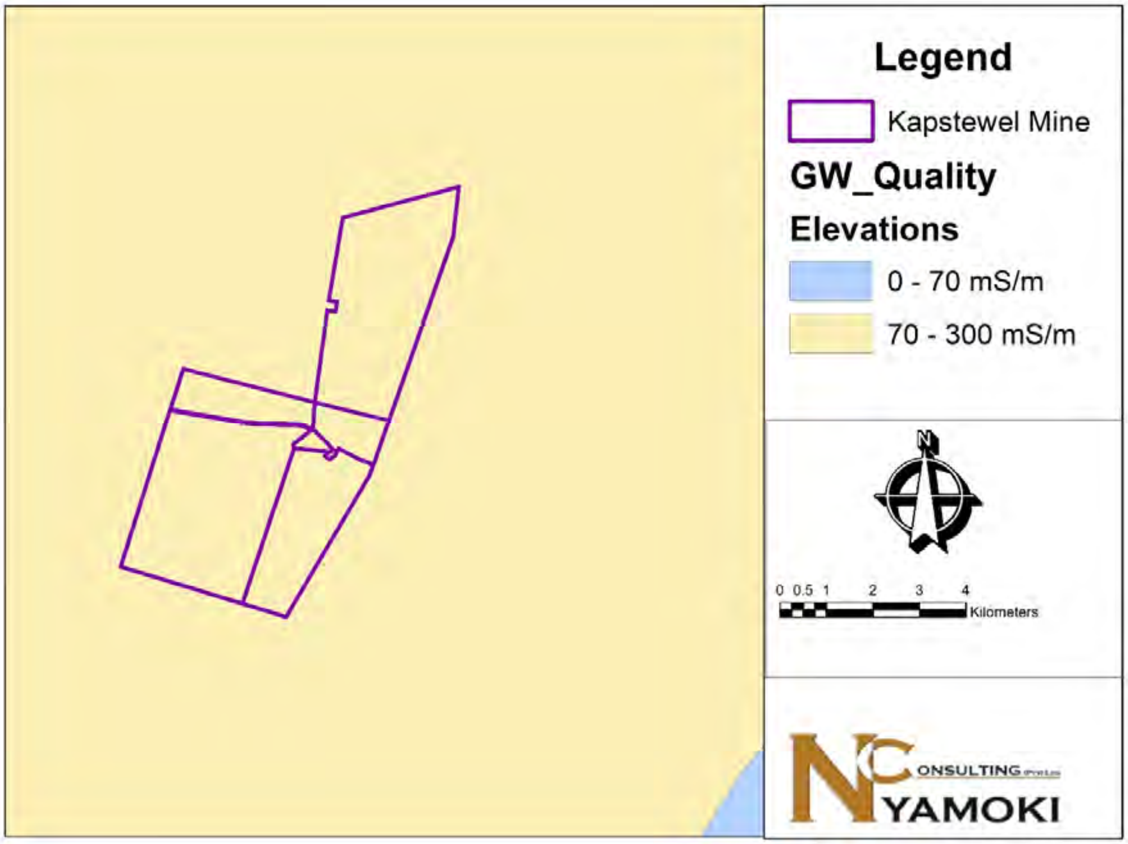


Figure 10-18: General Groundwater Quality

10.9.6 Groundwater Resource Assessment

The quaternary catchment is within the Vegter Region 25 referred to as West Griqua Land as indicated in Figure 10-19. Two basic types of aquifer storage are assumed to exist in this region, namely the "Weathered /Jointed" (WZ) and Fractured" Zone (FZ). In fractured rock (FZ) aquifers the number of water-bearing fractures generally decreases with depth (Vegter, 1995) and this often results in a similar decline in aquifer storativity with depth. While saturated zone (WZ) is normally a relatively thin zone (i.e. 5 to 40m thick) with its upper surface formed by the water table, therefore making this portion of the aquifer semi-unconfined to unconfined. This zone is characterised by a large number of relatively low-yielding water strikes.

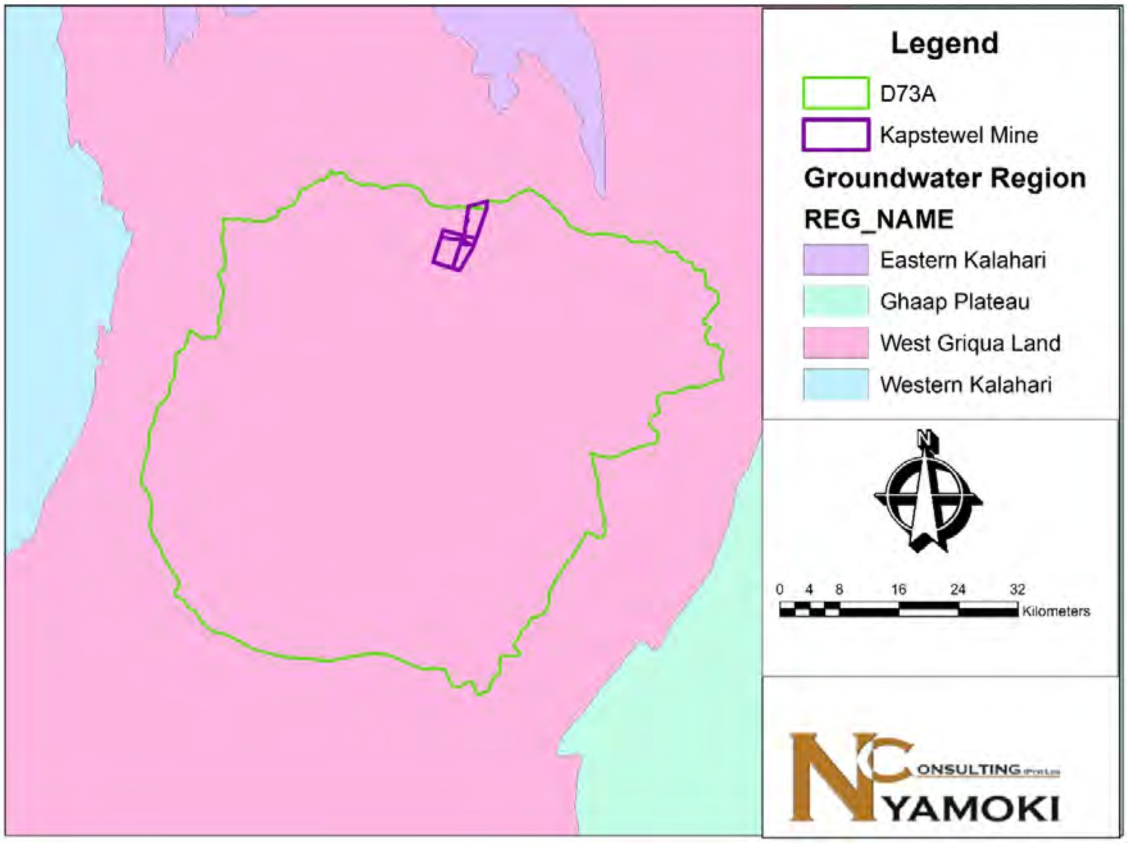


Figure 10-19: Groundwater Region

Table 10-6 indicates the estimated groundwater quantity for quaternary catchment D73A of which the study area is located. The total volume of water stored in both the weathered and fractured aquifer is also indicated. Recharge in quaternary catchment D73A has been estimated at 8.5 mm/a (Vivier and Grobler, 2017) and this equates to 2.7 million cubic meters per annum with consideration of the size of the catchment as indicated in Table 10-6. The quaternary catchment has an estimated aquifer yield of 333 785 000m³ as indicated in Table 10-6 and a total registered groundwater usage of 19 734 902 m³/a (WARMS database). The registered groundwater volume is used for irrigated agriculture, livestock agriculture, industry, mining and water supply.

Based on the estimated annual recharge and the registered groundwater use, the catchment is under stress. This is further confirmed by the GRAII study result which placed this catchment under highly stressed. However as the proposed activity, i.e. small scale mining (quarrying) does not require a large amount of water, and also due to the fact that this project is occurring in an existing/abandoned mining activity, no new boreholes will be drilled for groundwater abstraction. This therefore may mean that the proposed activity may not add further stress to the quaternary catchment.

Table 10-6: Estimation of groundwater availability

Quaternary Catchment	Area km²	Saturated Thickness (m)			Specific Yield Of WZ	Storage Coefficient of FZ	Volume of Water Stored in Aquifer X 10^3 m^3/km^2		
		Weathered Zone (WZ)	Fractured Zone (FZ)	Aquifer			Weathered Zone	Fractured Zone	Aquifer
D73A	3235	57	136	193	1.57E-03	1.04E-04	287 716	46 069	333 785

10.9.7 Hydrocensus

Hydro-census was conducted within a limited distance of 1 km radius of the study area to establish groundwater use information such as the registered and unregistered boreholes, borehole depth to water level, groundwater use, springs etc. The project area had an abstraction borehole equipped with a pump and storage tank. According to the personal contact in the study area, the borehole had an average depth of 60 m with the submersible pump at 26 m below ground level.

Five water level monitoring boreholes belonging to DWS were identified within the boundaries of the project area. These boreholes had an average water level of 12 m below ground level. Many other boreholes within the catchment area were identified on the WARMS database; these boreholes mainly belonged to the surrounding mines such as Beeshoek which is approximately 7 km southwest of the study area. Hydrocensus was conducted from the 27 to the 30th of March 2022 .and only 25 boreholes were visited, although most of them were closed and few are operational (Table 10-7).

Table 10-7: Local hydrocensus Boreholes

Borehole ID	Latitude	Longitude	Elevation (mamsl)	Farm Name	Depth (m)	Yield (l/s)	Water Level (mbgl)	Estimated Use (m3/a)	Use	Equipment	pH	EC (mS/m)
W4	-28.19145	23.11118	1426	Klipfontein	57	> 20	37.94	42048	Mine	Mono	7.81	70
KN1	-28.19145	23.1274	1431	Klipfontein		45.71		1892	Dom & Agric	Windmill	7.35	93
KN2	-28.1605	23.14343	1434	Klipfontein		13.08		1892	Stock	Windmill	7.75	84
DT3	-28.20867	23.11424	1405	Doringput	25	16.55		3406	Dom & Agric	Windmill	8.13	95
DT4	-28.20933	23.1143	1 404	Doringput		15.7		1892	Stock	Windmill		
DT5	-28.22869	23.10749	1 400	Doringput		11		1892	Stock	Windmill		
KN6	-28.17439	23.12096	1464	Klipfontein	7.5	0.85		3406	Stock	Windmill	6.65	35
W1	-28.18493	23.09796	1438	Klipfontein	100	47.86		7884	Domestic	Submersible	7.8	73
W2	-28.19608	23.11855	1 411	Klipfontein	100			-	-	-		
W3	-28.1838	23.12167	1421	Klipfontein	102	> 20	35.2	-	-	-	7.83	72
SBE1	-28.18711	23.12198	1 422	Klipfontein	100			-	-	-		
SBE2	-28.18696	23.12161	1423	Klipfontein	100	10	34.79	-	-	-	7.78	70
K1	-28.24233	23.0778	1412	Klippan	80	> 20	32.72		-	-		-
K2	-28.24427	23.07632	1417	Klippan	67	> 20	37.37		-	-		-
K3	-28.25652	23.10989	1388	Klippan	101	19	8.17		-	-		-
WP115	-28.17528	23.09539	1426	3 (RE)/436	11.25	-	-	-	Not in use			
WP116	-28.15955	23.1043	1472	3 (RE)/436	-	-	59.78	-	Not in use			
WP117	-28.16337	23.09627	1434	3 (RE)/436	15.52	-	-	-	Not in use			

Borehole ID	Latitude	Longitude	Elevation (mamsl)	Farm Name	Depth (m)	Yield (l/s)	Water Level (mbgl)	Estimated Use (m3/a)	Use	Equipment	pH	EC (mS/m)
WP118	-28.16269	23.09699	1434	3 (RE)/436	53.65	-	-	-	Not in use			
WP119	-28.16919	23.076	1402	2 (RE)/436	-	-	-	1460	Dom & Agric			
WP120	-28.21263	23.07686	1385	1/445	-	-	-	1460	Dom & Agric			
WP121	-28.14541	23.10784	1496	RE/436	130	3.33	89.65	-	Not in use			
WP122	-28.11285	23.11917	1460	RE/436	185	-	-	1460	Dom & Agric			
WP123	-28.20302	23.09042	1399	RE/436	-	-	-	-	Dom & Agric			
WP124	-28.15578	23.102253	1453	5/436	180	2.78	-	5185	Dom & Agric			

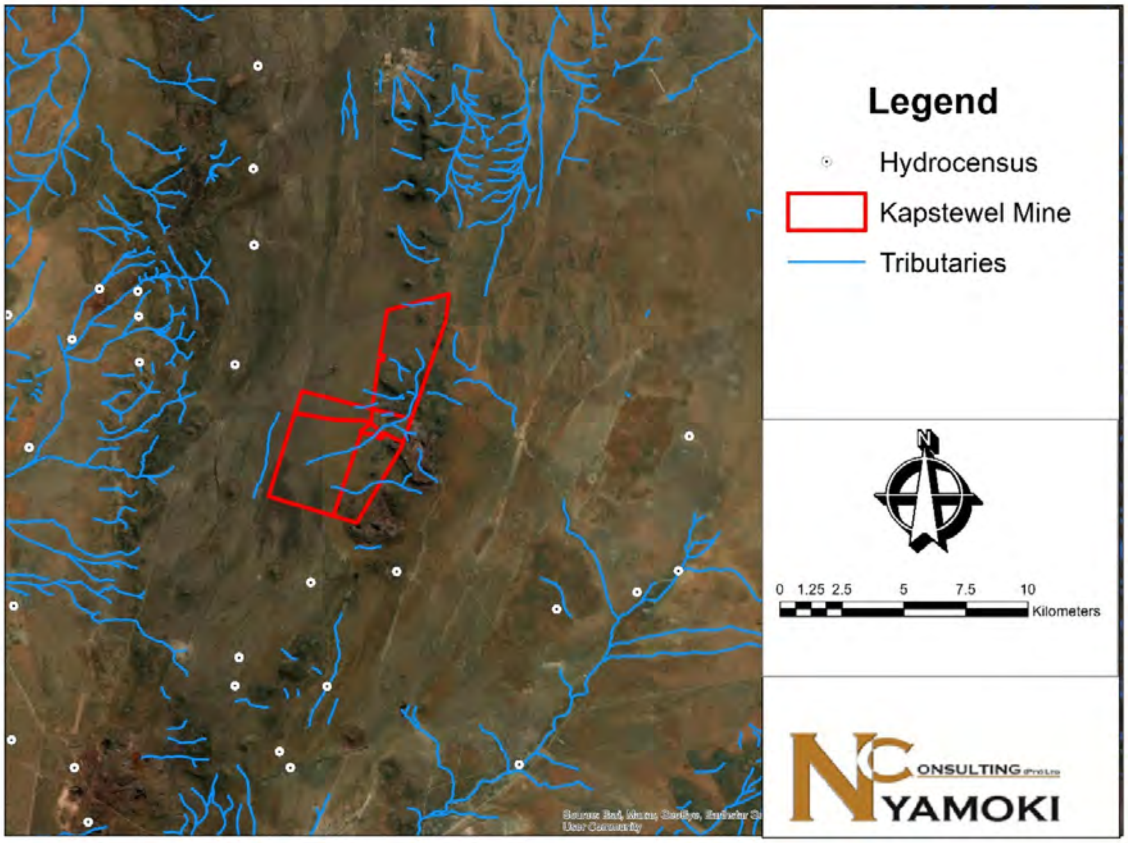


Figure 10-20: Hydrocensus boreholes locations

10.9.8 Test Pumping Data analysis

The two (2) boreholes pump testing data were used to calculate the sustainable yield of the boreholes and to subsequently determine the total volume of groundwater available from the boreholes without having a negative impact on the aquifer. Furthermore, to determine the aquifer parameters. Pump testing data was calculated using the same FC Method. Table 10-8 and Table 10-9 provide the summary of results from the FC Method.

Table 10-8: Yield Determination for BHO1

Method	Sustainable Yield (l/s)	Late T (m^2/d)	AD Used
Basic FC	0.9	0.5	
FC inflection Point	0.8	0.5	
Cooper - Jacob	0.8	0.7	
FC Non- Linear	1	0.9	
Barker	1		
Average Q_sust (l/s)	0.9		

It was recommended that the borehole is pumped for only 8 hours/day at a rate of 0.9 l/s in order to allow the aquifer to recover.

Table 10-9: Yield Determination for BH02

Method	Sustainable Yield (l/s)	Late T (m^2/d)	AD Used

Basic FC	1.2	0.6	
FC inflection Point	0.8	0.6	
Cooper - Jacob	0.9	0.7	
FC Non- Linear	1.1	0.8	
Barker	1		
Average Q_sust (l/s)	1		

It was recommended that the borehole is pumped for only 24 hours/day at a rate of 1 l/s in order to allow the aquifer to recover (Table 10-10).

Table 10-10: Summary of borehole abstraction recommended

BH ID	**Yield**		**Pump duration (h/day)**	**Volume**		**Max. water level (mbgl)**
	L/s	**L/h**		m^3/d	m^3/a	
C20-0-241-0-B1	0.9	3240	8	25.92	9 460.8	
C20-0-241-0-B2	1	3600	24	86.4	31 104	
Total				**112.32**	**40 564**	

According to the calculated total abstraction from these 2 boreholes is 40 564 m3/a. We strongly recommend that the farm should abstract not more than 40 564 m3/a from these 2 boreholes (Table 10-10). Therefore, will recommend that 40 564 m3/a should be abstracted from the 2 boreholes and can be pumped safely without negatively impacting the aquifer system. If the client will follow our recommendations, the water use licence should be granted.

In conclusion, the yield test data indicates that the property may sustainably abstract 40 564 m3/a from the aquifer system. The volume of water requested in the WULA is equal to this 10 000 m3/a and this is considered sustainable. The borehole abstraction rate and basic management guidelines are highly recommended. This is equal to the safe yields of the boreholes, and aquifer over-abstraction is unlikely to occur if these rates are adhered to. Note this is a conservative yield (for use throughout the year). However, to ensure that the yield is sustainable and does not impact the surrounding water level, the water level and abstraction should be monitored over time. This data should be reviewed on regular basis (suggested monthly) to ensure that the yield is sustainable.

10.9.9 Groundwater Sampling and water quality analysis

Groundwater samples (three) were collected in March 2022 from selected exploration boreholes, as well as neighbouring farm boreholes. The purpose of the groundwater sampling was to establish a regional baseline groundwater quality database to which future potential impacts can be compared. The water samples were analysed for basic inorganic parameters and the results were compared against the SANS 241:2015 Drinking Water Standards. The results are provided in Table 10-11.

Table 10-11: Groundwater Quality results

Parameters	Units	Boreholes			Drinking Water Standard	Mine Health& Safety Act 29 of 1996	Domestic Water Limits
Locality		BH01	BH02	BH03	SANS 241: 2015	MHSA	DWS
pH	pH	8.14	7.32	7.18	5.0-9.7	5.5-9.5	>4.0
Electrical Conductivity (EC)	mS/m	80.7	96.2	178	170	Max: 300 m/s	0 -70
Total Dissolved Solids (TDS)	mg/L	499	561	1051	1200	0 -100	0 -450
Alkalinity (Alk)	mg CaCO3/L	422	456	813			
Chloride (CL)	mg/L	24.6	35.1	205	300	0 -20	0 -100
Sulphate (SO4)	mg/L	13.6	17.2	2.81	500 (Health)	0 -30	0 -200
Nitrate (NO3)	mg/L	9.94	10.5	0.28	11	10	0 -6
Ammonium (NH4)	mg/L	0.059	0.123	27.9			
Fluoride (F)	mg/L	-0.263	-0.263	-0.263	1.5	1.5	0 -1.0
Calcium (Ca)	mg/L	61.7	81.1	154		150	0 -32
Manganese (Mg)	mg/L	84.1	85.5	112		100	0-30
Sodium (Na)	mg/L	11.8	16	34.7	200	400	0 -100
Potassium (K)	mg/L	1.72	1.72	10.2		50	0 -50
Aluminium (Al)	mg/L	-0.002	-0.002	-0.002	0.3		
Iron (Fe)	mg/L	-0.004	-0.004	0.007	2 (health) 0.3	1000	0 -0.1
Manganese (Mn)	mg/L	-0.001	-0.001	1.04	0.1		
Chrome (Cr)	mg/L	-0.003	-0.003	-0.003			

Parameters	Units	Boreholes			Drinking Water Standard	Mine Health& Safety Act 29 of 1996	Domestic Water Limits
Copper (Cu)	mg/L	-0.002	-0.002	-0.002	2		
Nickel (Ni)	mg/L	-0.002	-0.002	-0.002	2		
Zinc (Zn)	mg/L	-0.002	-0.002	-0.002	5		
Cadmium (Cd)	mg/L	-0.002	-0.002	-0.002	≤0.03		
Lead (Pb)	mg/L	-0.004	-0.004	-0.004	0.01		
Ecoli			-1	400	0 – 1		
F.coli	CFU/100mL	-1	-1	2800			
Tcoli			-1	12100			
NTU	NTU	0.323	0.28	90.8	<1		
Thard - cal	mg CaCO3/L	500	555	845			
TOC	mg/L	1.33	1.45	49.6			
CN Screening	mg/L	-1.1	-1.1	-1.1			
LSI - cal	LSI	1.25	-0.19	0.97			
TON	mg/L	9.94	10.5	0.28			

Hydro-geochemical processes in groundwater are largely controlled by the physical and chemical interactions that occur between the recharging water and the aquifer material. Table 10-11 provides a summary of the water analysis results, including both chemical and microbiological results. The water quality results indicated that the water quality generally does not satisfies the drinking water standards of the country, compared to the SANS 241 standards for domestic use and the South African Water Quality Guidelines (SAWQG) irrigation targets. The water cannot be used for human consumption. For the BHO1 and BH02, the EC was slightly elevated but only exceeded the standard limits for the Domestic Water Limit (Table 10-11). The TDS of all the boreholes are exceeding the Domestic Water Limit. The Chloride of BH03 exceeds the Domestic Water Limit, while BH01 and BH02 are within the acceptable range. Although the BH01 and BH02 are exceeding the Mine Health and Safety Act. The Calcium for all the boreholes are exceeding the Domestic Water Limit. Furthermore, magnesium is also exceeding the Domestic Water Limit for both BH01 and BH02 while Magnesium of BH03 is within the acceptable range. On the BH03, EC, NTU, Ecoli and manganese are exceeding drinking water standards. There is a need for verification of the water quality before any use would be implemented in these cases.

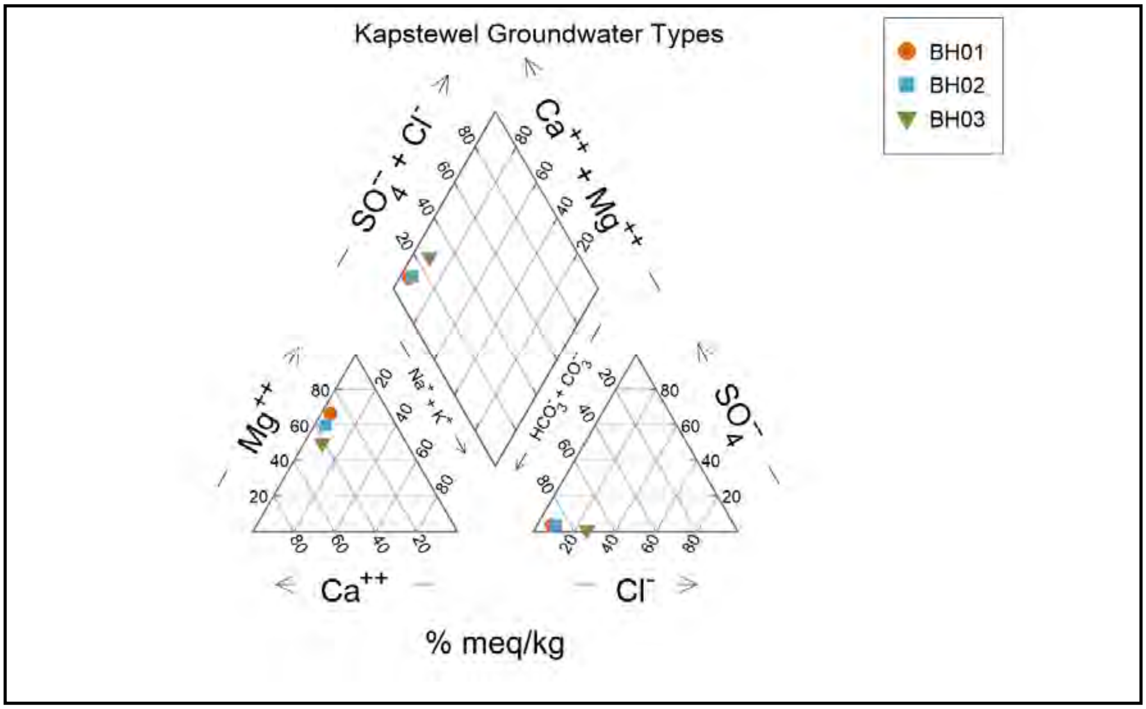


Figure 10-21: Piper diagrams representing groundwater types.

According to the analytical results, the Piper diagram of the hydrogeochemical composition of all water samples in the study area is shown in Figure 10-22. The results indicated that the water type for the BH01, BH02 and BH03 in the study area had a magnesium-calcium-bicarbonate (Mg-CaCO3) composition, clearly indicating that the BH01, BH02, and BH03 had a similar water type. Groundwater quality had its natural variations. Almost all the samples were clustered in the magnesium-calcium bicarbonate facies of the Piper diagram. That reflected the chemistry of the dolomite, indicating that the dissolution of dolomite was the dominant process controlling the chemistry of the groundwater or weathering of silicate minerals. As expected, groundwater from the dolomitic aquifers was of magnesium-calcium-bicarbonate nature due to the dolomite composition.

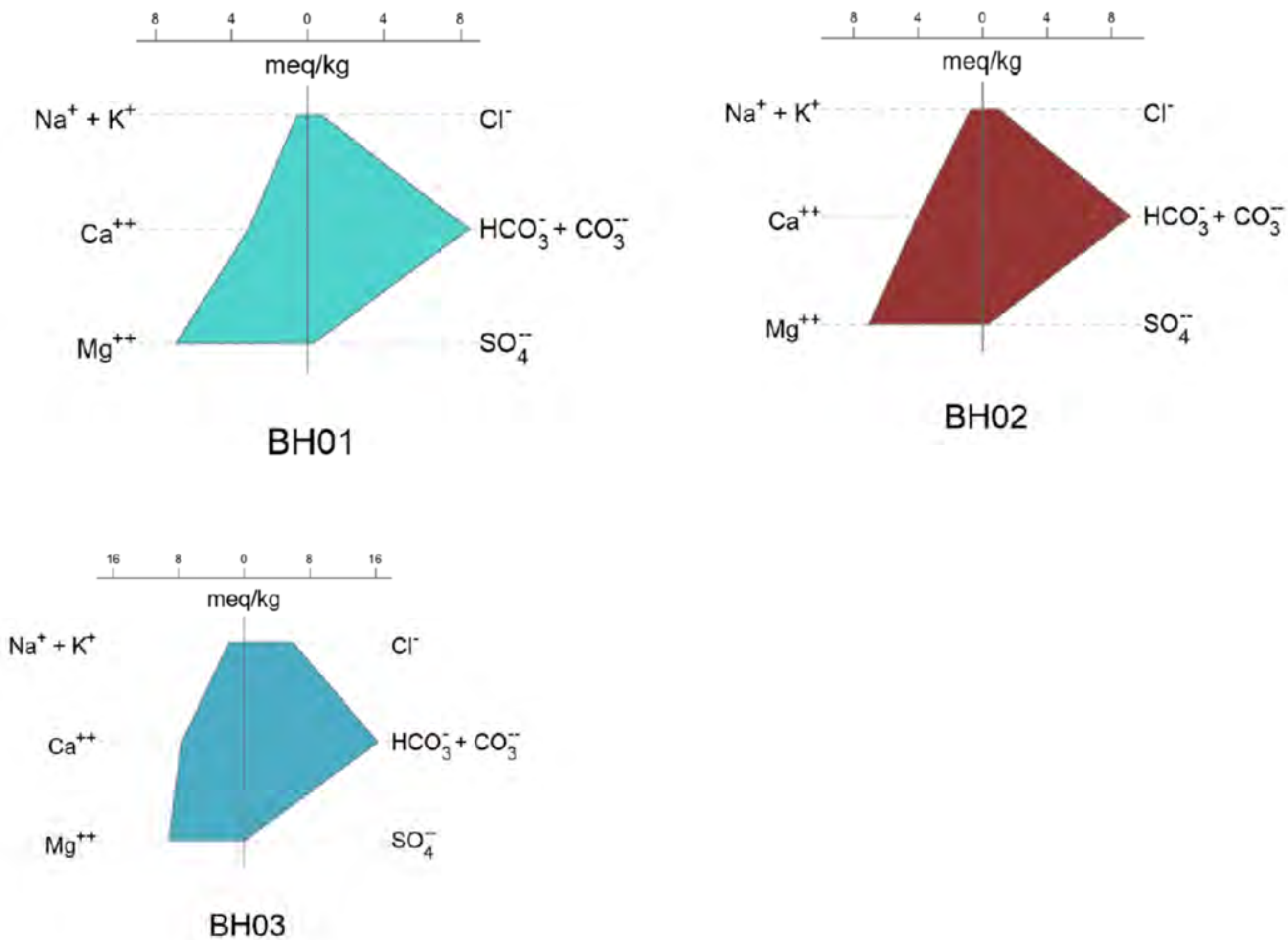


Figure 10-22: Stiff diagrams representing groundwater types.

10.10 Geochemistry and Waste Classification

10.10.1 Geochemistry

A geochemical analysis was undertaken on three samples ((Waste rock dump, Manganese, and Iron ore) were collected in 2022 from representative Mine Pit in the study area. The distilled water leach analysis undertaken on the geological material (waste rock) and the Manganese and Iron Ore samples found that:

- The pH was found to be alkaline, ranging from Mn Ore 6.36, Fe Ore 10.19 and WRD 7.52 pH units.
- The total dissolved solids (TDS) values were low ranging from 173 (mg/L) Mn Ore, 190 (mg/L) Iron Ore and with the highest WRD 463 (mg/L) TDS value.
- Sulphate concentration were all below detection, with the concentrations ranging from below 50 mg/L for all three samples. Of the metals identified as being present in concentrations greater than the average crustal abundance, the concentrations detected in the water leach were generally below detection limits.

The results from the assessment are provided in Table 10-12 to Table 10-14.

Table 10-12: Total Concentration Solids for WRD, Manganese and Iron Ore

Samples				Mn Ore 01		Fe Ore		WRD 01	
Total Concentration Solids									
VARIABLE	Guideline Limits (mg/kg)			Variable Concentration (mg/l)	Variable Concentration (mg/kg)	Variable Concentration (mg/l)	Variable Concentration (mg/kg)	Variable Concentration (mg/l)	Variable Concentration (mg/kg)
	TCT0	TCT1	TCT2						
Paste pH (1:2)	-	-	-	-	6.36	-	10.19	-	7.52
Total Cyanide as CN	14	10500	42000	<0.100	<5.00	<0.100	<5.00	<0.100	<5.00
Redox	-	-	-	-	384	-	172	-	256
Arsenic as As	5.8	500	2000	<0.058	<2.90	<0.058	<2.90	<0.058	<2.90
Boron as B	150	15000	60000	2.31	116	<1.50	<75.0	<1.50	<75.0
Barium as Ba	62.5	6250	25000	11.2	560	<0.625	<31.3	7.76	388
Cadmium as Cd	7.5	260	1040	<0.075	<3.75	0.211	10.6	<0.075	<3.75
Cobalt as Co	50	5000	20000	<0.500	<25.0	<0.500	<25.0	<0.500	<25.0
Chromium as Cr	46000	800000	-	<1.00	<50.0	<1.00	<50.0	<1.00	<50.0
Copper as Cu	16	19500	78000	0.849	42.5	<0.160	<8.00	<0.160	<8.00
Mercury as Hg	0.93	160	640	<0.009	<0.450	<0.009	<0.450	<0.009	<0.450
Manganese as Mn	1000	25000	100000	563	28150	4.78	239	83.8	4190
Molybdenum as Mo	40	1000	4000	0.201	10.1	0.226	11.3	0.189	9.45
Nickel as Ni	91	10600	42400	<0.500	<25.0	<0.500	<25.0	<0.500	<25.0
Lead as Pb	20	1900	7600	<0.200	<10.0	<0.200	<10.0	0.867	43.4
Antimony as Sb	10	75	300	<0.100	<5.00	<0.100	<5.00	<0.100	<5.00
Selenium as Se	10	50	200	<0.100	<5.00	<0.100	<5.00	<0.100	<5.00
Vanadium as V	150	2680	10720	<1.00	<50.0	<1.00	<50.0	<1.00	<50.0
Zinc as Zn	240	160000	640000	<1.00	<50.0	<1.00	<50.0	<1.00	<50.0
Moisture %	-	-	-	-	0	-	0	-	0
Solid %	-	-	-	-	100	-	100	-	100

Table 10-13: Leachable Concentrations - TCLP for WRD, Manganese and Iron Ore

Samples					Mn Ore 01	Fe Ore 01	WRD 01
Leachable Concentrations - TCLP							
VARIABLE	**Guideline Limits (mg/l)**				**Variable Concentration (mg/l)**	**Variable Concentration (mg/l)**	**Variable Concentration (mg/l)**
	LCT0	**LCT1**	**LCT2**	**LCT3**			
Total Cyanide as CN	0.07	3.5	7	28	<0.01	<0.01	<0.01
Arsenic as As	0.01	0.5	1	4	<0.010	<0.010	<0.010
Boron as B	0.5	25	50	200	<0.500	<0.500	<0.500
Barium as Ba	0.7	35	70	280	<0.700	<0.700	<0.700
Cadmium as Cd	0.003	0.15	0.3	1.2	<0.003	<0.003	<0.003
Cobalt as Co	0.5	25	50	200	<0.400	<0.400	<0.400
Chromium as Cr	0.1	5	10	40	<0.100	<0.100	<0.100
Hexavalent chromium (Cr^{6+})	0.05	2.5	5	20	<0.020	<0.020	<0.020
Copper as Cu	2	100	200	800	<1.00	<1.00	<1.00
Mercury as Hg	0.006	0.3	0.6	2.4	<0.006	<0.006	<0.006
Manganese as Mn	0.5	25	50	200	0.853	<0.500	0.876
Molybdenum as Mo	0.07	3.5	7	28	<0.070	<0.070	<0.070
Nickel as Ni	0.07	3.5	7	28	<0.070	<0.070	<0.070
Lead as Pb	0.01	0.5	1	4	<0.010	<0.010	<0.010
Antimony as Sb	0.02	1	2	8	<0.020	<0.020	<0.020
Selenium as Se	0.01	0.5	1	4	<0.010	<0.010	<0.010
Vanadium as V	0.2	10	20	80	<0.200	<0.200	<0.200
Zinc as Zn	5	250	500	2000	<2.00	<2.00	<2.00
Total Dissolved solids @ 180°C	1000	12500	25000	100000	5168	5208	4328
Chloride as Cl	300	15000	30000	120000	<50.0	<50.0	<50.0
Sulphate (SO_4)	250	12500	25000	100000	<50.0	<50.0	<50.0
Nitrate (NO3) as N	11	550	1100	4400	<10.0	<10.0	<10.0
Fluoride as F	1.5	75	150	600	<1.00	<1.00	<1.00

Table 10-14: Leachable Concentrations - Borax for WRD, Manganese and Iron Ore

Samples					Mn Ore 01	Fe Ore 01	WRD 01
Leachable Concentrations - Borax							
VARIABLE	**Guideline Limits (mg/l)**				**Variable Concentration (mg/l)**	**Variable Concentration (mg/l)**	**Variable Concentration (mg/l)**
	LCT0	**LCT1**	**LCT2**	**LCT3**			
Total Cyanide as CN	0.07	3.5	7		<0.01	<0.01	<0.01
Total oxidised nitrogen as N	-	-	-	-	<10.0	<10.0	<10.0
Arsenic as As	0.01	0.5	1	4	<0.010	<0.010	<0.010
Boron as B	0.5	25	50	200	<0.500	<0.500	<0.500
Barium as Ba	0.7	35	70	280	<0.070	<0.070	<0.070
Cadmium as Cd	0.003	0.15	0.3	1.2	<0.003	<0.003	<0.003
Cobalt as Co	0.5	25	50	200	<0.400	<0.400	<0.400
Chromium as Cr	0.1	5	10	40	<0.003	<0.003	<0.003
Hexavalent chromium (Cr^{6+})	0.05	2.5	5	20	<0.020	<0.020	<0.020
Copper as Cu	2	100	200	800	<1.00	<1.00	<1.00
Mercury as Hg	0.006	0.3	0.6	2.4	<0.006	<0.006	<0.006
Manganese as Mn	0.5	25	50	200	<0.500	<0.500	<0.500
Molybdenum as Mo	0.07	3.5	7	28	<0.070	<0.070	<0.070
Nickel as Ni	0.07	3.5	7	28	<0.070	<0.070	<0.070
Lead as Pb	0.01	0.5	1	4	<0.010	0.011	<0.010
Antimony as Sb	0.02	1	2	8	<0.020	<0.020	<0.020
Selenium as Se	0.01	0.5	1	4	<0.010	<0.010	<0.010
Vanadium as V	0.2	10	20	80	<0.200	<0.200	<0.200
Zinc as Zn	5	250	500	2000	<2.00	<2.00	<2.00
Total Dissolved solids @ 180°C	1000	12500	25000	100000	21808	24696	20976
Chloride as Cl	300	15000	30000	120000	<50.0	<50.0	<50.0
Sulphate (SO_4)	250	12500	25000	100000	<50.0	<50.0	<50.0
Nitrate (NO3) as N	11	550	1100	4400	<10.0	<10.0	<10.0
Fluoride as F	1.5	75	150	600	<1.00	<1.00	<1.00

10.10.2 Waste Classification

According to Schedule 3 of the NEM: WA, there is an overriding treatment of residue stockpiles. In terms of schedule 3 residue deposits and residue stockpiles include:

1) Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals	(a) wastes from mineral excavation
	(b) wastes from physical and chemical processing of metalliferous minerals
	(c) wastes from physical and chemical processing of non-metalliferous minerals
	(d) wastes from drilling muds and other drilling operations

In terms of Schedule 3, read with the definition of hazardous waste, the Manganese Ore, Iron Ore and WRD of at the Kapstewel Mine operation will be classified as hazardous waste, viz Class C for the Manganese Ore and Class D for the Iron Ore and WRD landfill design. The initial results of the analysis indicate that Manganese Ore materials as found on the property can be placed in terms of the Class C requirements whereas the Iron Ore and WRD horizon, when stockpiled, must be placed within a Class D designed area. A summary of the waste classification results is provided in Table 10-15.

Table 10-15: Summary of Waste Classification Results

Sample ID	**Sample description**	**LCT**	**TCT**	**Final Classification**	**Liner**
Mn Ore	Manganese Ore	Type 4	Type 3	Type 3	Class C
Fe Ore	Iron Ore	Type 3	Type 4	Type 4	Class D
WRD	Waste Rock Dump	Type 4	Type 4	Type 4	Class D

10.11 Noise

A noise assessment was undertaken, which included a description of the baseline noise characterisation of the area.

10.11.1 Sensitive Receptors

The identified potential noise sensitive receptor points surrounding the mine, which are likely to be impacted by the noise from the mine operations are provided in Table 10-16.

Table 10-16: Details of the Noise Sensitive Receptor Points and Distances from Operations

Receptor ID	**GPS Coordinates**		**Distance from operations (central point)/km**	**Elevation**
NSR01	28°º9’12,81”S	23° º5’ 59,43” E	2.11	1455m
NSR02	28 °º9’16.53”S	23° º6’19.17”E	1.65	1468
NSR03	28° º8’44.42”S	23° º6’ º3.65” E	2.67	1462
NSR04	28° º8’16.85”S	23° º6’ 57.51”E	3.84	1511
NSR05	28° 11’49.52”S	23° º5’ 31.94” E	3.26	1413
NSR06	28° 1º’5º.º7”S	23° º5’38.88”E	1.76	1423

NSR07	28° 1º'22.º6"S	23° º7'29.35"E	1.86	1438
Central Point	28° 1º'18.66"S	23° 6'19.95"E	0	1447

10.11.2 Ambient Noise Levels

The results of the noise survey are provided in Table 10-17, where the Leq is the average noise level for the specific measuring point over some time, the Lmax is the maximum noise level and the Lmin is the minimum noise level registered during the noise survey for the specific area in dBA.

Table 10-17: Measured ambient noise levels

	Daytime			Night-time		
Measuring Point	**Leq- dBA**	**Lmax(Fast) dBA**	**Lmin(Fast) dBA**	**Leq- dBA**	**Lmax(Fast) dBA**	**Lmin(Fast) dBA**
NSR01	68.2	77.8	21	34.1	68.4	19.9
NSR02	36.7	73.5	22.6	40.5	90.9	21.4
NSR03	36.2	61.2	22.5	33.4	75	19
NSR04	58.5	77.6	32	87.9	100	28.9
NSR05	50.3	79.9	18.8	40.1	77.7	22
NSR06	55.9	73.2	30.5	38.6	81.1	30.5
NSR07	42.6	80.9	22.8	46.9	85.8	22.8

10.12 Visual

The section below outlines relevant baseline information on visual impacts within the study area.

10.12.1 Contextual Visual Impact

The positions indicated in Figure 6 provide the series of positions taken to for the visual exposure of the proposed site to the existing urban fabric. Each position has considered the zones indicated in Figure 10-23 and identifies the elevation of the topological relationship.

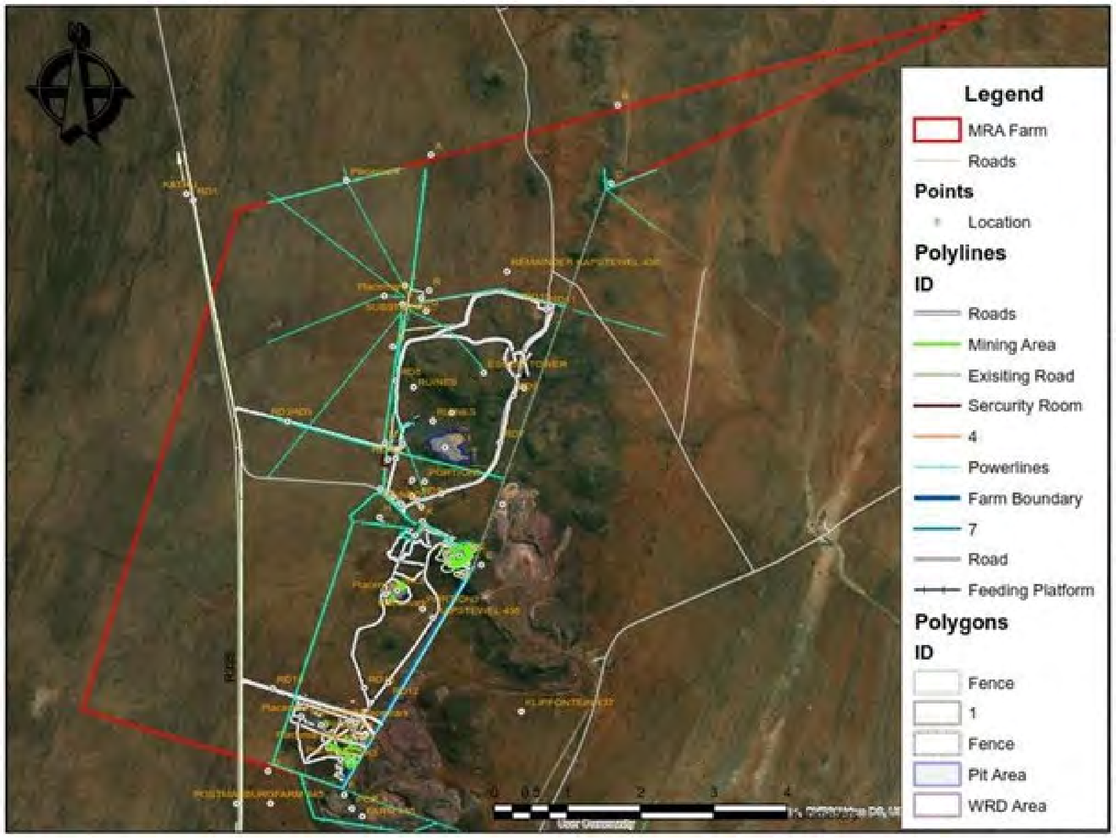


Figure 10-23: Locality Map

The proposed mining activities do not interfere with any residential area. From Figure 10-23 it is worth noting that the site is 50km south of Kathu town and 40km south-east of Olifantshoek, thus, insignificant mining impacts to the urban areas in proximity to the site.

10.12.2 Viewer Incidence / Viewer Perception

The number of observers and their perception of the structure determine the concept of visual impact. If there are no observers, or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity toward the proposed project. It is also necessary to generalize the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer. This includes regularity of sighting cultural background, state of mind, the purpose of the sighting, etc. which would create a myriad of options.

10.12.3 Roads

Roads concentrate people who use them to reach a routine destination (e.g. work or shopping), a holiday or recreational destination, or just as part of a leisure experience. The road network in the study area consists of a Main Road (R325) shown in Figure 10-24.

Figure 10-24: Main Road R325

The incidence of viewers will relatively be high on the R – routes. The perception of the observers on the route will likely vary from neutral (in respect of local people) to negative (concerning travellers). Negative perceptions mainly arise due to the contrast between the general natural environment and the infrastructure associated with the proposed site.

10.13 Biodiversity

10.13.1 Biomes

The proposed mining area is located in the Savanna Biome (Figure 10-25). The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

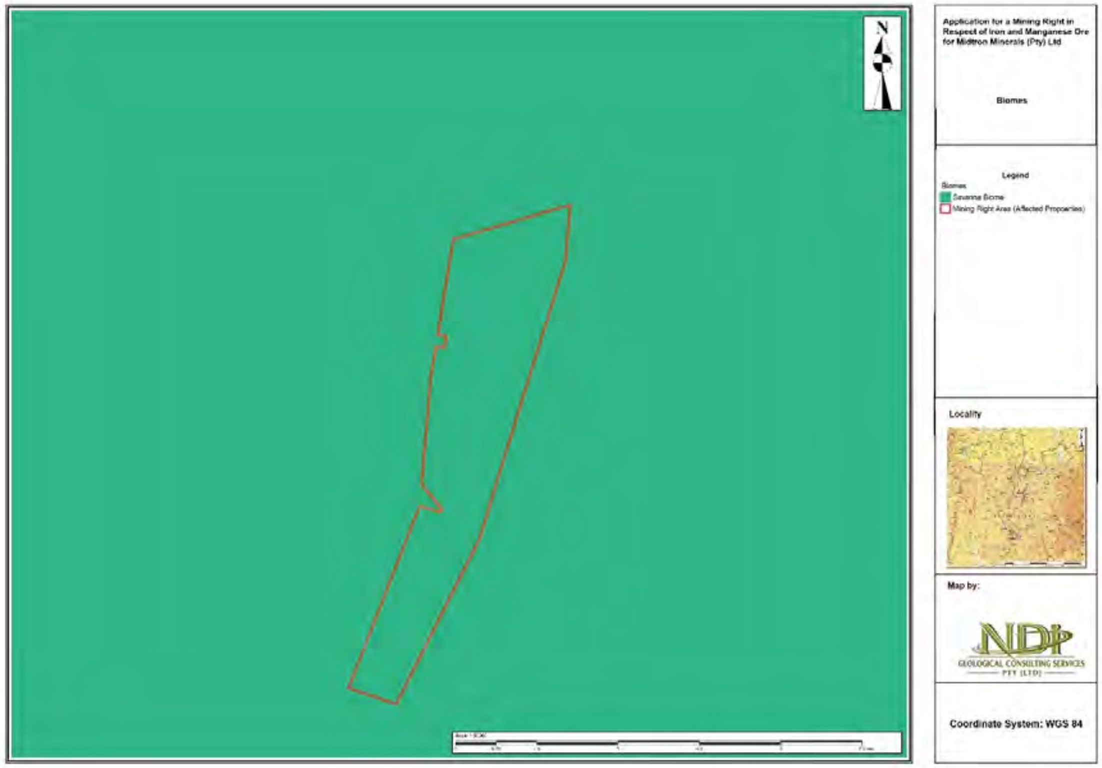


Figure 10-25: Biomes

Most of the savanna vegetation types are used for grazing, mainly by cattle or game. In the southernmost savanna types, goats are the major stock. In some types crops and subtropical fruit are cultivated. These mainly include the Clay Thorn Bushveld, parts of Mixed Bushveld, and Sweet Lowveld Bushveld.

10.13.2 Bioregions

The proposed mining area is located in the Eastern Kalahari Bushveld Bioregion as shown in Figure 10-26. The Eastern Kalahari Bushveld Bioregion is the largest savanna bioregion and is on average at the highest altitude. It is roughly bounded by Mafikeng, Bloemhof, Kimberley, Groblershoop and Van Zylsrus.

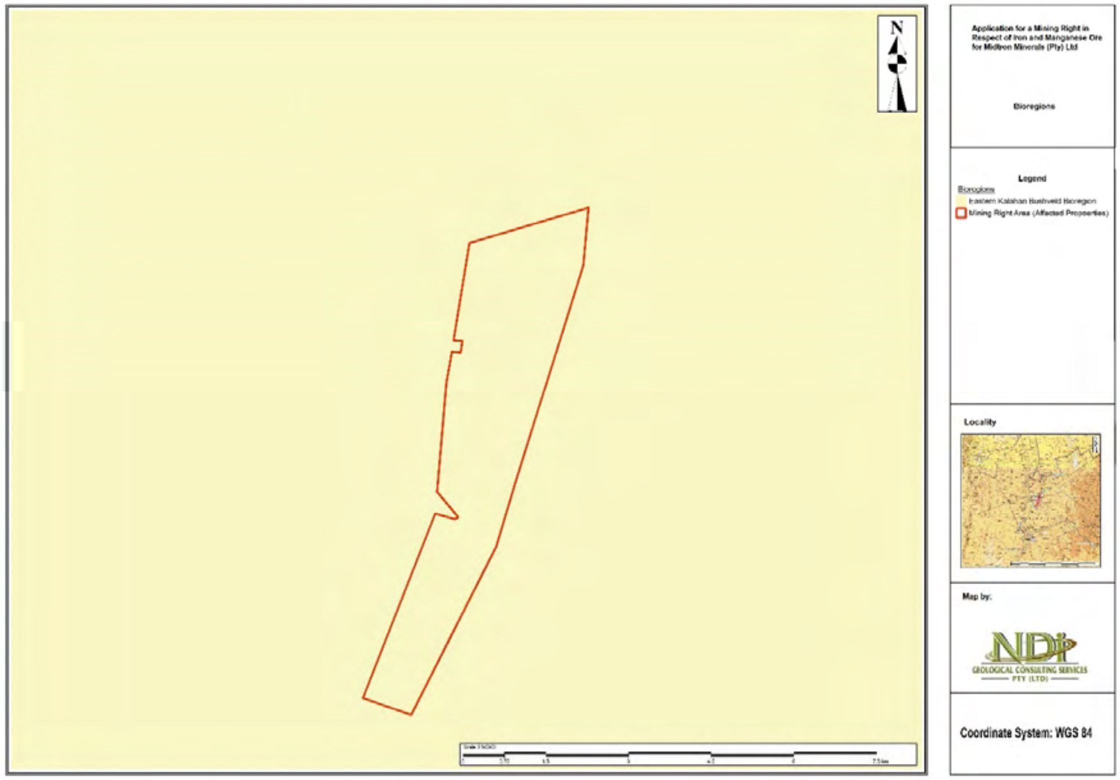


Figure 10-26: Bioregions

10.13.3 Vegetation Types

According to the SANBI remaining vegetation types database, there is no remaining natural vegetation on the affected area.

The proposed mining area is associated with ecosystems that are considered to be threatened (Figure 10-27). The threatened ecosystems associated with the site are the Kuruman Mountain Bushveld and the Kuruman Thornveld. According to SANBI, the ecosystem is classified at Least Threatened (Figure 10-28).

Figure 10-27: Vegetation with Threatened Ecosystems

Figure 10-28: Status of Vegetation with Threatened Ecosystems

10.13.4 Regional Sensitivity

The regional sensitivities of the vegetation are summarised as follows:

- SVk 9 Kuruman Thornveld; The SVk 9 Kuruman Thornveld is classified as Least Threatened. According to Mucina and Rutherford, the conservation for this vegetation type is set at 16%, None of the SVk 9 Kuruman Thornveld in statutory conservation areas. An estimated 2% of the SVk 9 Kuruman Thornveld is already transformed. Erosion is very low.
- SVk 10 Kuruman Mountain Bushveld: The SVk 10 Kuruman Mountain Bushveld is classified as Least Threatened. According to Mucina and Rutherford, the conservation for this vegetation type is set at 16%. None conserved in statutory conservation areas. Very little transformed. Erosion is very low to low. Some parts in the north are heavily utilised for grazing.

10.13.5 Flora assessment

The biodiversity assessment included a flora assessment. The study found that the study site is characterised by Flat rocky plains and some sloping hills with very well- developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba* (Figure 10-29).

Figure 10-29: Example of Acacia erioloba

Figure 10-30: Flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting of Acacia erioloba

Figure 10-31: Low shrubs observed onsite consisting of *Acacia hebeclada subsp. Hebeclada, Monechma divaricatum, Gnidia polycephala, Helichrysum zeyheri, Hermannia comosa, Pentzia calcarean and Plinthus sericeus* species

The findings from the assessment were as follows:

- Flora species of special concern: The following species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) are known to be found in the area (Table 10-18).

Table 10-18: The NCNCA Listed Species known to be found in the area

No.	Species Name	Category	Recorded onsite
1.	*Aloe claviflora*	Schedule 2 protected	×
2.	*Boscia albitrunca*	Schedule 2 protected.	×
.	*Boscia foetida*	Schedule 2 protected.	×
4.	*Cynanchum viminale*	Schedule 2 protected.	×
5.	*Euphorbia mauritanica var. lignosa*	Schedule 2 protected.	×
6.	*Euphorbia spinea*	Schedule 2 protected.	×
7.	*Galenia africana*	Schedule 2 protected.	×

- Ethnobotanical plant species: No medicinal plants were observed during the site inspection.
- Alien Invasive Plant Species: The site is infested by *Opuntia* species, this was observed during the site inspection. *Opuntia* species Compete with and replace indigenous species. Dense infestations reduce the grazing potential of the land and restrict access by domestic and wild animals. The spiny cladodes can cause injuries to animals and during the fruiting season, the minute spines (glochids) on the fruits can be highly irritative and can result in animals being unable to feed. Dense infestations can cause a drastic devaluation of agricultural and conservation land.

Figure 10-32: Opuntia Species observed on site

10.13.6 Fauna Assessment

The biodiversity assessment also included a fauna assessment. The assessment found the following:

- Mammals: According to the desktop study conducted, the species listed in Table 10-19 were identified as being possible to occur within the study area or the immediate vicinity of the proposed filing station area. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal. There are nine Red List mammal species that have a high chance of occurring in the study area. cattle and other domestic animals graze on the property.

Table 10-19: Sensitive mammals that are likely to occur onsite

Common name	Recorded on site
Spotted necked otter	None
Greater dwarf shrew	None
Pangolin	None
Rock dormouse	None
Lesser grey-brown musk	None
African weasel	None
Brown hyena	None
Honey badger	None
Southern hedgehog	None

The site is also used for grazing Sheep and Goats. None of the sensitive mammals which were expected was spotted on site except for droppings of smaller mammals. The presence of evidence of disturbance on site, and the seasonality issues may explain why all the sensitive mammals were not seen during the site visit. Some of the expected animals are nocturnal, and thus may only be seen at night.

- Reptiles: The study site has a number of venous snakes such as Cape Cobra, Black Mamba and a number of other venous snake. All these have a high chance of occurring in the study area, based on habitat requirements and are most likely to occur in rocky habitats, either on rocky outcrops or in rocky, well wooded valleys. Field investigation findings: None of the expected reptiles was observed on site during the site visit.
- Avifauna: According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the Sekhukhuneland area; the majority of these birds are comprised of Bushveld, Grassland and Mountainous species. All birds that could be present within the vicinity of the study area are listed in Table 10-20.

Table 10-20: Red Data bird species potentially found within the study site

Scientific Name	Common Name	IUCN Status
Geronticus calvus	Southern Bald Ibis	VU
Sagittarius serpentarius	Secretary bird	NT
Gyps coprotheres	Cape Vulture	VU
Stephanoaetus coronatus	African Crowned Eagle	NT
Circus ranivorus	African Marsh-Harrier	VU
Circus maurus	Black Harrier	NT
Falco biarmicus	Lanner Falcon	LC
Alcedo semitorquata	Half Collared Kingfisher	CR
Bugeranus carunculatus	Wattled Crane	VU
Anthropoides paradiseus	Blue Crane	VU
Balearica regulorum	Grey Crowned Crane	VU

Scientific Name	Common Name	IUCN Status
Eupodotis senegalensis	White-bellied Korhaan	VU

A few avifaunal species were spotted onsite during the site visit. The proposed mining operations may generate noise pollution which serves as a deterrent to birds.

- Invertebrates: A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in Table 10-21.

Table 10-21: Butterfly species expected to occur on site (courtesy of the Biodiversity Assessment)

Scientific Name	Common Name
Melanitis leda Helena	Evening Brown
Acraea anemosa	Broad-bordered Acraea
Acreae neobule	Wandering Acraea
Danaus chrysippus	African Monarch butterfly
Junonia hierta cebrene	Yellow Pansy butterfly
Danays chrysippus	Southern Milkweed
Charaxes jasius	Koppie Emperor
Cyclyrius pirithous	Common Blue
Hyalites esebria	Dusky Acrea butterfly
Phalantha aethiopica	Poplar Leopard
Alaena amazoula	Yellow Zulu
Catacroptera cloanthe	Pirate butterfly
Charaxes achaemenses	Bushveld Emperor
Pinacopteryx eriphia	Zebra White butterfly
Eurema brigitta	Broad-bordered yellow
Vanessa cardui	Painted Lady
Papilio demodocus	Citrus Swallowtail butterfly

10.14 Conservation Plan

According to the 2016 Northern Cape Critical Biodiversity Areas, the Farm Kapstewel 436 falls within an Ecological Support Area (ESA). Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic. The primary purpose of a map of Critical Biodiversity Areas and Ecological Support Areas is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact biodiversity. It is the biodiversity sector’s input into multi-sectoral planning and decision-making processes2.

Figure 10-33 provides a map showing areas of conservation importance that may be affected by the mining activities.

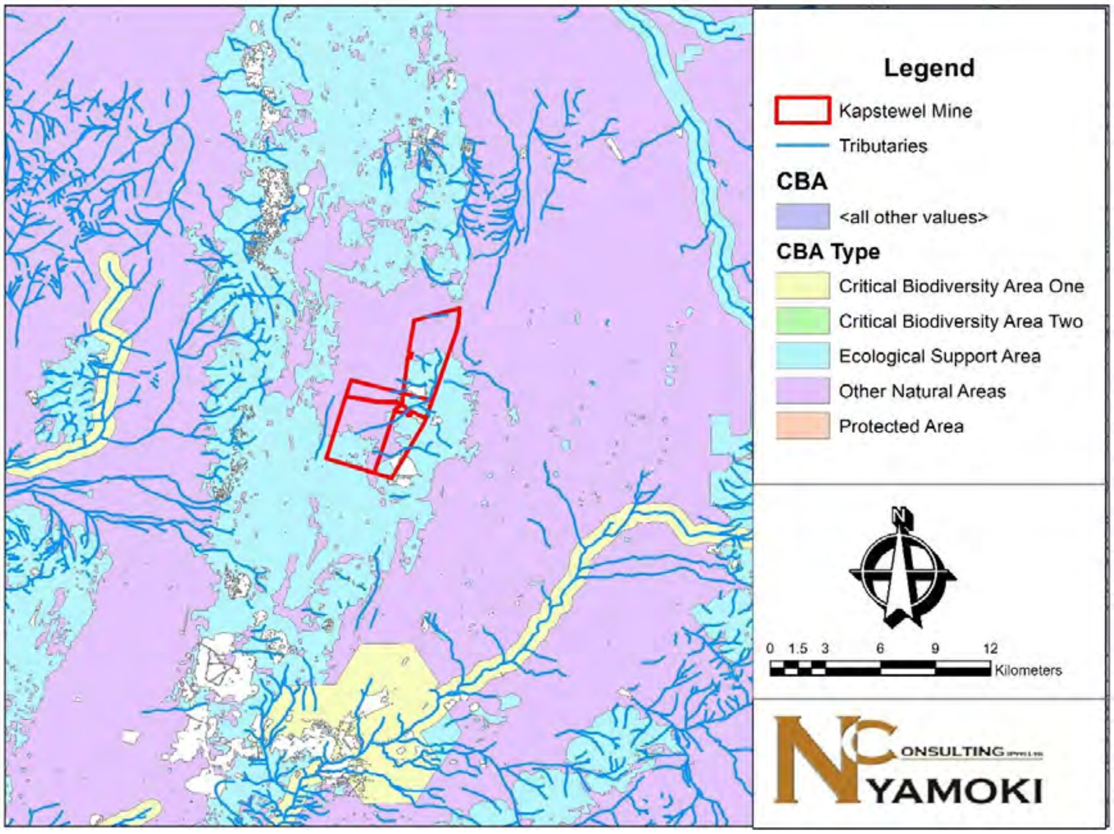


Figure 10-33: Areas of Conservation Importance

10.15 Protected Areas

The DFFE South African Conservation Areas Database (SACAD), South African Protected Areas Database (SAPAD) and the Important Biodiversity Area (IBA) database show that there are no protected areas or important bird areas affected by the proposed mining activities.

10.16 Air Quality

An air quality assessment as undertaken by a qualified specialist and included a baseline characterisation of the area.

10.16.1 Sensitive Receptors (SRs)

A base line air quality assessment undertaken for the proposed project found there are a number of Sensitive Receptors (SRs) located in close proximity to the project. SRs primarily refer to places where humans reside, schools and hospitals. Ambient air quality guidelines and standards have been developed to protect human health. Ambient air quality, in contrast to occupational exposure, pertains to areas outside of an industrial site boundary to where the public has access and according to the Air Quality Act, excludes areas regulated under the Occupational Health and Safety Act (Act No 85 of 1993).

For air quality impact assessment, the schools, clinics, hospitals and old age homes within the modelling domain are the primary sensitive receptors. There are eight schools, one old age home, three clinics and one hospital that were identified within the wider domain (Table 10-22 and Figure 10-35). There is one main residential area: Postmasburg, with sub-places that include Boitshoko (8,156 inhabitants), Marenteng (3,383 inhabitants), New Town (6,201 inhabitants), Postdene (6,934 inhabitants) and Postmasburg sub-place with 4,668 inhabitants (Table 10-23 and Figure 10-36) and the modelling domain encompasses parts of Wards 3 and 6 of the Tsantsabane Local Municipality, which, according to the 2011 Census, accounting for 35,093 inhabitants and 9,839 households. About 11 km the north of the project area, there is SA Army Combat Training Centre Lohatla which belongs to the South African National Defence Force (SANDF). It is located approximately 4 km to the east of R325 road. The village of Lohatla is 1.2 km west of the R325, just south of Lohatla Siding. A small mining village is located at the Glosam Mine, approximately 3 km to the west of R325 road.

Table 10-22: Potential primary sensitive receptors (schools, health facilities and old age homes) situated within the modelling domain of Kapstewel Manganese and Iron Ore Project

Receptor	Latitude (°S)	Longitude (°E)	Direction from Site Boundary	Distance from Site Boundary (km)
Asmandia Primary School	28.3036	23.08636	S	17.5
Assmang Primary School	28.319	23.05704	SSW	19.6
Blinkklip Sekondêre Skool	28.2957	23.08984	S	16.7
High School Postmasburg	28.3381	23.06278	SSW	21.5
HTT Bidi Memorial Primary School	28.3205	23.04032	SSW	20.1
Postdene Primary School	28.3005	23.08505	S	17.1
Postmasburg Primary School	28.3366	23.06201	SSW	21.3
Ratang-Thuto Secondary School	28.3207	23.03883	SSW	20.1
Huis Jan Vorster	28.3221	23.07205	SSW	19.6
Boichoko Clinic	28.3223	23.04447	SSW	20.1
Postdene Community Health Centre	28.3004	23.08969	S	17.1
Postmasburg Hospital	28.3285	23.06001	SSW	20.5
Postmasburg Military Medical Clinic	28.3206	23.07287	SSW	19.3

Table 10-23: Potential sensitive receptors – residential areas and farms, situated within the modelling domain of Kapstewel Manganese and Iron Ore Project

Receptor	Latitude (°S)	Longitude (°E)	Direction from Site Boundary	Distance from Site Boundary (km)
Farm Copthorne 677	28.059867°	23.192872°	NE	13.3
Farm Doorn Fontein 446	28.229509°	23.002439°	SW	13.2
Farm Driehoeks Pan 435	28.146058°	23.053227°	W	4.4
Farm 438	28.120295°	23.144644°	NE	5.4
Farm 439	28.089862°	23.209699°	NE	12.7
Farm 445	28.210916°	23.092311°	S	7.1
Farm 450	28.211332°	23.092012°	SSW	10.8
Farm 588	28.149412°	23.241831°	E	14.2
Farm Gloucester 674	28.088808°	23.054931°	NNW	7.6
Farm Kapstewel 436	28.146154°	23.098316°	N/A	N/A
Farm Klipfontein 437	28.162929°	23.127155°	SE	3.5
Farm Magoloring 668	28.103312°	22.994276°	NW	11.2
Farm Mount Huxley 676	28.068334°	23.147150°	NNE	9.9
Farm Paling 434	28.177600°	23.024816°	SW	7.9

Receptor	Latitude (°S)	Longitude (°E)	Direction from Site Boundary	Distance from Site Boundary (km)
Farm Plaas 589	28.200407°	23.215150°	SE	12.9
Farm Thaakwameng 675	28.084068°	23.099281°	N	6.9
Farm Vinci 580	28.241469°	23.141777°	SE	11.5
Farm Vlakfontein 433	28.190920°	22.964556°	SW	14

Figure 10-34: Proposed mining activities at the Kapstewel Manganese and Iron Ore Project area

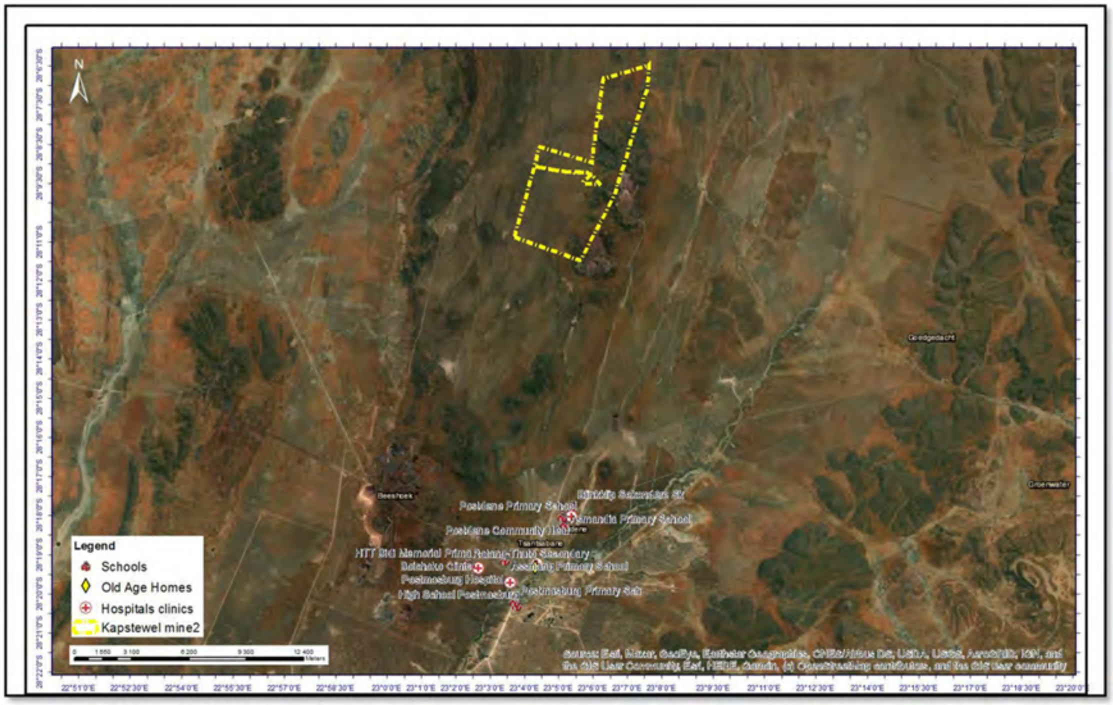


Figure 10-35: Sensitive receptors surrounding the Kapstewel Manganese and Iron Ore Project area

Figure 10-36: Sensitive receptors surrounding the Kapstewel Manganese and Iron Ore Project area - zoomed in

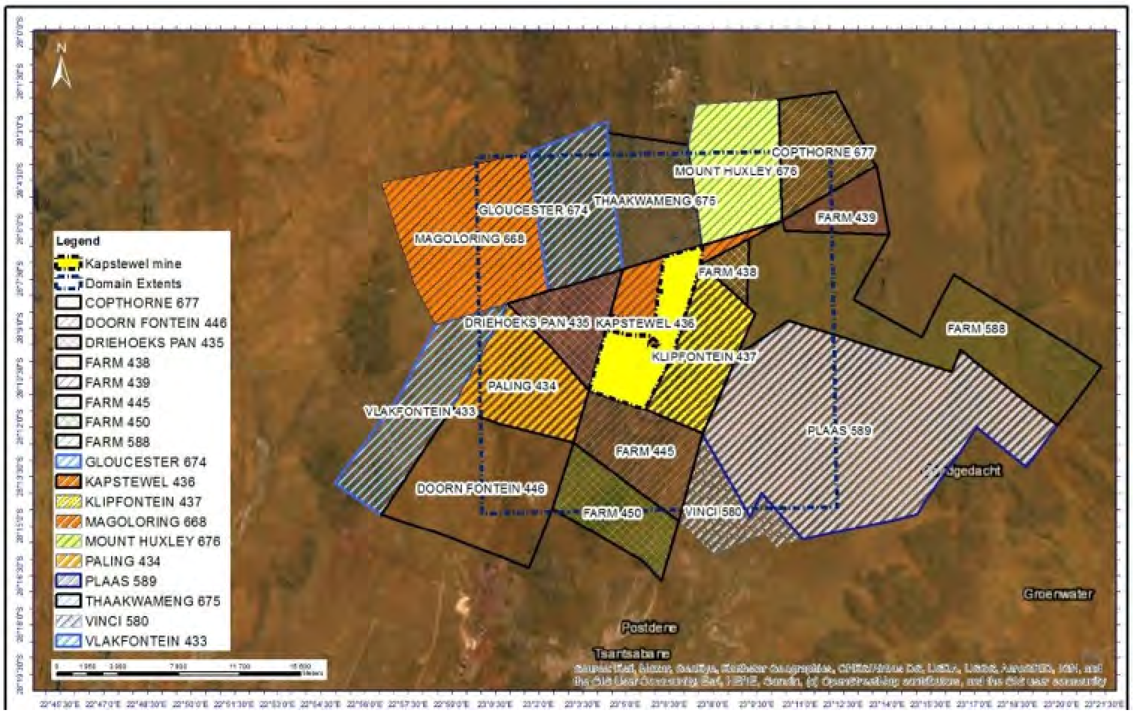


Figure 10-37: Potential sensitive receptors – adjacent farms situated within the modelling domain of Kapstewel Manganese and Iron Ore Project area

10.16.2 Ambient Air Quality and Sources of Air Pollution within the Region

Regional Road R325 and a network of gravel and unpaved roads, and an active mining site (opencast), a small town and low-income rural settlement that uses wood, coal and paraffin for heating and cooking purposes are located in the vicinity of the proposed site. These land- use activities contribute to baseline pollutant concentrations via windblown dust from mine stockpiles and dumps, vehicle tailpipe emissions and dust from vehicle entrainment, together with household fuel combustion, biomass burning, and veld fires and various fugitive dust sources.

The sources of atmospheric emissions include:

- Gaseous and particulate emissions from vehicles (tailpipe emissions);
- Miscellaneous fugitive dust sources including vehicle entrainment on roads and windblown dust from open areas;
- Gaseous and particulate emissions from biomass burning/veld fires (e.g. wild-fires).
- Gaseous and particulate emissions from adjacent mining operations; and
- Gaseous and particulate emissions from household fuel burning.

Details of sources of atmospheric emissions in the area include:

- Vehicle Entrainment of Dust from Paved and Unpaved Roads and Tailpipe Emissions: The force of wheels of vehicles travelling on unpaved roadways causes the pulverisation of the surface material. Particles are lifted and dropped from the rotating wheels and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The quantity of dust emissions from unpaved roads varies linearly with the volume of traffic, as well as the speed of the vehicles. The site that is proposed for mine development is in the vicinity of the corridor of R325 (Postmasburg – Kathu) and a network of unpaved, gravel local roads.

- Household Fuel Combustion (Domestic Fuel Burning): Despite the intensive national electrification programme, a large number of households continue to burn fuel to meet all or a portion of their energy requirements. The main fuels with air pollution potentials used by households within the study region are coal, wood and paraffin. The distribution patterns of fuel use are linked with the former townships and informal residential areas. Pollutants released from these fuels include CO, NO2, SO2, inhalable particulates and polycyclic aromatic hydrocarbons. Particulates are the dominant pollutant emitted from the burning of wood. Smoke from wood burning contains respirable particles that are small enough in diameter to enter and deposit in the lungs. These particles comprise a mixture of inorganic and organic substances including aromatic hydrocarbon compounds, trace metals, nitrates and sulphates. Polycyclic aromatic hydrocarbons are produced as a result of incomplete combustion and are potentially carcinogenic in wood smoke (Maroni et al., 1995). The main pollutants emitted from the combustion of paraffin are NO2, particulates, carbon monoxide and polycyclic aromatic hydrocarbons.

  Domestic fuel burning shows a characteristic diurnal and seasonal signature. Periods of elevated domestic fuel burning, and hence emissions, occur in the early morning and evening for space heating and cooking purposes. During the winter months, an increase in domestic fuel burning is recorded as the demand for space heating and cooking increases with the declining temperature. The site is located close to the low-income area of Postdene, located south of the Kapstewel mine site (~12 km), as well as areas further south and southwest such as Boitshoko, New Town and Marenteng (~15 km).

- Biomass Burning (Veld Fires): A veld fire is a large-scale natural combustion process that consumes various ages, sizes, and types of plants growing outdoors in a geographical area. Consequently, veld fires are potential sources of large amounts of air pollutants that should be considered when attempting to relate emissions to air quality. The size and intensity, even the occurrence, of a veld fire depend directly on such variables as meteorological conditions, the species of vegetation involved and their moisture content, and the weight of consumable fuel per hectare (available fuel loading). Veld fires are not easily quantified due to the irregular and seasonal nature of this source but are also considered to be an important contributor to ambient particulate concentrations, particularly during the fire-burning season.

- Mining: The closest mining activity to the Kapstewel project area is located on the farm Klipfontein 437, and this is an iron ore mine belonging to Sedibeng Iron Ore (Pty) Ltd. It is an open pit operation. In addition, there are numerous other opencast mines in the adjacent area such as Glosam Iron and Manganese Ore Mine on the farm Gloucester 674, Assmang's Beeshoek Iron Ore Mine on farm Beesthoek 448, Emang Mmogo Manganese Mine on the farm Magoloring 668, Boskop Manganese Mine owned by DVD Quality Mining on farm McCarthy 559, Lomoteng Mine (iron ore, manganese ore) owned by Huatian SA Mining & Investment (Pty) Ltd on the farm Lomoteng 669 and others.

10.16.3 Baseline on-site meteorological and ambient particulate matter monitoring

Measurements of PM1, PM2.5, PM4, PM10, TSP, as well as meteorological parameters such as temperature, relative humidity and pressure were taken on site. Particulate matter is commonly divided into four categories based on the size of its particles: Coarse, PM10, PM2.5, and PM1. Coarse PM particles are 10 micrometres (µm) or bigger, while PM10 and PM2.5 consist of particles that are 10 or 2.5 µm or smaller in diameter, respectively. Both PM10 and PM2.5 are considered inhalable particles, meaning that they are small enough to be inhaled deep into the lungs.

PM1 consists of the smallest particles: those under 1 micrometre in diameter. Though it may potentially be more harmful to human health due to its small size, there is limited evidence of its negative health effects because of the lack of widespread monitoring or regulation — PM1 is not monitored as routinely as PM2.5 or PM10 as it is not a subject of most air quality standards. However, it is theorized that PM1 may contribute to a significant portion of PM2.5's health effects because of its small particle size.

The results showed that PM1 values did not exceed 0.6 µm/m3 during the monitoring period.

PM2.5 is commonly measured and reported and there is a NAAQS standard (daily average of 40 µm/m3 that is in force until the end of 2029) that we could compare measured values during the monitoring period. PM2.5 values did not exceed 18 µm/m3 during the monitoring period. There are distinguished peaks during daytime (08:00 – 17:00), which most probably coincide with dust generating activities on site.

PM4 is not commonly measured and reported and there are no guidelines, limits or standards that we could compare measured values during the monitoring period. PM4 values did not exceed 35 µm/m3 during the monitoring period. There are distinguished peaks during daytime (08:00 – 17:00), which most probably coincide with dust generating activities on site. There was an outlier with a signal showing a value of approximately 235 µm/m3 at around 06:00 on the 3rd of April, which is probably a malfunction of the instrument.

PM19 is commonly measured and reported and there is a NAAQS standard (daily average of 75 µm/m3) that we could compare measured values during the monitoring period. PM10 values did not exceed 40 µm/m3 during the monitoring period. There are distinguished peaks during daytime (08:00 – 17:00), which most probably coincide with dust generating activities on site.

TSP is not commonly measured and reported and there is no NAAQS standard in South Africa that which we could compare the measured values during the monitoring period. TSP values could not be deducted due to the fact that there was a malfunction of the instrument at the dawn of the 3rd of April when the instrument was reading around 16,000 µm/m3.

The meteorological parameters showed typical autumn inland patterns, with the temperature slowly decreasing, especially during night-time, and a steady increase of barometric pressure over the period showing the influence of high-pressure anticyclone, accompanied by the decrease in relative humidity readings towards the end of the monitoring period.

10.17 Heritage Resources

Heritage resources may be tangible, such as buildings and archaeological artefacts or intangible such as landscapes and living heritage. Their significance is based upon their aesthetic, architectural, historical scientific, social, spiritual, linguistic economic or technological values; their representation of a particular period; their rarity and their sphere of influence. There are a number of heritage and cultural resources in the Northern Cape Province.

A site-specific Phase 1 Heritage Impact Assessment (HIA) was conducted as part of the process. The purpose of the study was to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed mining right application by means of mitigation measures (Chance Find Procedure). The study concludes that the impacts will be negligible since the sites have already been disturbed. The results of the archaeological and heritage survey conducted within the proposed mining right application site are summarised in Table 10-24.

Table 10-24: Summary of findings

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	Several buildings and mine structures were recorded during the survey. Due to the lack of information the ages of the buildings could not be established conclusively.
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists in the study area
Historical settlements and townscapes	None recorded on the study site
Landscapesnd natural features of cultural significance	None
Archaeological sites	None recorded within the proposed mining site
Graves and burial grounds	None recorded within the proposed project site must be protected/
Movable objects	None
Overall comment	Although no burial site was recorded within the proposed mining site, there is potential to encounter unmarked graves.

Table 10-25: Coordinates of Historical Findings

Item	Description	Coordinates
KHB01	Dilapidated historic building	28° 9'43.00"S 23° 6'3.00"E
KHB02	Industrial structure	28° 9'36.00"S 23° 6'8.00"E
KHB03	Decommissioned railway line	28° 9'31.00"S 23° 6'10.00"E
KHB04	Remain of house foundations	28° 9'23.00"S 23° 6'7.00"E
KHB05	Partially destroyed buildings	28° 9'22.52"S 23° 6'4.42"E
KHB06	Industrial building blocks	28° 9'20.00"S 23° 6'3.00"E
KHB07	Linear dwellings and remains of foundations	28° 9'15.99"S 23° 6'4.88"E
KHB08	Dilapidated building	28° 9'15.88"S 23° 6'8.09"E
KHB09	Remnants of a house	28° 9'14.00"S 23° 6'10.00"E
KHB10	Mine compounds	28° 8'43.40"S 23° 6'18.81"E
KHB11	Remains of a loading bay	28° 8'43.76"S 23° 6'19.64"E
KHB12	Water reservoir	28° 8'51.17"S 23° 6'20.29"E
KHB13	Remains of a weigh bridge	28° 8'6.00"S 23° 6'17.00"E
KHB14	Partially destroyed brick dwelling	28° 8'30.00"S 23° 6'10.00"E
KHB15	Stone curns	28° 9'17.00"S 23° 6'28.00"E

Item	Description	Coordinates
KHB16	Partially demolished structure	28° 9'18.00"S 23° 6'29.00"E
KHB17	Clustered house foundations	28° 9'19.00"S 23° 6'33.00"E

10.17.1 Archaeological and Heritage Sites

The proposed mining right application site did not yield any confirmable archaeological sites or material. Based on the field study results and field observations, it is the considered opinion of the author that the receiving environment for the proposed mining right application site is low to medium potential to yield previously unidentified archaeological sites during mining.

10.17.2 Buildings and Structures older than 60 years

The study recorded more than 17 individual structures within the mining right site. Most of the buildings and structures are associated with the previous mining activities within the area. Due to a lack of information and their state of conservation, their ages could not be conclusively confirmed. However, it is assumed that most of the historical buildings have been destroyed or collapsed due to natural decay and what remains are foundations which from a heritage perspective are not very significant. Although the buildings and structures are in a bad state of conservation, they are still protected in terms of Section 34 of the NHRA. It looks like most of the affected structures have been avoided and therefore the mining right application may be approved subject to ensuring that no historic building may be destroyed without a permit from PHRA. Further investigation and mitigation are required if a heritage building is earmarked for demolition or alteration.

10.18 Palaeontology

The development is taking place on sediment ary sequences, which are underlain by Transvaal, Rooiberg and Griqualand-West geology. Over areas totalling fully 40% of Southern Africa the 'hard rocks', from the oldest to the Quaternary, are concealed by normally unconformable deposits – principally sand, gravel, sandstone, and limestone. Inland deposits are much more extensive than marine deposits and are terrestrial and usually unfossiliferous. Some of these deposits date back well into the Tertiary, whereas others are still accumulating. Owing to the all-to-often lack of fossils and of rocks suitable for radiometric or palaeomagnetic dating, no clear-cut dividing line between the Tertiary and Quaternary successions could be established (Kent 1980). The alluvium sands were deposited by a river system and reworked by wind action (Snyman 1996). A thick cover of Kalahari reddish sand blankets most outcrops and is dominated by the typical Kalahari thornveld (Norman and Whitfield 2006).

Groenewald and Groenewald (2014) placed the Ghaap Plateau as a Group in the Transvaal Supergroup with the Campbell Group as a Subgroup. The Ghaap Plateau was deposited as a thick layer of carbonaceous sediments in extensive shallow basins. It consists of carbonates, siliclastics and iron formations. The age is Late Archaean, Early Proterobufferc (Johnson 2006). Stromatolites are present in the upper member. Stromatolites occur in the dolomite of the Ghaap Plateau Formation. The Ghaap Plateau Formation is followed by the Asbestos Hills Formation (Sheet 2722 info). The Ghaap Plateau dolomites correlate with the Chuniespoort Group dolomites (McCarthy and Rubidge 2005). Johnson (2006) refers to the area round Kuruman and Postmasburg as the Griqualand basin as part of the Transvaal Supergroup. Johnson (2006) divided the Ghaap Group into the Schmidtsdrift, Campbell Rand, Asbestos Hills and Koegas Subgroups. The age is placed as 2642 ± 3 Ma.to 2222 ± 13 Ma. The Campbell Rand Subgroup has two formations, the Nauga and Klein Naute with the Kliphuis, Kuruman and Daniëlskuil Formations part of the Asbestos Hills Subgroup. The Lime Acres

Member, Campbell Rand Subgroup lies on top of the Kogelbeen Formation containing important limestone resources (Eriksson et al. 2006).

Palaeontology - Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, the palaeontological sensitivity can generally be LOW to VERY HIGH, and here in the development MODERATE for the Transvaal Supergroup and HIGH for the Quaternary (SG 2.2 SAHRA APMHOB, 2012) (Almond and Pether 2009).

'Algal microfossils' have been reported from shales and are probably of diagenetic origin (Eriksson 1999), these may be present here. Stromatolites are significant indicators of palaeoenvironments and provide evidence of algal growth between 2640 and 2432 million years ago. These fossils are rarely found in shales and are allocated a HIGH palaeontological sensitivity as they are important indicators of palaeo- environmental conditions (Groenewald and Groenewald 2014). Stromatolites may be plentiful in dolomites, but good examples should always be preserved.

The Quaternary Formation to Holocene may contain fossils. A very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size (Groenewald and Groenewald 2014).

Figure 10-38: Example of a Stromatolite (Photograph: E. Butler).

The more recent Phanerobufferc deposits (Cenobufferc) are of importance in the study of life during the last 300 million years. Large areas in the western part of the Northern Cape Province are underlain by Cenobufferc (Tertiary, Quaternary) deposits of the Kalahari Group.

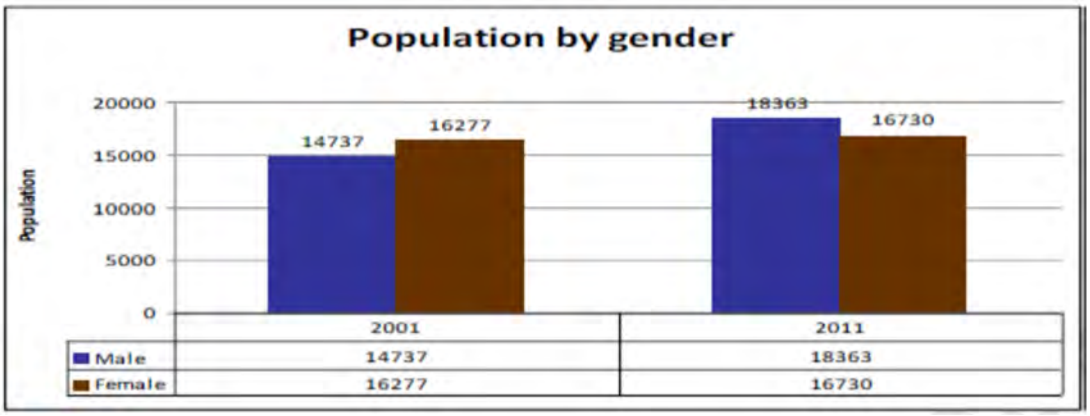
10.19 Socio-Economic

The proposed mining project will be located within the Tsantsabane Local Municipality which is situated in the ZF Mgcawu District Municipality of the Northern Cape Province.

10.19.1 Population

Census 2011 the population figures for Tsantsabane Local Municipality is 35 093, this indicates a population growth of 4 079, from population size of 31 014 (Census 2001). The municipality has a total of 9 839 households. According to the IDP, the population increase is due to immigration of people coming to the municipal area in search for better living conditions or jobs in the mining and solar industrial sectors.

The male population has increased by 24% while the female population has increased with only 2.7% since 2001. The municipality has more males than females and the reason could be derived from the male dominated employment industry as there are a lot of mines in the area. Out of the whole population 54% are black male followed by 36% coloured males then 8% white and lastly 1% Indians. For females there are 51% black Africans followed by 40% coloured females then lastly 9% of whites in the municipal area.

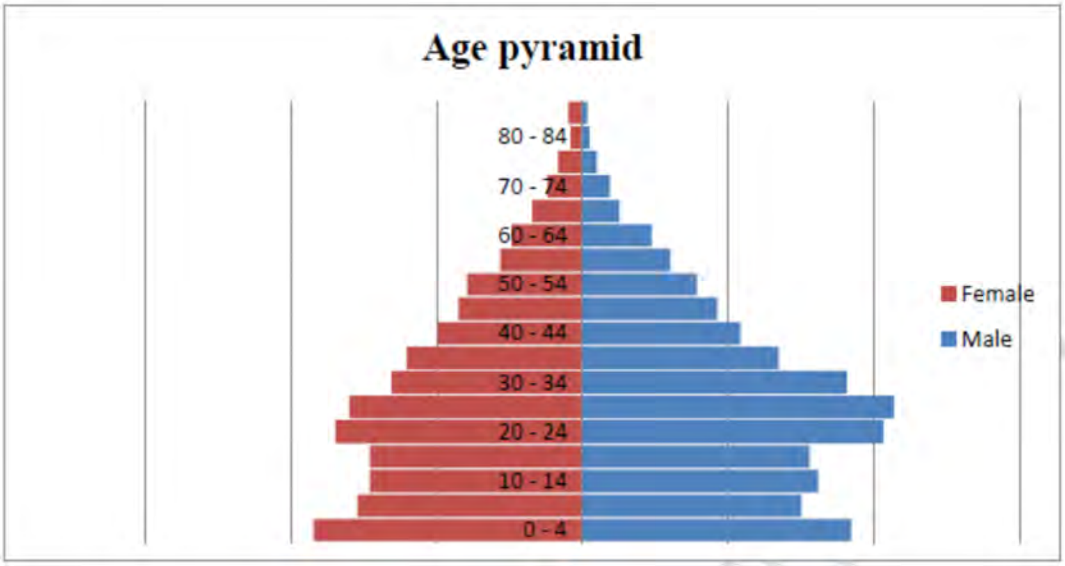


GEOLOGICAL CONSULTING SERVICES PTY (LTD)

POPULATION BY GENDER

Figure 10-39: Population by Gender

The age pyramid indicates that the population of Tsantsabane is predominantly young people. There is a small percentage of people older than 60 years. The age pyramid further indicates that approximately 31% of the population is under 14 years and approximately 33% is between 15 and 34 years.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)

POPULATION PYRAMID

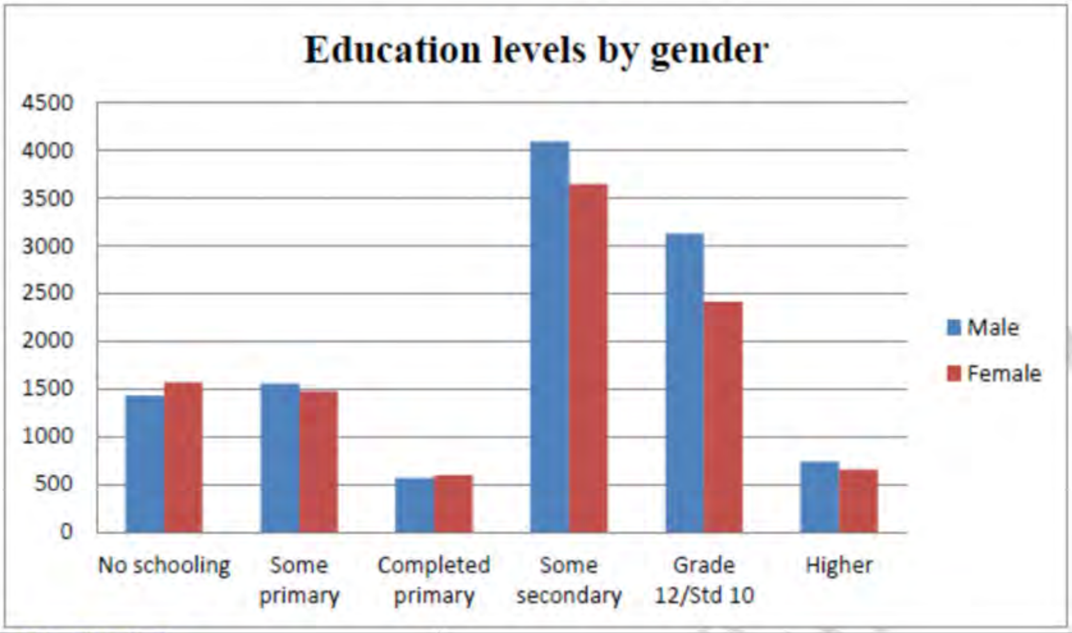
Figure 10-40: Population pyramid

10.19.2 Level of Education

From a statistical analysis it is clear that there has been an increase of people obtaining Matric since 2001. There has also been an increase in the number of people with higher education.

The statistics indicate that although a high number of students enrolling for primary school a very low number of students complete grade 12. This has resulted in a very low probability for employment. Only 5% of those who enrolled for grade 1 make it into tertiary. Less than 15% of the population has a tertiary qualification or have completed Grade 12. It must, however, be mentioned that the education level is affected negatively by the urbanization process, in the past since it mostly involves matriculates and those with a better qualification, due to the local lack of job opportunities. This can also be attributed to the fact that the nearest University of Technology (Central University of Technology, in Bloemfontein) is almost 400km away and the Sol Plaatjie University has recently started a limited offering of some courses.

Males seems to be doing much better when it comes to education levels, as more men have some secondary education, grade 12 and higher education than their female counterparts.



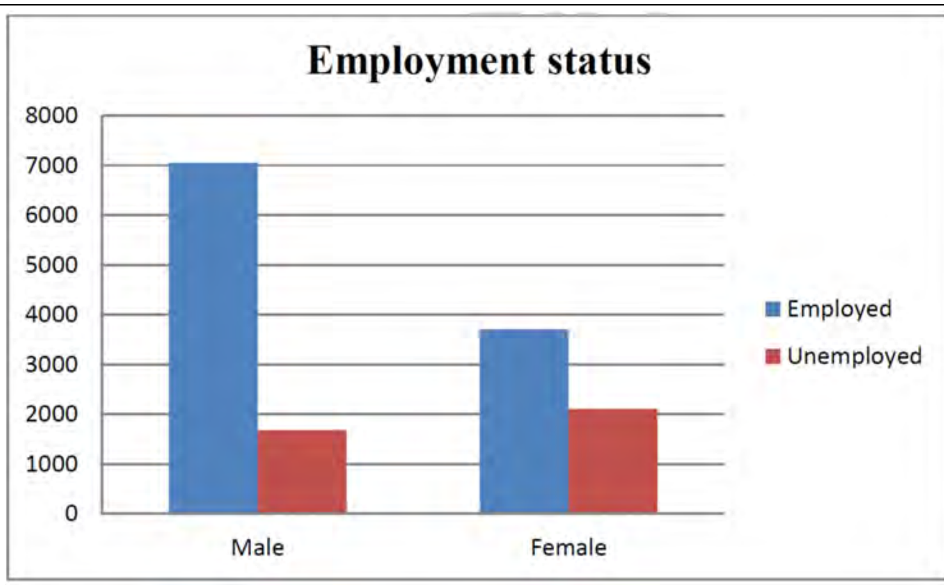
GEOLOGICAL CONSULTING SERVICES PTY (LTD)

EDUCATION LEVELS

Figure 10-41: Education Levels by Gender

10.19.3 Employment Levels

According to the STATSA unemployment figure has drastically reduced from 4 466 in 2001 to 3 795 in 2011 this shows a decrease of 15%. Employment has increased by 69% in 2011, this clearly indicates that there are more people working in 2011 than in 2001.

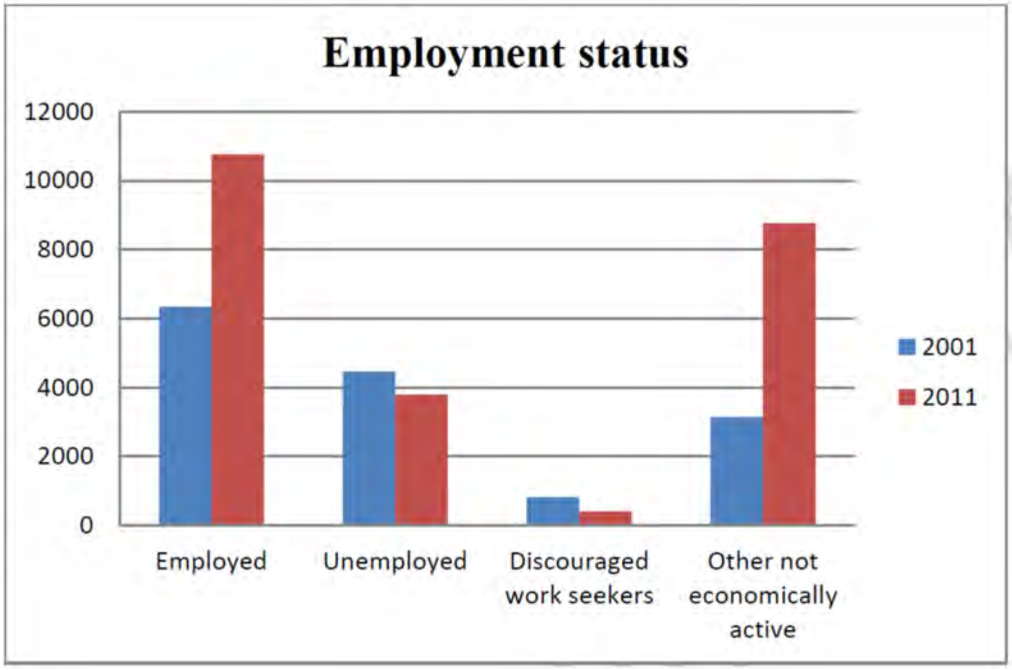


GEOLOGICAL CONSULTING SERVICES PTY (LTD)

EMPLOYMENT STATUS

Figure 10-42: Employment Status

Although there were more employed people in 2011 than in 2001, there is a very high level of economically inactive members in 2011 than it was in 2001. The high number of economically inactive could indicate a high level of dependency on those who are employed.



GEOLOGICAL CONSULTING SERVICES PTY (LTD)	EMPLYMENT STATUS

Figure 10-43: Employment Status

10.19.4 Economic Statistics

The Draft Spatial Development Framework (SDF) indicates that "during 2012 the primary sector contributed 76% of all the sectors' contribution to the Gross Domestic Product (GDP) of Tsantsabane LM. Mining is the single biggest contributor of all industries to the GDP, contributing 74% (R 3.9 billion), and the secondary and tertiary sectors contributed 4% and 20% respectively".

10.20 Soils and Land Types

The site is consist of Some Campbell Group dolomite and chert and mostly younger, superficial Kalahari Group sediments, with red wind-blown (0.3–1.2 m deep) sand (Figure 10-44). Locally, rocky pavements are formed in places. The most important land types are Ae, Ai, Ag and Ah, with Hutton soil form.

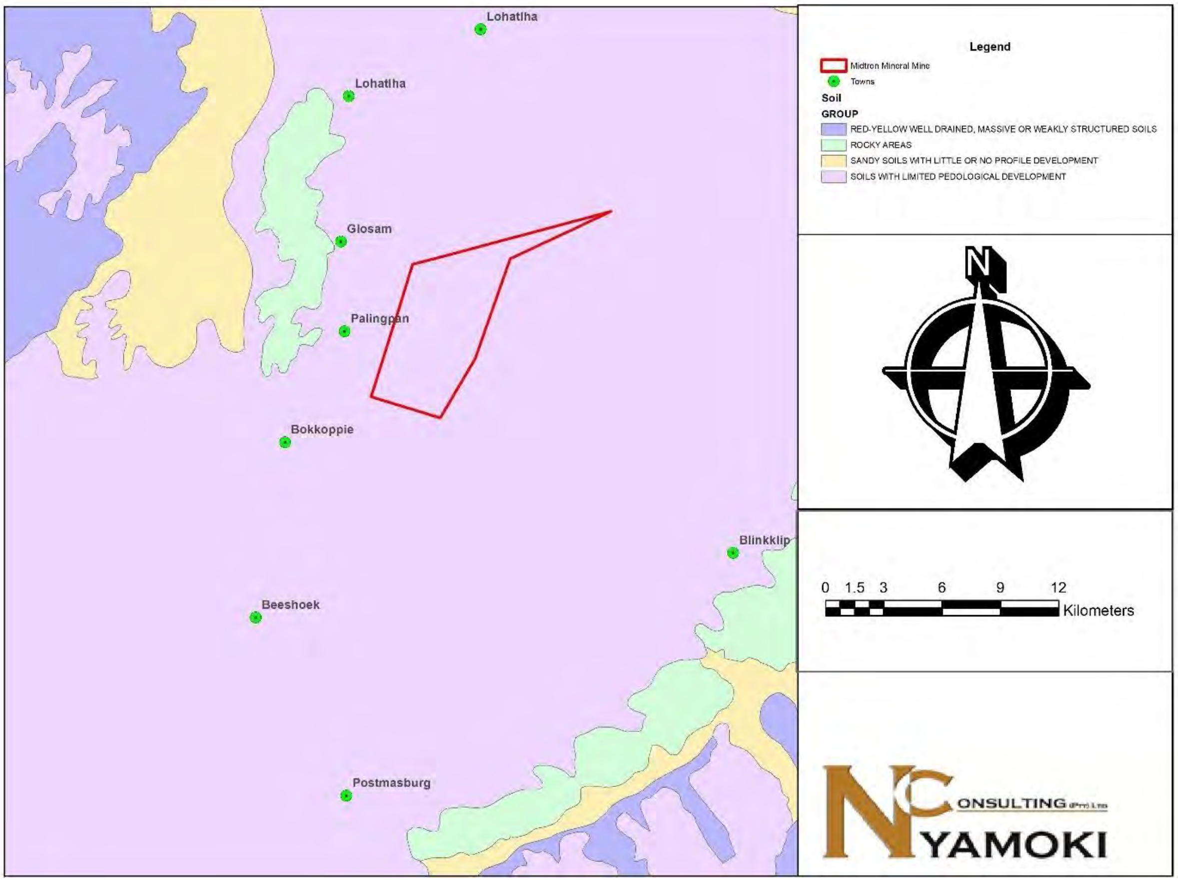


Figure 10-44: Soil Type onsite

Figure 10-45: Soil Type observed onsite

10.21 Description of the current land uses

The majority of the affected area and surroundings are currently being used for prospecting and mining. The Postmasburg area consist of the Mining sectors including Iron Ore, Manganese and other quarry mining for aggregates and well supported by the presences of the local shopping centre in the central of Postmasburg to support the local economy. The most agricultural practice in the area include goat, sheep, and cow farming. Near the proposed area only mines such as Sedibeng Mine exist.

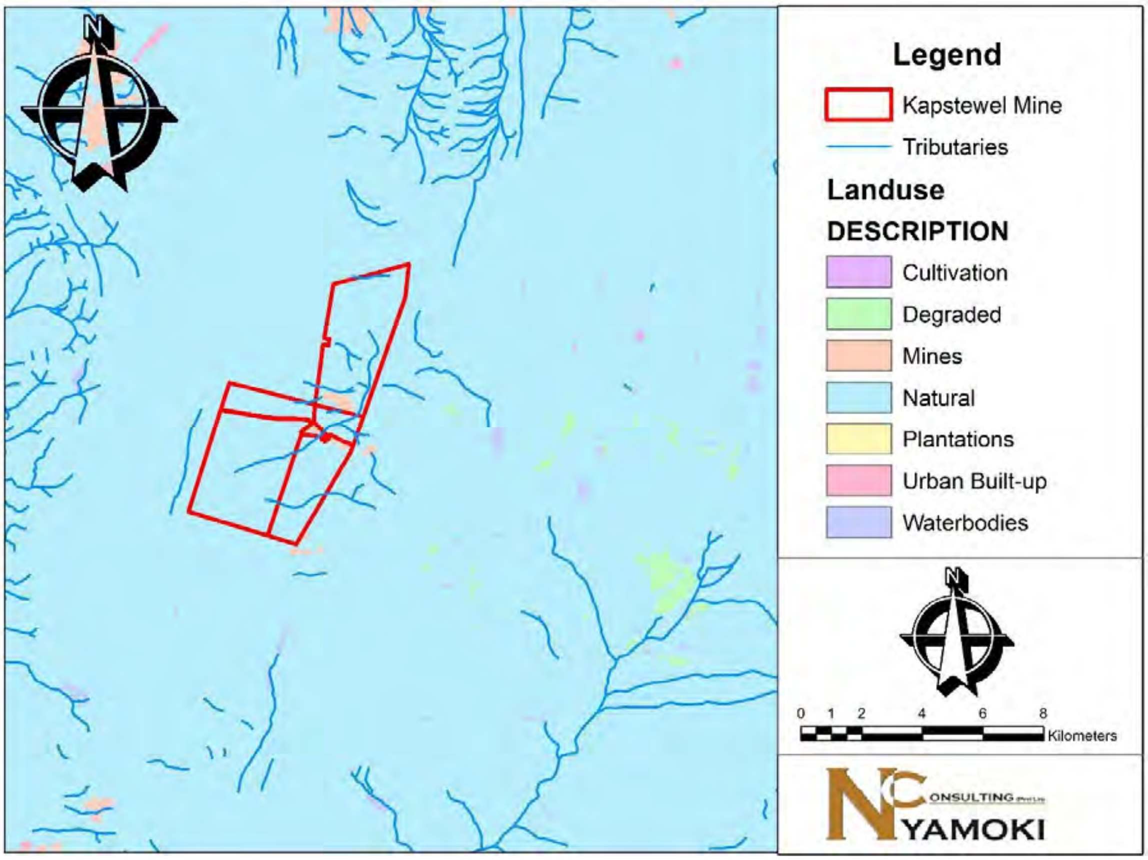


Figure 10-46: Landuse

10.22 Environmental Attributes Map

A combined environmental attributes map is provided in Figure 10-47

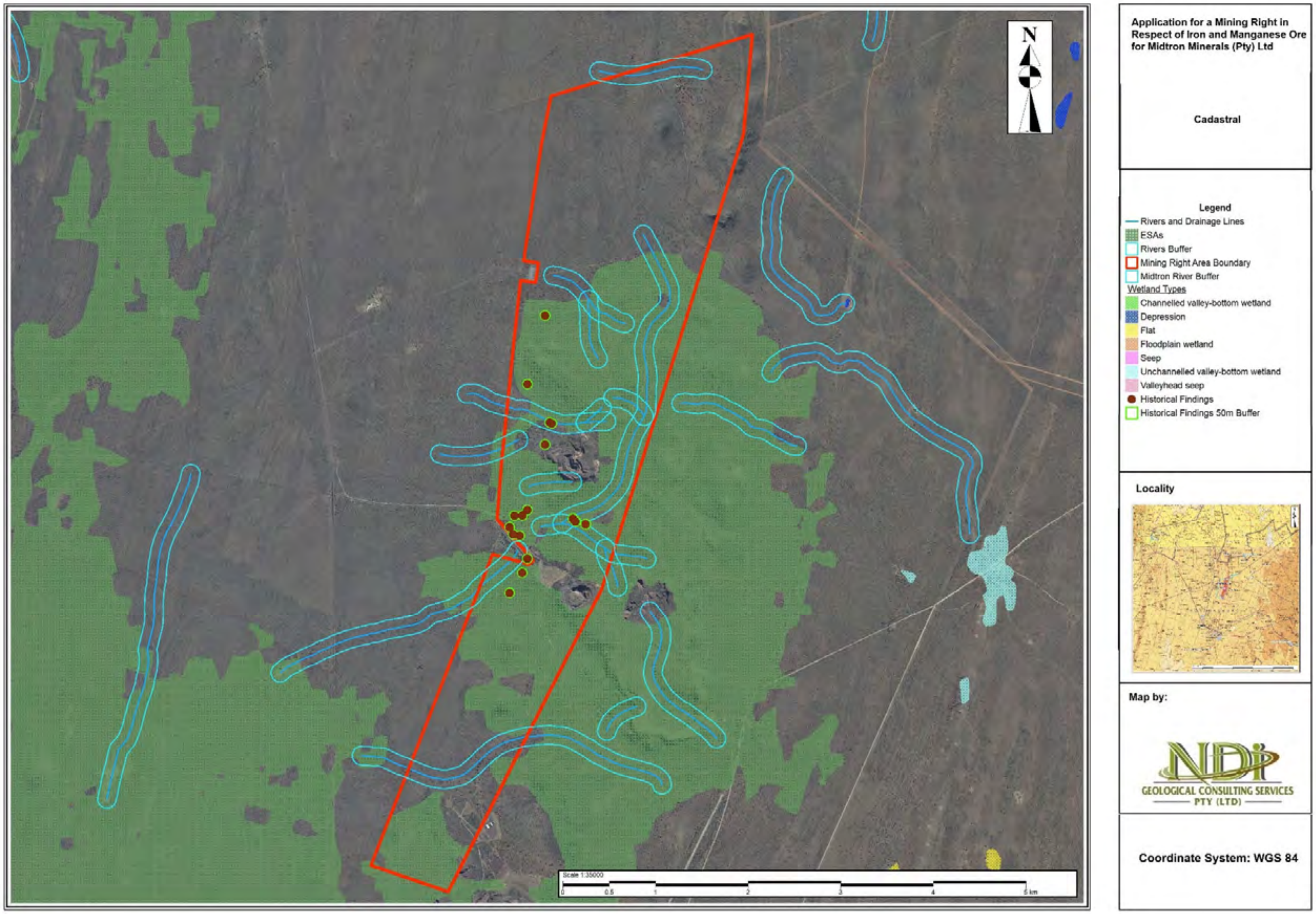


Figure 10-47: Environmental Attributes Map

11 Impacts identified and risks identified

Anticipated impacts that were identified by the project team and through the stakeholder engagement process are summarised in Table 11-1.

Table 11-1: Summary of Potential Environmental Impacts Associated with the Proposed Development

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible job opportunities during the construction and operation.
Topography	Changes in the topography in the area.
Hydrogeology	Possible groundwater contamination.
Geology	Changes in the geology in the area.
Hydrology and Surface water	Possible surface water contamination.
Air Quality	Possible impact on Air Quality in the area.
Climate Change	Possible contribution to climate change through emission of Green House Gases
Noise	Possible generation of noise during construction and operation.
Visual	Visual impact associated with the mine infrastructure and operation.
Soils/Land Use/Land Capability	Loss of soil resource and change in land capability and land use.
Biodiversity	Disturbance and loss of biodiversity, especially SCC.
Aquatic habitat and aquatic ecology	Possible loss, sedimentation and contamination of aquatic habitat seeps
Heritage	Possible impact on heritage and cultural resources (including graves) in the area.
Palaeontology	Possible impact on palaeontology resources (including graves) in the area.
Traffic	Potential safety issues due to the increased traffic.
Cumulative Impacts	Cumulative Impacts

These impacts have been further refined and assessed according to the quantitative impact assessment methodology in Section 12 and the results are presented in Section 13.

12 Methodology used in determining the significance of environmental impacts

The following methodology for determining the significance of environmental impacts will be utilised for the EIA/EMPr phase.

The impact assessment methodology has been formalised to comply with Regulation 31(2) (i) of NEMA, which states the following:

> *(2) An environmental impact assessment report must contain all information that is necessary for the competent authority to consider the application and to reach a decision …, and must include –*
> *(l) an assessment of each identified potentially significant impact, including –*
> *(i) **cumulative impacts**;*
> *(ii) the **nature** of the impact;*
> *(iii) the **extent** and **duration** of the impact;*
> *(iv) the **probability** of the impact occurring;*
> *(v) the **degree** to which the impact can be **reversed**;*
> *(vi) the **degree** to which the impact may **cause irreplaceable loss of resources**; and*
> *(vii) the **degree** to which the impact can be **mitigated**.*

All the identified potential impact will be assessed according to the following Impact Assessment Methodology as described below. This methodology has been utilised for the assessment of environmental impacts where the consequence (severity of impact, spatial scope of impact and duration of impact) and likelihood (frequency of activity and frequency of impact) have been considered in parallel to provide an impact rating and hence an interpretation in terms of the level of environmental management required for each impact.

The first stage of any impact assessment is the identification of potential environmental activities[1], aspects[2] and impacts which may occur during the commencement and implementation of a project. This is supported by the identification of receptors[3] and resources[4], which allows for an understanding of the impact pathway and an assessment of the sensitivity to change. Environmental impacts[5] (social and biophysical) are then identified based on the potential interaction between the aspects and the receptors/resources.

The significance of the impact is then assessed by rating each variable numerically according to defined criteria as outlined in Table 12. The purpose of the rating is to develop a clear understanding of influences and processes associated with each impact. The severity[6], spatial scope[7] and duration[8] of the impact together comprise the consequence of the impact and when summed can obtain a

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[1]An ***activity*** is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation.

[2]An ***environmental aspect*** is an 'element of an organisations activities, products and services which can interact with the environment'. The interaction of an aspect with the environment may result in an impact.

[3]***Receptors*** comprise, but are not limited to people or man-made structures.

[4]***Resources*** include components of the biophysical environment.

[5]***Environmental impacts*** are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality. Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. In the case where the impact is on human health or well-being, this should be stated. Similarly, where the receptor is not anthropogenic, then it should, where possible, be stipulated what the receptor is.

[6]***Severity*** refers to the degree of change to the receptor status in terms of the reversibility of the impact; sensitivity of receptor to stressor; duration of impact (increasing or decreasing with time); controversy potential and precedent setting; threat to environmental and health standards.

[7]***Spatial scope*** refers to the geographical scale of the impact.

[8]***Duration*** refers to the length of time over which the stressor will cause a change in the resource or receptor.

maximum value of 15. The frequency of the activity9 and the frequency of the impact10 together comprise the likelihood of the impact occurring and can obtain a maximum value of 10. The values for likelihood and consequence of the impact are then read off a significance rating matrix table as shown in Table 12-1. This matrix thus provides a rating on a scale of 1 to 150 (low, medium low, medium high or high) based on the consequence and likelihood of an environmental impact occurring.

Natural and existing mitigation measures, including built-in engineering designs, are included in the pre-mitigation assessment of significance. Measures such as demolishing of infrastructure, and reinstatement and rehabilitation of land, are considered post-mitigation.

Table 12-1: Criteria for Assessing Significance of Impacts

SEVERITY OF IMPACT	RATING
Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4
Disastrous / extremely harmful	5

SPATIAL SCOPE OF IMPACT	RATING
Activity specific	1
Mine specific (within the mine boundary)	2
Local area (within 5 km of the mine boundary)	3
Regional	4
National	5

DURATION OF IMPACT	RATING
One day to one month	1
One month to one year	2
One year to ten years	3
Life of operation	4
Post closure / permanent	5

CONSEQUENCE

FREQUENCY OF ACTIVITY / DURATION OF ASPECT	RATING
Annually or less / low	1
6 monthly / temporary	2
Monthly / infrequent	3
Weekly / life of operation / regularly / likely	4
Daily / permanent / high	5

FREQUENCY OF IMPACT	RATING
Almost never / almost impossible	1
Very seldom / highly unlikely	2
Infrequent / unlikely / seldom	3
Often / regularly / likely / possible	4
Daily / highly likely / definitely	5

LIKELIHOOD

[9]***Frequency of activity*** refers to how often the proposed activity will take place.

[10]***Frequency of impact*** refers to the frequency with which a stressor (aspect) will impact on the receptor.

Table 12-2: Significance Rating

Consequence

Likelihood

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	1	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

13 The positive and negative impacts that the proposed activity and alternatives will have

This section contains the assessment of potentially positive and negative environmental impacts that can be caused by the proposed project. The impacts are linked to the activities conducted for the proposed development, broadly relating to pre-construction, construction, operational, and decommissioning phases. Specific emphasis was placed on any relevant environmental, social, and economic impacts identified by the specialist studies, comments received during the stakeholder engagement process, issues highlighted by relevant authorities; as well as a professional judgement of the EAP team through appraisals on the project description, listed activities and the receiving environment.

The objectives for each of the potential environmental impacts identified was to determine their significance and to promote mitigation measures to reduce the impacts to an acceptable level where required. Key potential positive and negative environmental issues relating to the proposed project were assessed according to the adopted methodology for assessing impacts as described in Section 13.

13.1 Pre-construction and Construction Phases

During the pre-construction and construction phases, the following main activities will take place:

- Mine planning and design for:
  - the identification and minimisation of environmental impacts associated with mining; and
  - developing projects that through mine planning for environmental protection can help in developing projects that meet community expectations.

  Considerations will include social and economic factors, water resource protection, air quality, noise, surrounding land uses etc.
- Site surveillance for any Red Data Listed (RDL) species and SCC;
- Surveillance and marking of graves and cultural artefacts (if any);
- Where required, potentially conduct a Phase 2 Heritage assessment, which may require the application for permits allowing for grave relocation and/or application for destruction permits from SAHRA Limpopo Province;
- Demarcation of no-go areas;
- Site preparation- removal of protected vegetation (shrubs and trees) to be relocated, monitored and maintained.

The construction phase of the project will entail:

- Earthworks:
  - Stripping of topsoil and sub-soil;
  - Stockpiling of topsoil and sub-soil;
  - Digging of trenches and foundations;
  - Establishing of stormwater controls as per the stormwater management plan;
- Civil works:

  - o Installation of liner for the PCD, evaporation dams and tailings dam per the approved design report;
  - o Erection of structures and general building activities;
  - o Foundation excavations and compaction;
  - o Concrete work including the mixing of concrete; and
  - o Steelwork including grinding and welding.
- Construction and ground preparation for the planned mining areas and infrastructure;
- Rehabilitation of disturbed areas after general site construction is completed.
- Construction and maintenance of stormwater management measures;
- Stockpiling of topsoil for the construction;
- Trench excavations;
- Backfilling of trenches associated with the project;
- Preparation of mining activities associated with the project; and
- Vegetation clearing of the construction footprint.

The impact assessment for the pre-construction and construction phases can be found in **Table 13-1**. The following impacts are envisaged during the pre-construction and construction phases.

13.1.1 Socio – Economic Impacts

The following socio – economic impacts are envisaged as a result of the construction phase of the proposed project:

- Negative impact associated with construction activities, including the clearing of land and excavations for the project dissecting the landscape which will impact on the sense of place;
- Negative impact as a result of the mining activities resulting in loss of farming land;
- Positive impact on local economy due to economic opportunities and skills development for local and regional business (informal as well) from supplying services and materials to contractors during the construction phase;
- Negative impact due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site, water and air pollution, health and safety impacts on local communities may include construction workers lighting fires on site, littering and driving irresponsibly;
- Potential increase in social pathologies and negative health impacts due to contractor camp and potential squatting of job seekers; and
- As a result of construction activities, potential local employment opportunities will become available, increasing access to financial capital for workers.

13.1.2 Groundwater Impacts

The use of earth moving machinery and construction vehicles on site poses the risk of chemical spillages including fuel and oils, which may leach into the groundwater. The removal of vegetation could furthermore lower the evapotranspiration rates, thereby allowing a greater volume of potentially contaminated water to percolate to the underlying aquifer in the event of an accidental spill from the machinery. It must however be noted that the removal of vegetation will be limited to the required footprints for the access roads, the boreholes and sumps as well as the camp sites. The impact on evapotranspiration is therefore expected to be negligible.

Site clearing and grubbing is unlikely to materially affect the groundwater within the project area. However, care should be taken during the utilisation and storage of hydrocarbons and chemicals, which may have an impact on groundwater quality as a result of spillages and uncontrolled release.

Potential groundwater pollution flow through the proposed monitoring borehole. The pollution can spread to the low-lying areas of the aquifer.

13.1.3 Surface Water Impacts

The potential impacts on surface water during the pre-construction and construction phases of the proposed project are as follows:

- Accidental spillages of hazardous substances from hazardous storage areas as well as from construction vehicles used during construction of the infrastructure;
- Contamination of runoff by poor materials/waste handling practices, which will result in the contamination of the rivers and streams flowing across the project properties;
- Debris from poor handling of materials and/or waste blocking watercourses;
- Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality;
- Increase in turbidity of the local water streams as a result of runoff of cleared areas;
- Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred;
- Vegetation and soil cleared from site and roadway may obstruct natural drainage;
- Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources; and
- Removal of MAR from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.

Some level of sedimentation is expected to occur in the water resources as runoff is naturally anticipated to pick up environmental debris as it crosses natural areas. Increased turbidity is reversible and surface water should return to pre-impact turbidity levels once sediment levels entering the watercourse are reduced. Settled sediments should naturally move downstream during periods of high flow flowing storm events.

13.1.4 Biodiversity Impacts

The property still has areas that have vegetation regarded as intact and to some degree species diverse. In addition to this, the area falls within a Critical Biodiversity Area (CBA), with endemics and protected plant species present. As a result of this, the impacts of the proposed filling station and associated aspects and features, although limited in extent are regarded as highly significant. Due to disturbance of the soil and removal of vegetation, alien plants may likely establish on site.

Alien plants often reduce the diversity of an area due to their invasive habit. Invasive plants grow prolifically and out-compete native species. Loss of vegetation will be irreversible and although rehabilitation can be aimed at reinstating the land to some form of land use, restoration of the natural habitat on site cannot be achieved. This is particularly significant in an area where some plant species remain undescribed. Many species in this habitat are adapted to specific soil composition and structure and the natural species composition cannot be restored after disturbance to the soil (Victor et al. 2005). The proposed project may result in the following impacts on the floral environment during the pre-construction and construction phases of the project:

- Destruction of potential floral habitats as a result of site clearing, proliferation of alien invasive plant species, waste management and soil compaction;
- Insufficient planning of infrastructure placement and design leading to floral habitat loss of potential species of conservational concern;
- Impact on floral diversity as a result of site clearance, anthropogenic activity, and possible uncontrolled fires;
- Impact on flora as a result of clearing, anthropogenic activity, and uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance;
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase; and
- Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation.

The project may result in the following impacts on the faunal environment during the pre-construction and construction phases:

- Loss of faunal habitat and ecological structure as a result of site clearing, alien invasive species, erosion, and general construction activities;
- Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal species trapping;
- Impact of faunal species of conservational concern due to habitat loss and collision with construction vehicles;
- Habitat fragmentation as a result of construction activities of the pipeline leading to loss of floral diversity; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

13.1.5 Aquatic habitat and Aquatic Environmental Impacts

The aquatic habitat assessment found that there are aquatic habitats that are located on the proposed project site which are expected to be affected by the project. During the pre-construction and construction phases of the project, the following potential impacts on aquatic habitats are envisaged:

- Loss of habitat and aquatic habitat ecological structure as a result of site clearance activities and uncontrolled aquatic habitat degradation;
- Impact on the aquatic habitats systems as a result of changes to the sociocultural service provisions though site clearance, waste management and aquatic habitat disturbance;
- Potential poor planning, resulting in the placement of infrastructure within aquatic habitat, leading to altered habitat ;
- Impact on the hydrological functioning of the aquatic habitat systems;
- Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat and riparian habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of aquatic habitat and riparian resources.

13.1.6 Air Quality Impacts

Dust generating activities associated with the pre-construction and construction phase activities include:

- Materials handling;
- Vehicle entrainment of dust on the haul roads;
- Windblown dust from stockpiles; and
- Vehicle emissions.

The impact the proposed project is envisaged to have on the air quality of the area during the pre-construction and construction phases are as follows:

- Possible increase in dust generation, PM_{10} and $PM_{2.5}$ as a result of bulk earthworks, operation of heavy machinery, and material movement; and
- Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.

13.1.7 Visual Impacts

The following impacts on the visual character as a result of the proposed mining project are envisaged during the pre-construction and construction phases:

- Scaring of the landscape as a result of the clearance of vegetation;
- Visual intrusion as a result of the movement of machinery and the erection of contractor camps; and
- Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.

It must be noted that the visual specialist assessment undertaken for the project found that the impact of the construction process on the existing urban fabric is low and too negligible because of the distance from the affected areas. Construction projects for the type of surface infrastructure based on previous experience only have a significant impact when the affected areas are directly adjacent to the proposed site. In this case, there is no immediate interaction and therefore no visual impact from the site construction process from the vantage points identified in this report.

13.1.8 Noise Impacts

The use of vehicles and machinery during the pre-construction and construction phases may generate noise in the immediate vicinity. In addition, the assembling of mine related equipment and/or structures during the construction phase will inherently generate a degree of noise emissions. The main noise producing activities and equipment to be used include piling of ore, hydraulic excavators, compactors, cranes, mobile site generators, grinders, air compressors, jack hammers, and construction vehicles including articulated dump trucks and concrete premix trucks etc.

13.1.9 Soils, Land Use and Land Capability Impacts

The disturbance of original soil profiles and horizon sequences of these profiles during earthworks is considered to be a measurable deterioration. This impact is considered to be permanent but will be localised within the site boundary.

Soil chemical pollution as a result of potential oil and fuel spillages from vehicles is considered to be a moderate deterioration of the soil resource. This impact will be localized within the site boundary and have moderate significance on the soil resource when not managed. However, with proper waste management and immediate clean-up, the significance of this impact can be reduced to a low. Soil compaction will be a measurable deterioration that will occur as a result of the heavy vehicles commuting on the roads used for this project. This is a permanent impact that will be localised within the site boundary with moderate consequence and significance.

Soil erosion is also anticipated due to slopes and vegetation clearance. The impacts of soil erosion are considered to be both direct and indirect. The direct impacts are the reduction in soil quality which results from the loss of the nutrient-rich upper layers of the soil and the reduced water-holding capacity of severely eroded soils. The off-site indirect impacts of soil erosion include the disruption of riparian ecosystems and sedimentation. Soil erosion is a permanent impact for once the resource has been lost from the landscape it cannot be recovered. Although there are off-site indirect impacts associated with this, the impact is mainly considered to be local. The consequence and significance of the impact are considered as high. With proper mitigation measures, it is anticipated that the significance of this impact can be reduced to moderate. In areas of permanent changes such as roads, the sinking of open pits and the erection of infrastructure and stockpiles, the current land capability and land use will be lost permanently.

13.1.10 Heritage Impacts

The heritage resource assessment for the proposed mining right application site did not identify any significant archaeological heritage within the mining right site to warrant abandonment of the site. The study encountered isolated lithic tools in secondary deposition sites. It must also be noted that there is a possibility that some heritage resources, especially graves, may have been missed during the assessment. Therefore, the following impacts are envisaged on archaeological artefacts and graves as a result of the construction phase of the proposed project:

- The proposed project has the potential to impact on local graves within the area; and
- The proposed project has the potential to impact on sites of archaeological importance.

13.1.11 Palaeontology Impacts

Earth moving activities and excavations during the pre-construction and construction phases of the project may result in the sealing-in and /or destruction of fossils.

13.1.12 Topography Impacts

Vegetation clearance and movement of vehicles during the pre-construction and construction phases of the project may result in minor changes to the topography. The impact is expected to be minimal and of a short duration.

13.1.13 Geology Impacts

The pre-construction and construction activities are expected to result in the removal of geology as a result of trenching and excavations.

13.1.14 Traffic Impacts

The movement of construction vehicles in the project area will result in an increase in traffic on the roads.

13.1.15 Climate Impacts

The movement of construction vehicles and machinery hand generators as potential to impact on the climate in the area due to emissions of Green House Gases (GHGs).

13.1.16 Waste Management

Poor waste management practices during the construction phase will result in:

- Contamination of surface runoff resulting in the deterioration of water quality of the water resources and aquatic habitats; and

- Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. could result in the contamination of surface runoff resulting in the deterioration of water quality of the water resources and aquatic habitat.

Table 13-1: Potential Impacts and mitigation measures associated with the pre-construction and construction phases

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio - Economic Impacts																			
Direct	Negative impact associated with construction activities which will impact on the sense of place	3	2	2	2	1	**21**	Low (-)	Mining Project	Protect social - economic environment of local land users.	• Where possible, mine infrastructure should be located as far away from private infrastructure as possible; • Implement noise and dust management measures; • Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent.	Pre-Construction and Construction Phase	2	2	2	1	1	**12**	Low (-)
Direct	Negative impact on property owners as a result of the mining activities, loss of agricultural land	4	2	5	3	2	**55**	Medium High (-)	Mining Project	Minimise loss of agricultural land and crop yields.	• Timeous communication with property owners of the Mining Project land to give sufficient notice as to when construction will commence so he/she may plan accordingly; • Disbursement of agreed upon compensation package for loss of portion of the owner's potential harvest, or compensation for the entire harvest where a season is interrupted.	Pre-Construction and Construction Phase	1	2	2	3	2	**25**	Low (-)
Direct	As a result of construction activities, potential local employment opportunities will become available, increasing access to financial capital for workers	4	2	5	3	2	**55**	Medium High (+)	Mining Project	Improve on local economy through utilisation of local resources	• Where it is possible, hire/use local personnel; • Identify opportunities for the employment/procurement and training of people and contractors from the local area; • Opportunities for local employment may include activities related to site clearance, digging of trenches and building of the mining area; • Based on these opportunities, develop a recruitment and training strategy that the main construction contractors will have to adhere to; • Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; • Employment and training of the youth and females where possible; • Implementation of employment and procurement policy; and • Communication with locals regarding job opportunities and skills requirements to manage expectations.	Pre-Construction and Construction Phase	4	2	5	3	2	**55**	Medium High (+)
Indirect	Positive impact on local economy due to economic opportunities for local and regional business	4	2	5	3	2	**55**	Medium High (+)	Mining Project	Improve on local economy through utilisation of local resources.	• Procurement of suppliers must be as per the SLP and Midtron's policy and standards; • Develop a register of local business; • Open communication channel with the local community around the mine regarding opportunities to register on the mine's suppliers list to manage expectations; • Potential upskilling and training allowances to be included as per the SLP; • Where it is possible, request contractors to hire/use local personnel; • Identify opportunities for the employment/procurement and training of people and contractors from the local area. • Opportunities for local employment may include activities related to site clearance, digging of trenches and building of the open pits; • Based on these opportunities, develop a recruitment and training strategy that the main construction contractors will have to adhere to; • Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; • Employment and training of the local youth and females where possible; and • Communication with locals regarding service/job opportunities and skills requirements to manage expectations.	Pre-Construction and Construction Phase	4	2	5	3	2	**55**	Medium High (+)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Indirect	Negative impact due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site	3	3	3	2	2	**36**	Medium Low (-)	Mining Project	Minimise harm to local land users and owners.	• Construction vehicles to be road worthy and drivers to adhere to speed limits; • Fires are prohibited on site and emergency procedures are in place; • Contractors adhere to Midtron's standards and requirements, Midtron's Safety Health and Environmental policies, as well as relevant South African regulations such as the Mine Health and Safety Act (Act No. 29 of 1996); • Inform employees and neighbouring landowners and inhabitants about construction timeframes and activities, and give regular updates; • Ensure a grievances procedure is in place and communicated.	Pre-Construction and Construction Phase	2	3	2	2	1	**21**	Low (-)**d**
Indirect	Potential increase in social pathologies and negative health impacts due to contractor camp and potential squatting of job seekers	3	3	3	2	2	**36**	Medium Low (-)	Mining Project	To minimise loss of floral biodiversity	• Ensure grievances procedures are in place for local people to log grievances; • Implement local recruitment and training strategies and policies, and clearly communicate these locally through relevant authorities and media; • No recruitment may be undertaken at the gate but follow a formal recruitment process; • Make use of local accommodation for workers, as opposed to a construction camp; • Inform employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; • Monitor the surrounding area for illegal informal settlement and develop a strategy to deal with illegal settlement; • Ensure that all contractors and their employees attend inception training, addressing Midtron's standards and requirements, Midtron's Safety Health and Environmental policies, relevant South African regulations, the environmental management plan, and recruitment strategies.	Pre-Construction and Construction Phase	2	3	2	2	1	**21**	Low (-)
Groundwater Impacts																			
Direct	Impact on groundwater quality because of hydrocarbon spillages from machinery.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project	Prevent groundwater contamination.	• All spillages will need to be cleaned up as soon as practically possible; • Proper management of stormwater drainage infrastructure should be ensured; • Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater; • Groundwater monitoring of boreholes should be undertaken per the requirements of the Groundwater Specialist Studies undertaken for the project, the WUL and approved monitoring programme. • Spill kits will be made available in areas of likely spillage; • All hydrocarbon storage containers will be stored within a bunded areas which are watertight and able to contain 110% of the stored volume; • Regular service of vehicles in designated repair bays • Sealing of monitoring boreholes to prevent contamination from surface pollutants • All equipment utilising hydrocarbons will be stored on a hard-standing surface.	Pre-Construction and Construction Phase	1	2	2	2	2	**20**	Low (-)**d**
Direct	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release	2	2	2	3	3	**36**	Medium Low (-)	Mining Project			Pre-Construction and Construction Phase	1	2	2	2	2	**20**	Low (-)**d**
Surface Water Impacts																			
Direct	Contaminated dirty water runoff to surrounding areas resulting in the impact on local	3	3	4	3	3	**60**	Medium High (-)	Mining Project	Ensure adequacy clean and dirty water separation.	• Construct diversion drains around the site timeously prior to operation; • Ensure adherence to GNR 704 of the NWA;	Pre-Construction and	1	2	2	2	3	**25**	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION: Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES): Management and Mitigation Measures	Timeframe	IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION): Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
	surface water quality											Construction Phase							
Direct	The spillage of oils, fuel and chemicals can result in the pollution of water resources if care is not taken.	3	3	3	2	2	**36**	Medium Low (-)	Mining Project	Protection of Surface water	• Oil recovered from any vehicle or machinery on site should be collected, stored and disposed of by accredited vendors for recycling.	Pre-Construction and Construction Phase	1	2	2	2	3	**25**	Low (-)
Direct	Increase in turbidity of the local water streams as a result of runoff of cleared areas	2	3	2	4	2	**42**	Medium High (-)	Mining Project	Protection of Surface water	• Where necessary, and as defined when the final detailed project design is confirmed, construct sediment collection paddocks downstream of the working activities to minimise uncontrolled runoff from the site; • Minimise the areas that are to be stripped of vegetation; • Adequate storm water management should be considered in the detailed design of the proposed infrastructure in order to minimize undue erosion; • Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways; • Progressive rehabilitation of disturbed land should be carried out to minimise the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff • Implementation of the proposed basic stormwater management plan is recommended at the mine site to channel and contain storm runoff • Traffic and movement over stabilized areas should be controlled (minimised and kept to designated paths), and damage to stabilized areas should be repaired timeously and maintained; and • The total footprint area to be cleared for the development of mine infrastructure should be kept to a minimum by demarcating the construction areas and restricting removal of vegetation to the footprint areas only • Stormwater runoff will be directed towards natural watercourses; • Construction will be undertaken during the dry season, where possible, to minimise the potential for stormwater runoff; • Routine surface water quality monitoring up and down stream of construction activities and position of infrastructure and activities associated with the project will be undertaken on a monthly basis.	Pre-Construction and Construction Phase	1	2	2	2	1	**15**	Low (-)
Direct	Increase of surface runoff and potentially contaminated water that needs to be maintained in the areas where site clearing occurred.	2	2	3	3	3	**42**	Medium High (-)	Mining Project	Protection of Surface water	• Progressive rehabilitation of disturbed land should be carried out to minimise the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff • Implementation of the proposed basic stormwater management plan is recommended at the mine site to channel and contain storm runoff	Pre-Construction and Construction Phase	1	2	1	1	1	**8**	Low (-)
Direct	Increase of erosion potential during construction activities associated with the Mining Project	1	2	4	3	2	**35**	Medium Low (-)	Mining Project	Prevention of sedimentation as a result of erosion.	• Progressive rehabilitation of disturbed land should be carried out to minimise the amount of time that bare soils are exposed to the erosive effects of rain and subsequent runoff • Implementation of the proposed basic stormwater management plan is recommended at the mine site to channel and contain storm runoff • Ensure erosion protection measures are adequately implemented and monitored; • Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways.	Pre-Construction and Construction Phase	1	2	2	2	1	**15**	Low (-)

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		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Indirect	Removal of MAR from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.	2	2	1	2	2	**20**	Low (-)	Mining Project	Minimise loss of water to the catchment.	• The stormwater will be diverted into the natural environment which further mitigates the impact; • Stormwater dams need to be assessed to ensure that the capacity of water pumped during construction will be adequately catered for; • Recycle wastewater as far as feasible.	Pre-Construction and Construction Phase	1	1	1	1	1	**6**	Low (-)
Indirect	Contamination of runoff by poor materials/waste handling practices, impacting on surface water quality.	3	3	3	2	3	**45**	Medium High (-)	Mining Project		• Waste will be disposed of in accordance to the waste management procedure; • Housekeeping will be kept up to standard. Housekeeping should be done after every shift.	Pre-Construction and Construction Phase	1	1	1	1	1	**6**	Low (-)
Biodiversity Impacts																			
Direct	Potential spreading of alien invasive species as a result of floral disturbance	3	2	4	4	4	**72**	Medium High (-)	Mining Project	Minimise proliferation of alien species.	• Implement an alien plant management and eradication program; • Removal of alien vegetation should commence during the construction phase and continue during the operational and decommissioning phases; • Care should be taken with the choice of herbicide to ensure that no additional impact or loss of indigenous plant species occur due to the use of the herbicides; • No vehicles should be allowed to drive through riparian areas during the eradication of alien and weed species; • Removal of alien and weed species must take place in accordance with existing legislation process and procedures.	Pre-Construction and Construction Phase	1	1	2	3	3	**24**	Low (-)
Direct	Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation.	4	3	3	3	3	**60**	Medium High (-)	Mining Project	Protection of species diversity.	• No dumping of waste should take place. If any spills occur, they should be immediately cleaned up. • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries and associated buffer zones or any other surrounding natural habitat; • In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss; • No construction-related waste material is to enter aquatic habitat or other natural habitats.	Pre-Construction and Construction Phase	2	1	2	2	2	**20**	Low (-)
Direct	Impact of faunal species due to habitat loss and collision with construction vehicles	2	3	4	3	3	**54**	Medium High (-)	Mining Project	Protection of floral species.	• Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; • Should new road development be necessary during construction activities, the roads should be ripped and rehabilitated at the end of construction activities	Pre-Construction and Construction Phase	2	2	2	2	2	**24**	Low (-)
Direct	Loss of habitat due to vegetation clearance, disturbance of soils and vehicle operation.	3	4	4	4	4	**88**	High (-)	Mining Project	Protection of indigenous vegetation and habitats.	• Minimise the impacted area and clear only what is required • Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation • Employ stormwater management measures		2	3	2	2	2	**28**	Medium Low (-)

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Indirect	Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	2	3	4	4	4	**72**	Medium High (-)	Mining Project	Protection of indigenous vegetation.	• Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous grassland species are reintroduced; • Where possible, rehabilitation must be undertaken in tandem with the construction activities. • As far as possible, indigenous grassland species, including grasses, should be used to revegetate bare areas.	Pre-Construction and Construction Phase	2	3	2	2	2	**28**	Medium Low (-)
Indirect	Loss of faunal divert and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping	3	2	3	3	3	**48**	Medium High (-)	Mining Project	Reduce impacts on faunal ecological integrity through curbing erosion and poaching.	• Edge effects of construction and operational activities need to be actively managed so as to minimise further impacts to the receiving environment; • No trapping or hunting of any faunal species is to take place; • The occurrence of erosion is to be monitored on a regular basis during the construction phase of the project and remedial action taken immediately if noted; • To prevent the erosion of topsoils, management measures may include berms, soil traps, hessian curtains and stormwater diversion away from areas susceptible to erosion. It must be ensured that topsoil stockpiles are located outside of any aquatic habitat and riparian areas and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances such as fuel and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site; • The following points should serve to guide the placement of erosion berms: o Where the track has a slope of less than 2%, berms every 50m should be installed; o Where the track slopes between 2% and 10%, berms every 25m should be installed; o Where the track slopes between 10% and 15%, berms every 20m should be installed; o Where the track has a slope greater than 15%, berms every 10m should be installed. • To minimise the risk of erosion, the extent of disturbed vegetation and exposed soil should be kept to a minimum; • Adequate stormwater management must be incorporated into the design of the project throughout all phases in order to prevent erosion of topsoil and the subsequent loss of floral habitat; • Sheet runoff from cleared areas and access roads needs to be curtailed; • Runoff from compacted and built-up surfaces should be slowed down by the strategic placement of berms; • All topsoil and waste stockpiles must be designed in such a manner that runoff is contained.	Pre-Construction and Construction Phase	2	2	2	3	3	**36**	**M**edium Low (-)
Indirect	Insufficient planning of infrastructure placement and design leading to floral habitat loss of potential species of conservational concern.	1	2	4	3	2	**35**	Medium Low (-)	Mining Project	Ensure adequate planning to prevent habitat destruction.	• Stripping of topsoil not earlier than required, revegetate stockpiles, erosion control measures (berms), maintain roads; • Prior to the start of construction activities on site a rehabilitation plan should be developed for implementation throughout the development phases.	Pre-Construction and Construction Phase	2	2	2	2	2	**24**	Low (-)
Aquatic habitat and Aquatic Ecosystems																			

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Indirect	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of aquatic habitat and riparian resources	3	3	2	3	2	**40**	Medium High (-)	Mining Project	Reduce impact of sedimentation on aquatic habitat and riparian resources.	• Restrict construction to the drier winter months if possible, to avoid increased water inputs and sedimentation within the aquatic habitat; • Adequate storm water management must be incorporated into the design of the proposed development throughout all phases in order to prevent erosion of topsoil and the loss of floral and faunal habitat. In this regard, special mention is made of: o Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; o Runoff from paved surfaces should be slowed down by the strategic placement of berms; o All topsoil and waste stockpiles must have berms and catchment paddocks at their toe to contain runoff of the facilities.	Pre-Construction and Construction Phase	2	2	2	2	3	**30**	Medium Low (-)
Indirect	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat and riparian habitat	4	3	3	4	3	**70**	Medium High (-)	Mining Project	Minimise impact on aquatic habitat and riparian habitat	• No construction of infrastructure may take place within riparian and aquatic habitat areas and associated buffer zones unless authorisation is granted by the DWS; • As far as possible all mining activity and infrastructure should be excluded from the aquatic habitat and riparian areas and associated 100 m buffer zone; • All areas of increased ecological sensitivity should be designated as No-Go areas and be off limits to all unauthorised construction vehicles and personnel; • All development footprint areas and areas affected by the proposed mining development should remain as small as possible and any disturbance of sensitive habitat must be actively avoided; • Construction vehicles must remain on demarcated roads and should not encroach into the aquatic habitat areas or their associated buffer zones; • It must be ensured that contractor laydown areas are located outside of aquatic habitat and riparian areas and associated 100 m buffer zones and excluded from clearing activities in order to minimise vegetation loss and resultant erosion and sedimentation.	Pre-Construction and Construction Phase	2	2	3	2	2	**28**	Medium Low (-)
Air Quality Impacts																			
Direct	Possible increase in dust generation, PM10 and PM2.5 as a result of bulk earthworks, operation of heavy machinery, and material movement.	2	2	2	2	2	**24**	Low (-)	Mining Project	Minimise emissions to the atmosphere impacting on employees, local land users, and climate change.	• Regular irrigation by water especially during windy conditions at the site, access road and construction material and debris with just enough moisture to keep the dust down without creating significant runoff. • Should water not be available as a result of drought conditions then chemical suppressants need to be considered. • Reduction of speed on unpaved roads to reduce the entrainment of dust into the atmosphere. • During grading activities, any exposed earth should be watered if it is going to be exposed for long periods of time; • If dust generating material such as soil, waste rock is hauled from the site, vehicles should be covered with a tarpaulin to reduce spillages; • On windy days, or when fugitive dust is dispersed from the Site of Works, additional application of water to the affected areas should be applied.	Pre-Construction and Construction Phase	1	1	1	1	1	**6**	Low (-)
Direct	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of	3	3	2	2	2	**32**	Medium Low (-)	Mining Project		• Engine idle speeds during operating times should be reduced; • Where applicable, use a fuel sources with low sulphur content; • Ensure regular servicing and maintenance of all combustion engine operated machinery;	Pre-Construction and Construction Phase	2	1	1	2	1	**12**	Low (-)

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	machinery/equipment.																		
Blast and Vibration Impacts																			
Direct	Impact of ground vibration on houses, boreholes and roads, resulting in possible damage to infrastructure	4	3	3	3	4	**70**	Medium High (-)	Mining Project	Minimise impacts on infrastructure and land occupiers during blasting activities.	• Reduce Charge Mass/Delay over decreasing distance towards POI's of concern; • Relocate POI's of concern at least 600 m; • Re-drill boreholes further away which will be impacted on by the blasting activities, should these boreholes be utilised at a later stage.; • Reroute affected roads; • Notify all affected parties in advance prior to any blasting activity; • Prior to blasting a 500 m radius must be cleared of people and animals; • Immediate action will take place should thresholds exceed legal requirements for air blast (134 dB) and ground vibration (12.5 mm/s).	Life of Operation	2	2	2	3	3	**36**	Medium Low (-)
Direct	Air blast impact on houses, boreholes and roads, resulting in possible damage to infrastructure	4	3	3	3	4	**70**	Medium High (-)	Mining Project		• Reduce Charge Mass/Delay over decreasing distance towards POI's of concern; • Relocate POI's of concern at least 600 m;	Life of Operation	2	2	2	3	3	**36**	Medium Low (-)
Direct	Fly rock impact on houses, boreholes and roads, resulting in possible damage to infrastructure;	2	2	3	2	3	**35**	Medium Low (-)	Mining Project		• Increase stemming length; • Put in controls for management of stemming lengths, • Relocate POI's of concern at least 600 m.	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Impact of fumes on nearby land occupiers, and road users.	1	2	2	3	3	**30**	Medium Low (-)	Mining Project		• Use correct products; • Control product quality; • Prevent sleep time for charged blast holes; • Same day charge and blast.	Life of Operation	1	1	1	1	1	**6**	Low (-)
Visual Impacts																			
Direct	Scaring of the landscape as a result of the clearance of vegetation and preparation of the Mining Project.	2	2	2	2	2	**24**	Low (-)	Mining Project	To minimise visual disturbance and sense of place.	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff; • Natural vegetation, wherever practical, must be retained on and around the construction sites; • All lights used for illumination (except for lighting associated with security) should be faced inwards and shielded to avoid light escaping above the horizon; • Construction site will be screened from sensitive receptors and rubble removed from site on a daily basis; • Litter and dust management measures should be in place at all times; • The sites should be kept neat and tidy at all times;	Pre-Construction and Construction Phase	1	1	1	1	1	**6**	Low (-)

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	1	2	2	3	3	**30**	Medium Low (-)	Mining Project		• On site construction activities will be limited to be undertaken between 6am and 6pm.	Pre-Construction and Construction Phase	1	1	1	2	2	**12**	Low (-)
Noise Impacts																			
Direct	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	3	3	3	4	4	**72**	Medium High (-)	Mining Project	Minimise the emission of noise pollution during construction and mining activities.	• Hauling vehicles with low noise levels to be used and must be maintained in a good order at all times; • Maintenance plan to be put in place and to be followed; • Conduct baseline noise monitoring prior to constriction activities; • Implement a noise monitoring programme to measure against the baseline noise assessment; • The project will investigate using equipment and applying technology that results in the generation of less noise than existing equipment and technology; • Building activities to take place during daytime only; • Safe blasting methods to be used under controlled conditions; • Emergency generators to be placed in such a manner that it is away from residential areas.	Life of Operation	1	2	2	2	3	**25**	Low (-)
Direct	Increase in ambient noise levels as a result of the mining activities.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project		• The roll over mining method must include the construction of a noise barrier on the current mine area using the removed topsoil and stripped overburden; • It is strongly recommended that the high-pitched alarms be replaced with devices that produce high levels of broadband noise.	Life of Operation	1	1	2	3	3	**24**	Low (-)
Soil, Land Use and Land Capability Impacts																			
Direct	Chemical pollution of soils as a result of vehicle hydrocarbon spillages and compaction.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project	Prevent soil contamination and ensure rehabilitation of contamination.	• Existing established roads should be used wherever possible; • Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts should be installed to permit free drainage of existing water courses; • The side drains of the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used; • 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 drilling fluids, using lined sumps for collection of drilling fluids, recovering drilling muds and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste.	Life of Operation	1	2	2	2	2	**20**	Low (-)

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Direct	Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	3	2	3	2	3	**40**	Medium High (-)	Mining Project	Minimise loss of Soil resources.	• The activities of construction contractors or employees will be restricted to the planned areas; • Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site; • Locate all topsoil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation; • The ideal is to place all overburden materials removed at mine opening in their final closure location, or as close as practicable to it; • Ensure all topsoil stockpiles are clearly and permanently demarcated and located in defined no-go areas; • Map all stockpile locations; • Topsoil should never be used as a filling material for roads	Life of Operation	2	2	3	2	2	**28**	Medium Low (-)
Direct	Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.	3	2	3	2	3	**40**	Medium High (-)	Mining Project		• The pre-construction mine layout and design must aim to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible; • All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined; • Height of stockpiles be restricted between of 4 – 5 metres maximum for extra stability and erosion protection, the stockpiles may be benched; • Stripping of topsoil should not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; • Using drainage control measures and culverts to manage the natural flow of surface runoff; • Soil stockpiles must be sampled, ameliorated (if necessary) and re-vegetated as soon after construction as possible.	Life of Operation	2	2	3	2	2	**28**	Medium Low (-)
Direct	Handling and storage of building materials and different kinds of waste leading to soil sterilisation.	2	2	2	2	2	**24**	Low (-)	Mining Project	Prevent soil sterilisation.	• Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from product stockpile and the pumping out of contaminated water from the pits are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Permanent loss of land capability and land use.	3	3	2	2	2	**32**	Medium Low (-)	Mining Project	Minimise loss of land capability and enhance rehabilitation.	• Land capability and land use will be lost as a result of the proposed project. This cannot be mitigated further; • Construction footprints will be kept to the minimal; and • Construction footprints of the project will be rehabilitated to the pre-construction land capability.	Pre-Construction and Construction Phase	2	2	1	2	2	**20**	Low (-)
Heritage Impacts																			
Direct	The proposed project has the potential to impact on sites of archaeological importance.	4	1	1	4	4	**48**	Medium High (-)	Mining Project	Conserve heritage artefacts and buildings.	• A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage; • Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer;	Pre-Construction and Construction Phase	2	1	1	1	1	**8**	Low (-)

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											• In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures; • Maintain a 100 m buffer zone around identified grave that will not be relocated. • Monitor and control the mining construction activities to prevent impact on the heritage resources • If impact cannot be avoided a Phase 2 study is required followed with a destruction permit application from SAHRA; • However, care should be taken that, when development commences, if any archaeological and/or historical sites are discovered, a qualified archaeologist be called in to investigate the occurrence.								
Palaeontology Impacts																			
Direct	Sealing-in or destruction of the fossils during earth moving activity	4	3	3	2	2	**40**	Medium High (-)	Mining Project	Protection of Palaeontological findings	• If any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped, and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.	Pre-Construction and Construction Phase	2	1	1	2	2	**16**	Low (-)
Topography Impacts																			
Direct	Minor changes in the topography may be experienced as a result of bush clearing and construction vehicles on site.	3	3	2	2	2	**32**	Medium Low (-)	Mining Project	Reduce impacts on topographic character.	• Bush clearance will only take place in designated areas and as minimal as possible; • The construction site will be kept neat and tidy and free of litter; • Building rubble will be removed daily; • The construction site will be screened to minimise the visual disturbance to surrounding landowners.	Life of Operation	2	2	2	2	2	**24**	Low (-)
Geology Impacts																			
Direct	Removal of local geology as a result of the mining activities	3	2	3	3	3	**48**	Medium High (-)	Mining Project	Minimise the generation of mining waste.	• The extent of this impact is extremely localised, and the impact has been rated to have a Low significance rating; • Mining will be conducted strictly according to the mine plan submitted to the DMR; • Optimally exploit this resource in terms of tonnage of rock mined and cost as provided for in the mine plan.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Climate Impacts																			
Direct	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	3	2	3	3	**42**	Medium High (-)	Mining Project	Reduce greenhouse gas emissions.	• Plant and machinery will be maintained so that no unnecessary emissions are expelled; • Appropriate technology and machinery will be utilised for the job at hand; • A Green House Gas Emissions assessment will be calculated as part of the initiative to reduce greenhouse gas emissions.	Life of Operation	1	1	3	2	2	**20**	Low (-)
Cumulative Impacts																			
Indirect	Increased generation of dust, PM_{10} and $PM_{2.5}$ within the local area	2	3	2	3	2	**35**	Medium Low (-)	Mining Project	To minimise air quality emissions and health impacts.	• Through the implementation of all the above-mentioned mitigation measures, the overall significance of the activity's impact can be lowered to low.	Life of Operation	2	2	2	2	2	**24**	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Indirect	Increased loss of indigenous vegetation and loss of soil resources.	2	3	2	3	2	**35**	Medium Low (-)	Mining Project				2	2	2	2	2	**24**	Low (-)
In terms of the overall construction phase it is anticipated that the significance of the cumulative impact will be Medium-Low, due to the impact occurring on site and over a short duration of time although the activity may affect the local areas' biodiversity, soils and air quality emissions have a likely potential.																			

13.2 Operation

During the operational phase, the following main activities will take place:

- Mining of ore;
- Operation of the processing plant;
- Water and stormwater management;
- Maintenance of infrastructure;
- Maintenance of topsoil stockpiles;
- Machinery movement during mining activities; and
- Transportation of ore.

The impact assessment for the operational phase can be found in **Table 13-3**. The following impacts are envisaged during the operational phase.

13.2.1 Socio – Economic Impacts

The following socio – economic impacts are envisaged as a result of the operational phase of the proposed project:

- Positive impact as a result of operation and associated activities, providing a potential for local employment opportunities. increasing access to financial capital for workers.
- Negative impact as a result of the project as there will be additional trucks on the roads, impacting on local communities' health and safety.
- Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation.
- Conflict of communities due to a competition for business opportunities.
- Positive impacts due to the implementation of the provisions of the mine's SLP as provided in Section 7.3.
- The SEIA study undertaken as part of the process revealed a variety of social issues raised by key stakeholders. These included: landowners; surrounding farmers; general/ local stakeholders; NGOs; local government departments, representatives from local municipalities, and ward councillors and ward committees. The key issues raised are summarised in Table 13-2.

Table 13-2: General Key stakeholder issues and concerns

Socio-economic	Social	Physical Environment
Labour and employment. Skills development. Procurement and Local Economic Development (LED); and Local economic impact. Issues of service delivery	Social environment. Potential influx of jobs. Infrastructure and services. Impact on homesteads; and Health and safety. Welfare and dignity issues	Decreased water quality and quantity. Increase surface water (dewatering). Loss of farmland and access to land for housing. Decreased local air quality; and Visual impacts.

13.2.2 Groundwater Impacts

The mining project is estimated to commence from the top of the pits which is around 2 meters above sea level to around 1170 masl depth. This depth is below the study area's average groundwater elevations of 1321 masl and therefore inflows into the opencast pits from the surrounding aquifer were only expected at the mining operation after year 15. Less seepage was expected from year 1 to year 14 due to the height of mining pits.

The zone of influence of the dewatering cone depends on several factors such as; the depth of mining below the regional groundwater level, recharge from rainfall to the aquifer, the size of the mining area and the aquifer transmissivity, etc.

During the Operational Phase, it is expected that more boreholes would be drilled for dewatering of the mining area which might have an impact on the groundwater environment of the surrounding aquifer. Drawdown due to dewatering after year 15 was simulated at 10 m on average.

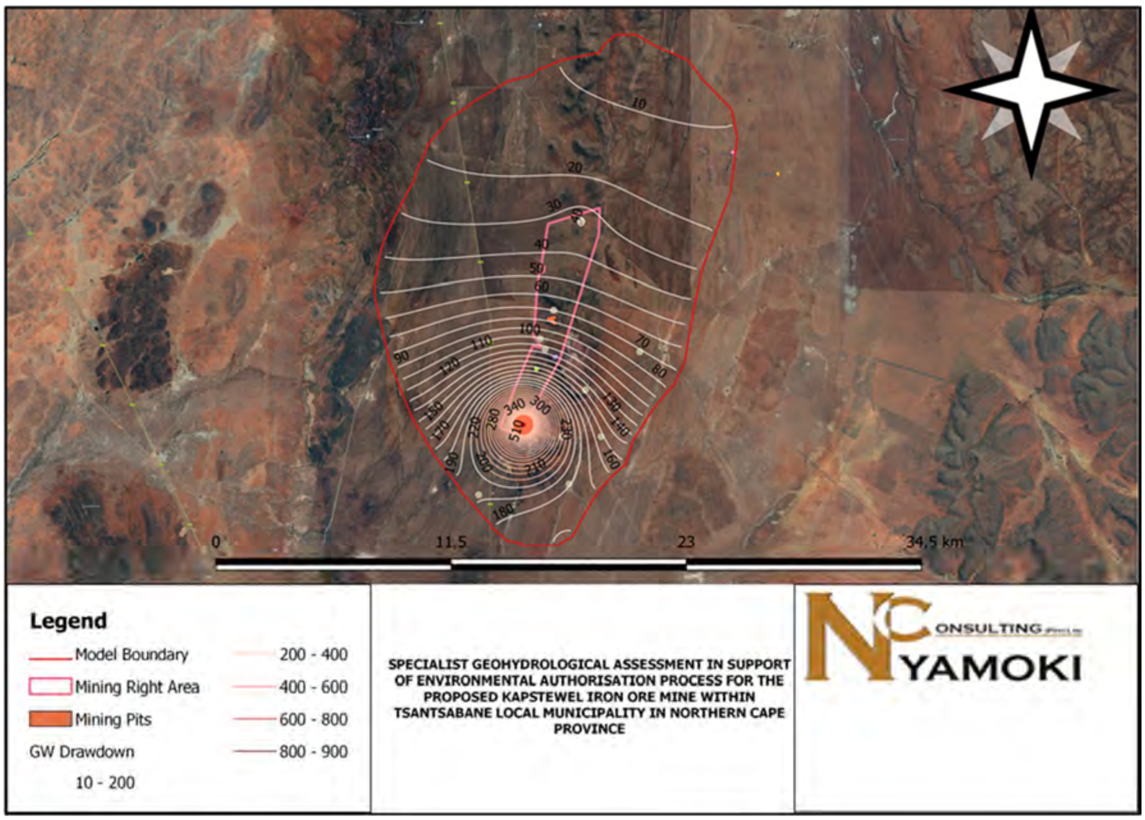

Figure 13-1: Groundwater Level Drawdown (scenario 2).

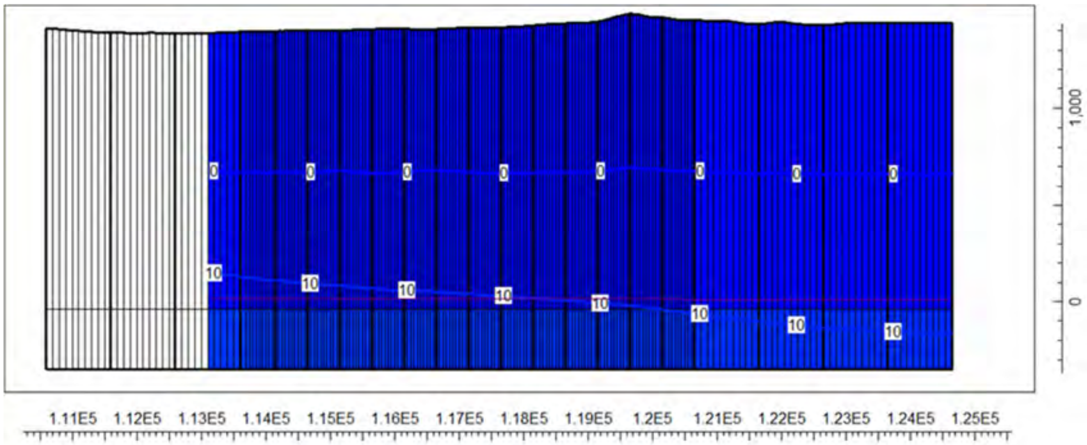

Figure 13-2: Water Table Drawdown

Potential operational phase impacts on groundwater are expected to be as follows:

- Total destruction of the upper aquifer at the proposed mining pits. This impact is localized to the mining Portions.
- Dewatering at the proposed opencast pits may result in the reduction of groundwater storage volume.
- Pollution plume development at the waste dumps as a result of nitrate concentration introduced during blasting. The groundwater mass transport simulation showed that the project has potential for a localised slow movement of nitrates only to areas within a 2metre radius of the waste dump.

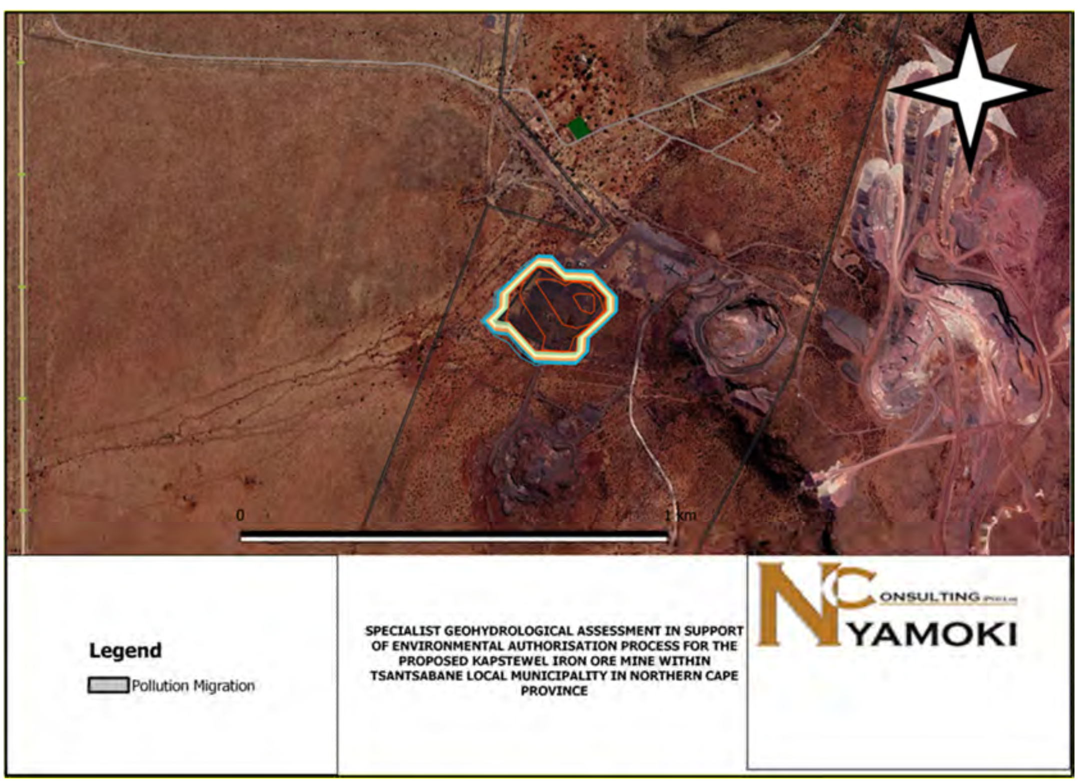

Figure 13-3: Pollution Migration.

- Potential groundwater contamination from poor waste and sanitation management

- Handling of waste and transport of materials cause various types of spills (domestic waste, sewage water, hydrocarbons) which can infiltrate and cause contamination of the groundwater system; and

13.2.3 Surface Water Impacts

The potential impacts on surface water during the operational phase of the proposed project are as follows:

- Operation of the pits: The rainfall water within the designated dirty water areas that form part of the MAR to the local water courses will continue to be removed from the catchment and may continue to reduce the quantity of water available to downstream users.
- General waste and sewage issues will arise as a result of population increase at the proposed mine due to hiring of mine workers. This is expected to negatively impact on the water quality of downstream rivers.
- There is also potential for contamination of surface water due to releases of dirty water (runoff and return water) from all access roads due to transportation of product. Spillages and accidental discharges could result in the contamination of surface water resources.
- Increase in impervious area could lead to an increase in runoff into the nearby stream which could affect the catchment's time of concentration (TOC).
- Pump failure may result in dirty water accumulation in the pits, leading to uncontrolled dirty water management and associated pollution;
- Impacts on surface water resources quality as a result of incorrect waste management practises and pollution.

13.2.4 Biodiversity Impacts

The project may result in the following impacts on the floral environment during the operational phase:

- Destruction of potential floral habitats as a result of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;
- Impact on floral diversity as a result of possible uncontrolled fires;
- Potential spreading of alien invasive species as a result of floral disturbance; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.

The proposed may result in the following impacts on the faunal environment during the operational phase:

- Continued loss of faunal diversity as a result of poaching and faunal species trapping;
- Impact of faunal species of conservational concern due to habitat loss and collision with vehicles transporting material and ore; and
- Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts on faunal habitats during the operation phase.

13.2.5 Aquatic habitat and Aquatic Ecosystems Impacts

In addition to the impacts on aquatic habitats as explained in Section 13.1.5, the operational phase of the project is expected to have the following impacts on aquatic habitats and aquatic ecosystems:

- Loss of habitat and aquatic habitat ecological structure as a result of continual aquatic habitat disturbance and uncontrolled aquatic habitat degradation;
- Impact on water quality and availability as a result in ineffective dirty water separation, and dirty water entering into the aquatic habitat;
- Impact on the aquatic habitats systems as a result of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and aquatic habitat disturbance; and
- Impact on the hydrological functioning of the aquatic habitat systems as a result of reduced aquatic habitat footprints and uncontrolled disturbance.

13.2.6 Air Quality Impacts

During the operational phase there is potential for dust generation potentially resulting in nuisance and health effects on nearby receptors during operational activities. This impact relates mainly to the operational phase of the project. Dust generating activities associated with the operational phase activities include materials handling, vehicle entrainment of dust on the haul roads, windblown dust from the stockpiles and dumps.

The impact the postposed project is envisaged to have on the air quality of the area during the operational phase are as follows:

- Possible increase in dust generation, PM_{10} and $PM_{2.5}$ as a result of stockpiling material, use of heavy machinery, and material movement;
- Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.

13.2.7 Blasting and Vibration Impacts

The following impacts are envisaged as a result of blasting activities:

- Impact of ground vibration on houses, boreholes and roads, resulting in possible damage to infrastructure;
- Air blast impact on houses, boreholes and roads, resulting in possible damage to infrastructure;
- Fly rock impact on houses, boreholes and roads, resulting in possible damage to infrastructure; and
- Impact of fumes on nearby land occupiers, boreholes and road users.

13.2.8 Visual Impacts

The operational phase of the project will potentially result in visual impacts due to loss of sense of place due to:

- On-going mining activities, including removal of ore and potentially increasing the height of the stockpiles and dumps;
- Generation of dust leading to visual intrusion and impacts on the overall landscape character; and
- Night-time lighting should 24-hour operations taking place may impacting on receptors accustomed to a low district brightness during night-time.

13.2.9 Noise Impacts

The main noise producing activities and equipment to be used include piling of ore, hydraulic excavators, compactors, cranes, mobile site generators, grinders, air compressors, jack hammers, and construction vehicles including articulated dump trucks and concrete premix trucks etc.

The following noise impact is envisaged as a result of the operational phase of the proposed project:

- The use of vehicles and machinery during the operational phase may generate noise in the immediate vicinity; and
- Increase in ambient noise levels as a result of the mining activities. The assembling of mine related equipment and/or structures during the operational phase will inherently generate a degree of noise emissions.

13.2.10 Soils, Land Use and Land Capability Impacts

The operation of the project will inevitably scar the landscape. The use of vehicles during the operation of the project may result in the spillages of hydrocarbons from the vehicles and machinery. This will result in the contamination and compaction of soils.

The materials removed from the mining activities has potential for contamination should it not be managed properly, which may render the land not usable after backfilling operation.

Open Pits will result in the permanent loss of land use and land capability of the footprints of the pits areas. Surface infrastructure like haul roads and product stockpiles are by far the most disruptive to current land uses, land capability as well as agricultural potential of the soil. Soil underneath buildings and stockpiles are subject to compaction and sterilisation of the topsoil.

Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).

13.2.11 Traffic Impacts

The movement of vehicles transporting ore and material in the project area will result in an increase in traffic on the roads.

13.2.12 Heritage Impacts

The Phase 1 Archaeological Impact Assessment found no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to the proposed development activities. The assessment of the proposed project has rated the potential impact to archaeological material as being very low. The possibility of locating significant pre-colonial archaeological heritage remains during implementation of the project is unlikely. It is unlikely, but unmarked human burials may be uncovered or exposed during earthmoving operations. The following impacts are envisaged on archaeological artefacts and graves as a result of the construction phase of the proposed project:

- The proposed project has the potential to impact on local graves within the area; and
- The proposed project has the potential to impact on sites of archaeological importance.

13.2.13 Palaeontology Impacts

The operation of the project has potential to seal-in or destroy fossils during mining activities. The impact for the proposed project will be the same as for the alternative layout plan.

13.2.14 Topography Impacts

As a result of operational phase activities, the following impacts are envisaged as a result of the operational phase:

- The continuous placement of ore material onto the demarcated stockpile area will modify the local topography of the site-specific area; and
- Progressive mining of the mining area will ultimately alter the topography.

13.2.15 Geology Impacts

Extraction of the ore will result in the removal of local geology.

13.2.16 Climate Impacts

As a result of the operational activities the following impact is envisaged on the climate in the area:

- Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.

13.2.17 Waste Management

The geochemical assessment undertaken for the project states that in terms of Schedule 3, read with the definition of hazardous waste, the Manganese Ore, Iron Ore and WRD at the Kapstewel Mine operation will be classified as hazardous waste, viz Class C for the Manganese Ore and Class D for the Iron Ore and WRD landfill designs.

Poor waste management practices during the operational phase will result in:

- Contamination of surface runoff resulting in the deterioration of water quality of the watercourses and groundwater.
- Improper disposal of hazardous waste could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourses.

Table 13-3: Potential Impacts and mitigation measures associated with the operational phase

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio - Economic Impacts																			
Direct	Negative impact as a result of the mining activities as there will be additional trucks on the roads, impacting on local communities' health and safety	3	3	4	2	1	**30**	Medium Low (-)	Mining Project	Protect social - economic environment of local land users.	• Operation vehicles to be road worthy and drivers to adhere to speed limits; • Employees and contractors adhere to Midtron standards and requirements, Midtron's Safety Health and Environmental policies, as well as relevant South African regulations such as the Mine Health and Safety Act (Act No. 29 of 1996) as amended; • Inform mine employees and neighbouring landowners and inhabitants about operation activities (specifically for blasting); • Ensure a grievances procedure is in place.	Life of Operation	3	3	4	1	1	**20**	Low (-)
Direct	Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation	3	4	4	2	2	**44**	Medium High (-)	Mining Project	Prevent negative social impacts on the health and safety of land users and employees.	• Ensure a grievances procedure is in place for local people to log grievances; • A community liaison officer must be appointed to deal with and manage community grievances; • Implement local recruitment and training strategies and policies, and clearly communicate these locally through relevant authorities and media; • Do not recruit informally at the gate but follow a formal recruitment process; • Make use of local accommodation for contract workers, as opposed to a contractor's camp; • Inform employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; • Monitor the surrounding area for informal settlement developments and develop a strategy to deal with informal settling; • Ensure that all contractors and their employees attend inception training, addressing Midtron's standards and requirements, Midtron's Safety Health and Environmental policies, relevant South African regulations, the environmental management plan, and recruitment strategies.	Life of Operation	4	3	2	1	1	**18**	Low (-)
Direct	Positive impact as a result of operation and associated activities, providing a potential for local employment opportunities; increasing access to financial capital for workers	3	4	4	2	2	**44**	Medium High (+)	Mining Project	Improve the local financial capital for local communities and landowners.	• Where it is possible, hire/use local people; • Identify opportunities for the employment/procurement and training of people and contractors from the local area; • Opportunities for local employment may include activities related to office cleaning, ground maintenance and mining; • Based on these opportunities, develop a recruitment and training strategy that operations recruiters will have to adhere to; • Monitor implementation of local recruitment and training strategies, including monitoring of corruption and nepotism; • Employment and training of the youth and females where possible; • Implementation of the provisions of the SLP will ensure that socio-economic benefits from the project are enhanced. • Implementation of employment and procurement policy; • Communication with locals regarding job opportunities and skills requirements to manage expectations.	Life of Operation	3	4	4	2	2	**44**	Medium High (+)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	As a result of blasting activities during operation, potential damage to adjacent landowner's/occupiers infrastructure	3	3	2	2	2	**32**	Medium Low (-)	Mining Project	Protect infrastructure during blasting activities.	• Alert adjacent landowners of operational blasting activities in a timeous manner; • Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary damage; • Ensure management measures indicated by blasting specialist study are adhered to; • Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Negative impact as a result of manmade features dissecting the landscape which will impact on sense of place.	2	3	4	2	1	**27**	Medium Low (-)	Mining Project	Ensure the safety of the employees and land occupiers.	• Where possible, infrastructure should be located as far away from private infrastructure as possible; • Implement noise and dust management measures as recommended by relevant specialists; • Stakeholder engagement channels and grievance procedure mechanisms need to be developed prior to operation and need to be ongoing and frequent.	Life of Operation	3	3	4	1	1	**20**	Low (-)
Groundwater Impacts																			
Direct	Impact on groundwater quality as a result of hydrocarbon spillages from machinery.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project	Prevent groundwater contamination.	• All spillages will need to be cleaned up as soon as practically possible; • Proper management of stormwater drainage infrastructure should be ensured; • Maintain construction vehicles and encourage contractors to report, react and manage all spills and leaks so that action can be taken to immediately minimise contamination to the groundwater; • A groundwater monitoring programme must be developed by a groundwater specialist; • Spill kits will be made available in areas of likely spillage; • All hydrocarbon storage containers will be stored within a bunded areas which are watertight and able to contain 110% of the stored volume; • All equipment utilising hydrocarbons will be stored on a hard-standing surface.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Storage of hydrocarbons and chemicals, which may impact on groundwater as a result of spillages and uncontrolled release.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project			Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Total destruction of the upper aquifer at the proposed mining pits.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project		• This impact is localized to the mining Portions.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Dewatering at the proposed opencast pits may result in the reduction of groundwater storage volume.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project		• Mining should progress as swiftly as possible to reduce the period of active dewatering • The mining area extent should be kept to a minimum • Dewatering of the opencast pits should stop as soon as the mining activities cease • Dewatering volumes should be monitored frequently throughout the mine life span to note deviations from the predicted inflows as simulated from the updated model as soon as possible	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Pollution plume development at the waste dumps as a result of nitrate concentration introduced during blasting.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project		• The lining of waste dumps, PCD, and stockpile surface area reduce the chances of seepage into the underground aquifer.	Life of Operation	1	2	2	2	2	**20**	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	Potential groundwater contamination from poor waste and sanitation management.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project		• Diverting and separating clean and rainfall water from the dirty water surface area and infrastructures such as the PCDs and stockpile, etc. • Containing contaminated water from the latrines, workshop, wash bays, etc. by proper construction of hard standing and banded areas. • Limited to the mining area, pit latrine area, iron ore stockpile, waste rock dumps, and surroundings. • Negligible effects due to drawdown cone preventing contaminants from spreading • With currently limited data available and based on previous experience this impact is probable	Life of Operation	1	2	2	2	2	**20**	Low (-)
Indirect	Monitoring borehole on the border of the Mining Project area may be a conduit of flow to the groundwater unless sealed.	3	3	4	3	3	**60**	Medium High (-)	Mining Project		• Grouting and capping of boreholes located within the footprint of construction camps be required prior to construction activities; • Treat the water emanating for the opencasts to improve the decant water quality	Life of Operation	1	2	2	2	3	**25**	Low (-)
Surface Water Impacts																			
Direct	Impact on water quality and availability as a result in ineffective dirty water separation, and dirty water entering into the water resources and aquatic habitats	2	1	1	1	1	**8**	Low (-)	Mining Project	Ensure effective and reliable clean and dirty water separation.	• Monitor the effective usage and functioning of the upstream bunds constructed upstream of the affected site; • Monitor and maintain good vegetation cover, to reduce runoff; • Develop and implement controls to clean up oil/diesel leaks and spillages of any designated hazardous waste.	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	High rate of ground water ingress causing flooding of the pits	4	4	3	4	3	**77**	**High (-)**	Mining Project	Prevent water wastage and impact on water resources.		Life of Operation	3	2	3	2	3	**40**	Medium High (-)
Direct	The rainfall water within the designated dirty water area of the mining project area that forms part of the MAR to the local water courses will be removed from the catchment. This will result in a lower intensity potential on the local surface water resource	2	3	2	4	2	**42**	Medium High (-)	Mining Project	Reduce the loss of water to the catchment.	• The clean stormwater will be diverted which further mitigates the impact.	Life of Operation	1	2	2	2	1	**15**	Low (-)
Direct	Increase in impervious area could lead to an increase in runoff into the nearby stream which could affect the catchment's time of concentration (TOC).	2	3	3	2	2	**32**	Medium Low (-)	Mining Project	Reduce the loss of water to the catchment.	• Compacted surfaces at the mine should be kept to a minimum and vegetation rehabilitation must be implemented within the mine setup; and • Proposed stormwater drains should be designed to channel clean runoff to a single discharge point into the nearby drainage line or watercourse while dirty water should be channelled to a central pollution control dam (PCD).	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Increase in volume of contaminated water that needs to be managed within the footprint	2	2	3	3	3	**42**	Medium High (-)	Mining Project	Ensure effective and reliable clean and dirty water separation.	• Monitor the effective usage and functioning of the upstream bunds constructed upstream of the affected site; • Monitor and maintain good vegetation cover, to reduce runoff; • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste.	Life of Operation	1	2	1	1	1	**8**	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION: Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES): Management and Mitigation Measures	Timeframe	IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION): Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
Direct	Pump failure may result in dirty water accumulation in the pits, leading to uncontrolled dirty water management and associated pollution;	2	3	3	2	2	**32**	Medium Low (-)	Mining Project	Prevent water pollution as a result of pump failure	• Maintenance of infrastructure must be undertaken in a regular basis	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources	2	3	3	2	2	**32**	Medium Low (-)	Mining Project	Prevent water pollution as a result of waste management practises.	• A waste management plan will be compiled and approved for implementation of site. This management plant should focus on the waste hierarchy of the NEM:WA; • No waste may be disposed of to land without the necessary legal permits; • Water quality monitoring must be undertaken to determine changes in water quality.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Indirect	Impacts on surface water resources quality as a result of incorrect waste management practises and pollution.	2	3	3	2	2	**32**	Medium Low (-)	Mining Project	Prevent water pollution as a result of waste management practises.	• A reticulated sewage disposal facility at the proposed mine site should mitigate potential water quality issues. • Waste will be removed from site by an accredited waste removal company and legally disposed of. Disposal certificates will be kept on site for audit purposes; • Sufficient waste receptacles will be placed around the site allowing the separation of waste as source.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Biodiversity Impacts																			
Direct	Generation of waste and incorrect disposal from construction material leading to disturbance of boundary natural vegetation.	2	2	3	2	2	**28**	Medium Low (-)	Mining Project	Minimise disturbance to natural habitats.	• No dumping of waste should take place. If any spills occur, they should be immediately cleaned up.	Life of Operation	1	1	2	2	2	**16**	Low (-)
Direct	Loss of faunal habitat and ecological structure as a result of increased fires during operation and introduction of alien species, leading to transformation of the natural habitat	3	2	3	2	2	**32**	Medium Low (-)	Mining Project	Minimise the impact on the local faunal habitat and ecological structure.	• No uncontrolled fires whatsoever should be allowed; • In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced preventing the ingress of hydrocarbons into the topsoil; • All alien plants within the linear development should be cleared, with follow up activities running concurrently for one year.	Life of Operation	1	2	2	1	1	**10**	Low (-)
Indirect	Loss of faunal diversity and ecological integrity as a result of alien species proliferation, poaching, and collision of vehicles with animals	3	3	2	2	2	**32**	Medium Low (-)	Mining Project	Minimise the loss of faunal diversity as a result of operational activities	• Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; • Implement speed limit and traffic calming devices along roadways; • Ensure that all vehicles utilise existing designated road networks; • Erect warning signs to pro-actively prevent collisions; • Access control must be implemented to ensure that no illegal trapping or poaching takes place.	Life of Operation	1	1	2	2	2	**16**	Low (-)
Indirect	Impact of faunal species of conservational concern due to habitat loss within the operational footprint and increased alien species proliferation.	2	1	2	2	3	**25**	Low (-)	Mining Project	Protection of indigenous vegetation.	• All soils compacted as a result of construction activities should be ripped and profiled. Special attention should be paid to alien and invasive plant control within these areas.	Life of Operation	1	1	2	1	2	**12**	Low (-)

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		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Indirect	Discharge and contamination from operational facilities may pollute receiving environment, impacting on faunal diversity	2	2	2	2	2	**24**	Low (-)	Mining Project	Ensure adequate planning to prevent habitat destruction.	• Edge effects of operational activities need to be actively managed so as to minimise further impacts to the receiving environment; • No polluted water may be discharged to the receiving environment without approval from the DWS.	Life of Operation	1	2	1	1	1	**8**	Low (-)
Aquatic habitat and Aquatic Impacts																			
Direct	Loss of habitat and aquatic habitat ecological structure as a result of continual aquatic habitat disturbance and uncontrolled aquatic habitat degradation.	2	3	3	3	3	**48**	Medium High (-)	Mining Project	Protection of Aquatic habitat and aquatic habitat ecological structure.	• Operational vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; • It must be ensured that contractor laydown areas are located outside of aquatic habitat and riparian areas and associated 100 m buffer zones and excluded from clearing activities in order to minimise vegetation loss and resultant erosion and sedimentation where not approved by DWS; • Compacted areas are to be ripped, re-profiled and revegetation as soon as areas becomes available; • Any areas where active erosion within the aquatic habitat features are observed must be immediately rehabilitated in such a way as to ensure that the hydrology of the area is re-instated to conditions which are as natural as possible; • Cutting/ clearing of the herbaceous layer within the aquatic habitat areas along the linear development should be avoided so as to retain soil stability provided by the grass root structures.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Impact on the aquatic habitats systems as a result of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and aquatic habitat disturbance	2	3	3	3	3	**48**	Medium High (-)	Mining Project	Minimise change and effectiveness of aquatic habitat service provision	• As much vegetation growth as possible should be promoted within the aquatic habitat features in order to protect soils. In this regard, special mention is made of the need to prevent the loss of large areas of the freshwater features' vegetation and the use of indigenous vegetation species' where hydro seeding and rehabilitation planting (where applicable) are to be implemented; • No dumping of waste should take place within aquatic habitat and riparian areas or their buffer zones. If any spills occur, they should be immediately cleaned up; • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries, aquatic habitat resources and associated buffer zones. All waste and rubble must be removed from site and disposed of according to relevant SABS standards; • Implement an alien vegetation control program within the aquatic habitat features and ensure establishment of indigenous species within areas previously dominated by alien vegetation; • Maintain the REC for each of the aquatic habitat features, as stated within the aquatic habitat report during the life of the development.	Life of Operation	2	2	2	2	2	**24**	Low (-)

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Indirect	Impact on the hydrological functioning of the aquatic habitat systems as a result of reduced aquatic habitat footprints and uncontrolled disturbance during maintenance activities	2	3	3	3	2	**40**	Medium High (-)	Mining Project	Conserve the hydrological function of the surrounding aquatic habitats.	• Flow continuity and connectivity of the freshwater features must be reinstated post- construction activities; • Regular monitoring of water quality must be implemented in order to ensure the impacts of runoff and decant of water into aquatic habitat resources is prevented or minimised; • Adequate storm water management must be incorporated into the design of the proposed development throughout all phases in order to prevent erosion of topsoil and the loss of floral and faunal habitat. In this regard, special mention is made of: o Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; o Runoff from paved surfaces should be slowed down by the strategic placement of berms; o All topsoil and waste stockpiles must have berms and catchment paddocks at their toe to contain runoff of the facilities.	Life of Operation	1	2	2	2	3	**25**	Low (-)
Indirect	Impacts on the hydrological functioning of the aquatic habitat as a result of the Mining Project	4	3	3	4	3	**70**	Medium High (-)	Mining Project	Minimise impact on aquatic habitat and riparian habitat	• Dirty water must be recycled back into the mining system; • All aquatic habitat areas adjacent to the operational footprint will demarcated as no-go areas.	Life of Operation	2	2	3	2	2	**28**	Medium Low (-)
Air Quality Impacts																			
Direct	Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	3	3	2	4	4	**64**	Medium High (-)	Mining Project	Minimise emissions to the atmosphere impacting on employees, local land users, and climate change.	• When and where applicable, soil stockpiles that will not be used should be re-vegetated as soon as possible, or kept wet during windy periods; • During the operational phases for the proposed project any bare ground surrounding the main operational area but within the boundaries of the facility must be covered with suitable vegetation that will be able to grow in the area; • When fugitive dust can be observed leaving the area, additional dust suppression should be applied to the affected areas; • Additional dust monitoring equipment needs to be installed in order to effectively monitor dust related impacts from the proposed project area to the northwest and thereafter dust emissions can be managed better; • A continuous PM10 and PM2.5 monitor should be installed at the mine or if possible, at sensitive receptors in close proximity to the mine; • Conduct periodic independent audits of monitoring systems and the implementation of management plans to ensure that the system is maintained, and that suitable data is obtained for decision making.	Life of Operation	1	1	1	4	1	**15**	Low (-)
Direct	Increase in carbon emissions and ambient air pollutants (NO2 and SO2) as a result of movement of vehicles and operation of machinery/equipment.	3	3	2	2	2	**32**	Medium Low (-)	Mining Project		• In places of high vehicular traffic on unpaved roads, dust suppression measures on the roads should be implemented to reduce dust levels from the entrainment of dust. These measures will range from watering of roads, application of a chemical dust suppressant where watering is impractical, and/or paving of roads. • Reduce the possibility of spillage from vehicles by ensuring all loads are covered, for example, with tarpaulin.	Life of Operation	2	1	1	2	1	**12**	Low (-)
Blast and Vibration Impacts																			

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		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	Impact of ground vibration on houses, boreholes and roads, resulting in possible damage to infrastructure	1	2	2	3	3	**30**	Medium Low (-)	Mining Project	Minimise impacts on infrastructure and land occupiers during blasting activities.	• Reduce Charge Mass/Delay over decreasing distance towards POI's of concern; • Relocate POI's of concern at least 600 m; • Re-drill boreholes further away which will be impacted on by the blasting activities, should these boreholes be utilised at a later stage.; • Reroute affected roads; • Notify all affected parties in advance prior to any blasting activity; • Prior to blasting a 500 m radius must be cleared of people and animals; • Immediate action will take place should thresholds exceed legal requirements for air blast (134 dB) and ground vibration (12.5 mm/s).	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Air blast impact on houses, boreholes and roads, resulting in possible damage to infrastructure	1	2	2	3	3	**30**	Medium Low (-)	Mining Project		• Reduce Charge Mass/Delay over decreasing distance towards POI's of concern; • Relocate POI's of concern at least 600 m;	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Fly rock impact on houses, and roads, resulting in possible damage to infrastructure;	2	2	3	2	3	**35**	Medium Low (-)	Mining Project		• Increase stemming length; • Put in controls for management of stemming lengths, • Relocate POI's of concern at least 600 m.	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Impact of fumes on nearby land occupiers, and road users.	1	2	2	3	3	**30**	Medium Low (-)	Mining Project		• Use correct products; • Control product quality; • Prevent sleep time for charged blast holes; • Same day charge and blast.	Life of Operation	1	1	1	1	1	**6**	Low (-)
Visual Impacts																			
Direct	Scaring of the landscape as a result of the clearance of vegetation and preparation of the Mining Project.	2	2	2	2	2	**24**	Low (-)	Mining Project	Minimis visual impacts	• It is recommended that stockpiles be vegetated with indigenous vegetation in order to blend more easily into the existing landscape and for screening purposes; • The design and height increase of stockpiles and dumps must be monitored to ensure that these components relate to acceptable environmental standards in terms of slope and elevation; • Stockpiles are ideally to be shaped at an adequate slope from the commencement of the project to ensure that it integrates more successfully into the natural topography of the visual landscape; • It must be ensured, wherever possible, that existing natural vegetation is retained in the vicinity of the infrastructure areas; • The access gravel roads should be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff; • Soil stockpiles must be kept damp during the dry season, and preferably be vegetated in order to minimise the potential for dust generation; • Vehicle speed on gravel roads must be reduced to limit dust generation; • As far as possible, operational activities should take place during the daylight hours, in order to limit the use of bright floodlighting and to avoid the use of additional night-time lighting which may lead to skyglow; • Outdoor lighting must be strictly controlled;	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.	1	2	2	3	3	**30**	Medium Low (-)	Mining Project			Life of Operation	1	1	1	2	2	**12**	Low (-)

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		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
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											• The use of high light masts and high pole top security lighting should be avoided along the periphery of the operations. Any high lighting masts should be covered to reduce sky glow; • Up-lighting of structures must be avoided, with lighting installed at downward angles that provide precisely directed illumination beyond the immediate surrounding of the mining infrastructure, thereby minimising the light spill and trespass; • Censored and motion lighting may be installed at office areas, workshops and other buildings to prevent use of lights when not needed; • Vehicle-mounted lights or portable light towers are preferred over permanently mounted lighting for night- time maintenance activities. If possible, such lighting should be equipped with hoods or louvers and be aimed toward the ground to avoid causing glare and skyglow; and • The use of permanent signs and project construction signs should be in accordance with the requirements of the project and mining regulations, be minimised and visually unobstructive.								
Noise Impacts																			
Direct	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	3	3	3	4	4	**72**	Medium High (-)	Mining Project	Minimise the emission of noise pollution during construction and mining activities.	• Hauling vehicles with low noise levels to be used and must be maintained in a good order at all times; • Vehicle maintenance plan to be put in place and to be followed; • Implement a noise monitoring programme to measure against the baseline noise assessment; • The project will investigate using equipment and applying technology that results in the generation of less noise than existing equipment and technology; • Building activities to take place during daytime only; • Safe blasting methods to be used under controlled conditions; • Emergency generators to be placed in such a manner that it is away from residential areas.	Life of Operation	1	2	2	2	3	**25**	Low (-)
Direct	Increase in ambient noise levels as a result of the mining activities.	2	2	2	3	3	**36**	Medium Low (-)	Mining Project	Reduce noise emissions during operation.	• The mining method must include the construction of noise barriers around the pit areas using the removed topsoil and stripped overburden; • It is strongly recommended that the high-pitched alarms be replaced with devices that produce high levels of broadband noise.	Life of Operation	1	1	2	3	3	**24**	Low (-)
Soil, Land Use and Land Capability Impacts																			

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Direct	Operation of opencast pits, use of haul roads, and permanent displacement of soil from buildings will reduce the land capability and agricultural potential and sterilise the soils.	3	2	2	3	3	**42**	Medium High (-)	Mining Project	Prevent soil contamination and ensure rehabilitation of contamination.	• Existing established roads should be used wherever possible; • Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts should be installed to permit free drainage of existing water courses; • The side drains of the roads can be protected with sediment traps and/or gabions to reduce the erosive velocity of water during storm events and where necessary geo-membrane lining can be used; • 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 drilling fluids, using lined sumps for collection of drilling fluids, recovering drilling muds and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Processing areas should be contained, and systems designed to effectively manage and dispose of contained stormwater, effluent and solids.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.	2	3	2	2	2	**28**	Medium Low (-)	Mining Project		• The existing pre-construction mine layout and design must aim to minimise the area to be occupied by mine infrastructure (workshops, administration, product stockpile, etc.) to as small as practically possible; • All footprint areas should also be clearly defined and demarcated and edge effects beyond these areas clearly defined; • Height of stockpiles be restricted between of 4 – 5 metres maximum. For extra stability and erosion protection, the stockpiles may be benched; • Stripping of topsoil should not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt; • Reducing slope gradients as far as possible along road cuts and disturbed areas to gradients at or below the angle of repose of those disturbed surfaces; • Using drainage control measures and culverts to manage the natural flow of surface runoff; • Soil stockpiles must be sampled, ameliorated (if necessary) and re-vegetated as soon after construction as possible; • Use recycled grey water from washing facilities to spray un-vegetated areas to combat dust; • Soils should be loosely packed during stockpiling; • Re-spread and rip soil to alleviate compaction; • Minimise re-handling of stripped soil and locate stockpiles as close as possible to their respective intended post-use areas; • Stockpiles are managed so they do not become contaminated and then need additional handling or disposal; • Equipment, and vehicle maintenance and washdown areas, are contained and appropriate means provided for treating and disposing of liquids and solids;	Life of Operation	1	2	3	2	2	**24**	Low (-)
Direct	As a result of construction activities, the land use will have altered from grazing and agriculture to that of construction for mining activities	2	3	3	2	2	**32**	Medium Low (-)	Mining Project	Minimise loss of agricultural land.		Life of Operation	2	2	2	2	2	**24**	Low (-)

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Direct	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	2	3	3	2	**40**	Medium High (-)	Mining Project	Prevent soil sterilisation and contamination.	• Topsoil stockpiles can be contaminated by dumping waste materials next to or on the stockpiles, contamination by dust from product stockpile and the pumping out of contaminated water from the underground mine or Pits are all hazards faced by stockpiles. This should be avoided at all cost and if it occurs, should be cleaned up immediately; • Waste piles should be placed on impervious layer to prevent direct soil contact; • Excavate and dispose of any contaminated soil at the appropriate landfill as per waste classification; • A low process or storage inventory must be held to reduce the potential volume of material that could be accidentally released or spilled; • Storage tanks of fuels, oils or other chemicals stored are above ground, preferably with inspectable bottoms, or with bases designed to minimise corrosion. Aboveground (rather than in-ground) piping systems should be provided. Containment bunds should be sealed to prevent spills contaminating the soil and groundwater;	Life of Operation	1	2	2	2	2	**20**	Low (-)
Heritage Impacts																			
Direct	The proposed project has the potential to impact on sites of archaeological importance. Historic power line pylons are present within the proposed footprint.	4	2	2	4	4	**64**	Medium High (-)	Mining Project	Conserve heritage artefacts and buildings.	• Monitor and control the mining activities to prevent impact on the heritage and cultural resources. If impact cannot be prevented a Phase 2 study is required followed with a destruction permit application from SAHRA; • However, care should be taken that, when development commences, if any archaeological and/or historical sites are discovered, a qualified archaeologist be called in to investigate the occurrence; • All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made; • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site.	Life of Operation	2	2	2	2	2	**24**	Low (-)
Palaeontology Impacts																			
Direct	Sealing-in or destruction of the fossils during earth moving activity	4	3	4	2	2	**44**	Medium High (-)	Mining Project	Protection of Palaeontological findings	• If any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified. All development activities must be stopped, and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow caves.	Life of Operation	2	1	1	2	2	**16**	Low (-)
Topography Impacts																			
Direct	The continuous placement of ore material onto the demarcated ore stockpile area will modify the local topography of the site-specific area.	3	3	2	2	2	**32**	Medium Low (-)	Mining Project	Reduce impacts on topographic character.	• Bush clearance will only take place in designated areas and as minimal as possible; • The operational site will be kept neat and tidy and free of litter; • Building rubble will be removed daily; • The operational site of pits will be screened to minimise the visual disturbance to surrounding landowners.	Life of Operation	2	2	2	2	2	**24**	Low (-)
Direct	Progressive mining of the area will ultimately alter the topography.	3	3	4	3	3	**60**	Medium High (-)	Mining Project			Life of Operation	3	3	4	2	1	**30**	Medium Low (-)
Geology Impacts																			

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Direct	Removal of local geology as a result of the mining activities	2	2	3	2	2	**28**	Medium Low (-)	Mining Project	Minimise the generation of mining waste.	• The extent of this impact is extremely localised, and the impact has been rated to have a Low significance rating; • Mining will be conducted strictly according to the mine plan submitted to the DMR; • Optimally exploit this resource in terms of tonnage of rock mined and cost as provided for in the mine plan.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Climate Impacts																			
Direct	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	2	2	3	2	2	**28**	Medium Low (-)	Mining Project	Reduce greenhouse gas emissions.	• Plant and machinery will be maintained so that no unnecessary emissions are expelled; • Appropriate technology and machinery will be utilised for the job at hand; • A Green House Gas Emissions assessment will be calculated as part of the initiative to reduce greenhouse gas emissions.	Life of Operation	1	1	3	2	2	**20**	Low (-)
Waste Management																			
Direct	Potential leaching of contaminated water into groundwater resources and water courses from residue tailings	2	2	3	2	2	**28**	Medium Low (-)	Mining Project	Avoid/minimise /contamination of groundwater and water courses.	• The site of the residue tailings and Iron Ore will need to be prepared in terms of the requirements for a Class D liner design and Manganese Ore Stockpiled Areas Class per the findings of the waste classification process. • An additional waste classification exercise be commenced within 6 months (as required by GNR 634 of 2013) of the generation of ores and of processing of fines, to determine the barrier design requirements for the residue deposit (tailings).	Life of Operation	1	2	2	2	2	**20**	Low (-)
Direct	Poor waste management could result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	2	2	3	2	2	**28**	Medium Low (-)	Mining Project	Avoid/minimise /contamination of groundwater and water courses.	• Waste management will be undertaken in line with the NEM: WA Waste management hierarchy, ensuring re-use and recycling of waste as much as possible. Where re-use, recycling or disposal of waste is required, the following shall apply: *Separation of waste* • All waste shall be separated into general waste and hazardous waste. • Hazardous waste shall not be mixed with general waste • General waste can further be separated in waste that can be recycled and/or reused, if possible • No littering shall be allowed in and around the site, enough bins shall be provided for the disposal of waste. • Where necessary dedicate a storage area on site for collection of waste. *Storage of waste* • General waste will be collected in an adequate number of litter bins located throughout the site. • Bins must have lids in order to keep rainwater out. • Bins shall be emptied regularly to prevent the bins from overflowing. • All work areas shall always be kept clean and tidy. • All waste management facilities will be maintained in good working order. • Waste shall be stored in demarcated areas according to type of waste. • Flammable substances must be kept away from sources of ignition and from oxidizing agents. • No builder's rubble shall be disposed of to the riparian area.	Life of Operation	1	2	2	2	2	**20**	Low (-)

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		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
											• If builder's rubble is not removed immediately, it shall be stockpiled outside the 1:50 year flood line and outside the sensitive riparian areas. • Demolition waste and surplus concrete shall be re-used, recycled or disposed (last resort) of responsibly. • Waste shall not be buried or burned on site. *Disposal of general waste* • No dumping shall take place in or near the project site. • All general waste shall be re-used, recycled or disposed (last resort) of to a licensed landfill site. • Demolition waste and builder's rubble shall be used as cover material at an appropriate licensed landfill site								
Cumulative Impacts																			
Indirect	Increased generation of dust, PM10 and PM2.5 within the local area	2	3	2	3	2	**35**	Medium Low (-)	Mining Project	To minimise air quality emissions and health impacts.	• Through the implementation of all the above-mentioned mitigation measures, the overall significance of the activity's impact can be reduced to low.	Life of Operation	2	2	2	2	2	**24**	Low (-)
Indirect	Reduced land availability for agricultural use	2	3	2	3	2	**35**	Medium Low (-)	Mining Project	To minimise cumulative loss of natural vegetation in the region.			2	2	2	2	2	**24**	Low (-)
Indirect	Increased loss of indigenous vegetation and loss of soil resources.	2	3	2	3	2	**35**	Medium Low (-)	Mining Project				2	2	2	2	2	**24**	Low (-)

13.3 Decommissioning, Closure and Post - Closure Phase

The main activity that will take place during this phase of the project is the demolition and removal of mining related infrastructure. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction phase. The impacts and mitigation measures have been dealt with during the discussions of the construction activities and will not be recaptured in this section, only references will be made where applicable.

13.3.1 Demolition of Project Related Infrastructure

The decommissioning and closure of the mine will entail the demolition and removal of the majority of the project related Infrastructure:

13.3.2 Potential Impacts and Mitigation Measures

It is anticipated that the potential impacts of this activity in the rehabilitation phase will be the same as the anticipated impacts listed in the construction phase. It is therefore recommended that the mitigation/management measures applicable to the construction phase are implemented. The following additional mitigation measures, as listed in Table 13-4, can be applied during the closure/rehabilitation phase in terms of the demolition of the project related infrastructure:

Table 13-4: Additional Mitigation Measures

Environmental Aspect	Additional Mitigation Measures
Soil, Land Use and Land Capability	• Once the site has been cleared of infrastructure and potential contamination, the slope must be re-graded (slope) in order to approximate the pre-mining aspect and contours. The previous infrastructure footprint area must be ripped a number of times in order to reduce soil compaction. The area must then be covered with topsoil material from the stockpiles. • Replacement of nutrient and organic carbon needs and requirements at time of rehabilitation, landscaping of the topographic slope, cultivation of soils and replacement of vegetative cover as soon after replacement of materials as possible. Monitoring of vegetative growth until self-sustaining. • Ensure that a soil conservation plan is developed and implemented where necessary during the rehabilitation phase; • All buildings, structures and foundations not part of the post-closure land use plan must be demolished and removed from site; • Frequent visual observations should be undertaken to confirm if vegetation has re-established and if any erosion gullies have developed. In the event that vegetation has not re-established, and erosion gullies have developed, remedial action should be taken.
Biodiversity	• All soils compacted as a result of closure activities should be ripped and profiled. • Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all development including decommissioning phases to prevent loss of faunal habitat. • All project related disturbed habitat areas must be rehabilitated and planted with indigenous floral species as soon as possible to ensure that faunal habitat is reinstated. • A bi-annual alien vegetation clearance program should be implemented for up to 3 years after closure. • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries and associated buffer zones after closure.

Environmental Aspect	Additional Mitigation Measures
	• Post closure groundwater management will need to be very carefully managed to ensure that no impact on the aquatic habitat areas and riparian resources in the area takes place after closure has taken place. • Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure.
Surface water	• Demolition activities will be undertaken during the dry season, where possible to minimise the potential for stormwater runoff. • During closure and rehabilitation activities, clean water diversion berms upstream of the area will be constructed. • Routine surface water quality monitoring up and down stream of closure and rehabilitation activities will be undertaken as per the surface water monitoring programme. • Maintain stormwater collection systems.
Groundwater	• Implement a groundwater monitoring programme during the closure and rehabilitation phase. • Implement active remediation if impacted groundwater is contaminated and monitor for at least 2-3 years; • The final backfilled opencast topography should be engineered such that runoff is directed away from the opencast areas; • The final layer (just below the topsoil cover) should be as clayey as possible and compacted if feasible, to reduce recharge to the opencasts; • The drilling of boreholes into mining areas is recommended so that recovery of water in mining areas can be monitored; • Intercepting decant by a downstream trench is an option to investigate;
Social	• The upskilling of workers to enhance re-employment opportunities following closure and decommissioning must be implemented well in advanced of the decommissioning phase; • Where possible, Midtron must provide assessment and counselling services for affected individuals; • Establishment of clear criteria for socio-economic projects and corporate social investment activities, that incorporate partnerships, exist strategy and sustainability; • Adhere to the mine closure plan.

Closure of the mine will also have significant socio-economic impacts on the surrounding communities and the personnel who will be retrenched due to mine closure.

The impacts of the closure of the mine will be assessed in detail during the closure phase.

Table 13-5: Quantitative Impact Assessment Results for the Decommissioning and Closure Phase

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION: Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES): Management and Mitigation Measures	Timeframe	IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION): Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Socio-Economic																			
Direct	Downscaling and retrenchment will result in: • Loss of employment • Reduced regional economic development • Reduced ore supply • Reduced community investment	1	2	4	4	3	49	Medium-High (-)	Decommissioning and Closure	To minimise socio-economic impacts after closure of the mine	• Manage qualifications of mine workers and implement programmes in the SLP to enable workers to source employment elsewhere on decommissioning of the mine.	Closure and post closure phase	1	2	2	2	3	25	Low (-)
Surface water																			
Direct	Impeding flow while under demolition	3	2	2	1	3	28	Medium-Low (-)	Decommissioning and Closure	To avoid blockage of watercourse	• Demolish infrastructure as far as possible in the dry season	Duration of the decommissioning/ rehabilitation phase	1	2	2	1	3	20	Low (-)
Direct	Compacted services could lead to an increase in runoff into the nearby stream.	3	2	2	1	3	28	Medium-Low (-)	Decommissioning and Closure	To minimise impacts on water courses	• Progressive rehabilitation of disturbed land should be carried out to minimise the compacted surfaces at the decommissioned mine.	Duration of the decommissioning/ rehabilitation phase	1	2	2	1	3	20	Low (-)
Direct	Increased turbidity due to demolition.	3	2	1	2	4	36	Medium-Low (-)	Decommissioning and Closure	To minimise contamination of water courses and minimise water quality impacts.	• Demolish during dry season, limit the disturbed footprint.	Duration of the decommissioning/ rehabilitation phase	1	2	2	1	3	20	Low (-)
Direct	Accidental spillages of hazardous substances from construction vehicles used during demolition.	2	2	1	1	4	25	Medium-Low (-)	Decommissioning and Closure		• Operate using best practices and clean spillages immediately they occur and remediate as necessary using spill kits.	Duration of the decommissioning/ rehabilitation phase	1	2	1	2	4	24	Low (-)
Groundwater																			
Direct	Following mine closure and subsequent recovery (rebounding) of the local groundwater, the backfill material in the open pits will alter the local hydraulic properties down to the pit base resulting in lowered groundwater	4	4	3	3	4	77	Medium-Low (-)	Decommissioning and Closure	To avoid or minimise the lowering of groundwater	• Regularly monitor water levels in boreholes near the active mining area. • Regularly update and validate groundwater numerical model to ensure that the drawdown zone does not extend beyond managed/monitored areas. • Monitor surface features such as local rivers, streams and springs and implement augmentation, if required.	Duration of the decommissioning/ rehabilitation phase	1	2	4	4	3	49	Medium-High (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	Groundwater contamination from activities identified in the operational phase such as the iron ore stockpiling, discard dumps and another surface infrastructure is expected during this phase. Pumping of groundwater for dewatering activity was expected to cease at this phase allowing groundwater levels to recover.	3	2	2	1	3	28	Medium-Low (-)	Decommissioning and Closure	To avoid or minimise the contamination of groundwater	• Drilling of monitoring boreholes in the mining area to monitor the recovery of water levels. • Implementing of groundwater monitoring program during the closure and rehabilitation phase • Implement active remediation if impacted groundwater is contaminated and monitored for at least 2-3 years. • Mine pits should be backfilled/lined and; • Plant vegetation to reduce oxygen in the soil. • Reduced groundwater levels may fully recover within 30 years, but the exact time will be determined during the model update after analysing groundwater level trends for the monitoring	Duration of the decommissioning/ rehabilitation phase	1	2	2	1	3	20	Low (-)
Direct	Post-closure the contamination plumes are expected to take time to return to the natural water quality of the area.	2	2	1	2	4	30	Medium-Low (-)	Decommissioning and Closure		• Implement frequent (preferably with loggers) monitoring of water levels and water quality in boreholes local to the active mining area. • Ensure receptors (private boreholes and riverbeds) are regularly monitored. • Source alternative water sources to provide to the sensitive receptors (users), should groundwater quality, or yield, be shown to be negatively affected by the mine. • The tailings facility will be lined to minimise leaching of minerals into the ground; • Groundwater and geochemical models must be compiled and updated on a regular basis (every 5 years) to verify potential for decant	Duration of the decommissioning/ rehabilitation	2	2	1	1	4	25	Low (-)
Aquatic habitats																			
Direct	Movement of construction vehicles and personnel may result in disturbance to soil and established vegetation within the operational area.	1	2	1	2	4	24	Low (-)	Decommissioning and Closure	To minimise groundwater contamination	• Dedicated roadways should be used during the decommissioning of the infrastructure components and no additional areas may be disturbed; • All building rubble must be removed from the site and disposed of at a registered waste disposal facility; • The topography of the footprint area should be free draining. The post-closure recharge of the catchment should also be as near natural as possible; • Bare areas should be revegetated within suitable indigenous vegetation species; • A Maintenance and Management Plan (MMP) must be compiled and implemented. Implementation must be overseen by a suitably qualified Environmental Site Officer (ESO) with watercourse rehabilitation experience, and the ESO must sign off the rehabilitation before the	Duration of the decommissioning/ rehabilitation phase	2	1	2	1	2	15	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
											relevant contractors leave the site; • Post-closure monitoring of the aquatic habitats is recommended to be undertaken.								
Visual																			
Indirect	Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.	2	2	2	4	2	36	Medium-Low (-)	Decommissioning and Closure	To minimise groundwater contamination	• Decommissioning footprints and disturbed areas should be kept as small as possible and no further indigenous vegetation should be cleared or soils exposed for this purpose; • All areas where infrastructure is removed must be resloped to resemble the pre-development landscape and revegetated as soon as possible; • Concurrent/ progressive rehabilitation must be implemented, and disturbed areas must be rehabilitated as soon as possible and as soon as areas become available by replacing topsoil and revegetating disturbed areas; • Indigenous and locally occurring plant species selected for use in re-vegetation should be selected taken quick growth rates into consideration in order to cover bare areas and prevent soil erosion; and • Upon final rehabilitation, it must be aimed to remove all much surface infrastructure and to reshape the landscape to pre-development conditions.	Duration of the decommissioning/ rehabilitation phase	2	1	2	2	2	20	Low (-)
Soils, Land use and Land Capability																			
Direct	Soil Compaction	2	3	3	3	2	40	Medium-High (-)	Decommissioning and Closure	Maintain soil vegetation cover to combat dust fallout	• Heavy machinery/mining equipment should stick to demarcated routes to avoid soil compacting; • If possible, vegetation clearance, can be scheduled to coincide with low rainfall conditions when soil moisture is anticipated to be relatively low to avoid surface crusting and sealing of exposed soils • Direct surface disturbance of soils should be limited within demarcated areas where possible to minimise the intensity of compaction; and • Compacted soils adjacent to the mining pit and associated infrastructure footprint can be lightly ripped to at least 25 cm below ground surface to alleviate compaction prior to re-vegetation.	Duration of the decommissioning/ rehabilitation phase	2	2	2	4	2	36	Medium-Low (-)
Direct	Dust and Soil Erosion	3	2	2	3	3	42	Medium-High (-)	Decommissioning and Closure	Minimise soil losses	• Temporary erosion control measures may be used to protect the disturbed soils during the decommissioning and closure phase until adequate vegetation has established. • Restrict vegetation clearance to priority areas of	Duration of the decommissioning/ rehabilitation	2	1	2	1	2	15	Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
											development. • The footprint of the proposed mining and infrastructure areas should be clearly demarcated to restrict vegetation clearing activities within the infrastructure footprint as far as practically possible; • Bare soils can be regularly dampened with water to suppress dust during the decommissioning and closure phase, especially when strong wind conditions are predicted according to the local weather forecast;								
Indirect	Soil Degradation	2	3	2	5	3	56	Medium-High (-)	Decommissioning and Closure	Minimise compaction and maintain soil fertility	• Excavation and long-term stockpiling of soil should be limited within the demarcated areas as far as practically possible; • Ensure all stockpiles are clearly and permanently demarcated and located in defined no-go areas; • Separate stripping, stockpiling and replacing of soil horizons in the original natural sequence to combat hard setting and compaction, and maintain soil fertility; • Stockpiles height should be restricted to that which can deposited without additional traversing by machinery. Maximum height of 2-3 m is proposed, and the stockpile should be treated with temporary soil stabilization; • Stockpiled soils should be stored for a maximum of 3-5 years. Alternatively, concurrent rehabilitation should strongly be considered to reduce the duration of stockpile storage to ensure that the quality of stored soil material does not deteriorate excessively; especially with regard to leaching and acidification • At decommissioning and rehabilitation phase, replace soil to appropriate soil depths in the correct order, and cover areas to mimic a natural topographic aspect so as to achieve a free draining landscape that is as close as possible the pre-mining land capability rating.	Duration of the decommissioning/ rehabilitation	3	1	3	3	2	35	Medium-Low (-)
Residual	Soil Contamination n	4	3	3	2	3	**50**	Medium-Low (-)	Decommissioning and Closure	Avoid migration of impact to surrounding receptors	• A spill prevention and emergency spill response plan should be compiled to guide the construction works; and • An emergency response contingency plan should be put in place to address clean-up measures should a spill and/or a leak occur.	Duration of the decommissioning/ rehabilitation	2	1	2	1	2	**15**	Medium-Low (-)
Biodiversity																			

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating			Management and Mitigation Measures	Timeframe	Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact							Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Direct	Loss of floral species	4	2	5	2	3	55	Medium-High (-)	Decommissioning and Closure	To prevent loss of floral SCC and medicinal species	• Floral SCC, if encountered within the decommissioning footprint areas, are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist.	Duration of the decommissioning/ rehabilitation	3	2	4	2	1	27	Medium-Low (-)
Direct	Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of floral species diversity	4	2	5	2	3	55	Medium-High (-)	Decommissioning and Closure	To ensure effective rehabilitation takes place	• Concurrent/ progressive rehabilitation must always be implemented, and disturbed areas must be rehabilitated (ripped, scarified and re-vegetated with suitable indigenous grass species that will aid in soil stabilisation) as soon as possible. This will not only reduce the total disturbance footprint but will also reduce the overall rehabilitation effort and cost.	Duration of the decommissioning/ rehabilitation	2	2	2	2	2	24	Low (-)
Direct	Loss of floral habitat	3	2	5	2	3	50	Medium-High (-)	Decommissioning and Closure	To prevent additional loss of floral habitat	• It must be ensured that no additional natural areas are further impacted or cleared during the decommissioning/ closure phase of the project	Duration of the decommissioning/ rehabilitation	2	2	2	2	2	24	Low (-)
Direct	Alien vegetation	3	3	3	4	4	72	Medium-High (-)	Decommissioning and Closure	To prevent and manage alien vegetation	• Ongoing monitoring and clearing of AIP species must take place during the decommissioning/ closure phase of the project	Duration of the decommissioning/ rehabilitation	2	2	2	2	2	24	Low (-)
Indirect	Increase in erosion as a result of disturbance leading to loss of floral habitat	3	2	3	4	3	56	Medium-High (-)	Decommissioning and Closure	To prevent and manage erosion	• Ongoing management of edge effects such as erosion and alien vegetation control must take place, as well as control of soil contamination, as salinization of soils could severely affect habitat; • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect floral habitat, need to be strictly managed in all areas of increased ecological sensitivity; • Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure.	Duration of the decommissioning/ rehabilitation	3	2	3	2	2	32	Medium-Low (-)
Residual	Ineffective rehabilitation may lead to permanent transformation of floral habitat	4	3	5	3	4	84	High (-)	Decommissioning and Closure	To ensure effective rehabilitation	• Rehabilitation of the disturbed areas is to be conducted during the operational phase to reintroduce indigenous vegetation where areas are available.	Concurrently for the duration of the decommissioning/ closure phase	2	2	3	2	2	28	Medium-Low (-)
Cumulative	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	4	3	5	5	3	88	High (-)	Decommissioning and Closure	To minimise cumulative loss of natural vegetation in the region	• Minimise loss of indigenous vegetation where possible throughout the decommissioning and closure phase.	Duration of the decommissioning/ rehabilitation	2	3	2	3	2	35	Medium-Low (-)
Residual-post closure	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities.	4	3	3	4	4	80	High (-)	Decommissioning and Closure	To prevent a significant increase in alien invasive species abundance and spread	• A bi-annual alien vegetation clearance programme should be implemented for up to 2 years after closure.	Post-closure	2	3	2	3	2	35	Medium-Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION – Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating	Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES) – Management and Mitigation Measures	Timeframe	IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION) – Consequence: Severity	Consequence: Spatial	Consequence: Duration	Likelihood (Probability): Frequency: Activity	Likelihood (Probability): Frequency: Impact	Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
Residual-post closure	Ineffective rehabilitation may lead to permanent transformation of floral habitat	4	3	3	4	4	80	High (-)	Decommissioning and Closure	To ensure effective rehabilitation	• Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure	Post-closure	2	2	3	2	2	28	Medium-Low (-)
Cumulative-post closure	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	3	3	4	4	4	80	High (-)	Decommissioning and Closure	To minimise cumulative loss of natural vegetation in the region	• Minimise loss of indigenous vegetation where possible post- closure and ensure that rehabilitation is effectively implemented.	Post-closure	2	3	3	2	2	28	Medium-Low (-)
Direct	Continued decrease in faunal habitat, species abundance and diversity	3	2	5	4	3	70	Medium-High (-)	Decommissioning and Closure	Limit further habitat and species loss	• Manage edge effects from decommissioning and rehabilitation activities; and • Ensure that all disturbed areas are suitably revegetated with indigenous plant species.	Duration of the decommissioning/ rehabilitation	3	2	2	2	2	28	Medium-Low (-)
Direct	Alien plant proliferation in disturbed areas leading to loss of faunal habitat	3	2	5	2	3	50	Medium-High (-)	Decommissioning and Closure	Remove alien vegetation in disturbed areas	• Implement an alien and invasive plant control program and manage until suitable indigenous basal cover has been established.	Duration of the decommissioning/ rehabilitation	3	2	2	2	2	28	Medium-Low (-)
Indirect	Fire hazards	3	3	2	2	3	40	Medium-High (-)	Decommissioning and Closure	No unauthorised fires	• Controlled fire burning regimes are to be conducted by a qualified fire management officer; and • Unplanned fires are to be strictly forbidden.	Duration of the decommissioning/ rehabilitation	3	2	2	2	2	28	Medium-Low (-)
Indirect	Trapping of faunal species	3	2	3	3	3	48	Medium-High (-)	Decommissioning and Closure	No trapping or hunting of fauna is to take place	• Access control must be implemented to ensure that no illegal trapping or poaching takes place; and • Any individuals caught with poached faunal species should be prosecuted.	Duration of the decommissioning/ rehabilitation	3	2	2	2	2	28	Medium-Low (-)
Indirect	Change in species diversity	3	3	3	3	3	54	Medium-High (-)	Decommissioning and Closure	Species composition should be similar to surrounding natural areas	• Ensure a suitable rehabilitation plan is implemented and suitable indigenous habitat is re-established to support pre-mining faunal communities.	Duration of the decommissioning/ rehabilitation	3	2	2	2	2	28	Medium-Low (-)
Residual	Ongoing loss of faunal habitat and diversity in the MRA	3	2	4	3	3	54	Medium-High (-)	Decommissioning and Closure	Faunal habitat should be rehabilitated to a similar state prior to mining activities	• Rehabilitate all faunal habitat areas to ensure that faunal ecology is re-instated during decommissioning and rehabilitation. • The rehabilitated habitat should aim to support pre- mining faunal communities.	Duration of the decommissioning/ rehabilitation	3	1	3	2	2	28	Medium-Low (-)
Residual	Reduced chance of faunal species recolonizing the disturbed areas	3	3	4	3	3	60	Medium-High (-)	Decommissioning and Closure	Re-instate faunal habitat	• Rehabilitate all faunal habitat areas to ensure that faunal ecology is re-instated during and rehabilitation; and • The rehabilitated habitat should aim to support pre- mining faunal communities	Duration of the decommissioning/ rehabilitation	3	1	3	2	2	**28**	Medium-Low (-)

TYPE OF IMPACT	POTENTIAL IMPACT DESCRIPTION IN TERMS OF ENVIRONMENTAL ASPECTS	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION							Project Activities	Impact Management Objective	IMPACT MANAGEMENT ACTIONS (PROPOSED MITIGATION MEASURES)		IMPACT MANAGEMENT OUTCOME (ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION)						
		Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which impact may cause irreplaceable loss of resources)	Significance Rating
		Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact					Management and Mitigation Measures	Timeframe	Severity	Spatial	Duration	Frequency: Activity	Frequency: Impact		
Cumulative	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of faunal habitat and diversity in the region	3	3	5	3	3	66	Medium-High (-)	Decommissioning and Closure	Reduce habitat loss	• Rehabilitate all faunal habitat areas to ensure that faunal ecology is re-instated during rehabilitation; and • The rehabilitated habitat should aim to support pre- mining faunal communities	Duration of the decommissioning/ rehabilitation	3	1	3	2	2	**28**	Medium-Low (-)
Residual-post closure	Proliferation of alien and invasive floral species in disturbed areas may lead to altered faunal habitat within the study area	4	3	5	3	3	72	Medium-High (-)	Decommissioning and Closure	To prevent a significant increase in alien invasive species abundance and spread	• A bi-annual alien vegetation clearance and monitoring programme should be implemented for up to 5 years after closure; and • Indigenous basal vegetation cover should be monitored, and it must be ensured that habitat availability post closure can support faunal communities identified pre-mining.	Post-closure	2	2	3	2	2	28	Medium-Low (-)
Residual-post closure	Ineffective rehabilitation may lead to permanent transformation of faunal habitat and species composition	4	4	3	3	3	66	Medium-High (-)	Decommissioning and Closure	To ensure effective rehabilitation	• Faunal habitat is to be reinstated to a similar state as to that of conditions prior to mining activities; and • Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure	Post-closure	2	2	3	2	2	28	Medium-Low (-)
Cumulative	Long term faunal habitat and species composition alteration in the region	4	3	5	3	3	72	Medium-High (-)	Decommissioning and Closure	Recovery of habitat structure	• Ensure habitat structure is similar to that of prior to mining activities	Post-closure	3	2	3	2	2	32	Medium-Low (-)
Waste Management																			
Direct	Potential water and soil pollution as a result of inappropriate waste management practices	2	3	2	2	2	28	Medium-Low (-)	Decommissioning and Closure	Avoid surface and soils contamination due to improper waste management	• Implement the mitigation measures contained in the construction phase assessment.	Duration of construction phase	2	2	2	1	2	18	Low (-)

13.4 Cumulative Impacts

Incomparable activities can result in several complex effects on the natural biophysical and social environment. These impacts are mainly identified as direct and immediate effects on the environment by a single entity affecting a variable of the environment. These direct impacts have the potential to combine and interact with other activities, depending on the surrounding environmental state and land use. These impacts may aggregate or interact with other impacts to cause additional effects, not easily quantified when assessing an individual entity.

The NEMA, 2014, specifically requires that cumulative impacts be assessed. This section provides a description and analysis of the potential cumulative effects of the proposed project, and past and present projects hereby considering the effects of any changes on the:

- Biophysical; and
- Socio – Economic conditions.

For the analysis of cumulative effects to be utilised as a useful tool for decision makers and I&APs, it must be limited to the effects that can be meaningfully evaluated, rather that expanding on resources or receptors that are no longer affected by the development or are not of interest to the I&APs. Two important aspects require consideration prior to the evaluation of cumulative effects:

- The determination of an appropriate spatial and temporal boundaries for evaluation of cumulative effects of the project; and
- The evaluation of relevant projects for consideration in the cumulative effects' analysis.

Spatial and temporal boundaries for analysis of cumulative effects are dependent on several factors, including:

- The size and nature of the project and its potential effects;
- The size, nature and location of past and (known) future projects and activities in the area,
- The aspect of the environment impacted by the cumulative effect; and
- The period of occurrence of effects.

The spatial extent of the cumulative impact analysis is generally aligned with the zone of influence of the project and other projects in the vicinity. Most impact will be localised; however, others may be experienced on a regional scale. This is taken into consideration during the assessment of cumulative impacts. It is reasonably straightforward to identify significant past and present projects and activities that may interact with the project to produce cumulative impacts, and in many respects, these are taken into account in the descriptions of the biophysical and socio- economic baseline.

13.4.1 Biodiversity

The proposed project area is located in an area that is regarded as ecologically intact, moderate in plant species diversity with a large number of endemic species. According to the above risk assessment, the proposed project and associated infrastructures will place additional pressure on the environment, especially on the fauna; which will be subjected to increased human presence, reduction in habitat and elevated noise levels. The results of the fauna survey indicate that fauna activity within the area might decline as a result of the current activities around the area. Further to this, the cumulative loss of fauna and flora is expected.

13.4.2 Socio-Economic

The potential cumulative impacts that may result from the proposed project were identified as follows:

- Increased pressures on existing social services
- Increased conflict over access to benefits from multiple projects in the study area
- An overall loss of sense of place or community identity
- Increased traffic congestion and road degradation
- Increased employment and economic opportunities
- Development of human capital (training and skills development)
- Increased awareness of health and safety
- Community development and social infrastructure upgrades
- Improved livelihood with the new Social and Labour Plan Project implementation
- programme
- Increase in tourism and investment injection within the Province and District level by foreign countries

13.4.3 Heritage Resources

The impacts of the proposed project when combined with other past, present, and reasonably foreseeable future development projects. The impacts of the proposed mining were assessed by comparing the post-project situation to a pre-existing baseline. This section considers the cumulative impacts that would result from the combination of the proposed development.

This proposed mining combined with other proposed mining activities will effectively transform the landscape and will spoil the visual quality of the area along Road R325. The cumulative impact will negatively affect the landscape quality of the area which is ordinarily considered to be a source. The frequency of development proposals in the area has the potential to collectively change the character of the landscape (see the Kathu area as an example). The once isolated landscape will see volumes of people establishing low settlements or enlarging the existing ones. In the long run, the accumulative impact will be of high significance in terms of its potential to change the characteristics and quality of the landscape in the long run. The field survey focused on the potential of lithic tools and rock engravings that are known to occur in the project area

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

Refer to Section 13 for the positive and negative impacts identified for the Midtron mining project. It is anticipated that the management measures associated with the activities will be adequate to manage the impacts associated with the project as provided in Section14 of this report.

15 Motivation where no alternatives were considered

Not applicable. The location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). As such, no property alternatives were considered for the location of the mining area. The proposed site is located in an area characterised by historical mining activities. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property has manganese resources estimated to 50 million tons as well as iron ore resources estimated to1 373 075 tons. The site is therefore regarded as the preferred site and as such, no property alternatives were viable to be considered for this project.

Specialist studies have been conducted for the proposed project and the initial stakeholder engagement process undertaken. No fatal flaws relating to the proposed site have been identified to date through specialist studies and/or stakeholder engagement.

It is possible that only mobile screening and crushing plants, which can process 300 tons of raw materials per hour may be used, instead of the fixed plants, due to the high capital costs of the fixed plants. In this case, three (3) sets of mobile screening and crushing plants will be positioned at different locations to crush all materials to proper sizings, from 6mm to 25mm, which will be removed to the magnetic beneficiation plant for further beneficiation.

16 Statement motivating the preferred site

Not applicable. The location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). As such, no property alternatives were considered for the location of the mining area. The proposed site is located in an area characterised by historical mining activities. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property has manganese resources estimated to 50 million tons as well as iron ore resources estimated to1 373 075 tons. The site is therefore regarded as the preferred site and as such, no property alternatives were viable to be considered for this project.

Specialist studies have been conducted for the proposed project and the initial stakeholder engagement process undertaken. No fatal flaws relating to the proposed site have been identified to date through specialist studies and/or stakeholder engagement.

17 Description of the process undertaken to identify, assess and rank the impact and risks the activity will have on the preferred site

A quantitative impact assessment process was undertaken as described in Sections 12. The results of the impact assessment process are provided in Section 13.

17.1 Assessment of each identified potentially significant impact and risk

A summary of potentially significant impact and risks is provided in **Table 17-1**. A detailed assessment of all the identified potential impacts is provided in Section 13.

Table 17-1: Impact Assessment of potentially significant impact and risk

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Site Establishment and site clearance for the construction of infrastructure: • Mining Right Application • Drilling and blasting • Excavations, open cast mining areas • Waste Rock Dump Areas • Water Dams • Tailings Stockpile Areas • Topsoil dump areas • Recycling Dams • Stormwater management infrastructure • Control Rooms • Diesel tank storage areas • Generators • Haul Roads • Offices areas • Parking areas • Processing Plant for the processing of Iron Ore • Processing Plant for the processing of Manganese Ore • Rapid Reloading Area • Explosive Magazine area • Safety Berms • Brake test ramp • Fenced salvage yard • Weigh bridges • Security access points • Tyre Bay area • Contractors laydown areas • Access Roads • Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank • Chemical Toilets • Wash Bay areas • Feeder Bay and substation • Waste storage areas • Water pipelines f • Water provision • Laboratory • Fencing • Borehole areas	Generation of waste and incorrect disposal from construction material leading to disturbance of natural vegetation.	Flora	Construction and decommissioning	Medium-High (-)	Implementation of proper waste management strategies	Low (-)
	Impact of faunal species of conservational concern due to habitat loss and collision with construction vehicles	Fauna	Construction and decommissioning	Medium-High (-)	Relocation of affected faunal species of conservation importance Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Minimisation of project footprint areas	Low (-)
	Loss of habitat due to vegetation clearance, disturbance of soils and vehicle operation.	Flora and Fauna	Construction and decommissioning	High (-)	Minimise the impacted area and clear only what is required Avoid erosion, manage alien invasive species establishment, ensure the re-establishment of natural vegetation Employ stormwater management measures	Medium-Low (-)
	Failure to initiate a rehabilitation plan and alien control plan during the construction phase may lead to further impacts during the operation phase.	Flora and Fauna	Construction and decommissioning	Medium-High (-)	Rehabilitation of areas cleared of vegetation Control of alien invasive plant species Relocation of floral affected species of conservation importance	Medium-Low (-)
	Loss of faunal diversity and ecological integrity as a result of construction activities, erosion, poaching and faunal specie trapping	Fauna	Construction, operation and decommissioning	Medium-High (-)	Relocation of affected faunal species of conservation importance Minimisation of project footprint areas	Medium-Low (-)
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources	Flora	Construction, operation and decommissioning	Medium-High (-)	Implementation of the stormwater management plan Separation of clean and dirty water around the site Minimisation of project footprint areas Control access to wetland and riparian areas and the regulated 500m buffer around wetlands	Medium-Low (-)
	Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat	Aquatic Ecosystems	Construction, operation and decommissioning	Medium-High (-)	Control access of vehicles in sensitive areas and in areas where soils are exposed Control access to aquatic habitat areas and the regulated 500m buffer around wetlands	Medium-Low (-)
	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	Social	Construction and decommissioning	Medium-High (-)	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel Management and maintenance of construction vehicles Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low (-)
	Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Soil, Land Use and Land Capability Impacts	Construction and decommissioning	Medium-High (-)	Rehabilitation of areas cleared of vegetation Minimisation of project footprint areas	Medium-Low (-)
	Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint.		Construction and decommissioning	Medium-High (-)		Medium-Low (-)
	The proposed project has the potential to impact on sites of archaeological importance.	Heritage Resources	Construction and decommissioning	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Sealing-in or destruction of the fossils during earth moving activity	Fossils	Construction and decommissioning	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Removal of local geology as a result of the mining activities.	Geology	Construction	Medium-High (-)	Minimisation of project footprint areas	Low (-)
	Emissions of Green House Gases as a result of the use of plant, heavy moving machinery, generators etc.	Climate	Construction and decommissioning	Medium-High (-)	Air quality monitoring Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Low (-)
Blasting and drilling	Impact of ground vibration resulting in possible damage to infrastructure	Social	Operation	Medium-High (-)	Notification of blasting activities Storage of blasting and hazardous materials should adhere to prescribed regulation Measures suggested minimising the impact of fly-rock on surrounding roads and structure Relocation of structures close to mining operations	Medium-Low (-)
	Air blast impact resulting in possible damage to infrastructure	Social/human health				
Mining of ore (open cast) and operation of associated infrastructure	Negative impact on, local community health and safety due to influx of employees, the presence of job seekers, which may lead to prostitution and conflict with the local communities. Illegal informal settlement of job seekers in the area may exacerbate the situation	Human health and Social	Operation	Medium-High (-)	Management of influx of employees Implementation of the SLP Open and honest communication with surrounding communities	Low (-)
	Monitoring borehole on the border of the mining area may be a conduit of flow to the groundwater unless sealed.	Groundwater	Operation	Medium-High (-)	Monitoring of groundwater levels in the surrounding areas	Low (-)
	High rate of ground water ingress causing flooding of the Pits	Groundwater	Operation	High (-)	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr. Monitoring of pits for ingress	Medium-High (-)
	The rainfall water within the designated dirty water area of the mining area that forms part of the MAR to the local water courses will be removed from the catchment. This will result in a lower intensity potential on the local surface water resource	Groundwater	Operation	Medium-High (-)	Development and implementation of a stormwater management plan	Low (-)
	Increase in volume of contaminated water that needs to be managed within the footprint	Surface Water	Operation	Medium-High (-)	Control through management and monitoring of spillages. Water quality monitoring Development and implementation of a stormwater management plan Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low (-)
	Loss of habitat and wetland ecological structure as a result of continual disturbance and uncontrolled aquatic ecosystem degradation.	Aquatic ecology	Operation	Medium-High (-)	Control of access to wetland areas and within the 100 m regulated area. Minimisation of project footprint areas Where possible, avoid placement of infrastructure in wetland areas and within the 500 m regulated area	Low (-)
	Impact on the aquatic systems as a result of changes to the sociocultural service provisions through	Aquatic ecology	Operation	Medium-High (-)		Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	uncontrolled vegetation clearance, waste management and disturbance					
	Impact on the hydrological functioning of the aquatic ecology as a result of uncontrolled disturbance during maintenance activities	Aquatic ecology	Operation	Medium-High (-)		Low (-)
	Impacts on the hydrological functioning of the aquatic ecology as a result of the mining activities.	Aquatic ecology	Operation	Medium-High (-)		Medium-Low (-)
	Possible increase in dust generation, PM10 and PM2.5 as a result of stockpiling material, use of heavy machinery, and material movement.	Air Quality, Social and Human Health	Operation	Medium-High (-)	Air quality monitoring Management through use of dust suppression techniques	Low (-)
	Operation of opencast Pits, use of haul roads, and permanent displacement of soil from buildings will reduce the land capability and agricultural potential and sterilise the soils.	Soil, landuse and land capability	Operation	Medium-High (-)	Minimisation of project footprint areas	Low (-)
	Soil contamination as a result of operational activities can be as a result of a number of activities (i.e. hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	Soil, landuse and land capability	Operation	Medium-High (-)	Implementation of proper waste management strategies Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Low (-)
	The proposed project has the potential to impact on sites of archaeological importance. Historic power line pylons are present within the proposed footprint.	Heritage Resources	Operation	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Sealing-in or destruction of the fossils during earth moving activity	Fossils	Operation	Medium-High (-)	Control through management and monitoring of heritage resources identified by the Specialist	Low (-)
	Progressive mining of the area will ultimately alter the topography.	Topography	Operation	Medium-High (-)	Minimisation of project footprint areas	Medium-Low (-)
Transportation of ROM	The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity	Social	Operation	Medium-High (-)	Management and maintenance of construction vehicles Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Low (-)
Closure and rehabilitation of mine and infrastructure sites Removal of equipment and infrastructure • Mining Right Application • Drilling and blasting	Loss of employment Reduced regional economic development Reduced Mn and Fe supply Reduced community investment	Socio-Economic	Decommissioning and closure	Medium-High (-)	Ensure proper training of personnel prior to decommissioning to ensure they can be employed elsewhere Implementation of the SLP	Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
• Excavations, open cast mining areas • Waste Rock Dump Areas • Water Dams • Tailings Stockpile Areas • Topsoil dump areas • Recycling Dams • Stormwater management infrastructure • Control Rooms • Diesel tank storage areas • Generators • Haul Roads • Offices areas • Parking areas • Processing Plant for the processing of Iron Ore • Processing Plant for the processing of Manganese Ore • Rapid Reloading Area • Explosive Magazine area • Safety Berms • Brake test ramp • Fenced salvage yard • Weigh bridges • Security access points • Tyre Bay area • Contractors laydown areas • Access Roads • Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank • Chemical Toilets • Wash Bay areas • Feeder Bay and substation • Waste storage areas • Water pipelines f • Water provision • Laboratory • Fencing • Borehole areas	Debris blocking watercourses if road continues to be used by the community.	Surface Water	Decommissioning and closure	Medium-High (-)	Rehabilitation of areas cleared of vegetation Monitoring of water courses Control of access	Low (-)
	Following mine closure and subsequent recovery (rebounding) of the local groundwater, the backfill material in the open pit will alter the local hydraulic properties down to the pit base resulting in permanently lowered groundwater	Groundwater	Decommissioning and closure	High (-)	Monitoring of groundwater levels	Medium-High (-)
	Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.	Visual and Social	Decommissioning and closure	Medium-High (-)	Removal of infrastructure must be done in a way that will minimise visual impacts Minimise the amount of time waste is left on site	Low (-)
	Soil Compaction	Soils, Land use and Land Capability	Decommissioning and closure	Medium-High (-)	Management and maintenance of vehicles. Management through the use of noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Medium-Low (-)
	Dust and Soil Erosion	Soils, Land use and Land Capability	Decommissioning and closure	Medium-High (-)	Implementations of dust control measures Air quality monitoring Monitoring and management of soil erosion	Low (-)
	Ineffective rehabilitation and monitoring of disturbed areas could lead to loss of floral species diversity	Biodiversity	Decommissioning and closure	Medium-High (-)	Monitoring of rehabilitated areas to ensure successful rehabilitation	Low (-)
	Loss of floral habitat	Biodiversity	Decommissioning and closure	Medium-High (-)		Low (-)
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities within the project area	Biodiversity	Decommissioning and closure	High (-)	Control and management of alien invasive vegetation Monitoring of rehabilitated areas to ensure successful rehabilitation	Medium-Low (-)
	Increase in erosion as a result of disturbance leading to loss of floral habitat	Biodiversity	Decommissioning and closure	High (-)	Minimisation of exposed areas Monitoring of rehabilitated areas to ensure successful rehabilitation Control and management of alien invasive vegetation	Medium-Low (-)
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	Biodiversity	Decommissioning and closure	High (-)		Medium-Low (-)
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	Biodiversity	Decommissioning and closure	High (-)		Medium-Low (-)
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered vegetation communities.	Biodiversity	Decommissioning and closure	Medium-High (-)		Medium-Low (-)
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	Biodiversity	Decommissioning and closure	**High (-)**		Medium-Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	Biodiversity	Decommissioning and closure	**High (-)**		Medium-Low (-)
	Continued decrease in faunal habitat, species abundance and diversity	Biodiversity	Decommissioning and closure	**High (-)**		Medium-Low (-)
	Alien plant proliferation in disturbed areas leading to loss of faunal habitat	Biodiversity	Decommissioning and closure	**High (-)**	Control and management of alien invasive vegetation Monitoring of rehabilitated areas to ensure successful rehabilitation	Medium-Low (-)
	Reduced chance of faunal species recolonizing the disturbed areas	Biodiversity	Decommissioning and closure	Medium-High (-)	Minimisation of exposed areas Monitoring of rehabilitated areas to ensure successful rehabilitation Control and management of alien invasive vegetation	Medium-Low (-)
	Ongoing mining development and ineffective rehabilitation leading to cumulative loss of faunal habitat and diversity in the region	Biodiversity	Decommissioning and closure	Medium-High (-)	Monitoring of rehabilitated areas to ensure successful rehabilitation	Medium-Low (-)
	Proliferation of alien and invasive floral species in disturbed areas may lead to altered faunal habitat within the study area	Biodiversity	Decommissioning and closure	Medium-High (-)	Minimisation of exposed areas Monitoring of rehabilitated areas to ensure successful rehabilitation Control and management of alien invasive vegetation	Medium-Low (-)
	Ineffective rehabilitation may lead to permanent transformation of faunal habitat and species composition	Biodiversity	Decommissioning and closure	Medium-High (-)		Medium-Low (-)
	Long term faunal habitat and species composition alteration in the region	Biodiversity	Decommissioning and closure	Medium-High (-)		Medium-Low (-)

18 Summary of Specialist Reports

A summary of the specialist reports is provided in Table 18-1. The full specialist reports are included in Appendix 6 of this report.

Table 18-1: Summary of specialist reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Biodiversity Assessment	The Farm Kapstewel 436 was surveyed between 24 and 27 March 2022 to ascertain the overall state of biodiversity. According to the South African National Biodiversity Institute (SANBI) the proposed site is classified as an Ecological Support Area, this implies that the proposed site plays a role in meeting biodiversity targets for ecosystems, species and ecological processes as identified in a systematic biodiversity plan. The sites were found to incorporate endemic trees species that will need to be considered during the planning and construction phase of the proposed activities. They also provide ecosystem services for both fauna and flora onsite. Specific conclusions and recommendations are listed below: • The mining area should be surveyed for species suitable for search and rescue, which should be translocated prior to the commencement of construction activities. • All plants that have been identified to be removed are to be marked and verified with an Ecologist/ECO and carefully removed. • Necessary permits and licenses to cut, disturb, damage, destroy, remove or rescue and translocate protected plants recorded within the project area must be applied for prior to any actions being taken. • Commencement of mining activities must be preceded by a plant rescue Programme which must be conducted only when plant permits, and licenses have been issued by the relevant authority. • No material storage or laydown is permitted under trees. • No heavy equipment, machinery or vehicles may be parked under any tree unless authorized by the ECO. • All mining activities must be carried out according to the generally accepted environmental best practice and the temporal and spatial footprint of mining activities must be kept to a minimum. • Existing roads must be used for access. • The boundaries of the mine footprint, including stockpiling areas, are to be demarcated and it must be ensured that all activities remain within the demarcated footprint area. • Erosion and the proliferation of alien plant species will affect faunal habitats adjacent to the mining area, these need to be strictly managed. This can be achieved through the clearing of alien invasive vegetation within the mining footprint. • Any natural areas beyond the mining footprint, which have been affected by the mining activity, must be rehabilitated using indigenous plant species. • Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors. In order to ensure that impact mitigation takes place to an adequate level should mining proceed it is deemed essential that a Biodiversity Action Plan (BAP) be developed which contains details on all actions that need to be undertaken to manage impacts on the ecology of the region. In addition, the BAP and its implementation should be overseen by an environmental panel which should include representatives from the mine and any relevant local stakeholders like farmers. The BAP should also be seen as a living	X	Sections 14, 20, 24, 27, 36, 38 and 41

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	document and must be continuously updated based on the findings of management and the ecological monitoring program. The actions required from the BAP should be implemented into a fully automated Environmental Management System (EMS).		
Visual	The visual impacts associated with the Kapstewel Manganese and Iron Ore Project are avoidable because of the isolation of the proposed site and do not hold severe impacts that would restrict the development from taking place.		
Noise	All of the receptor points were below the industrial thresholds as observed on the noise depiction maps, except for NSR04 (Nighttime monitoring). The following recommendations should, therefore, be explored; • Monitoring should be done every quarter to determine the impact of the operations on receptor areas during different seasons (for at least a year after operations begin and during construction). This is to determine the impact the project may have on surrounding environments. The baseline results will be used to compare for cumulative noise analysis. Noise differs from season to season; therefore a better understanding of the noise profile may take time to attain. • Noise barriers are and will be naturally established on the site (difference in elevations, hills, valleys and even waste rock dumps), and these normally slow down noise emanating from operations, alternatively, source controls can be explored, such as silencers on engine powered equipment and enclosures around generators and other noise intensive machines, for the protection of the employees on and around the site.  **Figure 18-1: View of the site** • Specific focus on the ecosystems found on and adjacent to the site should be ensured and noted. The mine to implement best practices to reduce and monitor noise impacts on sensitive receptors.		
Geochemical Assessment	The assessment was undertaken on the assumption that the mining method is not altered, that the processing method does not introduce any additional chemicals except for the use of water late in the processing stage. If there is a change in any method, or a change in law, then this waste classification must be repeated.		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	In terms of GNR634 (4.4) waste must be re-classified every 5 years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of the relevant factors.		
Heritage Resources	The study did not find any permanent barriers to the proposed mining rights application. It is the considered opinion of the author that the mining right application may be approved from a heritage resources management perspective if mitigation measures are implemented if and when required. The following recommendations are based on the results of the AIA/HIA research, cultural heritage background review, site inspection and assessment of significance. • The proposed mining right application may be approved to proceed as planned under the observation that project work does not extend beyond the surveyed site. • The recorded buildings and structures must not be destroyed without a permit from PHRA. They are protected in terms of Section 34 of the NHRA. • Should any unmarked burials be exposed during mining, potential custodians must be trekked and consulted and relevant rescue/ relocation permits must be obtained from SAHRA and or the Department of Health before any grave relocation can take place. Furthermore, a professional archaeologist must be retained to oversee the relocation process in accordance with the National Heritage Resources Act 25 of 1999. • Should chance archaeological materials or human burial remains be exposed during subsurface mining work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations. • Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no other significant cultural heritage resources barriers to the proposed mining right application. The Heritage authority may approve the proposed mining right to proceed as planned with special commendations to implement the recommendations herein made. • The Site Manager must then make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area before informing ISS • It is the responsibility of the applicant to protect the site from publicity (i.e., media) until a mutual agreement is reached. • Noteworthy that any measures to cover up the suspected archaeological material or to collect any resources are illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by SAHRA • The applicant is reminded that the unavailability of archaeological materials (e.g., stone tools and graves, etc) and fossils does not mean they do not occur, archaeological material might be hidden underground, and as such the client is reminded to take precautions during mining. • The footprint impact of the proposed mining activities should be kept minimal to limit the possibility of encountering chance finds within the proposed development site. • Overall, impacts on heritage resources are not considered to be significant for the project receiving environment. It is thus concluded that the project may be cleared to proceed as planned subject to the Heritage Authority ensuring that detailed heritage monitoring procedures are included in the project EMP for the mining phase, including chance archaeological finds mitigation procedure in the project EMP. • The chance finds process will be implemented, when necessary, especially when archaeological materials and burials are encountered during subsurface mining activities. • The findings of this report, with approval of the SAHRA, may be classified as accessible to any interested and affected parties within the limits of the laws.	X	Sections 14, 20, 24, 27, 36, 38 and 41

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	In terms of the archaeology and heritage in respect of the proposed mining right application site, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, remains and the applicant and contractors are advised to be diligent and observant during mining, should mining activities commence on the site. The procedure for reporting chance finds has been laid out (see Appendix 3 of the specialist report included in Appendix 6 of this report). This report concludes that the proposed mining right sites may be approved by SAHRA to proceed as planned subject to recommendations herein made and a heritage monitoring plan is incorporated into the EMP (also see Appendices). The mitigation measures are informed by the results of the AIA/HIA study and principles of heritage management enshrined in the NHRA, Act 25 of 1999		
Palaeontology	• There is no objection to the development, it may be necessary to request a Phase 1: Palaeontological Impact Assessment: Field Study if fossils are found during excavating, clearing, trenching or drilling. The palaeontological sensitivity is HIGH and MODERATE and fossils (stromatolites) may be present. • This project may benefit the economy, the growth of the community and social development in general. • Preferred choice: Only one locality Alternative is presented and possible. • Care must be taken during the grading of roads, digging of foundations and removing topsoil, subsoil and overburden (see Executive Summary) or blasting of bedrock. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting SAHRA must be notified. All drilling activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures. • No consultation with parties was necessary (1o,p,q). • This report must be submitted to SAHRA together with the HIA.	X	Sections 14, 20, 24, 27, 36, 38 and 41
Air Quality	The Report addresses the Air Quality Baseline Aspects of the project. This solely outlines the status quo of the area. It is recommended that the Modelling exercise be undertaken to determine the impacts of the proposed development. Thereafter, an Air Quality Impact Assessment Report can be compiled based on the computed results, together with an Air Quality Management Plan which will be used to address monitoring requirements as well as mitigation in light of emission reduction strategies that may be required.		
Surface Water and Hydrology	Floodline delineation indicated that pollution control dam and the proposed Plant area, Workshop area, and stockpiling area are within the 1:50 and 1:100 floodlines. It is recommended that gn704 exemption be applied to acquire all infrastructures within the 1:50 and 1:100 floodlines and if the mine requires to be exempted for backfilling purposes. Stormwater management plan was developed which indicated dirty and clean runoff areas. It is, therefore, recommended that dirty and clean water should not be mixed and the areas should be clearly marked. Construction of road networks within the mining right area should be constructed in a manner that allows water to free flow and culverts and bridges must stalled were roads are passing drainage lines. Risk assessment was carried out for the proposed Kapstewel mine with impacts and mitigation measures clearly defined. It is recommended that all mitigation measures be implemented to protect the environment. In this water balance assessment of the planned mining operations, the findings suggest that securing water to support the operations will be vital. The fact that site is located in a region where the evaporation rates far outstrip the expected precipitation, if water resources management by the mine is less than adequate, the potential for water losses through evaporation will be significant. It should also be noted that the assessment has been conducted based on information provided by the client. Indications are that some of the information about the planned infrastructure is tentative and liable to change. It will be imperative that as and when the infrastructure designs are finalised that a study be commissioned to update this water balance assessment. That way, the management will be certain that the water balance assessment findings can be relied on to support operational decision making.	X	Sections 14, 20, 24, 27, 36, 38 and 41

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	Finally, based on the information availed for completion of this water balance assessment, the assumptions made and the findings from the water balance assessment, it will be essential that as the mine development plans take shape, serious consideration be paid to the necessity for implementation of water conservation and water demand management. This will not only be useful for aligning the mine's environmental sustainability imperatives with those of the country but will likely also be key to their realizing cost-effectiveness of their operations from initiatives that could include water recovery, reuse and recycling.		
Groundwater	• The following conclusion and recommendation were based on the study conducted for the Kapstewel Mine. • Hydrocensus: Groundwater sampling was conducted for 4 boreholes that were within the hydrocensus radius and only three boreholes' water quality samples were taken to Aquatico Lab for analysis. • Aquifers: The hydraulic properties of the area are characterised by shallow dolomitic aquifers with high transmissivities. The lithologies below the dolomites are characterised by a host of interbedded chert, ironstones, chert breccias, quartzites, conglomerates and shales which would be indicative of primary and secondary aquifers. Groundwater flow will mainly be in the form of fracture flow. The geohydrological regime in the study area is likely made up of two aquifer systems. The first, the upper, semi-confined aquifer occurs in the calcrete or on the contact between the calcrete and underlying Kalahari clay formation, if the latter is present. This aquifer is, however, often poorly developed in the study area and only sustains livestock and domestic water supply. Where the upper aquifer is present, quarrying within the site boundary area will destroy it but the dewatering effects of the aquifer will not be so widespread due to its limited depth. The most significant dewatering effect as well as contamination, if present, will be on the deeper secondary aquifer with higher transmissive properties and more dynamic hydraulic properties. Groundwater is mainly used for domestic supply, livestock watering, and watering of gardens. The borehole yields from the upper calcrete aquifer are relatively low and groundwater cannot be pumped in quantities sufficient for extensive crop irrigation purposes. The groundwater elevation contours are taken from the Hydrogeological Map Series (DWA, 2000) and show groundwater flow to be in a South to South Easterly direction. Measured groundwater levels indicate that the hydraulic gradient slopes towards the southeast along the course of the Groenwater Spruit River. It is thought that the groundwater flow follows the surface topography somewhat, flowing towards the Groenwater Spruit River and then in a south-westerly direction. The quaternary catchment is within the Vegter Region 25 referred to as West Griqua Land. Two basic types of aquifer storage are assumed to exist in this region, namely the "Weathered /Jointed" (WZ) and Fractured" Zone (FZ). In fractured rock (FZ) aquifers the number of water-bearing fractures generally decreases with depth (Vegter, 1995) and this often results in a similar decline in aquifer storativity with depth. While saturated zone (WZ) is normally a relatively thin zone (i.e. 5 to 40m thick) with its upper surface formed by the water table, therefore making this portion of the aquifer semi-unconfined to unconfined. This zone is characterised by a large number of relatively low-yielding water strikes. The project area had an abstraction borehole equipped with a pump and storage tank. According to the personal contact in the study area, the borehole had an average depth of 60 m with the submersible pump at 26 m below ground level. Five water level monitoring boreholes belonging to DWS were identified within the boundaries of the project area. These boreholes had an average water level of 12 m below ground level. Many other boreholes within the catchment area were identified on the WARMS database; these boreholes mainly belonged to the surrounding mines such as Beeshoek which is approximately 7 km southwest of the study area. Hydrocensus was conducted from the 27 to the 30th of March 2022 .and only 25 boreholes were visited, although most of them were closed and few are operational. In conclusion, the yield test data indicates that the property may sustainably abstract 40 564 m3/a from the aquifer system. The volume of water requested in the WULA is equal to this 10 000 m3/a and this is considered sustainable. The borehole abstraction rate and basic management guidelines are highly recommended. This is equal to the safe yields of the boreholes, and aquifer over-abstraction is unlikely to occur if these rates are adhered to. Note this is a conservative yield (for use throughout the year). However, to ensure that the yield is sustainable and does not impact the surrounding water level, the water level and abstraction should be monitored over time. This data should be reviewed on regular basis (suggested monthly) to ensure that the yield is sustainable. • Water Quality: The water quality results indicated that the water quality generally does not satisfies the drinking water standards of the country, compared to the SANS 241 standards for domestic use and the South African Water Quality Guidelines (SAWQG) irrigation targets. The water cannot be used for human consumption. For the BHO1 and BH02, the EC was slightly elevated but only exceeded the standard limits for the Domestic Water Limit (Table 1). The TDS of all the boreholes are exceeding the Domestic Water Limit. The Chloride of BH03 exceeds the Domestic Water Limit, while BH01 and BH02 are within the acceptable range. Although the BH01 and BH02 are exceeding the Mine Health and Safety Act. The Calcium for all the boreholes are exceeding the Domestic Water Limit. Furthermore, magnesium is also exceeding the	X	Sections 14, 20, 24, 27, 36, 38 and 41

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	Domestic Water Limit for both BH01 and BH02 while Magnesium of BH03 is within the acceptable range. On the BH03, EC, NTU, Ecoli, and manganese are exceeding drinking water standards. There is a need for verification of the water quality before any use would be implemented in these cases. The results indicated that the water type for the BH01, BH02, and BH03 in the study area had a magnesium-calcium-bicarbonate ($Mg\text{-}CaCO_3$) composition, clearly indicating that the BH01, BH02, and BH03 had a similar water type. Groundwater quality had its natural variations. Almost all the samples were clustered in the magnesium-calcium bicarbonate facies of the Piper diagram. That reflected the chemistry of the dolomite, indicating that the dissolution of dolomite was the dominant process controlling the chemistry of the groundwater or weathering of silicate minerals. As expected, groundwater from the dolomitic aquifers was of magnesium-calcium-bicarbonate nature due to the dolomite composition. • Groundwater Model:. Groundwater elevations during scenario 1 are lower in areas close to domestic and irrigation pumping boreholes. The mining activity was still above the water table and therefore the mining pits did not have an impact on the groundwater regime of the area. However, there was s indicated that groundwater heads reduced towards the mining area from the high elevation areas due to topography while groundwater heads in low lying areas close to the rivers did not move towards the high-elevated mining right area. The mining right area was less than 50% of the total model surface area, located in higher elevation areas than the rivers which were 2-5 km away from the mining right area. The mining pits elevation was decreasing as per the mining plan. This resulted in an influx into pits modelled as drains. The water balance showed a cumulative total influx of 25610.54 m³ for 15 years. Scenario 2 was modelled with the mining pits elevation reduced from initial mine elevation to 1312 masl from year 1-15 and to 1170 masl from year 15 to 30. The reduction or drop in elevations resulted in high recharge of more than 10% of the MAP into the mining pits referred to as drains. This influx will have to be dewatered through pumping boreholes. Dewatering was simulated with the volumes indicated in the scenario. The modelling results show groundwater drawdown within the mining right area because of dewatering activities within the mining pits. An estimated 10 m cone of depression developed within the mining right area due to this dewatering from the proposed pits and Sedibeng Iron Ore pits. The cone of depression indicated a drop in the water table in aquifers surrounding the mining pits. Notable reductions in groundwater levels were observed as follows: Pit B dropped from 59.78 to 120 mbgl and pit D dropped from 78 to 360 mbgl. Nitrates were simulated for 30-year LOM with the worst-case scenario of an initial concentration of 4400 mg/l injected at 10 m³/d into the aquifers from the waste dump area. Packages used for mass transport were the Basic Transport Package, Advection Package, Dispersion Package, and Sink and Source Mixing Package. Hydraulic parameters used for the transient state were applied to this modeling. However, the elevation for the mining pits decreased each year as per the mining schedule, therefore, accumulating more seepage with time. Mass transport modeling result shows a localized slow movement of nitrates confined only to areas within 2 meter radius of the waste dump. The model was also run for the post mining phase as represented by scenario 3. In this scenario, mine pits are backfilled, and there is no dewatering of the aquifer. The modeling result for post mining was very much similar to the steady-state condition as groundwater levels returns to near the surface in areas outside the mining right while groundwater levels within the mining pits remained below the surface due to hills made up of waste dumps. The iron ore mining is estimated to commence from the top of the pits which is around 2 meters above sea level to around 1170 masl depth. This depth is below the study area's average groundwater elevations of 1321 masl and therefore inflows into the opencast pits from the surrounding aquifer were only expected at the mining operation after year 15. Less seepage was expected from year 1 to year 14 due to the height of mining pits. The zone of influence of the dewatering cone depends on several factors such as; the depth of mining below the regional groundwater level, recharge from rainfall to the aquifer, the size of the mining area and the aquifer transmissivity, etc. During the Operational Phase, it was expected that more boreholes would be drilled for dewatering of the mining area which might have an impact on the groundwater environment of the surrounding aquifer. Drawdown due to dewatering after year 15 was simulated at 10 m on average. Groundwater contamination from activities identified in the operational phase such as the iron ore stockpiling, discard dumps and another surface infrastructure is expected during this phase. Pumping of groundwater for dewatering activity was expected to cease at this phase allowing groundwater levels to recover. Groundwater levels in the surrounding area which were drawn down due to the dewatering activity will subsequently return to close to the natural or pre-mining state. However, due to the low recharge influx, it may take a long time before groundwater levels return to pre-mining conditions. Groundwater recovery time was not simulated during the model run due to the lack of groundwater monitoring borehole data. It was therefore recommended that this task be conducted during the model update to simulate the time it may take for groundwater levels to fully recover. Groundwater quality and quantity monitoring should be conducted quarterly during the operation and post-mining phases. It is recommended that groundwater quality monitoring be conducted just after the wet season in March and in September after the dry season. The groundwater monitoring system should be extended as deemed suitable to cover mine infrastructure and projected pollution plume over the LOM.		

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Aquatic habitats and Aquatic Ecology	The dry tributaries identified onsite are classified as NFEPA aquatic habitats and are directly connected to the catchment. The proposed development is located within a greenfield. The dry tributaries are in a Moderately Modified state based on the PES assessment undertaken for the stream. The PES status of the riverine system infers that a moderate change in the ecosystem processes and loss of natural habitat has taken place, but the natural habitat remains predominantly intact. As mentioned above, the watercourses are located on greenfield land, which infers that there has not been any development within the Study Area prior to the proposed mine. Therefore, the dry tributaries have not experienced major anthropogenic impacts, the proposed development is expected to have Potential impacts on the study site including the loss and disturbance of aquatic habitat and biodiversity loss, impact on water quality deterioration, interruption to hydrology and the establishment of an alien invasion of native species. Based on the impact assessment undertaken, the impacts identified were high-moderate prior to mitigation and low post mitigation, provided that mitigation measures are put in place and best practices with regard to the surface and groundwater are maintained during operations. A 100m buffer zone should be indicated around the aquatic habitats/watercourses as advocated by Regulation GN 704 of the National Water Act, 1998 which contains Regulations on the use of water for mining and related activities aimed at the protection of water resources. GN 704 states that: No person in control of a mine or activity may- a) *locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on the ground likely to become waterlogged, undermined, unstable or cracked;* According to the above, the project footprint must fall outside of the 1:100 year floodline of the aquatic habitats or 100m from the edge of the features, which ever distance is the greatest unless an exemption from the GN704 is granted. Furthermore, construction activities planned within 32m of the aquatic habitat features require relevant authorisation according to the National Environmental Management Act (NEMA) 107 of 1998 and Section 21 c and i of the National Water Act 36 of 1998. The disturbance of the watercourse/aquatic habitat areas and their associated buffer zones should be avoided as far as possible. In this regard, special mention is made of the undisturbed tributaries which are of increased ecological sensitivity and importance.	X	Sections 14, 20, 24, 27, 36, 38 and 41

19 Environmental Impact Statement

19.1 Summary of key findings

The impacts evident from the detailed impact assessment (Section 13) of the proposed project are both positive and negative in nature. The key positive and negative findings outlined below.

19.1.1 Key Positive Impacts After Mitigation

The main positive impacts identified for the project relate to socio-economic impacts that the construction and operation of the project will have. These impacts were determined to have a positive impact, either directly or through the spinoffs generated by the development and operation of the proposed project and associated infrastructure. These positive impacts are not listed per phase of the project, but as consolidated impacts during construction, operation and closure

In terms of local economy, there is the potential for multiple significant benefits to both local and regional businesses, as well as local employment opportunities. This would be highest during the construction phase, due to the requirement of contractor numbers (for services and materials). This has opportunities for both the formal and informal sectors, as smaller enterprises, including spaza shops, are likely to be established during the construction period to supply contractors and others with food and other amenities.

The proposed mining activities will ensure that the LM and communities in the area will benefit from the mine. The stimulation of the national economy will occur as a result of the investment into the mine and proceeding increase in production. The subsequent benefits are employment creation, a rise in consumption levels, new business sales, and a contribution to GDP.

It is expected that the mine will implement a policy allowing for preferential procurement for the local businesses and training of local Small, Medium and Micro-sized Enterprises (SMME) on procurement and business management. The mine is expected to have a positive socio-economic benefit through employment of locals. Recruitment of labour will be guided by Midtron’s recruitment policies which are expected to promote the employment of local labour by the mine as well as by any appointed contractors. Midtron will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise.

The mine will use recruitment to meet the targets as set forth in the SLP. A projected total of 80 employees are envisaged to be employed at the mine, of which 76 will be HDIs. Where specialist and skilled labour is recruited from outside the local boundaries due to the skills scarcity, local residents will benefit through on the job training, where possible.

The skills programmes to be applied during mining operations at the Midtron Mine are considered to be holistic, given that they cover qualification attainment, basic education provision, on the job training, etc. If implemented accordingly, the skills levels particularly of the local community will improve and thus enable employees to acquire future employment.

19.1.2 Key Negative Impacts After Mitigation

The assessment found that there are a number of negative impacts that are expected as a result of the Midtron Mine. The most significant impacts identified were on the biodiversity, groundwater and surface water resources, including the loss of aquatic habitats and their associated functions.

The wetland delineation and aquatic habitat assessment found that there are no wetlands located on the affected property. The study area consists of dry tributaries, however, due to the most rains, some of the tributaries were covered with stormwater. The stream on the property is considered an NFEPA watercourse, meaning that the area is regarded as important for the conservation of biodiversity. The specialist noted that it is very important to note that the watercourse is located within a very sensitive area, which plays a major role in managing Biodiversity. The aquatic assessment concluded that based on the proposed activity and taking into consideration the present state of the aquatic habitats and their associated functionality and biodiversity status the largest and most effective mitigation measure to mitigate the foreseen impacts is to design the mine site layout to exclude the delineated aquatic habitat system inclusive of the regulated 100 m buffer zones.

The biodiversity assessment found that the proposed project is located in an area that is largely classified as natural, and certain portions of the study site are located within an Ecological Support Area (ESA). A number of species protected in terms of the Northern Cape Nature Conservation Act 9 of 2009 (NCNCA) are known to be found in the area and were observed on the property. The site consists of the Kuruman Thornveld and the Kuruman Mountain Bushveld vegetation types. Since endemism and species richness are highly relevant to the prioritisation of areas for conservation, the study site is regarded as particularly sensitive. Loss of endemic plant diversity in the study site will also result in a loss of faunal biodiversity and a resultant loss of faunal SSC. This is of specific relevance to invertebrates, since they are dependent on those plant species. Mining activities in the area will have direct negative ecological impacts, most notably vegetation clearing leading to habitat loss, degradation and fragmentation as well as proliferation of alien invasive plant species. Due to the nature of the proposed development, the impact is expected to be highly significant. In addition to the loss of important natural heritage, an alien invasion is expected to occur, resulting in the degradation of vegetation. However, if the proposed is executed as per the Environmental Management Programme will help minimise the impact by restricting the development to areas that are already disturbed and conserving the undisturbed sites. It is thus deemed essential that a cogently developed, documented and managed biodiversity management plan be implemented and maintained throughout the life of the proposed mine.

Other negative impacts identified include:

- Socio – Economic: Transportation of material to and from the study area will result in additional trucks and construction vehicles on the study area roads, which can cause damage to the road surface and increase the potential for accidents in the area. The influx of additional people looking for employment will result in impacts on the social dynamics in the area.
- Groundwater Impacts: Local spillages of hydrocarbons and chemicals used during the pre-construction and construction phase which may leach to groundwater. Groundwater contamination from activities identified in the operational phase such as the iron ore stockpiling, discard dumps and another surface infrastructure is expected during this phase. Pumping of groundwater for dewatering activity was expected to cease at this phase allowing groundwater levels to recover. Groundwater levels in the surrounding area which were drawn down due to the dewatering activity will subsequently return to close to the natural or pre-mining state. However, due to the low recharge influx, it may take a long time before groundwater levels return to pre-mining conditions.
- Surface Water: Movement and use of vehicles and machinery as well as improper storage of hazardous substance may have Impacts on surface water and groundwater quality due to accidental spillages of hazardous substances. Contaminated dirty water runoff from the mining area to surrounding areas resulting in the impact on local surface water quality. The removal or containment of dirty water will result in the removal of MAR from the catchment, as this runoff will now be considered dirty water and will need to be contained within the mining area.
- Aquatic habitat Impacts: The NFEPA database shows that there are no wetlands associated with the affected property, as supported by findings from the wetlands delineation specialist study. There are streams and tributaries located on the site of the proposed mine area ,

therefore, there is potential for impacts on these aquatic habitats located on the property. Indiscriminate movement into and access to aquatic habitats areas will result in:

  - Loss of aquatic habitat ecological structure as a result of site clearance activities and uncontrolled aquatic habitat degradation;
  - Impact on the aquatic habitats systems as a result of changes to the sociocultural service provisions
  - Impact on the hydrological functioning of the aquatic habitats;
  - Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of aquatic habitat and riparian resources; and
  - Soil compaction and levelling as a result of construction activities and vehicle movement leading to loss of aquatic habitat and riparian habitat.

- Air Quality Impacts: The movement of vehicles in the area will have an impact on ambient air quality as follows:
  - Possible increase in dust generation, PM_{10} and $PM_{2.5}$ as a result of bulk earthworks, operation of heavy machinery, and material movement.
  - Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) as a result of movement of vehicles and operation of machinery/equipment.
- Blast and Vibration Impacts: Blasting during the operation of the opencast mining area will result in:
  - Impact of ground vibration resulting in possible damage to infrastructure;
  - Air blast impact resulting in possible damage to infrastructure;
  - Fly rock impact resulting in possible damage to infrastructure; and
  - Impact of fumes on nearby land occupiers and road users.
- Visual Impacts due to:
  - Visual intrusion as a result of the movement of machinery and the erection of contractor camps;
  - Scaring of the landscape as a result of the clearance of vegetation and preparation of the mine areas; and
  - Indirect visual impact due to dust generation as a result of the movement of vehicles and materials, to and from the site area.
- Noise Impacts: The use of vehicles and machinery during the construction phase may generate noise in the immediate vicinity. Mining activities will therefore result in an increase in ambient noise levels as a result of the mining activities. However, given that there are current mining activities taking place on site, it is expected that the additional noise impacts as a result of the project will be negligible.
- Soil, Land Use and Land Capability: The impacts on land capability are generally considered to be limited since there currently are mining activities in the area. The soil has already been significantly altered by previous mining activities and the potential of this land to be used for agriculture after rehabilitation is very limited. The opencast mining areas will result in permanent loss of land capability and result in a permanent change in landuse of the footprints of the pit areas. There is potential for chemical potential pollution of soils due to use of vehicles and machinery and storage of hazardous material at the mine. Other impacts include:

- o Clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion;
- o Loss of soil resource and utilisation as a result of the cleaning and topsoil stripping of the construction footprint;
- o Handling and storage of building materials and different kinds of waste leading to soil sterilisation.

- Heritage Impacts: Although no graves were identified during the heritage assessment, there is potential that the proposed project has the potential to impact on local graves and sites of archaeological importance. within the area. According to the HIA, there are no major archaeological reasons why the proposed mining rights application should not be approved. Should any heritage resources be identified during construction and operation of the mine, implementation of the mitigation measures in Section 13 will results in protection of the resources.
- Palaeontology Impacts: Sealing-in or destruction of the fossils during earth moving activity. Implementation of the mitigation measures in the specialist studies report and Section 13 of this report will reduce the potential for loss of fossils.

Closure and Decommissioning

The residual risk associated with the proposed project will largely relate to water management and rehabilitation following the operational phase. The rehabilitation of the mining area as well as the latent water influx will need to be managed to as to prevent any residual impact in years following decommissioning. These monitoring requirements have been addressed in the EMPr.

The main impacts that will result from the closure phase will relate to the ineffectiveness of the construction and operational phases to eradicate alien vegetation, which will ultimately result in the loss of indigenous fauna and flora. In addition, the decommissioning activities may further impact on the established vegetation in the area, resulting in the loss of biodiversity species, habitats and ecological structure. All the impacts that may result from the decommissioning activities of the proposed project have been effectively addressed in the impact assessment in Section 13.3, as well as the EMPr.

19.2 Final Site Map

No fatal flaws were identified for the proposed project through the stakeholder engagement process specialist studies and impact assessment by the EAP's team. As such it was not necessary to revise the layout plan for the proposed Midtron mining project. The site map is provided in **Figure 19-1**.

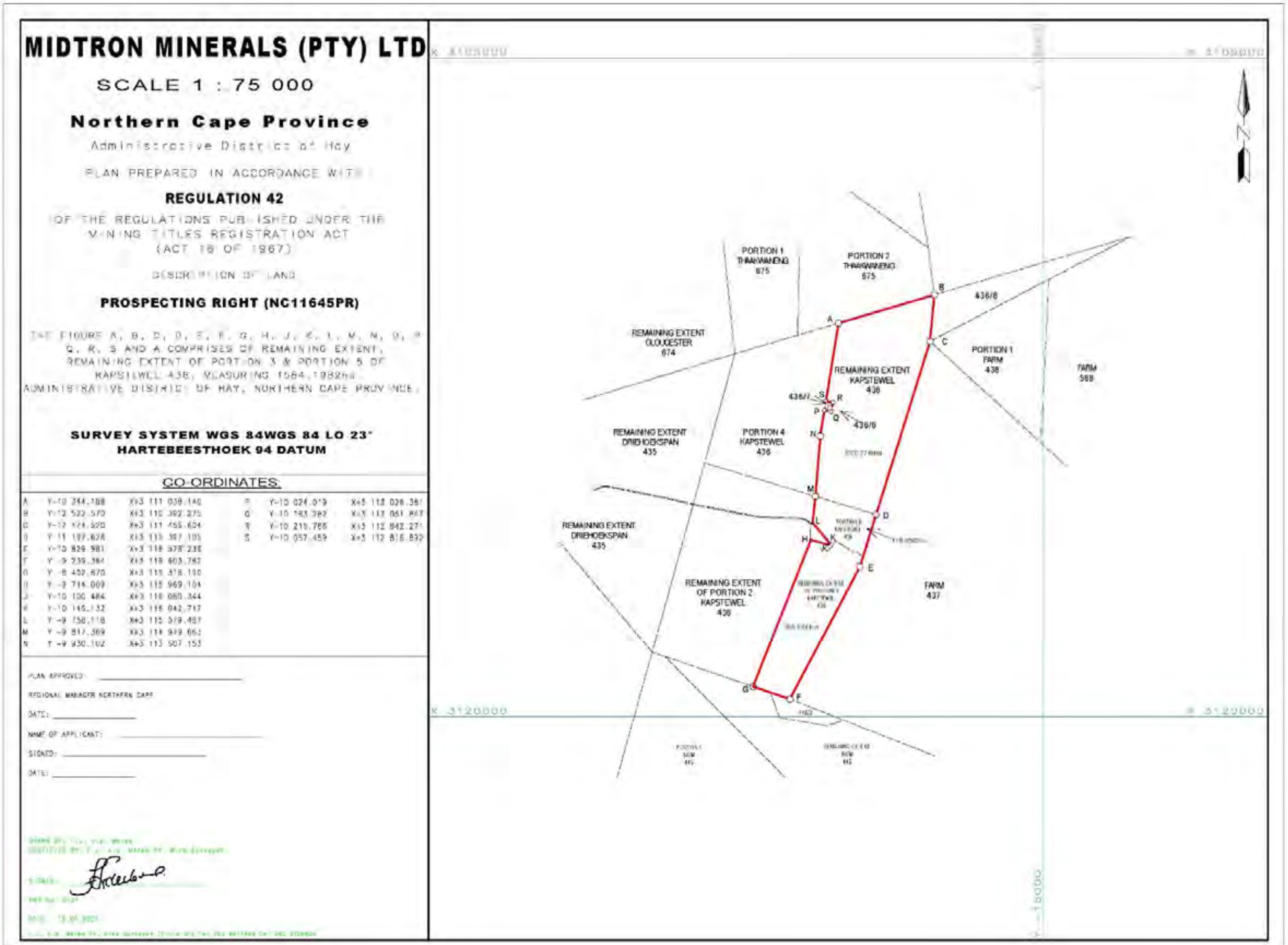


Figure 19-1: Final Site Map

19.3 Summary of the positive and negative implications and risks of the proposed activity and alternatives

The positive and negative implications were assessed according to the construction, operational and decommissioning phases of the proposed Project. A detailed description of the main impacts is provided in Section 14 and the main impacts are provided in Section 20.1. A short summary is provided below for each phase of the project.

19.3.1 Construction Phase

During the construction phase of the proposed project the majority of the negative impacts are associated with site clearance and vegetation removal activities. Topsoil loss should be limited by storing and protecting the topsoil to be used for rehabilitation purposes. The establishment of the proposed project will result in loss of aquatic habitat.

Vegetation clearance during construction will also result in loss of natural vegetation and disturbance to fauna on site. Site clearance and vegetation removal will also result in a loss in land capability. The affected land will transform from grazing and crop farming land use to mining use which is an irreversible negative impact. Natural vegetation removal is expected to have moderate significance impacts. Alteration of the sub catchment and increased sedimentation of surface water resources (unnamed tributaries and aquatic habitats) which may also impact aquatic biota may also occur due to the proposed The Midtron mining project. The implementation of mitigation measures such as commencing rehabilitation activities in tandem with or immediately following construction will however reduce the significance of the impacts. The main negative implications associated with other general construction activities are nuisance noise, traffic, dust and visual impacts.

From a socio-economic perspective the development of the mine will have a positive impact on employment creation, economic and social upliftment and community development. An increase in employment opportunities, household income and skills development will contribute to a positive growth in the local and regional economy. Moderate negative social impacts are expected due to the impacts the proposed mine will have on agricultural activities and surroundings.

19.3.2 Operational Phase

The majority of the impacts identified for the operational phase are associated with the open pit mining. Mining will result in the perforation of rock and groundwater reserves leading to severe hydrological and geomorphological impacts. Blasting activities associated with open pit mining may have significant implications namely of ground vibration and flyrock impacts at surrounding houses and roads. With the implementation of mitigation measures and proper blast designs these impacts can be reduced to be of minor negative significance.

Furthermore, the operation of surface infrastructure may lead to deterioration of water quality. Stormwater management measures will be in place to ensure clean and dirty water separate. Runoff emanating from surface infrastructure will be contained in the PCD as far as possible; however, this in turn will result in the reduction in catchment yield. Topsoil loss has been identified as a potential impact of moderate significance during the operational phase as a result of rainwater runoff and wind erosion from roads and soil stockpiles. In addition, alien vegetation may establish on the topsoil. This can be prevented by planting indigenous grass mixture, which will also assist in erosion reduction.

Ineffective rehabilitation of construction areas will lead to proliferation of alien invasive plant species.

Similar to the construction phase, nuisance noise, dust and visual impacts of moderate negative significance are expected from general operation activities such as loading, hauling and stockpiling overburden and ROM. All of these impacts can be mitigated.

Employment creation during operation as well as stimulation and growth of the local, regional and national economies will be a continued and more positive social impact during the operational phase. Additionally, local SMME will continue to indirectly benefit from the operational phase of the mine. The community will also benefit from community projects which should improve the well- being of the community. As with the construction phase, moderate negative social impacts are expected due to the impacts the proposed mine will have on agricultural activities in the area and surroundings.

19.3.3 Decommissioning Phase

During the decommissioning phase positive impacts will occur from rehabilitation activities including the restoration of land capability to its pre-mining state or agreed upon alternative, the restoration of vegetation and habitat types as well as the rehabilitation of infrastructure footprint areas.

The main expected negative impacts are associated with the movement of machinery to dismantle and remove equipment and infrastructure and rehabilitate the disturbed areas. Negative impacts resulting from soil loss, erosion and dust emissions were also identified. Moderate negative social impacts are expected when mining operations cease as a dependency on the mine for sustaining local economy would have been established.

Post closure monitoring is essential to determine if rehabilitation was successful and sustainable.

20 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

The EMPr seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment and surrounding communities will be mitigated, controlled and monitored.

The EMPr will address the environmental impacts and possible unplanned events during each phase of the Project (construction, operational, decommissioning and post-closure). Due regard must be given to environmental protection during the entire Project; a number of environmental recommendations are made to achieve environmental protection.

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts, assess their significance and implement appropriate mitigation and management measures to avoid, minimise and/or remediate the associated impacts where they cannot completely be avoided.
- Implement an adequate monitoring programme to:
    - Ensure that mitigation and management measure are effective.
    - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
    - Reduce duration of any potential negative impacts.

22 Final Proposed alternatives

22.1 Preferred Option

The preferred option includes 6 mining areas that have been identified for the proposed mining project where present vegetated soil overlying the planned mining areas is to be stripped prior to mining and stockpiled on dedicated stockpile areas next to each mining area which will be used for rehabilitation purposes at a later stage.

The proposed mining area is currently disturbed due to the previous prospecting activities and historical mining activities that have been taking place. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The ores will be loaded onto the dump trucks from the open excavations by excavator and hauled to the crushing and screening plant. Blasting is required when extreme hard materials are to be mined out of the pits.

Due to the proximity and the nature of the orebodies, mining will be done by conventional opencast mining method, which is designed based on the nature of the orebodies on the mine. Each mining area will be treated as a separate pit. Mining will be done on three ore bodies at most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

The mining process will include drilling, blasting, loading, hauling and quality control. The Reverse Circulation (RC) drill machine will be utilized to drill holes for prospecting resources as well as blasting. Drilling will be conducted on a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.

After drilling, explosives provided by service providers are placed down the holes using trucks designed for such purposes. The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted. Once the materials have been blasted, excavators and Front-End Loaders (FELs) will load the minerals onto the dump trucks and Articulated Dump Trucks (ADTs). Wastes and ROMs will be loaded separately onto different trucks and hauled to designated areas.

Infrastructure to be built on the mine will include, but no limited to:

- Processing plants for manganese and iron ore;
- Static jaw crushing, cone crushing and screening plant magnetic separating plant
- Second stage cone crushing plant
- Weighbridges (x3)
- Diesel tanks (3* 23m^3)
- Water dams (2* 250m^3)
- Washbay
- Workshop (20m*100m)
- Gensets (2*300kVA, 2*500kVA)
- Feeder bay and substation (3MVA)
- Offices
- Storerooms

- Laboratory
- Ablution facilities
- Security control point

The initial processing will be a dry process, with the wet process commencing during year 4 of operation. The required processing plants are as follows:

- Processing Plant for the processing of Iron Ore: Dry crushing and screening plant as well as wet magnetic separation process; and
- Processing Plant for the processing of Manganese Ore: Dry crushing and screening plant.

Ore <600mm is fed to the primary JAW crusher where ore is crushed down to 140mm. Ore is then fed to the primary cone crusher where it is crushed down to 25mm. From here the ore is fed to the secondary cone crusher where it is crushed down to -15mm. The ore is then fed to a vibrating three deck screen. The first deck separates the -25mm +15mm material from the +25mm material. The +25mm material is conveyed back to the secondary cone crusher for re-crushing. The second deck screens out the -15mm +6mm material and the third deck screens out the -6mm material. The -25mm +15mm and -15mm +6mm ore goes through a dry magnetic separation process. The -6mm ore goes through another magnetic separation process. After this process there are three stockpiles, each consisting of a different size.

The waste that is screened out is dumped on a temporary tailings stockpile from where waste is either used for back-filling of excavations or hauled to the waste rock dump. Throughout the production process, at various times during mining of the ore and from the stockpiles at the completion of the plant process, the ore is sampled and analyzed in order to maintain the correct manganese grade.

22.2 Alternative Option

No alternatives were investigated as the location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. As such, no property alternatives were considered for the location of the mining area.

23 Aspects for inclusion as conditions of Authorisation

The studies and impact assessment have been based on the proposed mine layout and mine works programme and other available information from the applicant. The management of the impacts identified for the construction, operation and closure phase is through a comprehensive range of programmes and plans contained in the EMPr. Implementation of these plans and programmes together with mitigation measures stipulate in the EMPr will be institutionalized through regular monitoring and auditing.

In order to achieve relative environmental management standards and ensure that the findings of the environmental assessment are implemented through practical measures, the recommendations and management measures from this EIA study are included within an EMPr.

The EMPr must be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for the life cycle phases of the project is considered to be vital in achieving the appropriate environmental management standards as detailed for this project.

In addition, the following key conditions should be included as part of the authorisation:

- No activities may be undertaken within 500 m of aquatic habitats and/or within 100 m of watercourses without approval from the DWS;
- No removal and/or relocation of protected species may be undertaken without relevant permits.
- No graves and/or cultural and palaeontological resources may be relocated and/or destroyed without relevant permits from SAHRA.
- The proponent is not exempted from complying with any other statutory requirements that is applicable to the undertaking of the activity. Relevant key legislation that must be complied with by the proponent includes inter alia:
  - Provisions of the National Environmental Management Waste Act (No. 59 of 2008);
  - Provisions of the National Water Act, 1998 (Act No 36 of 1998);
  - Provisions of the National Forests Act (Act No 84 of 1998); and
  - Provisions of the National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- The proponent must appoint a suitably experienced (independent) ECO for the construction phase of the development that will have the responsibility to ensure that the mitigation and rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr;
- The Stormwater Management Plan must be adhered to;
- A Biodiversity Management Plan (BAP) must be compiled prior to commencement of the project and must be implemented throughout the LOM;
- In terms of GNR634 (4.4) waste must be re-classified every 5 years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of the relevant factors
- The EMPr must be enforced throughout the life of the project;
- Environmental audits reports must be submitted to the DMR on a monthly basis once construction has begun and on an annual basis during the operational phase. This is to ensure that mitigation measures are being implemented and to prevent environmental degradation (e.g. erosion) during the construction and operational phases.

24 Assumptions, uncertainties and gaps in knowledge

Ndi Geological Consulting Services (Pty) Ltd has exercised all due care in reviewing the supplied information. Whilst Ndi Geological Consulting Services (Pty) Ltd has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data.

Opinions presented in this report apply to the information about the site and the project as it existed at the time of Ndi Geological Consulting Services (Pty) Ltd.'s investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this report, about which Ndi Geological Consulting Services (Pty) Ltd had no prior knowledge nor had the opportunity to evaluate.

All the data and information supplied to Ndi Geological Consulting Services (Pty) Ltd is assumed to be accurate and reflective of the current condition of the affected area. It is assumed that the baseline information scrutinised and used to explain the environmental profile is accurate.

Midtron will comply with all legislation pertaining to the activities of this proposed project and that all permits and licenses that may be required will be identified and applied for prior to commencement of construction activities.

The public involvement process has been sufficiently effective in identifying the critical issues needing to be addressed in the EIA / EMP by the EAP. The public involvement process has sought to involve key stakeholders and individual landowners.

Wherever possible the information requested, and comments raised by I&APs during the initiation phase Scoping Report has been sufficiently addressed and incorporated into the EIA and EMPr that will be submitted to the DMR.

Ndi Geological Consulting Services (Pty) Ltd assumes that Midtron will implement the measures contained in the EMPr and will adhere to any monitoring procedures. A monitoring and evaluation system, including auditing, will be established and operationalized to track the implementation of the EMPr ensuring that management measures are effective to avoid, minimize and mitigate impacts and that corrective action is being undertaken to address shortcomings and / or non-conformances.

The following assumptions and limitation apply to the different specialist studies that were conducted for the proposed mine.

24.1 Groundwater Study and Modelling

The following assumptions and simplifications were made in the construction of the numerical model:

- The upper layer from zero to seven (7) meters is unsaturated. It is therefore not an important part of the hydrogeological system in this area, and it has thus not been modelled as a separate component.
- The bedrock has been modelled as two layers of decreasing hydraulic conductivity and specific yield. Fractures are on the second aquifer and this result in the increment of the hydraulic conductivity from the first to the second layer.
- No provisions have been made for the underlying base rock as a separate unit, as neither its vertical position nor properties were known with certainty. However, secondary porosity due to bedrock fracturing is more important at a depth than the original bedrock properties. It was therefore assumed that hydraulic properties were similar to those of the fractured deeper aquifer.

- The local effect of discontinuities such as faults, fractures and intrusions has been disregarded. The exact location and characteristics of these structures are unknown, and they will be difficult and expensive to determine. Moreover, the effects of these structures become less important on a large scale and may therefore be considered as part of a homogeneous aquifer as described earlier.

The following fixed assumptions and input parameters were used for this study's numerical model:

- Recharge of 8 mm/a. This value was obtained from the literature of studies conducted in the area and it was generally an acceptable value of recharge in the area even though is higher compared to the Karoo aquifer recharge. This value was not effective recharge as it did not take into account evapotranspiration and therefore, it varied with topographical elevations in the study area.
- Maximum evapotranspiration of 2450 mm/a. This value was obtained from the literature of studies conducted in the area. The value of evapotranspiration was only used when groundwater rises to the surface and the groundwater level between the surface and the extent depth, this was calculated proportionally.
- Evapotranspiration extent depth of 0.5 m was used which related to the average root depth of plants in the study area.
- The specific storage over the area was taken as 0.000001 which was a typical value for fractured aquifers.

24.2 Biodiversity

The SVk 9 Kuruman Thornveld and the SVk 10 Kuruman Mountain Bushveld vegetation types have not been completely described. As a result, there is limited literature available to aid in the identification of plant species. Some plants were only identified to the genus level. However, some of the faunal and floral species were very difficult to identify.

24.3 Air Quality

The following important assumptions, exclusions and uncertainties to the baseline study should be noted:

- Meteorological data from a data point near the project site for the period 2019- 2021 should be utilised from the WRF data set.
- Limited baseline particulate air pollution monitoring data could be sourced for the proposed location (five days of ambient particulate matter and meteorological parameters monitoring only). The predicted concentrations will be therefore limited to incremental impacts only.
- It will not be possible to provide short-term mining activities; therefore average conditions and process throughputs will be assumed.
- Mining operations will be assumed to be twenty-four hours over 365 days per year.
- Routine emissions for the proposed mining operations will be simulated.
- Entrained specks of dust from vehicles will be confined to the main haul roads since the locations of other traffic routes are premature at this stage of the design.

24.4 Visual

The limitations to conducting a sound visual impact of the proposed site are mainly contributed to the availability of data. Sufficient geographical data was provided to conduct a full visual impact assessment for the proposed scheme, however, most of the data lacked descriptive data. The existing data was supplemented with land cover/ land use data captured specifically for this project from monochrome aerial photographs. Assumptions were made as far as the existing operations within the urban fabric and immediate site activities.

24.5 Socio-Economic Study

It is assumed that the potential impacts relating to other specialist studies (including biodiversity, Heritage Impact Assessment (HIA), Geological, noise, air quality, visual, surface, and groundwater) will be addressed by the relevant specialists. It is assumed that these studies will assess the significance of the potential impacts and provide suitable management and mitigation measures that will consider the local communities in terms of sustainable local development and will not impact their quality of life, health, or rights. These studies were not available during the SEIA, however, are to be considered for detailed impacts rating and findings.

Limited surveys and interviews were conducted, the mine is an existing project and intended to expand and develop into a Mining Right phase and operation. The project's social impacts or economic impacts are to just intensify instead of new and unexpected previously unnoticed during the prospecting and exploration stage of the project. This SEA assumes that baseline mining social and economic impacts have been identified and the scope will give emphasis to the operational and closure phase of the mine. The risk of over-consultation and stakeholder fatigue resulted in limitations to the extent of the SEIA primary data collection process. The information and data collected, are considered sufficient for this level of assessment.

24.6 Heritage Resources

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be noted that archaeological deposits (including graves and traces of archaeological heritage) usually occur below the ground level. Should artefacts or skeletal material be revealed at the site during mining, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion. The study team observed that the site might not have attracted sedentary human settlement although Orton & Webly (2013) identified a few scatters of lithic tools. Some assumptions were made as part of the study and therefore some limitations, uncertainties and gaps in information would apply. It should, however, be noted that these do not invalidate the findings of this study in any significant way:

- The proposed mining right site will be limited to a specific right of the site as detailed in the development layout.
- The mining team to provide link and access to the proposed site by using the existing access roads and there will be no mining beyond the demarcated site.
- No excavations or sampling were undertaken since a permit from heritage authorities is required to disturb a heritage resource. As such the results herein discussed are based on surficial observed indicators. However, these surface observations concentrated on exposed sections such as road cuts and clear farmland.
- This study did not include any ethnographic and oral historical studies, nor did it investigate the settlement history of the area.

24.7 Aquatic habitat Delineation and Aquatic Ecosystem

None

24.8 Surface Water and Hydrology

The following are key assumptions and limitations for the conceptual SWMP:

- The SWMP and associated calculations are based on the current infrastructure layout. Should the infrastructure layout change, then the SWMP will need to be revised;
- The conceptual SWMP is based on low resolution 5 m contour interval data. This is sufficient for conceptual purposes for the WULA and EIA/EMP, however, more detailed elevation data will be required for the design phase of the Mine;
- The conceptual SWMP should only be used to provide an indication of the required clean and dirty water separation, as required for the WULA and EIA/EMP. This conceptual SWMP should be used as a guide for the design phase of the Mine; and
- The channels were sized to take the maximum flow calculated at the downstream end of the contributing catchment, and it is assumed that the channel sizing will be uniform along the entire length.

24.9 Geochemical Assessment

The assessment and classification were based on the assumption that the mining method is not altered, that the processing method does not introduce any additional chemicals except for the use of water late in the processing stage. If there is a change in any method, or a change in law, then this waste classification must be repeated.

24.10 Palaeontology

Due to the subsurface nature of fossils it is not be possible to determine the presence of absence of fossils. It is possible that new information could come to light in future, which might change the results of this Impact Assessment. The accuracy and reliability of the report **may be** limited by the following constraints:

- Most development areas have never been surveyed by a palaeontologist or geophysicist.
- Variable accuracy of geological maps and associated information.
- Poor locality information on sheet explanations for geological maps.
- Lack of published data.
- Lack of rocky outcrops.
- Inaccessibility of site.
- Insufficient data from developer and exact lay-out plan for all structures.

25 Reasoned opinion as to whether the proposed activity should or should not be authorised

25.1 Reasons why the activity should be authorised or not

Various specialist studies were undertaken during the EIA Phase of the proposed project with the objective of identifying and weighing anticipated impacts and risks associated with the mining activities as well as in accordance with all relevant legislative requirements. No fatal flaws were identified by the specialists.

The proposed project is expected to have significant and positive socio-economic benefits for the local communities, at regional and national level. These positive impacts include creation of employment for local communities, boost to local businesses, skill development for the locals which is associated with the implementation of the provisions of the SLP.

The findings of the impact assessment have shown that the proposed project will have medium, high and low significance negative impacts on the receiving environment, including:

- The loss of agriculture land (land use change) for the creation of the open cast mining blocks and construction of infrastructure;
- Contamination of aquatic habitats and rivers;
- Reduction in catchment yields as dirty water runoff within the mine will be contained in the PCDs.
- Potential loss of flora and fauna species and floral species of conservation concern;
- Loss and fragmentation of habitat of fauna and direct loss of fauna which will be expected to move from the area as a result of increased anthropogenic activities;
- Groundwater and surface water contamination due to chemical contamination from hazardous substance and fuel to be stored at the mine;
- Groundwater loss and flow from the pits will also contribute toward baseflow reduction; and
- Nuisance noise, dust and visual impacts.

Where possible, mitigation and management measures, no-go areas, as well as further recommendations have been provided by specialists which will lead to a reduction in the significance of these impacts to medium-low to low significance, including:

- Stormwater management plan was developed for the project and will be implemented throughout the LoM;
- The PCDs and residue stockpile areas must be appropriately lined to protect groundwater resources;
- Re-vegetation of the rehabilitated areas with indigenous species;
- Where possible rehabilitation will be conducted in tandem with construction and operational phases of the project;
- Develop and implement a biodiversity management plan; and
- The land use and the overall land capability as the soil can be rehabilitated.

Monitoring plans, which should be implemented throughout the life of the mine, have also been provided to ensure that adverse impacts are reduced, and continuous improvements are made.

With the correct and effective mitigation and management measures, including the protection of aquatic habitats located outside the footprints of the mining areas and infrastructure, the mining operations are feasible. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DFFE should monitor activities during the construction, operational and closure phases of the proposed mine.

Several mining activities are present in the surrounding areas of the proposed project and a cumulative impact assessment has been included in the impact assessment section of this report (Section 13.4). It is expected that the implementation of mitigation measures will reduce the contribution of the Midtron mining project to cumulative impacts.

25.2 Conditions that must be included in the authorisation

25.2.1 Specific conditions to be included into the compilation and approval of the EMPr

The following specific conditions are proposed:

- All mitigation measures in this report should be implemented;
- A geohydrology model must be compiled to simulate the extent of the impacts of the project on groundwater;
- Where possible, Midtron must revise the project layout plan to as much as possible avoid areas of conservation importance such as aquatic habitats, rivers and riparian areas;
- Environmental monitoring should take place as recommended;
- All flora identified by the biodiversity specialist and fauna SCC must be relocated by a qualified specialist as part of a relocation and monitoring plan prior to construction activities. Where it is not possible to relocate SCC, required permits must be obtained;
- An additional waste classification exercise be commenced within 6 months (as required by GNR 634 of 2013) of the generation of ores and of processing of fines, to determine the barrier design requirements for the residue deposit (tailings);
- Groundwater recovery time simulation during the model update to simulate the time it may take for groundwater levels to fully recover;
- No faunal SCC may be poached during the construction or operational phase of the project;
- A grievance system or communication platform must be established to create a forum for the public to interact with the mining house;
- The PCDs must be designed and operated in such a way that they will not spill more than once in the LoM. The dams must be able to contain the water required for operations and a storm event including a 0.8m freeboard at all times;
- A WUL must be obtained prior to water uses being undertaken;
- The hydrocensus and risk assessment should at least be repeated once before closure to evaluate any impacts;
- The Stormwater Management Plan must be adhered to;
- A Biodiversity Management Plan (BAP) must be compiled prior to commencement of the project and must be implemented throughout the LOM;

- In terms of GNR634 (4.4) waste must be re-classified every 5 years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of the relevant factors
- The closure cost assessment should be updated and submitted as per the legislative requirements.

25.2.2 Rehabilitation requirements

The post-mining land use should be restored to agricultural purposes and should represent the pre-mining land use, as far as possible. The rehabilitation of the project will aim to:

- Ensure that the final elevation around the site is free draining.
- Ensure that soil is replaced in the same sequence to ensure soil characteristics are retained as far as possible.
- Ensure a self-sustaining post-mining land capability similar to pre-mining of agricultural purposes.
- Ensure that the rehabilitated areas are cleared of all contaminating substances and that runoff from the area is returned to the natural catchment.
- Ensure that vegetation growth and cover on the rehabilitated areas is sustainable and local indigenous species are establishing on the site and that succession and colonisation from surrounding areas is taking place on rehabilitated areas. Ecological and ecosystem processes should function optimally after a prescribed period.
- Ensure that alien invasive species are eradicated until the closure certificate is granted.
- In order to ensure rehabilitation of the site can be undertaken responsibly, soils must be stripped and stockpiled separately. This will ensure preservation of soil for re-use in rehabilitation of the site.

The closure and rehabilitation objectives for the project are listed below, and should be met:

- Achieve a final land use that is sustainable and meets both legislative requirements and stakeholder needs;
- Maintain and monitor all rehabilitated areas following re-vegetation and, if this monitoring shows that the objectives have been met, make an application for closure;
- Comply with local, district and national regulatory requirements; and
- Follow a comprehensive consultation and communication process with all stakeholders.

The overall closure objectives for the proposed project are provided in Section 38.1.

26 Period for which the Environmental Authorisation is required

The EA/WML will be required for a period of 30 years.

27 Undertaking

We hereby confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

28 Financial Provision

A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The rehabilitation forecast estimates to a total amount of R6 251 828,63.

28.1 Explain how the aforesaid amount was derived

The environmental liability only focused on the proposed mining activities and was calculated by means of the DMR standard method for assessment of mine closure. Activities incorporated into the calculation included the demolition and management of physical infrastructure, rehabilitation of the waste facilities as well as the rehabilitation of all affected areas.

Only the areas affected by the proposed mining blocks and associated infrastructure are included. Should additional mining blocks and infrastructure be identified during future exploration activities, the financial provisioning will need to be updated.

The Master Rates will be updated on an annual basis, based on Consumer Price Index (CPI) or a similar approved method, or should legislation change. The first of these updates will take place during 2020 and continue to the year in which the review is taking place, and the overall document will be reviewed and updated whenever necessary (minimum requirement of annual updates).

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

The approach to calculating the closure quantum as specified in the DMR Guideline which was utilised in this assessment is as summarised as follows:

- Step 1: Determine the Mineral Mined;
- Step 2A: Determine Primary Risk Class;
- Step 2B: Revision of Primary Risk Class;
- Step 3: Determine Environmental Sensitivity and
- Step 4.4 determination of weighting factors.

The rates used in the assessment are based on the original 2005 rates included in the guideline, with these rates inflated by the CPI as published by StatsSA

A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The rehabilitation forecast estimates to a total amount of R6 251 828,63.

The calculations of quantum for a period of 10 years have been calculated based on the planned activities. The ten forecasts are pasted in this section. It should be noted that although the activities stated in the Environmental Authorisation have not all been included in the rehabilitation calculation, the rehabilitation calculations will be reviewed every year depending on current disturbances.

Forecast has been calculated for a period of 10 years, nonetheless the LOM is 30 years.

Calculation of rehabilitation pasted are only for the first 3 years, going forward, the company will review the calculations every year.

Table 28-1: Rehabilitation Forecast for Year 1

CALCULATION OF THE QUANTUM							
	Year 1						
No.	**Description**	**Unit**	**A**	**B**	**C**	**D**	**E=A*B*C*D**
			Quantity	**Master**	**Multiplication**	**Weighting**	**Amount**
				Rate	**factor**	**factor 1**	**(Rands)**
1	Dismantling of processing plant andrelated structures (Including overland conveyors andpowerlines)	m3	5000	**17,32**	1	1	86600
2 (A)	Demolition of steel buildings andstructures	m2	500	**241,33**	1	1	120665
2(B)	Demolition of reinforced concretebuildings and structures	m2	400	**355,65**	1	1	142260
3	Rehabilitation of access roads	m2	10000	**43,19**	1	1	431900
4 (A)	Demolition and rehabilitation of electrifiedrailway lines	m	0	**419,16**	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	**228,63**	1	1	0
5	Demolition of housing and/oradministration facilities	m2	0	**482,67**	1	1	0
6	**Opencast rehabilitation including finalvoids and ramps**	**ha**	**5**	**245652**	**0,52**	**1**	**638695,2**
7	Sealing of shafts adits and inclines	m3	0	**129,56**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	5	**168679,35**	1	1	843396,75
8 (B)	Rehabilitation of processing wastedeposits and evaporation ponds (non-polluting potential)	ha	0	**210087,08**	1	1	0
8 (C)	Rehabilitation of processing wastedeposits and evaporation ponds (polluting potential)	ha	0	**610192,47**	1	1	0
9	Rehabilitation of subsided areas	ha	0	**141243,55**	1	1	0
10	General surface rehabilitation	ha	10	**133622,5**	1	1	1336225
11	River diversions	ha	0	**133622,5**	1	1	0
12	Fencing	m	500	**152,42**	1	1	76210
13	Water management	ha	0,2	**50807,03**	1	1	10161,406
14	2 to 3 years of maintenance and aftercare	ha	20	**17782,46**	1	1	355649,2
15(A)	Specialist study	Sum	0			1	0

15(B)	Specialist study	Sum				1	0
					Sub Total 1		4041762,556
1	Preliminary and General (12.0% of Subtotal 2)		485011,5067		weighting factor 2 1		485011,5067
2	Contingencies (10.0% of Subtotal 2)		404176,2556				404176,2556
					Subtotal 2		4930950,32
					VAT (15%)		739642,55
					Grand Total		**5 670 592,87**

Table 28-2: Rehabilitation Forecast for Year 2

CALCULATION OF THE QUANTUM							
	Year 2						
No.	**Description**	**Unit**	**A**	**B**	**C**	**D**	**E=A*B*C*D**
			Quantity	**Master Rate**	**Multiplication factor**	**Weighting factor 1**	**Amount (Rands)**
	Dismantling of processing plant and relatedstructures	m3	5 000	18	1	1	90 930,00
	(Including overland conveyors andpowerlines)						
2 (A)	Demolition of steel buildings and structures	m2	500	253	1	1	126 698,25
2(B)	Demolition of reinforced concrete buildingsand structures	m2	400	373	1	1	149 373,00
3	Rehabilitation of access roads	m2	10 000	45	1	1	453 495,00
(A)	Demolition and rehabilitation of electrifiedrailway lines	m	-	440	1	1	-
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	-	240	1	1	-
5	Demolition of housing and/or administrationfacilities	m2	-	507	1	1	-
6	Opencast rehabilitation including final voidsand ramps	ha	5	257 935	0.52	1	670 629,96
7	Sealing of shafts adits and inclines	m3	-	136	1	1	-
8 (A)	Rehabilitation of overburden and spoils	ha	5	177 113	1	1	885 566,59
8 (B)	Rehabilitation of processing waste depositsand evaporation	ha	-	220 591	1	1	-
	ponds (non-polluting potential)						
8 (C)	Rehabilitation of processing waste depositsand evaporation	ha	-	640 702		1	-
	ponds (polluting potential)						
9	Rehabilitation of subsided areas	ha	-	148 306	1	1	-
10	General surface rehabilitation	ha	10	140 304	1	1	1 403 036,25

11	River diversions	ha	-	140 304	1	1	-
12	Fencing	m	500	160	1	1	80 020,50
13	Water management	ha	0	53 347	1	1	10 669,48
14	2 to 3 years of maintenance and aftercare	ha	20	18 672	1	1	373 431,66
15(A)	Specialist study	Sum	-			1	-
15(B)	Specialist study	Sum				1,00	-
					Sub Total 1		4 243 850,68
1	Preliminary and General (12.0% of Subtotal2)		3 700 502,51		weighting factor 2		509 262,08
					1,00		
2	Contingencies (10.0% of Subtotal 2)		3 083 752,09				3 083 752,09
					Subtotal 2		5 177 497,83
					VAT (15%)		776 624,68
					Grand Total		**5 954 122,51**

Table 28-3: Rehabilitation Forecast for Year 3

CALCULATION OF THE QUANTUM							
	Year 3						
No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master	Multiplication	Weighting	Amount
				Rate	factor	factor 1	(Rands)
1	Dismantling of processing plant and related structures	m3	5000	19,0953	1	1	95476,5
	(Including overland conveyors and powerlines)						
2 (A)	Demolition of steel buildings and structures	m2	500	266,066325	1	1	133033,1625
2(B)	Demolition of reinforced concrete buildings and structures	m2	400	392,104125	1	1	156841,65
3	Rehabilitation of access roads	m2	10000	47,616975	1	1	476169,75
4 (A)	Demolition and rehabilitation of electrified railway lines	m	0	462,1239	1	1	0
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	0	252,064575	1	1	0
5	Demolition of housing and/or administration facilities	m2	0	532,143675	1	1	0
6	Opencast rehabilitation including final voids and ramps	ha	5	270831,33	0,52	1	704161,458
7	Sealing of shafts adits and inclines	m3	0	129,56	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	5	185968,983	1	1	929844,9169
8 (B)	Rehabilitation of processing waste deposits and evaporation	ha	0	231621,006	1	1	0
	ponds (non-polluting potential)						

8 (C)	Rehabilitation of processing waste deposits and evaporation	ha	0	672737,198	1	1	0
	ponds (polluting potential)						
9	Rehabilitation of subsided areas	ha	0	155721,014	1	1	0
10	General surface rehabilitation	ha	10	147318,806	1	1	1473188,063
11	River diversions	ha	0	147318,806	1	1	0
12	Fencing	m	500	56014,7506	1	1	84021,525
13	Water management	ha	0,2	56014,7506	1	1	11202,95012
14	2 to 3 years of maintenance and aftercare	ha	20	19605,1622	1	1	392103,243
15(A)	Specialist study	Sum	0				
15(B)	Specialist study	Sum				1	0
					Sub Total 1		4456043,218
1	Preliminary and General (12.0% of Subtotal 2)		3885527,64		weighting factor 2		534725,1862
					1		
2	Contingencies (10.0% of Subtotal 2)		445604,3218				445604,3218
					Subtotal 2		5436372,726
					VAT (15%)		815455,9089
					Grand Total		**6 251 828,63**

28.2 Confirm that this amount can be provided for from operating expenditure

Midtron will fund the operation. and hereby confirms that the amount is anticipated to be an operating cost and is provided for as such in the Mining Works Programme.

29 Deviations from the approved scoping report and plan of study

29.1 Deviations from the impact assessment methodology

There are no deviations from the impact assessment methodology that was submitted with the approved Scoping Report.

29.2 Motivation for the deviation

Not applicable.

30 Other information required by the Competent Authority

30.1 Impact on the socio-economic conditions of any directly affected person

The landowners will be directly affected by the mining activity as it will interfere with the current livestock farming and irrigated agricultural activities. The impacts that will affect the landowners include but not limited to:

- Loss of land capability where the open pits will be developed;
- Loss of agriculture land for the directly affected property owners;
- Loss of land where the roads and infrastructure will be constructed;
- Increased noise and visual disturbances;
- Loss of indigenous vegetation and sensitive habitats; and
- Suffer losses due to increased criminal activity (poaching).

The financial losses due to the change in the land use will need to be compensated for by way of land use agreements with the property owners.

In order to mitigate specific risks of criminal activity to directly affected and neighbouring landowners, it is recommended that:

- Fence off servitudes and access roads and provide for strict access control measures to service roads and patrol service roads regularly;
- Utilize sufficient mine security to regularly patrol the fences of the mine infrastructure;
- Liaise with the South African Police Service to enhance police patrol activity in the project area;
- Implement the provisions made in the SLP in terms of recruitment policies and strategies, LED projects etc;
- Support the community watch of the directly affected and neighbouring landowners which can report criminal or suspicious activity; and
- Employment of local people on the mine to improve the poverty levels in the host and neighbouring communities.

30.2 Impact on any national estate referred to in Section 3 (2) of the National Heritage Resources Act

The Phase 1 Archaeological Impact Assessment found no significant impacts to pre-colonial archaeological material that will need to be mitigated prior to the proposed development activities. The assessment of the proposed project has rated the potential impact to archaeological material as being very low. The possibility of locating significant pre-colonial archaeological heritage remains during implementation of the project is unlikely. It is unlikely, but unmarked human burials may be uncovered or exposed during earthmoving operations.

The EIA has included mitigation measures that must be implemented should any heritage and archaeological resources be affected by the project during all phases of the project. Please refer to Section 13 of this report and the accompanying EMPr and Phase HIA Report.

31 Other Matters required in terms of Sections 24 (4) (a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.

The location of the proposed project is constrained to the location of the existing and confirmed mineral resource (iron and manganese ore). As such, no property alternatives were considered for the location of the mining area. The proposed site is located in an area characterised by historical mining activities. Exploration on the mining right has proven that there is Iron ore present within old mine workings and in outcrops. Exploration targets were generated by means of surface geological mapping. The prospecting undertaken found that the property has manganese resources estimated to 50 million tons as well as iron ore resources estimated to1 373 075 tons. The site is therefore regarded as the preferred site and as such, no property alternatives were viable to be considered for this project.

Specialist studies have been conducted for the proposed project and the initial stakeholder engagement process undertaken. No fatal flaws relating to the proposed site have been identified to date through specialist studies and/or stakeholder engagement.

It is possible that only mobile screening and crushing plants, which can process 300 tons of raw materials per hour may be used, instead of the fixed plants, due to the high capital costs of the fixed plants. In this case, three (3) sets of mobile screening and crushing plants will be positioned at different locations to crush all materials to proper sizings, from 6mm to 25mm, which will be removed to the magnetic beneficiation plant for further beneficiation.

Environmental Management Programme Report

32 Details of the EAP

32.1 Expertise of the EAP

32.1.1 Qualifications of the EAP

Please refer to Section 3.2.1.

32.1.2 Summary of EAPs past experience

Please refer to Section 3.2.2.

33 Description of the aspect of the activity

Please refer to Section 5 of this report.

34 Composite Map

The composite map is provided in Figure 34-1 and attached as Appendix 7. The following buffer areas were applied:

- 500 m buffer for wetlands and riparian zones ;
- 100 m buffer for water courses;
- 50 m buffer for heritage resources;
- CBAs; and
- 30 m buffer for SCC.

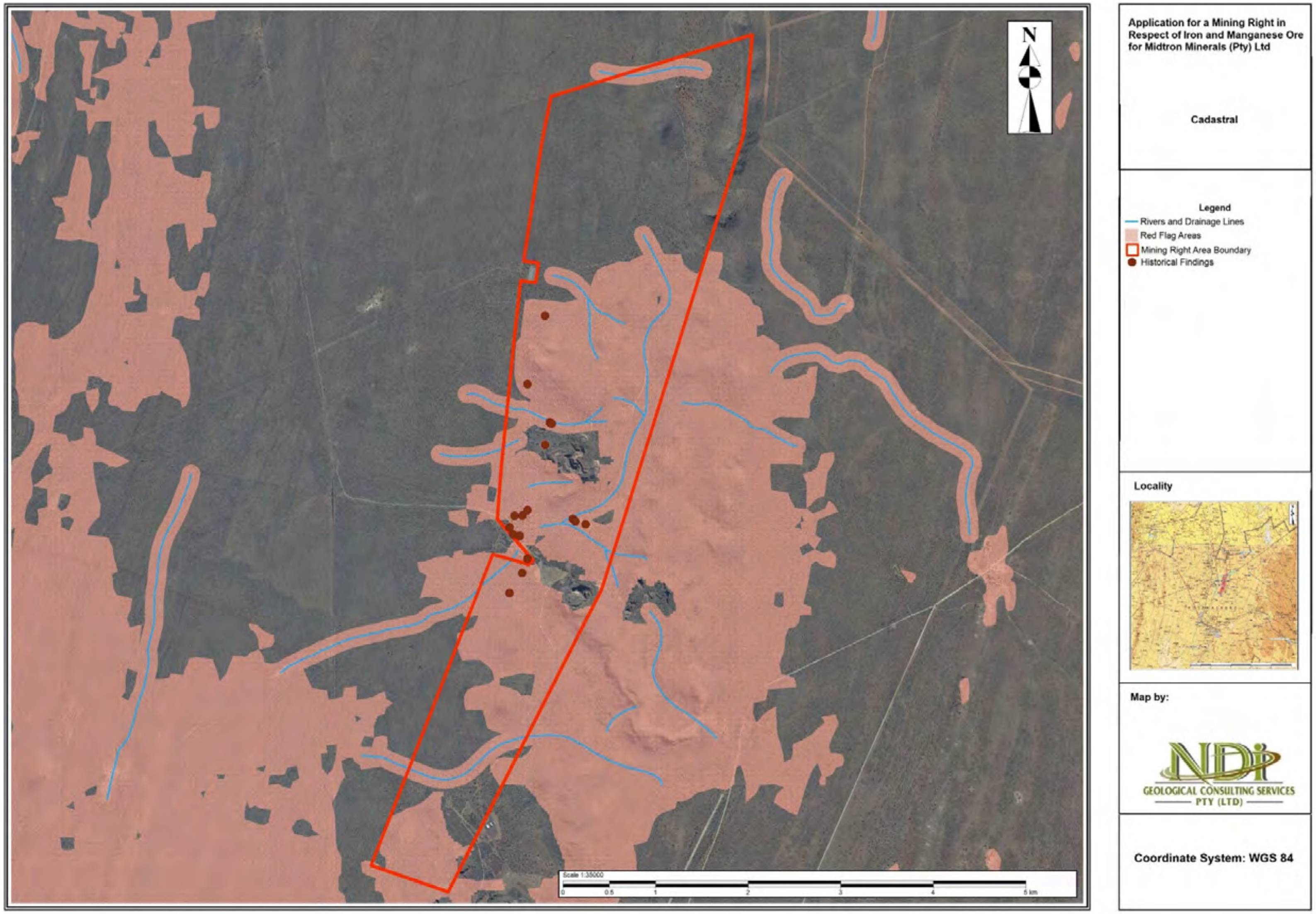


Figure 34-1: Composite Map

35 Description of impact management objectives including management statements

35.1 Determination of closure objectives

The main aim in developing Midtron's rehabilitation plan is to mitigate the impacts caused by the mining activities and to restore land back to a satisfactory end land use. The rehabilitation plan must be developed as early as possible and maintained throughout the LoM. It is important that the project's closure plan is clearly defined and understood by all involved before starting the process and is complementary to the rehabilitation objectives. The closure vision for the Midtron project is intended to inform the closure objectives and as such is currently stated as:

To implement a post mining landscape that is safe, stable and non-polluting over the long term, through collaboration with affected stakeholders

The overall closure objectives for the proposed project are as follows:

- Return land, mined by opencast methods, as far as possible to a land capable similar to that which existed prior to mining in consultation with the affected land users;
- Ensure that as little water as possible seeps out of the various sections of the mine and where this is unavoidable, ensure that the water is contained or treated if the volume is significant and if it does not meet statutory water quality requirements;
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party.
- Where buildings can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all stockpiles and loading areas and rehabilitate these as far as possible to a land capability similar to that which existed prior to mining;
- Rehabilitate the disturbed land to a state that facilitates compliance with applicable environmental quality objectives,
- Landscape the rehabilitated areas in alignment with the surrounding topography to prevent the unnecessary pooling of water which will reduce the runoff in the catchment;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible, reducing the overall visual impact;
- Physically and chemically stabilise any remaining structures to minimise residual risks;
- Leave a safe and stable environment for both humans and animals;
- To limit soil and surface/groundwater contamination by managing all water on site;
- Comply with local and national regulatory requirements;
- Form active partnerships with local communities to take care of management of the land after mining, where possible; and
- To maintain and monitor all rehabilitated areas following re-vegetation and, if monitoring shows that the objectives have been met, making an application for closure.

Successful rehabilitation must be monitored to ensure sustainability. This requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

35.2 The process of managing environmental impacts

All the identified impacts shall be mitigated as provided in Section 13 of this report.

An Environmental Response Plan (ERP) is a process to respond rapidly and effectively to and manage emergency situations that may arise at the mine. The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the following legislation:

- OHSAS 18001; and
- The MHSA.

In the event of an emergency, the ERP and applicable Procedure will be consulted, and the required actions implemented. To facilitate the effective implementation of the procedures, copies of the Emergency Response Plan will be placed in accessible and visible locations around the site, such as the site office and contractors' yards.

Midtron shall ensure that employees and contractors are adequately trained regarding the implementation of the EMPr, environmental legal requirements and obligations, and the ERP.

Environmental awareness is applicable to all personnel involved in the project including part time personnel who shall be trained so that they are aware of environmental obligations by the time they access the site. An Environmental Control Officer (ECO) will be appointed to conduct training during site establishment and will be responsible for how the site will look like before the commencement of mining activities and how it looks like after rehabilitation. This will be to ensure that the site has been restored to its original state or to an acceptable level, and ensure the ERP is adequately applied in case of an emergency. Accordingly, training programmes and frequent emergency simulations is suggested to ensure that all personnel are aware of safety and emergency procedures.

In addition, a list of emergency contact numbers will be displayed at various locations around the site. If the emergency has the potential to affect surrounding communities, the communities will be alerted via alarm signals or contacted in person.

Personnel that do not comply or ignore training and instruction regarding this, should be fined based on their offensive. First time offenders may only get away with a written warning, depending on the seriousness of the offence. Second time offenders may be suspended or fined depending on the decision made by the site manager who may consult with the ECO, contractor and Safety, Health and Quality Officer of the mine.

35.3 Potential risk of Acid Mine Drainage

The potential risk for acid mine drainage was not determined as the proposed mining activities are not expected to be afflicted by acid-producing wastes. Therefore, the proposed activities do not pose any potential risk of acid mine drainage.

35.4 Steps taken to investigate, assess and evaluate the impact of Acid Mine Drainage

Not applicable.

35.5 Measures to be put in place to remedy any residual or cumulative impacts from acid mine drainage

Not applicable.

35.6 Volume and rate of water use required for the mining operation

It is anticipated that 20 tons of water will be used for dust suppression and other non- production purposes. This water will either be obtained from the Sedibeng Municipality or underground. The Department of Water and Sanitation (DWS) will be contacted to seek their recommendation on the use of water:

- Regarding the Section 21(a) WUL for abstraction of Groundwater;
- Regarding Schedule 1 water use where no WUL is required;
- Regarding Section 21(g) WUL Disposing of wastewater; and
- Regarding Section 21(b) WUL Storage of water

JoJo tanks will be used to water storage. The water from the JoJo tanks will be for potable use and use in the ablution facilities.

35.7 Has a water use licence been applied for?

It is expected that the applicant will apply for a Water Use Licence for water uses identified in Section 35.6.

35.8 Impacts to be mitigated in their respective phases

The full impact assessment with associated mitigation and management measures are presented in Section 13

36 Impact Management Outcomes

Table 36-1: Impact Management During the Pre-Construction and Construction Phase Mitigation Type

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
Project Kick Off and Planning		Social	Pre-Construction	• This EMPr must form part of the contractual agreements with the specific contractors.	Control potential deviations from the approved EMPr.	Ensure contractors are aware of the required management measures stipulated in the EMPr.	Conditions of the EMPr are met
Project Kick Off and Planning		Social	Pre-Construction, Construction and Decommissioning	• The contractor is expected to have safety “toolbox” talks in accordance with the risks and trends associated with the project. Proof of these talks shall be kept on site.	Control potential deviations from the approved EMPr.	Ensure all construction staff is familiar with the Environmental Awareness Plan.	Environmental Awareness is promoted
Project Kick Off and Planning		Social	Pre-Construction	• The contractor will develop a specific emergency procedure and plan.	Control potential deviations from the approved EMPr.	Ensure that all staff is familiar with the emergency procedure and plan.	Environmental Awareness is promoted
Site Establishment and site clearance for the construction of infrastructure: • Mining Right Application • Drilling and blasting • Excavations, open cast mining areas • Waste Rock Dump Areas • Water Dams • Tailings Stockpile Areas • Topsoil dump areas • Recycling Dams • Stormwater management infrastructure • Control Rooms • Diesel tank storage areas • Generators • Haul Roads • Offices areas • Parking areas • Processing Plant for the processing of Iron Ore • Processing Plant for the processing of Manganese Ore • Rapid Reloading Area • Explosive Magazine area • Safety Berms • Brake test ramp • Fenced salvage yard • Weigh bridges • Security access points • Tyre Bay area • Contractors laydown areas • Access Roads • Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank • Chemical Toilets • Wash Bay areas • Feeder Bay and substation • Waste storage areas • Water pipelines f • Water provision • Laboratory • Fencing • Borehole areas	Groundwater and Surface water contamination	Groundwater and surface water	Pre-Construction and Construction	• No site establishment shall be permitted within sensitive landscapes; • Avoid stripping of areas outside the construction sites and rehabilitate areas that may have been mistakenly stripped; • Storm water upslope of the campsite and drill sites should be diverted around these sites; • Proper waste management facilities will be put in place at the campsite and construction sites. • Any hydrocarbon spill from the site establishment will be remediated as soon as possible; • No washing of vehicles shall be allowed outside demarcated areas. Washing bays for vehicles and other equipment shall be provided with appropriate soakaways, will be clearly demarcated and will not be allowed to contaminate any surface runoff; • Sufficient areas shall be provided for the maintenance and washing of vehicles; • Refuelling of vehicles will only be allowed in designated areas; • All construction equipment shall be parked in a demarcated area Drip trays shall be used when equipment is used for some time; • On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material; • Bunded areas shall contain 110% of the stored volume; • Bund areas must be impermeable; • Bund area must have a facility such as a valve/sump to drain or remove clean stormwater, • Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Contaminated water shall be pumped into a container for removal by an approved service provider; • Regular inspections shall be carried out to ensure the integrity of the bundwalls; • All preventative servicing of earth moving equipment and construction vehicles shall conducted off site;	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the DWS target water quality objective and construction will be in compliance with the regulations under the GN704. Midtron will be required to obtain all necessary authorisations in terms of Section 21 of the National Water Act (No.36 of 1998) where specific targets will be set to ensure the protection of water resources in the area	Impact on ground and surface water quality avoided/minimised

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Runoff from this area shall be contained; and • Spill kits shall be made available and all personnel shall be trained, and training records shall be made available on request.			
	Contamination of surface water resources	Surface water resources	Pre-Construction and Construction	• Where possible construction activities must be conducted in the dry season and • Silt bunds shall be used to trap; • The footprint area of all proposed infrastructure should be limited to what is necessary. • Disturbance to the surrounding natural habitat should be kept to a minimal; • It must be ensured that, as far as possible, all proposed infrastructure, including temporary infrastructure, is placed outside of sensitive habitat units such as aquatic habitats; • Ensure that topsoil is properly stored, away from the aquatic habitats riparian areas, streams and drainage areas; • Vehicle and personnel movement within watercourses and aquatic habitat areas shall be strictly prohibited; • Adequate stormwater management must be incorporated into the design of the project in order to prevent contamination of water courses and aquatic habitats from dirty water. • Refuelling areas will be bunded and nozzles protected from spillage during refuelling; • Vehicular access to the stream will be restricted; • All spillages will need to be cleaned up as soon as practically possible; • Proper management of stormwater drainage infrastructure should be ensured; • Hazardous substances stored on site will be stored within a designated bunded areas fitted with a sump and value. Collection of water within the bunded areas will be deemed hazardous and disposed of as such; • Bunded areas will be watertight and inspected for leaks on a frequent basis; • Leaks to the bunded areas will be rectified as soon as possible; • Drip trays will be utilised for the collection of leaks from vehicles and machinery parked for long period of time; • Should a spill occur, this will be handled at the source of the leak and prevented from transpiring to nearby watercourse; • Ensure that routine maintenance on all vehicles is undertaken as per maintenance schedule and records are kept; • Sewage spillages shall be treated as hazardous waste and will be handled as such.; • Where necessary, and as defined when the final detailed project design is confirmed, construct sediment collection paddocks downstream of the working activities to minimise uncontrolled runoff from the site; • Minimise the areas that are to be stripped of vegetation; • Adequate storm water management should be considered in the detailed design of the proposed infrastructure in order to minimize undue erosion;	Monitoring through rehabilitation and management of spills Rehabilitate contaminated areas	Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective and construction will be in compliance with the regulations under the GN704.	Surface water quality Impact avoided/minimised

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Erosion can also be limited by ensuring that mine vehicles and human movement is limited to project specific dedicated access ways; • Stormwater culverts and clean water diversions will be designed and constructed to accommodate the 1:50 year storm event around the mining areas; • Stormwater runoff will be directed towards natural watercourses; • Construction will be undertaken during the dry season, where possible, to minimise the potential for stormwater runoff; and • Routine surface water quality monitoring up and down stream of construction activities and position of infrastructure and activities associated with the Project will be undertaken on a monthly basis.			
	Loss of Species of Conservation Concern	Biodiversity	Pre-Construction and Construction	• Prior to the commencement of construction activities that the entire construction servitude, including lay down areas and stockpile areas etc., must be fenced off and clearly demarcated, including no-go zones such as aquatic habitats, riparian areas located outside the area affected by the project; • Prior to the commencement of construction activities on site an alien vegetation management plan should be compiled for implementation throughout the construction and operational phases; • Prior to the commencement of construction activities on site a rehabilitation plan should be developed for implementation throughout the development phases • No stripping of topsoil and vegetation will be allowed during site establishment; • Any area that may result into the disturbance of the vegetation cover must be rehabilitated immediately on discovery; • Cutting down, relocation or disturbance of floral SCC not affected by the project shall be strictly forbidden; • The floral SCC are to be handled with care and the relocation of sensitive plant species to suitable similar habitat is to be overseen by a botanist; • The proposed development footprint shall be kept to the minimum; • Where possible disturbed areas must be concurrently rehabilitated during construction; • Prohibit the collection of any plant material for firewood or medicinal purposes; • The existing integrity of flora surrounding the study area shall be upheld and no activities shall be carried out outside the footprint of the construction areas; • Edge effect control shall be implemented to avoid further habitat degradation outside of the proposed footprint area; • Protected floral species occurring within the vicinity of the study area, but outside the disturbance footprint shall be fenced for the duration of the construction activities; • Construction vehicles shall only be allowed on designated roadways and access roads to limit the ecological footprint of the project;	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	The implementation of mitigation measures will ensure that the establishment of the construction site and associated infrastructure/equipment do not have detrimental impact on the area's flora, in particular indigenous species and species that are of conservation importance.	Rehabilitation standards and flora SCC are protected No Alien Invasive Plant Species in the area

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Edge effects of activities including erosion and alien/ weed control will be strictly managed in the affected areas; • All sites disturbed by construction activities shall be monitored for colonisation by exotic or invasive plants; • An alien invasive plant special management and control program must be developed and implemented within all disturbed areas; • A bi-annual alien vegetation clearance programme should be implemented during the construction phase in order to prevent the establishment of alien and invasive plants; • A rehabilitation plan shall be developed for implementation throughout the development phases; and • Exotic or invasive plants shall be controlled as they emerge.			
	Migration of animal life due to disturbance caused proposed project:	Biodiversity	Pre-Construction and Construction	• The proposed development footprint areas shall remain as small as possible and where possible be confined to already disturbed areas; • Site activities will be conducted during daytime hours 07h00 – 17h30 to avoid night-time noise disturbances and night-time collisions with fauna; • Vehicle speed will be reduced, particularly in highly vegetated areas to avoid deaths by vehicle impacts; • No trapping or hunting of fauna is shall be permitted; • Uncontrolled and unauthorised fire shall be strictly prohibited; • Where a burning regime is implemented, this should be overseen by a qualified and experienced professional; • The mining and construction personnel should be informed about fire control and prevention measures to reduce the frequency of uncontrolled veld fires in areas surrounding and within the project area; • A fire management plan shall be developed and implemented in case of unplanned fire • Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which may affect faunal habitat, need to be strictly managed; • Should any faunal SCC be encountered within the study area, these species will be relocated to similar habitat within or in the vicinity of the study area with the assistance of a suitably qualified specialist; • No informal fires in the vicinity of construction areas shall be permitted; • An alien vegetation control plan must be developed and implemented in order to manage alien plant species occurring within the study area, and to prevent further faunal habitat loss; and • Poaching will be prohibited.	Relocation of affected species of conservation importance Management of site activities	Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	Rehabilitation standards and fauna habitats are protected
	Mortality and disturbance of fauna	Biodiversity	Pre-Construction and Construction	<u>Death/injury during vegetation clearing and earth works</u> • An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor for, and manage, any wildlife-human interactions. The ECO should be trained in inter alia, snake handling; and	Management of site activities	Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	Rehabilitation standards and fauna SCC are protected

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• As appropriate, fences should be erected to prevent fauna gaining access to construction and operational areas, such as open trenches and voids. Vehicle-wildlife collisions • Road signage indicating the potential presence and movement of wildlife should be installed within the construction footprints and along public roads. Hunting, snaring and poisoning • The handling, poisoning and killing of on-site fauna by mine and construction workers and contractors must be strictly prohibited; and • Employees and contractors should be made aware of the presence of, and rules regarding, fauna through suitable induction training and on-site signage. Noise, vibrations and lights (sensory disturbances) • General noise abatement equipment should be fitted to machinery and vehicles; • As required, noise shields, including earth berms, should be constructed around sites of noise origin; • Dust suppression using water bowsers/sprayers should be undertaken on all sites/facilities where dust entrainment occurs; and • Plan the lighting requirements of facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination. Possible options include: o Zoning of areas of high and low lighting requirements; o Movement activated lights as opposed to permanent lights; and o Reducing height and angle of lights.			
	Loss of soils, erosion of the soils and impacts on landowner's livelihood	Soils, landuse and Land Capability	Pre-Construction and Construction	• A spill prevention and emergency spill response plan shall be compiled to guide the construction works; • An emergency response contingency plan shall be put in place to address clean-up measures should a spill and/or a leak occur. • No soil stripping will be allowed during site establishment; • Should it be necessary to conduct geophysical surveys and geological mapping, ensure minimal disturbance of soil; • Any activity that may result in the disturbance of the soils must be rehabilitated immediately on discovery; • Access roads should be designed with a camber to avoid ponding and to encourage drainage to side drains; where necessary, culverts should be installed to permit free drainage of existing water courses; • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment shall be contained using a drip tray filled with absorbent material; • Any hydrocarbon spill from the site establishment will be remediated as soon as possible; • Contaminated soil shall be removed and disposed of to an appropriate licensed landfill site in terms of NEM: WA, or can be removed by a service provider that is qualified to clean the soil; • The time in which soils are exposed during construction activities should remain as short as possible;	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	Implementation of mitigation measures will ensure that the activities in the development of the construction sites and associated infrastructure do not have detrimental impacts on the soils, land use and land capability.	Rehabilitation standards, end use objectives

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Erosion control measures shall be implemented where deemed necessary; • In general, all steep slopes steeper than 1:3 or where the soils are more prone to erosion must be stabilised; • Institute adequate sedimentation control measures where necessary when excavation or disturbance of the riverbanks takes place; • The time in which soils are exposed during construction activities shall be kept to a minimum; • If stockpiles are not going to be used immediately the stockpiles shall be rehabilitated to prevent erosion and resulting in the increase in turbidity; • Runoff from stockpiles shall be detained in order to support growth of vegetation; • Minimise stockpile height to <3m. • Topsoil should never be used as a filling material for roads • Soil stockpiles must be sampled, ameliorated (if necessary) and re-vegetated as soon after construction as possible. • Runoff from the stockpiles shall be suitably managed to ensure that the runoff volumes and velocities are similar to pre disturbed levels; • Separate stripping, stockpiling and replacing of soil horizons in the original natural sequence to combat hard setting and compaction, and maintain soil fertility; • Stockpiles height should be restricted to that which can deposited without additional traversing by machinery; • Maximum height vegetation shall be used to promote infiltration of water into the stockpile instead of increasing runoff; • A monitoring programme will be implemented if the stockpiles are not used within the first year whereby the vegetation of the stockpiles is monitored in terms of basal cover and species diversity; • If it is noticed that the vegetation on the stockpiles is not sustainable, appropriate corrective actions shall be taken to rectify the situation; and • Stockpiles shall be maintained until the topsoil is required for rehabilitation purposes			
Vegetation clearance and site excavation Transportation of material and movement of vehicles and machinery on construction areas	Aquatic habitat destruction and loss of aquatic habitat and hydrological functions	Aquatic habitat and Aquatic Environmental Impacts	Pre-Construction and Construction	• Access to aquatic habitat areas outside of the construction areas shall be strictly forbidden and the aquatic habitats must be demarcated as no-go areas for vehicles and construction personnel; • No vegetation clearance shall be permitted outside the footprints of the project infrastructure; • Construction activities will be limited to be more than 100 m from the edge of the aquatic habitats and riparian zones without consent from the DWS; • The stormwater management plan must be developed and incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; • The dirty water systems should be adequately sized as per the GN704 Regulatory Requirements (have the capacity to cater for a 1:50 year flood occurring over a 24-hour period), to prevent failure thereof and ultimately,	Control of access to aquatic habitat areas and within the 100 m regulated buffer area	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	Aquatic habitat loss is avoided and impacts on aquatic habitat is reduced and/or avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				discharge of contaminated water into the water resources; • No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; • All disturbed areas shall be re-vegetated with indigenous species; • All construction materials shall be kept out of the aquatic habitats and riparian areas; and • All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystem With regards to ground-breaking activities (within 100m GN704 ZOR): • During excavation activities, the topsoil and vegetation should be stockpiled separately from other material outside of the 100m GN704 ZOR; • Excavated materials should not be contaminated, and it should be ensured that the minimum surface area is taken up. However, the stockpiles may not exceed 3m in height. The mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later use as backfill material after construction has commenced; and • All exposed soils must be protected for the duration of the construction phase to prevent potential erosion and sedimentation of aquatic habitats. With regards to backfilling of excavated areas: • Stockpiled material should be used as backfill material; • All excavated areas should be backfilled to the natural ground level with excavated material; • Soil must be lightly recompacted to a depth of 450 mm, and all construction material must be removed from the site upon the completion of construction or used in the rehabilitation process. With regards to concrete mixing on site: • No mixed concrete may be deposited outside of the designated construction footprint; • Protective equipment should be provided, onto which any mixed concrete can be deposited while it awaits placing; and • Concrete spilt outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site			
Transportation of material and movement of vehicles and machinery on construction areas	Possible increase in nuisance dust and carbon emissions and ambient air pollutants (NO_2 and SO_2) due to movement of vehicles and operation of machinery and equipment	Air Quality	Pre-Construction and Construction	• Use dust suppression techniques such as wet suppression or chemical suppression (must be environmentally friendly and non-polluting) to reduce dust on roads that exhibit an increase of dust emitted from the entrainment of dust. • Dust suppression measures shall be implemented on dry weather days and periods of high wind velocities; • Rehabilitation of disturbed areas shall be undertaken in tandem with construction activities; • Limit load size to reduce spillage and cover final product loads with tarpaulins where needed. • Attend to dust control when loading trucks by minimising drop heights and prevention of over loading.	Dust control measures	With the implementation of the mitigation measures, the construction will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	Dust and Particulate Matter levels

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• A routine emissions and ambient air quality monitoring program shall be developed and implemented to determine whether there are any significant increases in emissions and impacts at sensitive receptors. • A speed limit of 40 km/hr shall apply to limit vehicle entrained dust from the unpaved roads; • All construction equipment must be scheduled for preventative maintenance to ensure the functioning of the exhaust systems to reduce excessive emissions and limit air pollution; • Design road alignments to minimise travel distances and eliminate unnecessary traffic • Appropriate dust suppression measures may include limiting the extent of open areas, reducing the frequency of disturbance and spraying with water; and • A routine emissions and ambient air quality monitoring program shall be developed and implemented to determine whether there are any significant increases in emissions and impacts at sensitive receptors. Odours: • Putrescible waste must be handled, stored and disposed of before the probability of it generating odours; • Chemical toilets must be emptied / serviced on a regular basis. Proof of this must be provided to the Engineer; • All the construction vehicles shall undergo maintenance on a regular basis to improve on the combustion engine vehicle efficiency; and • Traffic will be restricted to demarcated areas and traffic volumes and speeds within the construction site will be controlled;			
Vegetation clearance and excavation of construction sites	Visual intrusion as a result of movement of machinery and erecting of contractor camps as well as clearance of vegetation	Visual	Pre-Construction and Construction	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff; • Natural vegetation, wherever practical, must be retained on and around the construction sites; • All lights used for illumination (except for lighting associated with security) should be faced inwards and shielded to avoid light escaping above the horizon; • Construction site will be screened from sensitive receptors and rubble removed from site on a daily basis; • Litter and dust management measures should be in place at all times; • Maintain the construction site in a neat and orderly condition at all times; • Create designated areas for material storage, waste sorting and temporary storage, batching and other potentially intrusive activities; • Limit the physical extents of areas cleared for material laydown, vehicle parking and the like as much as possible and rehabilitate these as soon as is feasible; • Repair unsightly and ecologically detrimental erosion damage to steep or bare slopes as soon as possible and re-vegetate these areas using a suitable mix of indigenous plant species.	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Measures will be undertaken to ensure that the visual aspects from the site are complying with the relevant visual standards and objectives and ensure that all operations during the construction phase do not result in detrimental visual impacts on surrounding properties, communities and road users.	Rehabilitation standards Traffic impacts reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• To reduce the visual intrusion of the buildings, roofing and cladding material should not be white or shiny (e.g. bare galvanised steel that causes glare); • Construct and/or paint offices and workshop buildings in colours that are complementary to the surrounding landscape, such as olive green, light grey, grey green, blue grey, dark buff, rust, ochre variations of tan; • Utilise construction materials that have matt textures where possible; and • On site construction activities will be limited to be undertaken between 6am and 6pm.			
Transportation of material and movement of vehicles and machinery on construction areas	Increase in ambient noise levels due to movement of vehicles and machinery	Noise	Pre-Construction and Construction/Operation	• Implement a noise monitoring programme to measure against the baseline noise assessment; • The maximum speed limit shall be limited to 40 km/hr subject to risk assessment; • Less noisy equipment will be used, the equipment will be kept in good working order and the equipment will be fitted with correct and appropriate noise abatement measures; • Ensure that the employees are issued with earplugs and that they are instructed to use them; • Educate employees on the dangers of hearing loss due to mine machinery noise; • Adjacent landowners must be advised of any work that will take place outside of normal working hours, that may be disruptive (e.g. noise) in advance; • Surrounding communities must be notified in advance of noisy construction activities; • All equipment should be provided with standard mufflers; • Muffling units on vehicles and equipment must be kept in good working order; • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 Dba should wear ear protection equipment; • Where possible, operation of several equipment and machinery must be avoided; • All equipment must be kept in good working order, with immediate attention being paid to defective silencers, slipping fanbelts, worn bearings and other sources of noise; • Equipment must be operated within specifications and capacity (e.g. no overloading of machines); • Regular maintenance of equipment must be undertaken, particularly with regard to lubrication; • Equipment must be operated in such a way that the equipment is operated throughout the working periods instead of operating several items simultaneously; • Equipment shall be switched off when not in operation; • Appropriate directional and intensity settings must be maintained on all hooters and sirens; • The Contractor must ensure that the employees conduct themselves in an appropriate manner while on site; • Adjacent landowners shall be notified in writing if work needs to be carried out after hours; • Noise/vibration producing activities shall be limited to daylight hours (Monday to Friday 07H00 to 17H30 and	Management and maintenance of construction vehicles. Management using noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	The mitigation measures ensure that the noise levels from the construction sites will be managed, and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the construction workers and surrounding communities/land owners.	Noise levels

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				Saturday 07H00 -14H00). However no noise/vibration producing activities shall be undertaken on Saturdays unless this has been agreed to by the community.			
Vegetation clearance and excavation of construction sites	Potential destruction of graves and areas of archaeological importance	Heritage Resources	Pre-Construction and Construction/Operation	• Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; • A Chance Find Protocol contained in the Phase 1 HIA must be implemented where heritage resources are exposed. • Contractors shall be made aware of the archaeological resources that were identified during the HIA; • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site without approval from SAHRA; and • Should any graves be identified during the pre-construction phase the contractors must: o Fence off and install a gate around graves; and o Maintain a buffer zone of 100 metres around all graves during construction and mining phases. • Should this buffer zone not be feasible, a phase 2 study must be conducted followed with a destruction permit application from SAHRA;	Control through clear demarcation of construction sites to ensure avoidance of graves and other heritage sites	The construction will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the specialist. The mitigation measures will ensure that the construction activities do not have detrimental impacts on heritage sites	Impact avoided
Vegetation clearance and excavation of construction sites	Potential sealing and loss of fossils	Fossils	Pre-Construction and Construction/Operation	• If any palaeontological material is exposed during digging, excavating, drilling or blasting, SAHRA must be notified and the Chance Find Protocol contained in the PIA Report must be implemented.	Management of topsoil integrity for the reuse in rehabilitation	The construction will be undertaken in compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the specialist. The mitigation measures will ensure that the construction activities do not have detrimental impacts on fossil resources	Impact avoided
Waste Management	Improper waste management has potential to contaminate water sources and aquatic habitats.	Water resources (surface and groundwater) and aquatic habitats	Pre-Construction and Construction/Operation	<u>*Separation of waste*</u> • All waste shall be separated into general waste and hazardous waste; • Hazardous waste shall not be mixed with general waste and in doing so increase the quantities of hazardous waste to be managed; • General waste can further be separated in waste that can be recycled and or reused; • No littering shall be allowed in and around the site, a sufficient number of bins shall be provided for the disposal of waste; • Where necessary dedicate a storage area on site for collection of construction waste. <u>*Storage of waste:*</u> • No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of aquatic habitats; • General waste will be collected in an adequate number of litter bins located throughout the construction site Bins shall be located no more than 50 m from construction sites; • Bins must have lids in order to keep rainwater out; • Bins shall be emptied regularly to prevent the bins from overflowing;	Waste management	The mitigation measures will result in reduced the amounts of waste produced, will encourage re-use of material where possible and recycling of the material where possible. Disposal will be utilised as the last resort. The mitigation measures will also ensure that the management of waste will be in accordance with the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)	Waste Management Impact on water resources avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• All work areas shall be kept clean and tidy at all times; • All waste management facilities will be maintained in good working order; • Waste shall be stored in demarcated areas according to type of waste; • Runoff from any area demarcated for waste will be contained, treated and reused; • Flammable substances must be kept away from sources of ignition and from oxidizing agents; • Waste shall not be buried or burned on site; and • The maximum retention time for temporary storage of waste generated shall not exceed 30 days, provided the waste does not present a health hazard or risk of odour; *Disposal of hazardous waste:* • No dumping shall be allowed in or near the construction site; • Hazardous containers shall be disposed of at an appropriate licensed site; • Hazardous waste will be removed and managed by an approved service provider; • A safe disposal certificate will be provided by the approved service provider as proof of responsible disposal of hazardous waste; and • The safe disposal certificate shall be stored and provided on request; *Disposal of general waste:* • No dumping shall take place in or near the construction site; • All general waste shall be disposed of to the nearest licensed landfill site; • Demolition waste and builder's rubble shall be disposed of to an appropriate licensed landfill site; and • The necessary permissions must be obtained to dispose of waste to a registered landfill site			
Vegetation clearance	Changes in the topography may be experienced as a result of bush clearing and construction vehicles on site	Topography	Pre-Construction and Construction/Operation	• Vegetation clearance will only take place in designated areas and kept as minimal as possible; • Construction foots prints shall be kept demarcated and to a minimum • Rubble will be removed frequently; • The construction activities will be screened to minimise the visual disturbance to surrounding landowners.	Control of the construction footprints and ensuring that vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas.	Implementing mitigation measure will minimise changes in topography and visual impacts	Rehabilitation standards End use objectives
Excavations	Removal of local geology as a result of construction activities	Geology	Pre-Construction and Construction/Operation				
Transportation of material and movement of vehicles and machinery on construction areas	Increased traffic on public roads may result in conflicts	Traffic/Social	Pre-Construction and Construction/Operation	• Ensure that where existing public roads are used to access the construction areas, adequate construction signage is in place to inform the public of increased construction activities in the affected areas; • Traffic signs shall be installed around the project site and surrounding areas to warn community road users of the presence of construction vehicles; • Local speed limits and traffic laws shall apply at all times to minimise the occurrences of accidents on public roads; • Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing residents;	Speed control and limitation of the times when construction vehicles may be on the roads	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow-moving vehicles	Impact avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• The number of construction vehicles and trips shall be kept to a minimum • Materials transported on public roads must be covered.			
Recruitment	Impact from the influx of job seekers and employment of farm labourers:	Social	All phases	• Recruitment will not be undertaken on site; • Recruitment process shall favour locals; • Where required, liaise with the SAPD to ensure safety of landowners in the areas; • Prepare an influx management plan • Develop a local employment procedure and recruitment process • Prepare a code of conduct for all workers and contractors associated with the mine • Ensure that employees are provided with adequate health support, including the dissemination of the Health and Safety Policy and the HIV/AIDS policy • Ensure that employees are provided with any other awareness training required as part of the general employment contract with contract or permanent staff • Monitor for any escalation of poaching, petty crime or establishment of illegal settlements on land surrounding the mine. Such cases need to be addressed immediately and appropriately	Management of the implementation of the SLP	Implementing mitigation measures will ensure recruitment of locals as per the requirements of the SLP for the Midtron Mine and will minimise conflicts with surrounding landowners and communities.	Impact managed/reduced
Continued vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in-stream channel habitat	Aquatic habitats	Pre-Construction and Construction/Operation	• Aim for majority of the earth mobilisation activities associated with the construction of the proposed mine shaft should be planned to be conducted during the dry season, so as to limit the intensity of impact, particularly in terms of runoff of sediments; • Implement low impact construction techniques to minimise the impact on the surrounding and downstream river systems; • Vegetation clearing should be restricted to the proposed development footprints only, with no clearing permitted outside of these areas; • Areas to be cleared should be clearly demarcated to prevent unnecessary clearing outside of these sites as to avoid approaching too close to the adjacent rivers. • Operational vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; • It must be ensured that contractor laydown areas are located outside of aquatic habitat and riparian areas and associated 100 m buffer zones and excluded from clearing activities in order to minimise vegetation loss and resultant erosion and sedimentation where not approved by DWS; • Compacted areas are to be ripped, re-profiled and revegetation as soon as areas becomes available; • Any areas where active erosion within the aquatic habitat features are observed must be immediately rehabilitated in such a way as to ensure that the hydrology of the area is re-instated to conditions which are as natural as possible; • Cutting/ clearing of the herbaceous layer within the aquatic habitat areas along the linear development should be avoided so as to retain soil stability provided by the grass root structures.	Monitoring and management of aquatic habitat areas	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided Extent of aquatic habitats not reduced
Land clearance for the proposed pits, movements of construction	Degradation of aquatic ecosystems due to increased	Aquatic habitats	Operation	• Access to aquatic habitat areas outside of the areas shall be strictly forbidden and the aquatic habitats must be	Control of access to aquatic habitat areas	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state	Impact avoided Extent of aquatic habitats not reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
vehicles in and around the direct project site	sedimentation and erosion			demarcated as no-go areas for vehicles and construction personnel; • The stormwater management plan developed for the project (Hydrology Report) must be incorporated into the design of the project in order to prevent erosion and the associated sedimentation of the aquatic system; • The dirty water systems should be adequately sized as per the GN704 Regulatory Requirements (have the capacity to cater for a 1:50 year flood occurring over a 24-hour period), to prevent failure thereof and ultimately, discharge of contaminated water into the water resources; • No vehicles may be allowed to indiscriminately drive through the riparian areas or within the active stream channels; • All disturbed areas shall be re-vegetated with indigenous species; and • All vehicles shall be regularly inspected for leaks. Re-fuelling must take place outside the project area, on a sealed surface area to prevent ingress of hydrocarbons into topsoil and aquatic ecosystem • As much vegetation growth as possible should be promoted within the aquatic habitat features in order to protect soils. In this regard, special mention is made of the need to prevent the loss of large areas of the freshwater features' vegetation and the use of indigenous vegetation species' where hydro seeding and rehabilitation planting (where applicable) are to be implemented; • No dumping of waste should take place within aquatic habitat and riparian areas or their buffer zones. If any spills occur, they should be immediately cleaned up; • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries, aquatic habitat resources and associated buffer zones. All waste and rubble must be removed from site and disposed of according to relevant SABS standards; • Implement an alien vegetation control program within the aquatic habitat features and ensure establishment of indigenous species within areas previously dominated by alien vegetation; and • Maintain the REC for each of the aquatic habitat features, as stated within the aquatic habitat report for the duration of the LOM.	and within the 100 m buffer. Implementation of the stormwater management plan Management and monitoring of the site for erosion	aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	

Table 36-2: Impact Management During the Operational Phase

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
Disposal of waste rock on the waste stockpile	Fugitive dust and fine particulate emissions affecting ambient air quality	Air quality	Operation	• The waste rock disposal facility should be well maintained to ensure that the deposited waste material does not accumulate to form any sharp edges. Sharp edged are prone to wind erosion and the generation of dust plumes from such facilities; • Progressive rehabilitation should be implemented on the disposal facility to reduce wind erosion ads the generation of fugitive dust; • If the facility is observed as generating significant dust plumes, appropriate; and • mitigation measures should be installed to reduce the emission levels such as the installation of suitable wind breaks, and or wet suppression.	Soil monitoring and management of spills Groundwater and surface water monitoring	With the implementation of the mitigation measures and monitoring of the air quality, the mining activities will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	Dust levels Particulate Matter levels
Transportation of product	Fugitive dust and fine particulate emissions affecting ambient air quality	Air quality	Operation	• Wet suppression on unpaved plant roads with water and a suitable dust palliative to achieve the 95% control efficiency (water alone will only achieve a 75% control efficiency) should be implemented; • Rigorous speed control and the institution of traffic calming measures to reduce vehicle entrainment. A recommended maximum speed of 30 km/h to be set on all unpaved roads and 45 km/h on paved roads within the project site; • Load wet suppression of materials transported by road (i.e. load spraying) or load covering with tarpaulins to reduce fugitive dust generation; • Reduction in unnecessary traffic volumes by developing plans to optimise vehicle usage and movement; • Avoidance of dust track-on onto neighbouring paved roads; and • Wind speed reduction through sheltering (where possible).	Soil monitoring and management of spills		
Fugitive vehicle emissions from the road	Fugitive dust and fine particulate emissions affecting ambient air quality	Air quality	Operation	• Wet suppression on unpaved plant roads with water and a suitable dust palliative to achieve the 95% control efficiency (water alone will only achieve a 75% control efficiency) should be implemented; • Rigorous speed control and the institution of traffic calming measures to reduce vehicle entrainment. A recommended maximum speed of 30 km/h to be set on all unpaved roads and 45 km/h on paved roads within the project site;	Dust control Air quality monitoring	With the implementation of the mitigation measures and monitoring of the air quality, the mining activities will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	Dust levels Particulate Matter level
Heavy vehicle exhaust emissions	CO, NO_2, SO_2 and fine particulate emissions affecting ambient air quality	Air quality	Operation	• All vehicles and other equipment should be maintained and serviced regularly to ensure that exhaust particulate emissions are kept to a minimum; • Vehicles should use low sulphur fuels; and • Vehicles should not be allowed to idle for more than 5 minutes when not in use to reduce particulate and combustion emissions.	Air quality monitoring		Particulate Matter level
Pit development, drilling and blasting	Loss/change of current land use. Soil disturbance due to excavation activities at pit location as well as in	Soil, Land Use and Land Capability	Operation	• Make sure that the results from the pre-mining soil survey are used effectively for the stripping phase to lead to optimal stockpiling.	Retain topsoil integrity for the reuse in rehabilitation	Implementation of mitigation measures will ensure that the mining activities do not have detrimental impacts on the soils, land use and land capability. .	Rehabilitation standards End use objectives

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
	surrounding soils. Modification of natural soil hydrological regime.			• Ensure that there is participation by a soil scientist in the stripping and stockpiling process. • Limit vehicle traversing on stockpiles. • Implement concurrent rehabilitation measures for soils and protect soil stockpiles from erosion by utilising soils erosion procedures. • Minimise stockpile height to <3m. • Re-use stockpiled soil within as short a period as possible (within 3-5 years). Strip and stockpile soils separately, ideally in a similar landscape position to its origin, i.e. valley bottom.			
Hauling of waste rock for storage in their respective storage facilities	Soil contamination from hydrocarbon spills from vehicles; and Soil contamination from spillage/poor handling of product and waste rock outside the designated areas.	Soil, Land Use and Land Capability	Operation	• Implement suitable measures on mining infrastructure such as the Product and Waste rock stockpile areas, to minimise soil contamination by controlling seepage and runoff. • Implementing regular site inspections for materials handling and storage.	Management and monitoring of spills		
Stockpiling of discard and waste rock. Containment of sediment laden water in evaporation dams Storage within tailings dams	Soil contamination due to leaching of soluble product and waste constituents into soils underlying the stockpiles; and Contamination of soil adjacent to product and waste stockpiles due to run-off or seepage of soluble product or waste rock constituents.	Soil, Land Use and Land Capability	Operation	• Implement suitable measures on mining infrastructure such as the tailings dams, evaporation dams and waste dump areas to minimise soil contamination by controlling seepage and runoff. • Implementing regular site inspections for materials handling and storage.	Management and motoring of integrity of infrastructure		
Spills of chemicals (e.g., hydrocarbon). Soil contamination on adjacent land potentially occurring due to inappropriate waste disposal and potential oil and diesel leakages from vehicles and machinery	Contamination of soils by hydrocarbon pollutants	Soil, Land Use and Land Capability	Operation	• Accidental spills (concrete, chemicals, process water, hydrocarbons, waste) need to be reported as soon as practical so that effective remediation and clean-up strategies and procedures can be implemented. • Where possible, soil that is contaminated by fuel or oil spills, for example, from vehicles, will be collected to be treated at a pre-determined and dedicated location, or will be treated in situ, using sand, soil as absorption medium. • Practice good housekeeping in chemical storage areas and ensure that storage areas are bunded. • Remedy by treatment of contaminated soils.	Management and monitoring of spills		
Open Cast Mining	The decrease in local groundwater levels and potential contaminants in the groundwater due to infiltration of process water, may result in an indirect impact to local receptors including rivers and private boreholes	Groundwater levels and quality	Operation	• Implement frequent monitoring of water levels and water quality in boreholes local to the active mining area as provided in Section 40. • Ensure receptors (private boreholes and riverbeds) are regularly monitored. • The groundwater management programme must be used to detect plume movement towards but prior to reaching sensitive receptors. • Source alternative water sources to provide to the sensitive receptors (users), should groundwater quality, or yield, be shown to be negatively affected by the mine	Groundwater and surface water monitoring	Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective.	Impact avoided Rehabilitation standards
	Dewatering of the mine has potential to form a groundwater drawdown zone around the mine void and extending radially.	Groundwater levels due to dewatering	Operation	• Regularly monitor water levels in boreholes near the active mining area. • Regularly update and validate groundwater numerical model to ensure that the anticipated drawdown zone does not extend beyond managed/monitored areas.	Groundwater Monitoring	Implementation of the mitigation measures will ensure that the quality of streams and groundwater within the site will comply with the target DWS target water quality objective. Implementation of the mitigation measures will also ensure that impacts on groundwater availability to	Impact avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Regularly monitor water levels in private boreholes and make alternative supply arrangements, if required. • Monitor surface features such as local rivers, streams and springs and implement augmentation, if required.		surrounding landowners is not adversely affected by the mining activities.	
	Contamination of groundwater resource due to seepage from waste dump areas, evaporation dams and tailings dam into the local groundwater and subsequently decrease the water quality in the local area	Groundwater	Operation	• Minimise moisture content in the dumps. • Establish an appropriate borehole monitoring network. • Ensure that good housekeeping rules are applied, and emergency spill clean-up procedures and equipment are in place. • Draw-up and strictly enforce procedures for the storage, handling and transport of different waste materials. • Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Incorporate an adequate under drainage and seepage collection facilities into the evaporation dams design. • Where required, design and construct the dump areas with adequate liners. • Ensure that facilities are well maintained good housekeeping rules are applied.	Management of erosion	Implementation of the mitigation measures will ensure that the quality of groundwater within the site will comply with the target DWS target water quality objective and will be of quality that can still be used by surrounding groundwater users.	Impact avoided
	Potential groundwater contamination resulting from seepage from waste dumps	Groundwater	Operation	• Minimise footprint and cap with soil and re-vegetate	Groundwater quality monitoring	Implementation of the mitigation measures will ensure that the quality of groundwater within the site will comply with the target DWS target water quality objective and will be of quality that can still be used by surrounding groundwater users	Groundwater Quality Standards
	Potential groundwater contamination resulting from seepage from evaporation dams			• Installation of liner systems in all water holding facilities			
	Potential groundwater contamination from poor waste and sanitation management			• Management and maintenance of sewage management infrastructure. • Supply chemical toilets where no permanent infrastructure exists			
	Potential groundwater contamination caused by spillages and accidents			• Good housekeeping, and adherence to good health and safety practices			
	Potential groundwater contamination caused by hydrocarbon chemicals storage			• Oil spill kits in case of spills of hydrocarbon chemical			
Vehicles and use of equipment/ machinery	Water resource contamination from hydrocarbon spills from vehicles and equipment, sewage conservancy tank, was-bay, change-house and laundry.	Downstream water resources, aquatic habitats	Operation	• Store all chemicals used on the site in bunded areas. • Drainage channels must be developed and maintained as per the stormwater management plan, • Dirty and clean water must be kept separate and where possible, clean water must be directed away from mine area to downstream water resources. • Clean up spillages immediately and dispose of contaminated materials to a permitted waste site. • Maintain bunded areas. • Ensure stormwater management system complies to GN. 704;	Monitor and manage water quality impacts	Implementation of mitigation measures will ensure that the mining activities do not have detrimental impacts on the soils, groundwater and surface water resources.	Water Quality Standards

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Store all chemicals used on the site in bunded areas.			
Operational activities	Establishment and spread of alien invasive species	Flora, aquatic habitats	Operation	• Monitoring of relocation success of rescued and relocated floral SCC should take place during the operational phase; • Harvesting of protected floral species by mining and operational personnel should be strictly prohibited. • The operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment; • Edge effect control needs to be implemented within disturbed areas; • Erosion berms and hessian sheets are to be used in areas where soils are susceptible to high levels of erosion; • No vehicles are allowed to indiscriminately drive through sensitive aquatic habitat and natural areas; • Upon completion of construction activities and decommissioning of temporary access road, all impacted and disturbed areas should be ripped, re-profiled and reseeded with an indigenous veldgrass mixture that will assist to stabilise soils as soon as possible; • During the operational phases of the project, erosion berms may be installed to prevent gully formation and siltation of the aquatic habitat resources associated with improved floral habitat; • The following points should serve to guide the placement of erosion berms: o Where the track has a slope of less than 2%, berms every 50m should be installed; o Where the track slopes between 2% and 10%, berms every 25 m should be installed; o Where the track slopes between 10% and 15%, berms every 20 m should be installed; o Where the track has a slope greater than 15%, berms every 10 m should be installed. *Minimisation* • An AIPS control programme must be developed and implemented during all phases of the proposed project; • AIS control should be undertaken in both the project site, and natural habitat and rehabilitated areas immediately adjacent to the site; • It is recommended that the programme include: o A combined approach using both chemical and mechanical control methods; o Periodic follow-up treatments, informed by regular monitoring; and o Monitoring should take place in disturbed areas, as well as adjacent undisturbed areas. *Rehabilitation* • Rehabilitate cultivated land in the project site that is not used for crop production; • Rehabilitate all sites that are disturbed by construction phase activities, as per the rehabilitation programme; and • Rehabilitate all disturbed footprints during the closure and rehabilitation phases, as per the rehabilitation programme.	Management and monitoring of vegetation clearance and aquatic habitat areas	The implementation of mitigation measures will ensure that the mining activities do not have detrimental impact on the area's flora, in particular indigenous species and species that are of conservation importance.	Alien Invasive Plant Species Eradication

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
Movement of vehicles	Mortality and disturbance of fauna	Fauna	Operation	Death/injury during vegetation clearing and earth works • An Environmental Compliance Officer (ECO) should be on-site during vegetation clearing to monitor for, and manage, any wildlife-human interactions. The ECO should be trained in inter alia, snake handling; and • As appropriate, fences should be erected to prevent fauna gaining access to construction and operational areas, such as open trenches and voids. Vehicle-wildlife collisions • Road signage indicating the potential presence and movement of wildlife should be installed within the construction footprints and along public roads. Hunting, snaring and poisoning • The handling, poisoning and killing of on-site fauna by mine and construction workers and contractors must be strictly prohibited; and • Employees and contractors should be made aware of the presence of, and rules regarding, fauna through suitable induction training and on-site signage. Noise, vibrations and lights (sensory disturbances) • General noise abatement equipment should be fitted to machinery and vehicles; • As required, noise shields, including earth berms, should be constructed around sites of noise origin; • Dust suppression using water bowsers/sprayers should be undertaken on all sites/facilities where dust entrainment occurs; and • Plan the lighting requirements of facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination. Possible options include: o Zoning of areas of high and low lighting requirements; o Movement activated lights as opposed to permanent lights; and • Reducing height and angle of lights.	Management and enforcement of road speed limits	Mitigation measures will ensure that the animal life within in the project is not affected by the proposed project.	Impact avoided
Use of heavy machinery	Changes in surface water quality due to contamination from heavy construction equipment	Aquatic habitats and water courses	Operation	• Areas to be cleared should be clearly demarcated to prevent unnecessary clearing outside of these sites as to avoid approaching too close to the adjacent rivers. • See further mitigation measures detailed in the terrestrial ecology report. • An aquatic biomonitoring programme must be developed and implemented during all phases of the proposed project. • Avoid the accumulation of non-perennial bodies of water where possible. • The mine should implement a monthly monitoring programme for surface water at all the recommended aquatic monitoring points and the data used for comparative analysis between the upstream and downstream sites. • Information from this monitoring can be used to quickly implement management actions should there be a significant change in water quality directly downstream of the project area.	Surface water quality monitoring Aquatic habitat Monitoring	Implementation of mitigation measures will assist with avoiding contamination of surface water resources within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided Extent of aquatic habitats not reduced No contamination of surface water

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Contain and/or avoid potential spills which could make their way to adjacent water resources. • Maintain service roads to avoid erosion and excessive dust formation;			
Operational phase activities	Loss of ecological communities within aquatic habitats and riparian areas due to increased sedimentation and the potential mobilisation of pollutants	Aquatic habitats and riparian areas Soils Flora	Operation	• Aim for majority of the earth mobilisation activities associated with the construction of the proposed mine shaft to be conducted during the dry season, so as to limit the intensity of impact, particularly in terms of runoff of sediments; • Implement low impact construction techniques to minimise the impact on the surrounding and downstream river systems; • Vegetation clearing should be restricted to the proposed development footprints only, with no clearing permitted outside of these areas; • Areas to be cleared should be clearly demarcated to prevent unnecessary clearing outside of these sites as to avoid approaching too close to the adjacent rivers. • See further mitigation measures detailed in the terrestrial ecology report. • An aquatic biomonitoring programme must be developed and implemented during all phases of the proposed project.	Monitoring of vegetation on site Monitoring and management of aquatic habitat areas, particularly the 500m regulated areas	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided Extent of aquatic habitats not reduced Impacts on flora, especially SCC is reduced or avoided
Operational phase activities	Disturbance of aquatic habitat	Aquatic habitat	Operation	• Disturbance to of aquatic areas outside the development footprint should be minimised by implementing the following measures: o Optimise design of surface infrastructure areas to minimise size of development footprint and implement the revised layout plan as provided in Figure 20.1 where the stores and access roads have been realigned. o Flow continuity and connectivity of the freshwater features must be reinstated post- construction activities; o Regular monitoring of water quality must be implemented in order to ensure the impacts of runoff and decant of water into aquatic habitat resources is prevented or minimised; o Adequate storm water management must be incorporated into the design of the proposed development throughout all phases in order to prevent erosion of topsoil and the loss of floral and faunal habitat. In this regard, special mention is made of: ▪ Sheet runoff from cleared areas, paved surfaces and access roads shall be curtailed; ▪ Runoff from paved surfaces should be slowed down by the strategic placement of berms; ▪ All topsoil and waste stockpiles must have berms and catchment paddocks at their toe to contain runoff of the facilities. ▪ All disturbed areas outside the direct development footprints should be rehabilitated and re-vegetated as soon as	Control of access to aquatic habitat areas and within the 100 m buffer.	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided Extent of aquatic habitats not reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				possible.			
Operational and closure phase activities	Water Quality Deterioration	Surface water resources Groundwater	Operation	• Water quality should be regularly monitored, and appropriate and timely remedial interventions made in the case of non-compliance. • Ingress of surface water should be limited. • Any water released to the environment should meet relevant DWS water quality guidelines for aquatic ecosystem, recreational, livestock watering, irrigation and/or domestic water use. • Mine layout and design should take cognisance of expected decant points and should ensure that no decant points are located within any aquatic habitat or watercourse. Minimum distances of 100m between expected decant points and aquatic habitats are recommended.	Surface water and groundwater quality monitoring and management	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state aquatic habitat features within the project area and will enable the project to comply with the requirements of the NWA	Water quality deterioration reduced
Operational phase noise	Noise nuisance experienced at Receptor 3	Noise	Operation	*Materials handling activities:* • The drop height policy should be maintained onsite. All equipment operators should be trained in the policy such that drop height reduction is implemented onsite; and • Wind speed reduction through sheltering (where possible). *Vehicle noise during ore haulage:* • Rigorous speed control to reduce the noise from vehicle traffic. It is recommended that a maximum speed of 20 km/h to be set on all unpaved roads and 40km/h on paved roads; • Reduction in unnecessary traffic volumes by developing plans to optimise vehicle usage and movement; and • Encouraging the receipt of materials during non-peak traffic hours to avoid traffic build-up and associated noise. *Heavy vehicle/machinery noise:* • Ensuring that equipment is well maintained and fitted with the correct and appropriate noise abatement measures; • All vehicles and other equipment should be maintained and serviced regularly to ensure that the noise levels are reduced; and • Vehicles should not be allowed to idle for more than 5 minutes when not in use.	Management and monitoring noise levels	The mitigation measures ensure that the noise levels from blasting activities will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the mine will not have detrimental effects on the mine workers and surrounding communities/land owners.	Impact Avoided
Operational phase	Employment	Socio- Economic	Operation	• Communities within the vicinity of the mine should be given special consideration in terms of the benefits arising from the project because they will be the most affected by the project. It is recommended that the following mitigation measures be implemented: • A local skills database must be developed and updated regularly. The skills database should be used for recruitment purposes to minimise the probability of nepotism or corruption during the recruitment process; • A monitoring system should be put in place to ensure that Midtron's recruitment policy is adhered to.	Management of the implementation of the SLP		Impact enhanced
Operational phase	Skills transfer and development	Socio- Economic	Operation	As per Midtron's SLP, Midtron will: • Comply with the requirements of the Skills Development Act, which includes the submission of a Workplace Skills Plan and an Annual Training Report as per the Sector Education and Training Authority's requirements	Management of the implementation of the SLP	Implementing mitigation measures will ensure recruitment of locals as per the requirements of the SLP for the Midtron project and will minimise conflicts with surrounding landowners and communities.	Impact enhanced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Appoint a dedicated skills development facilitator within six months of the commencement of operations. • Submit a five-year plan for learnerships once operations commence • Provide employees with the opportunity to participate in mentoring relationships with an individual they feel could add value to their growth and development • Implement a bursary scheme which aims to develop suitable students who once they have completed their studies are afforded professional career opportunities within our organisation.			
Operational phase	Community development	Socio- Economic	Operation	• A comprehensive community development plan will be developed by Midtron before the commencement of the project. During this process, Midtron will engage stakeholders in the area to gauge whether they can align with any of their efforts to collaborate on some development initiatives planned for the communities. Additionally, the selection of project beneficiaries should be fair and directly affected parties should be given first preference.	Management of the implementation of the SLP	Implementing mitigation measures will ensure recruitment of locals as per the requirements of the SLP for the project and will minimise conflicts with surrounding landowners and communities.	Impact enhanced
Operational phase	Regional and economic development	Socio- Economic	Operation	• Midtron will pay royalties and tax to the government. • Midtron will adhere to their SLP commitments.		Implementing mitigation measures will ensure recruitment of locals as per the requirements of the SLP for the Midtron mining project and will minimise conflicts with surrounding landowners and communities.	Impact enhanced
Operational phase	Increased Mn and Fe ore supply	Socio- Economic	Operation	• Midtron will secure contracts and adhere to the terms and conditions of its consumers to avoid contract termination. • Midtron will ensure the appropriate management of its workforce to ensure that deliverables are delivered accordingly.	Manage supply		Impact enhanced
Operational phase	Loss of employment (construction workers)	Socio- Economic	Operation	• Skills development programmes should be implemented to capacitate employees, construction workers and community members with the skills necessary to secure other employment opportunities.	Management of the implementation of the SLP		Impact minimised
Operational phase	Health and safety risk	Socio- Economic	Operation	• Midtron must adhere to all requirements contained in the Occupational Health and Safety Act (Act 85 of 1993) and the Mine Health and Safety Act (Act 29 of 1996). • The mine will be maintained during its lifetime to minimise the risk of mine personnel being injured because of failed machinery, and so forth. • Rigorous operational health and safety programmes should be implemented.	Manage through health and safety policies and training		Impact avoided
Operational phase	Possibility of unearthing unknown graves or other buried cultural/archaeological items	Archaeology and cultural heritage	Operation	• Chance find procedures will be implemented: • All work in the immediate vicinity of the find will cease; • The area will be demarcated with barrier tape or other highly visible means; o SAHRA will be notified immediately; o An archaeologist accredited with the Association for Southern African Professional Archaeologists (ASAPA) will be commissioned to assess the find and determine appropriate mitigation measures, which may include obtaining the necessary authorisation from SAHRA to undertake the mitigation measures; and	Management of access to heritage resources and sites	Mitigation measures will ensure compliance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) and recommendations from the specialist. The mitigation measures will ensure that the construction activities do not have detrimental impacts on heritage sites	Impact avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				o Access to the find by unqualified persons will be prevented until the assessment and mitigation processes have been completed.			
Movement of construction vehicles	Risk of vehicle collision	Traffic	Operation	• Indicate areas where heavy vehicles will be expected with adequate signage.	Speed control and limitation of the times when construction vehicles may be on the roads Manage through road upgrades where required	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow-moving vehicles and will reduce conflict with other road users.	Impact avoided
	Risk of pedestrian accidents	Traffic	Operation	• Clearly indicate pedestrian crossings. • Educate drivers on potential areas of high pedestrian and cyclist activity. • Educate community on dangers of construction vehicles new to their area.			
	Degradation of Public Roads	Traffic	Operation	• The deterioration over time must be monitored and a maintenance plan must be negotiated with the Provincial Authority.			
	Health and Safety Risk	Roads and Traffic	Operation	• The deterioration of public roads over time must be monitored, and a maintenance plan must be negotiated with the National Road Administration, with specific mention of the Monitoring and Planning departments that should be consulted.	Manage through health and safety policies and training	Implementing mitigation measure will ensure road safety along the public roads and onsite and to increase awareness of slow-moving vehicles and will reduce conflict with other road users.	Impact avoided
Disposal of waste rock on the waste stockpile	Fugitive dust and fine particulate emissions affecting ambient air quality	Air quality	Operation	• The waste rock disposal facility should be well maintained to ensure that the deposited waste material does not accumulate to form any sharp edges. Sharp edges are prone to wind erosion and the generation of dust plumes from such facilities; • Progressive rehabilitation should be implemented on the disposal facility to reduce wind erosion ads the generation of fugitive dust; and • If the facility is observed as generating significant dust plumes, appropriate mitigation measures should be installed to reduce the emission levels such as the installation of suitable wind breaks, and or wet suppression.	Dust control Air quality monitoring	With the implementation of the mitigation measures, mining activities will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	Particulate Matter Levels Dust levels
Transportation of ore by road	Fugitive dust and fine particulate emissions affecting ambient air quality	Air quality	Operation	• Wet suppression on unpaved plant roads should be implemented; • Rigorous speed control and the institution of traffic calming measures to reduce vehicle entrainment. A recommended maximum speed of 30 km/h to be set on all unpaved roads and 45 km/h on paved roads within the project site; • Load wet suppression of materials transported by road (i.e. load spraying) or load covering with tarpaulins to reduce fugitive dust generation; • Reduction in unnecessary traffic volumes by developing plans to optimise vehicle usage and movement; • Avoidance of dust track-on onto neighboring paved roads; and • Wind speed reduction through sheltering (where possible).			
Blasting	Blasting activities that may result in noise nuisance and fugitive dust, fine particulate emissions, and acrid blasting emissions affecting ambient air quality	Air Quality Noise Social	Operation	• Reduce Charge Mass/Delay over decreasing distance towards POI's of concern. • Accurate blasting plans and blasting charge calculations should be developed and/or calculated to ensure that good blasts are achieved without overcharging of the blastholes which will result in the generation of elevated levels of blasting emissions;	Management and monitoring of air quality (dust and particulate matter)	The mitigation measures ensure that the noise levels from blasting activities will be managed and measures will be taken to ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines and will ensure that the noise levels emanating from the construction sites will not have detrimental effects on the construction workers and surrounding communities/land owners.	Dust and particulate matter levels Noise levels Air blast and vibration levels

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Inform Midtron employees and neighbouring landowners and inhabitants about operation activities (specifically for blasting) at least 48 hours prior to blasting activities. • Ensure requirements for human health and safety relating to blasting are adhered to avoid unnecessary damage to infrastructures. • Immediate action will take place should thresholds exceed legal requirements for air blast (134 dB) and ground vibration (12.5 mm/s). • Blasting should not be delayed once the blast holes are charged as this can lead to degeneration of the explosives and the generation of elevated levels of noxious blasting emissions; • Prior to blasting a 500 m radius must be cleared of people and animals; • Increase stemming length; • Put in controls for management of stemming lengths; and • Blasting operations should be limited to days where the wind speed is reduced to limit the spread of the airborne blasting plume.		Comply with air blast (134 dB) and ground vibration (12.5 mm/s)	
Storage of chemicals and fuel	Spills of chemicals (e.g., hydrocarbon). Soil contamination on adjacent land potentially occurring due to inappropriate waste disposal and potential oil and diesel leakages from vehicles and machinery	Soil, Land Use and Land Capability Groundwater Surface Water	Operation	• Accidental spills (concrete, chemicals, process water, hydrocarbons, waste) need to be reported as soon as practical so that effective remediation and clean-up strategies and procedures can be implemented. • Where possible, soil that is contaminated by fuel or oil spills will be collected to be treated at a pre-determined and dedicated location, or will be treated in situ, using sand, soil as absorption medium. • Practice good housekeeping in chemical storage areas and ensure that storage areas are bunded. • On surface bulk storage of hydrocarbons must be situated in a dedicated area which will include a bund or a drain where necessary to contain any spillages during the use, loading and off-loading of the material. • Bunded areas shall contain 110% of the stored volume. • Bund areas must be impermeable. • Bund area must have a facility such as a valve/sump to drain or remove clean stormwater. • Place oil traps under stationary machinery, only re-fuel machines at fueling station, construct structures to trap fuel spills at fueling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Contaminated water shall be pumped into a container for removal by an approved service provider;	Management and monitoring of spills Monitoring and management of the integrity of infrastructure	Implementation of mitigation measures will ensure that the mining activities do not have detrimental impacts on the soils, land use and land capability.	Impact avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Regular inspections shall be carried out to ensure the integrity of the bundwalls; • All preventative servicing of earth moving equipment and construction vehicles shall conducted off site; • Runoff from the chemical storage area shall be contained;			

Table 36-3: Impact Management During the Decommissioning and Closure Phase

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
Spills of chemicals (e.g., hydrocarbon). Soil contamination on adjacent land potentially occurring due to inappropriate waste disposal and potential oil and diesel leakages from vehicles and machinery	Spillage of chemical solutions during the dismantling of plant equipment, pipelines or pumps which were in contact with chemicals solution may contaminate the soils; Spillage of diesel, oils and greases from the dismantled plant equipment, resulting in hydrocarbon contamination of exposed soils	Soil, Land Use and Land Capability	Decommissioning and closure	• Ensure proper handling of hazardous chemicals and materials (e.g. fuel, oil, cement, concrete, reagents, etc.) as per their corresponding Safety Data Sheets (SDS); • Dismantling of plant equipment and machinery should be carried out in designated appropriate facilities fitted with spillage containment, floors and sumps to capture any fugitive oils and greases. Develop detailed procedures for spills containment and soils clean up.	Management and monitoring of spills	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Removal of redundant infrastructure	Soil compaction in areas where active heavy machinery will be mobilised for the shaping of the final landform; and Loss of soil organic matter due to increased aeration (caused by soil disturbance) and subsequent organic matter decomposition.	Soil, Land Use and Land Capability	Decommissioning and closure	• Conduct soil assessment to determine post decommissioning/ closure soil quality on rehabilitated infrastructural footprint. • Where possible, re-use stockpiled soil within as short a period as possible. • Use appropriate soil handling machinery, preferably avoiding heavy earth moving equipment used for decommissioning activities to minimise compaction.	Management and monitoring of soil stockpiles	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Grading of project site to ensure long-term drainage conditions on site	Soil handling to convey soil from topsoil stockpile to project site for surface rehabilitation activities, may result in degradation of soil quality due to soil disturbance. Contamination of soil by handling of soil with contaminated earth moving Machinery (machinery previously used for handling mine waste such as waste rock). Insufficient soil volumes to meet end land use soil requirements.	Soil, Land Use and Land Capability	Decommissioning and closure	• Limit vehicle traversing on both stockpiles and rehabilitated areas as far as possible. • Prepare rehabilitated areas properly and monitor regularly.	Management and monitoring of soil stockpiles	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Destruction of all surface infrastructure; Backfill and closure of the mine shafts with waste rock dump material; and Flooding of mining works and resultant altering of the groundwater flow regime.	Continued depressed groundwater levels due to dewatering during mining.	Groundwater, aquatic habitats	Decommissioning and closure	• Minimise dewatering by sealing off excavation and shafts as soon as possible	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
	Continued decreased of base flow contribution to the rivers and aquatic habitats	Groundwater	Decommissioning and closure	• Additional options to divert dewatered water to the aquatic habitats to be investigated	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
	Surface and sub- surface decant from the mine	Groundwater, aquatic habitats	Decommissioning and closure	• No Mitigation possible			
	Potential groundwater contamination from The Midtron mining project	Groundwater	Decommissioning and closure	• No Mitigation possible			
	Potential groundwater Contamination resulting from seepage from waste rock dump and evaporation dams	Groundwater, aquatic habitats	Decommissioning and closure	• Minimise footprint of waste rock dump by backfilling as much waste rock into underground mine and cap remaining waste rock with soil and vegetate	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
	Potential groundwater contamination resulting from remaining surface infrastructure	Groundwater, aquatic habitats	Decommissioning and closure	• Remove buildings for which alternative post-mining use is identified and rehabilitate site to pre-agreed conditions	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
	Potential groundwater contamination from poor waste and sanitation management	Groundwater, aquatic habitats	Decommissioning and closure	• Remove infrastructure unless post-mining use is identified and rehabilitate to pre-agreed conditions.	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
	Potential groundwater contamination caused by spillages and accidents	Groundwater, aquatic habitats	Decommissioning and closure	• Good housekeeping, and adherence to good health and safety practices during closure activities	Groundwater monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
Removal of redundant infrastructure	Spillage of chemical solutions during the dismantling of plant equipment, pipelines or pumps which were in contact with chemicals solution may contaminate the soils; Spillage of diesel, oils and greases from the dismantled plant equipment, resulting in hydrocarbon contamination of exposed soils.	Downstream water resources, aquatic habitats	Decommissioning and closure	• Ensure that all contaminated areas are adequately removed and disposed of to a permitted waste site. • Clean up spillages immediately and dispose of contaminated materials to a permitted waste site.	Management of spills Water quality monitoring	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters.	Rehabilitation Standards End use objectives
Grading of project site to ensure long-term drainage conditions on site	Soil compaction in areas where active heavy machinery will be mobilised for the shaping of the final landform; and Loss of soil organic matt er due to increased aeration (caused by soil disturbance) and subsequent organic matter decomposition.	Downstream water resources, aquatic habitats	Decommissioning and closure	• Re-use stockpiled soil within as short a period as possible. • Use appropriate soil handling machinery to Minimise compaction • Limit vehicles traversing on both stockpiles and rehabilitated areas as far as possible. • Prepare rehabilitated areas properly and monitor regularly.	Water quality monitoring	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters.	Rehabilitation Standards End use objectives
Soil placement and revegetation of project site	Soil handling to convey soil from topsoil stockpile to project site for surface rehabilitation activities may result in erosion and sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling mine waste such as waste rock).	Downstream water resources, aquatic habitats	Decommissioning and closure	• Revegetate as quickly as possible to limit erosion and sedimentation in downstream water resources.	Water quality monitoring	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Vegetation clearing and earth works	Establishment and spread of alien invasive species	Terrestrial ecology, aquatic habitats	Decommissioning and closure	*Minimisation* • An alien invasive species (AIS) control programme must be developed and implemented during all phases of the proposed project; • AIS control should be undertaken in both the project site, and natural habitat and rehabilitated areas immediately adjacent to the site; • It is recommended that the programme include: o A combined approach using both chemical and mechanical control methods; o Periodic follow-up treatments, informed by regular monitoring; and o Monitoring should take place in disturbed areas, as well as adjacent undisturbed areas. *Rehabilitation* • Rehabilitate cultivated land in the project site that is not used for crop production; • Rehabilitate all sites that are disturbed by construction phase activities, as per the rehabilitation programme; and • Rehabilitate all disturbed footprints during the closure and rehabilitation phases, as per the rehabilitation programme.	Management of alien invasive plant species Monitoring of rehabilitation areas Rehabilitation of affected areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in-stream channel habitat	Aquatic ecology	Decommissioning and closure	• Aim for majority of the earth mobilisation activities associated with the construction of the proposed mine shaft should be planned to be conducted	Aquatic habitats Monitoring Management and control of access to aquatic habitat areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				during the dry season, so as to limit the intensity of impact, particularly in terms of runoff of sediments; • Implement low impact construction techniques to minimise the impact on the surrounding and downstream river systems; and • Vegetation clearing should be restricted to the proposed development footprints only, with no clearing permitted outside of these areas.	Rehabilitation of aquatic habitat areas		
Use of heavy machinery	Changes in surface water quality due to contamination from heavy construction equipment	Aquatic ecology	Decommissioning and closure	• Areas to be cleared should be clearly demarcated to prevent unnecessary clearing outside of these sites as to avoid approaching too close to the adjacent rivers. • See further mitigation measures detailed in the terrestrial ecology report. • The mine should implement a monthly monitoring programme for surface water at all the recommended aquatic monitoring points and the data used for comparative analysis between the upstream and downstream sites. • Vegetation clearing, and rehabilitation mitigation measures should be implemented In line with the terrestrial ecological impact assessment report. • Contain and/or avoid potential spills which could make their way to adjacent water resources. • Maintain service roads to avoid erosion and excessive dust formation;	Aquatic habitats Monitoring Management and control of access to aquatic habitat areas Rehabilitation of aquatic habitat areas	The surface water leaving the rehabilitation site will comply with the DWS target water quality parameters.	Rehabilitation Standards End use objectives
Closure phase activities	Loss of ecological communities due to Increased sedimentation and the potential mobilisation of pollutants	Aquatic ecology	Decommissioning and closure	• Aim for majority of the earth mobilisation activities associated with the construction of the proposed mine shaft should be planned to be conducted during the dry season, so as to limit the intensity of impact, particularly in terms of runoff of sediments; • Implement low impact construction techniques to minimise the impact on the surrounding and downstream river systems; • Vegetation clearing should be restricted to the proposed development footprints only, with no clearing permitted outside of these areas; • Areas to be cleared should be clearly demarcated to prevent unnecessary clearing outside of these sites as to avoid approaching too close to the adjacent rivers. • See further mitigation measures detailed in the terrestrial ecology report. • An aquatic biomonitoring programme must be developed and implements during all phases of the proposed project.	Aquatic habitats Monitoring Management and control of access to aquatic habitat areas Rehabilitation of aquatic habitat areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Closure phase activities	Disturbance of aquatic habitat	Aquatic habitats	Decommissioning and closure	• All aquatic habitats and an associated minimum buffer of 100m should be excluded from the proposed development and disturbance footprints. Disturbance to of aquatic habitats outside the development footprint should be minimised by implementing the following measures: • Optimise design of surface infrastructure areas to minimise size of development footprint. • All disturbance footprints must be separated from adjacent aquatic habitats by a fence, either a security fence or five strand cattle fences. • All construction staff should be educated on the sensitivity of aquatic habitat areas and should be	Aquatic habitats Monitoring Management and control of access to aquatic habitat areas Rehabilitation of aquatic habitat areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				made aware of all aquatic habitat areas in close proximity to the construction sites. • Locate all temporary stockpiles, constructor's camps, laydown areas, ablution facilities etc. a minimum of 50m from any delineated aquatic habitat area. • Develop and implement a construction stormwater management plan prior to the commencement of site clearing activities. • An alien vegetation management plan should be drawn up and implemented to limit the spread of alien vegetation into aquatic habitat. • All disturbed areas outside the direct development footprints should be rehabilitated and re-vegetated as soon as possible. Refer to the guidelines below.			
Decommissioning and closure phase activities	Permanent alteration of site topographical and visual character of due to presence of overburden dump	Visual	Decommissioning and closure	• Dismantle and remove all visible surface-built infrastructure during decommissioning; • Re-shape all footprint areas to be as natural in appearance as possible and actively revegetate using locally occurring grass species; • Stabilise and backfill the decline shaft, and contour to ensure it is free draining; and • Establish a vigorous and self-sustaining vegetation cover using locally occurring grass species;	Management of visual impacts Monitoring of rehabilitated areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Downscaling and retrenchment	Loss of employment	Socio- economic	Decommissioning and closure	• Timely and adequate consultation with employees who are dependent on the mine for employment. • Assisting employees in seeking alternative employment at other power plants or related facilities. • Training and education of employees to equip them with skills that could benefit them in other industries. • During the operational phase, members of the workforce will be encouraged to obtain skills or qualifications that are recognised by the National Qualifications Framework and are registered through the Mining Qualifications Authority. These qualifications include non-mining skills that will assist employees in areas other than mining. • Initiatives should be aligned with SLP commitments relating to downscaling and retrenchment.			
Downscaling and retrenchment	Reduced regional economic development	Socio- economic	Decommissioning and closure	• Engage local and regional government with respect to the decommissioning phase.			
Downscaling and retrenchment	Reduced Mn and Fe ore supply	Socio- economic	Decommissioning and closure	• Engage consumers concerning the decommissioning phase.			
Downscaling and retrenchment	Reduced community investment	Socio- economic	Decommissioning and closure	• Midtron will develop exit strategies for all its community development initiatives.			
Closure phase	The closure and rehabilitation phase should have no impact on any identified cultural and heritage resources	Archaeology and cultural heritage resources	Decommissioning and closure	• It is not expected that any mitigation measures will be required.			
Movement of construction vehicles	Risk of vehicle collision	Traffic	Decommissioning and closure	• Indicate areas where heavy vehicles will be expected with adequate signage.			
Movement of construction vehicles	Risk of pedestrian accidents	Traffic	Decommissioning and closure	• Clearly indicate pedestrian crossings.			

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Educate drivers on potential areas of high pedestrian and cyclist activity. Educate community on dangers of construction vehicles new to their area.			
Movement of construction vehicles	Degradation of Public Roads	Traffic	Decommissioning and closure	• The deterioration over time must be monitored and a maintenance plan must be negotiated with the Provincial Authority.			

37 Impact Management Actions

Table 37-1: Impact Management Actions for the Construction Phase

Activity	Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
Project Kick Off and Planning		Control potential deviations from the approved EMPr.	Planning stage	Ensure contractors are aware of the required management measures stipulated in the EMPr.
Project Kick Off and Planning		Control potential deviations from the approved EMPr.	Planning Stage	Ensure all construction staff is familiar with the Environmental Awareness Plan.
Project Kick Off and Planning		Control potential deviations from the approved EMPr.	Planning Stage	Ensure that all staff is familiar with the emergency procedure and plan.
Vegetation clearance will be required for the construction of: • Mining Right Application • Drilling and blasting • Excavations, open cast mining areas • Waste Rock Dump Areas • Water Dams • Tailings Stockpile Areas • Topsoil dump areas • Recycling Dams • Stormwater management infrastructure • Control Rooms • Diesel tank storage areas • Generators • Haul Roads • Offices areas • Parking areas • Processing Plant for the processing of Iron Ore • Processing Plant for the processing of Manganese Ore • Rapid Reloading Area • Explosive Magazine area • Safety Berms • Brake test ramp • Fenced salvage yard • Weigh bridges • Security access points • Tyre Bay area • Contractors laydown areas • Access Roads • Ablution facilities, the proposed project will require four ablution facilities, each with an underground conservancy tank • Chemical Toilets • Wash Bay areas • Feeder Bay and substation • Waste storage areas • Water pipelines f • Water provision • Laboratory • Fencing • Borehole areas	Groundwater Contamination	Control through management and monitoring of spillages. Where spillages occur, the soil must be stripped and disposed of as stipulated in the EMPr.	Pre-construction and Construction phases	Compliance with the regulations under the GN704. Compliance with the NWA and conditions of the WUL
	Drawdown of groundwater leading low groundwater levels	Monitoring of groundwater levels	Pre-construction and Construction phases	Compliance with the NWA and conditions of the WUL
	Contamination of surface water resources (drainage lines and rivers and streams)	Monitoring through rehabilitation and management of spills Rehabilitate contaminated areas	Pre-construction and Construction phases	Compliance with the regulations under the GN704. Compliance with the NWA and conditions of the WUL
	Loss of Species of Conservation Concern	Rehabilitation of areas cleared of vegetation. Control of alien invasive plant species	Pre-construction and Construction phases	Comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) and Alien and Invasive Species Regulations, 2014. No vegetation clearance outside of demarcated areas
	Migration of animal life due to disturbance caused proposed project:	Relocation of affected species of conservation importance Management of site activities	Pre-construction and Construction phases	Remain within the designated area demarcated for mining activities. Ensure minimal clearance of vegetation
	Mortality and disturbance of fauna	Management of site activities	Pre-construction and Construction phases	Remain within the designated area demarcated for mining activities. Ensure minimal clearance of vegetation
	Loss of soils, erosion of the soils and impacts on landowner's livelihood	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	Pre-construction and Construction phases	Retain topsoil integrity for the reuse in rehabilitation Vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas
Vegetation clearance and site excavation	Aquatic habitat destruction and loss of aquatic habitat and hydrological functions	Control of access to aquatic habitat areas and within the 100 m buffer determined by the specialist.	Pre-construction and Construction phases	Compliance with the NWA and conditions of the WUL

Activity	Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
Transportation of material and movement of vehicles and machinery on construction areas				
Transportation of material and movement of vehicles and machinery on construction areas	Possible increase in nuisance dust and carbon emissions and ambient air pollutants (NOx and Sox) due to movement of vehicles and operation of machinery and equipment	Dust control measures	Pre-construction and Construction phases	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities. Comply with the requirements of the Minimum Emission Standards
Vegetation clearance and excavation of construction sites	Visual intrusion as a result of movement of machinery and erecting of contractor camps as well as clearance of vegetation	Control and keep to a minimal the number of vehicles used for construction. Vehicles must be maintained to ensure efficient use of fuel.	Pre-construction and Construction phases	Ensure vegetation clearance and footprints of excavated area are kept to a minimum. Vehicles and machinery required for construction activities will be kept to a minimum
Transportation of material and movement of vehicles and machinery on construction areas	Increase in ambient noise levels due to movement of vehicles and machinery	Management and maintenance of construction vehicles. Management using noise dissipating technologies e.g. noise mufflers Control through the limiting of the activities to the daytime and the implementation of an open and transparent channel of communication	Pre-construction and Construction phases	Remain within the Noise Regulation Standards for Rural Areas. Ensure that noise levels are below the National Noise Control Regulations, SANS 10103:2008 Guidelines
Vegetation clearance and excavation of construction sites	Potential destruction of graves and areas of archaeological importance	Control through clear demarcation of construction sites to ensure avoidance of graves and other heritage sites	Pre-construction and Construction phases	Comply with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999)
Vegetation clearance and excavation of construction sites	Potential sealing and loss of fossils	Management of topsoil integrity for the reuse in rehabilitation	Pre-construction and Construction phases	Comply with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999)
Waste Management	Improper waste management has potential to contaminate water sources and aquatic habitats.	Waste management	Pre-construction and Construction phases	Comply with the requirements of the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)
Blasting	Blasting activities that may result in noise nuisance and fugitive dust, fine particulate emissions, and acrid blasting emissions affecting ambient air quality	Management and monitoring of air quality (dust and particulate matter)	Pre-construction and Construction phases	Comply with the National Noise Control Regulations, SANS 10103:2008 Guidelines Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities.
Vegetation clearance	Changes in the topography may be experienced as a result of bush clearing and construction vehicles on site	Control of the construction footprints and ensuring that vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	Pre-construction and Construction phases	Ensure vegetation clearance and footprints of excavated area are kept to a minimum.
Excavations	Removal of local geology as a result of construction activities	Control of the construction footprints and ensuring that vegetation clearance shall be kept to a minimum. No clearance of vegetation outside demarcated areas	Pre-construction and Construction phases	Ensure vegetation clearance and footprints of excavated area are kept to a minimum.
Transportation of material and movement of vehicles and machinery on construction areas	Increased traffic on public roads may result in conflicts	Speed control and limitation of the times when construction vehicles may be on the roads	Pre-construction and Construction phases	Minimise the number of vehicles on the roads and movement of vehicles shall be kept to outside busy times
Recruitment	Impact from the influx of job seekers and employment of farm labourers:	Management of the implementation of the SLP	Pre-construction and Construction phases	Comply with the provisions of the SLP

Table 37-2: Impact Management Actions for the Operational Phase

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
Disposal of waste rock on the waste stockpile	Fugitive dust and fine particulate emissions affecting ambient air quality	Dust control Air quality monitoring	Operation	Comply with the requirements of the National Environmental Management: Air Quality Act, 2004: Dust Regulation guidelines for rural communities Comply with the requirements of the Minimum Emission Standards
Transportation of product by road	Fugitive dust and fine particulate emissions affecting ambient air quality	Dust control Air quality monitoring	Operation	
Fugitive vehicle emissions from the gravel maintenance road	Fugitive dust and fine particulate emissions affecting ambient air quality	Dust control Air quality monitoring	Operation	
Heavy vehicle exhaust emissions	CO, NO_2, SO_2 and fine particulate emissions affecting ambient air quality	Air quality monitoring	Operation	
Shaft development, drilling and blasting	Loss/change of current land use. Soil disturbance due to excavation activities at pit location as well as in surrounding soils. Modification of natural soil hydrological regime.	Retain topsoil integrity for the reuse in rehabilitation	Operation	Minimise soil loss
Stockpiling of discard and waste rock. Containment of sediment laden water in PCD	Soil contamination due to leaching of soluble product and waste constituents into soils underlying the stockpiles; and Contamination of soil adjacent to product and waste stockpiles due to run-off or seepage of soluble product or waste rock constituents.	Management and motoring of integrity of infrastructure	Operation	Comply with the NEM: WA Comply with the NEMA Comply with the NWA
Waste disposal and movement of vehicles and machinery	Contamination of soils by hydrocarbon pollutants	Management and monitoring of spills	Operation	Comply with the NEM: WA
Open Cast Mining	The decrease in local groundwater levels and potential contaminants in the groundwater due to infiltration of process water, may result in an indirect impact to local receptors including rivers and private boreholes	Monitoring of groundwater and surface water quality	Operation	Comply with the NWA Comply with conditions of WUL
	During operation, mining may require dewatering of the local groundwater which will thus form a groundwater drawdown zone around the mine void which will result will be a cumulative reduction in groundwater quality.	Monitoring of groundwater levels	Operation	Comply with the NWA Comply with conditions of WUL
	Contamination of groundwater resource due to seepage from dumps, PCDs and tailings dam into the local groundwater and subsequently decrease the water quality in the local area	Monitoring of groundwater and surface water quality Monitoring and management of integrity of infrastructure and liner system	Operation	Comply with the NWA Comply with conditions of WUL
	Potential groundwater contamination resulting from seepage from waste rock dump	Monitoring of groundwater and surface water quality Monitoring and management of integrity of infrastructure and liner system	Operation	Comply with the NWA Comply with conditions of WUL
	Potential groundwater contamination resulting from seepage from PCDs and tailings dam	Monitoring of groundwater and surface water quality Monitoring and management of integrity of infrastructure and liner systems	Operation	Comply with the NWA Comply with conditions of WUL
	Potential groundwater contamination from poor waste and sanitation management	Proper waste management and monitoring	Operation	Comply with the NWA Comply with eth NEM: WA Comply with conditions of WUL
	Potential groundwater contamination caused by spillages and accidents	Management and monitoring of spills	Operation	
	Potential groundwater contamination caused by hydrocarbon chemicals storage	Management and monitoring of spills Monitoring and management of integrity of infrastructure (storage areas and bund systems)	Operation	Comply with the NWA Comply with conditions of WUL
Mining dewatering	Lowering of water levels due to dewatering	Monitoring of groundwater levels	Operation	Comply with the NWA Comply with conditions of WUL
Pit development, drilling and blasting	Soil disturbance due to excavation activities at pit location as well as in surrounding soils. Modification of natural soil hydrological regime.	Management of excavation activities to ensure the footprints are kept to a minimum Monitoring of soil stockpiles Soil assessment	Operation	Minimise footprints
Transportation of product and hauling of waste rock for storage in their respective storage facilities.	Water resource contamination from hydrocarbon spills from vehicles and equipment, sewage plant, wash-bay, change-house and laundry.	Surface water quality monitoring	Operation	Comply with the NWA Comply with conditions of WUL

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
Operation of PCDs	Contamination of downstream water resources; blockage of stormwater management system;	Surface water quality monitoring	Operation	Comply with the NWA Comply with conditions of WUL Comply with GN704
Vehicles and use of equipment/ machinery	Contamination of soils and downstream water resources	Surface water quality monitoring	Operation	Comply with the NWA Comply with conditions of WUL
Vegetation clearing and earth works	Establishment and spread of alien invasive species	Management of infestation of alien invasive plant species through implementation of the eradication programme Monitoring mine area	Operation	Eradicate all alien invasive plant species as they emerge
Vegetation clearing and earth works	Mortality and disturbance of fauna	Relocation of affected species of conservation importance Management of site activities	Operation	Comply with the requirements of the Northern Cape Nature Conservation Act, No. 9 of 2009 and NFA
Vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in- stream channel habitat	Control of access to aquatic habitat areas and within the 500 m of aquatic habitats.	Operation	Comply with the NWA Comply with conditions of WUL
Land clearance for the proposed shaft and associated infrastructure, movements of construction vehicles in and around the direct project site	Degradation of aquatic ecosystems due to increased sedimentation and erosion	Control of access to aquatic habitat areas and within the 500 m od aquatic habitats. Implementation of the stormwater management plan Management and monitoring of the site for erosion	Operation	
Use of heavy machinery	Changes in surface water quality due to contamination from heavy construction equipment	Surface water quality monitoring	Operation	
Construction phase activities	Loss of ecological communities due to increased sedimentation and the potential mobilisation of pollutants	Monitoring of vegetation on site	Operation	
Construction, operational and closure phase activities	Disturbance of aquatic habitat	Control of access to aquatic habitat areas and within the 100 m buffer determined by the specialist.	Operation	
Operational and closure phase activities	Water Quality Deterioration – Acidic Mine Drainage	Surface water quality monitoring Management through treatment	Operation	
Operational phase	Employment	Management of the implementation of the SLP	Operation	Comply with provision of the SLP and Employment policies
Operational phase	Skills transfer and development		Operation	
Operational phase	Community development		Operation	
Operational phase	Regional and economic development		Operation	
Operational phase	Increased Mn and Fe supply	Manage supply	Operation	
Operational phase	Loss of employment (construction workers)	Management of the implementation of the SLP	Operation	
Operational phase	Health and safety risk	Manage through health and safety policies and training	Operation	Comply with provisions of the Occupational Health and Safety Act Comply with the provisions of the Mine Health Act
Operational phase	Possibility of unearthing unknown graves or other buried cultural/archaeological items		Operation	Comply with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999)
Movement of construction vehicles	Risk of vehicle collision	Speed control and limitation of the times when construction vehicles may be on the roads Manage through road upgrades	Operation	Comply with road speed controls and limits
	Risk of pedestrian accidents	Speed control and limitation of the times when construction vehicles may be on the roads Manage through road upgrades s	Operation	Comply with road speed controls and limits
	Degradation of Public Roads	Speed control and limitation of the times when construction vehicles may be on the roads Manage through road upgrades	Operation	Maintenance of access roads and upgrade of roads where required
	Health and Safety Risk	Manage through health and safety policies and training	Operation	Comply with provisions of the Occupational Health and Safety Act Comply with the provisions of the Mine Health Act
Disposal of waste rock on the waste stockpile	Fugitive dust and fine particulate emissions affecting ambient air quality	Dust control Air quality monitoring	Operation	Comply with the provisions of the National Air Quality Standards.
Storage of chemicals and fuel	Spills of chemicals (e.g., hydrocarbon). Soil contamination on adjacent land potentially occurring due to inappropriate waste disposal and potential oil and diesel leakages from vehicles and machinery	Management and monitoring of spills Monitoring and management of the integrity of infrastructure	Operation	Comply with the requirement of the NEM: WA

Table 37-3: Impact Management Actions for the Decommissioning and Closure Phase

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
Spills of chemicals (e.g., hydrocarbon). Soil contamination on adjacent land potentially occurring due to inappropriate waste disposal and potential oil and diesel leakages from vehicles and machinery	Spillage of chemical solutions during the dismantling of plant equipment, pipelines or pumps which were in contact with chemicals solution may contaminate the soils; Spillage of diesel, oils and greases from the dismantled plant equipment, resulting in hydrocarbon contamination of exposed soils	Soil monitoring and management of spills Groundwater and surface water monitoring	Decommissioning and closure	Comply with the closure objectives. Comply with the requirements of the NEM: WA
Removal of redundant infrastructure	Soil compaction in areas where active heavy machinery will be mobilised for the shaping of the final landform; and Loss of soil organic matter due to increased aeration (caused by soil disturbance) and subsequent organic matter decomposition.	Soil monitoring and management of spills	Decommissioning and closure	Comply with the closure objectives
Grading of project site to ensure long-term drainage conditions on site	Soil handling to convey soil from topsoil stockpile to project site for surface rehabilitation activities, may result in degradation of soil quality due to soil disturbance. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling mine waste such as waste rock). Insufficient soil volumes to meet end land use soil requirements.	Soil monitoring and management of spills Groundwater and surface water monitoring	Decommissioning and closure	Comply with the closure objectives Comply with provisions of the NWA Comply with provisions of the WUL
Destruction of all surface infrastructure; Backfill and closure of the Midtron mining project shafts with dump material; and Flooding of mining works and resultant altering of the groundwater flow regime.	Continued depressed groundwater levels due to dewatering during mining. Continued decreased of base flow contribution to the rivers and aquatic habitats Surface and sub- surface decant from The Midtron mining project Potential groundwater contamination from The Midtron mining project Potential groundwater contamination resulting from seepage from waste rock dump. Potential groundwater contamination resulting from remaining surface infrastructure Potential groundwater contamination from poor waste and sanitation management Potential groundwater contamination caused by spillages and accidents	Groundwater monitoring	Decommissioning and closure	Comply with the closure objectives Comply with provisions of the NWA Comply with provisions of the WUL
Removal of redundant infrastructure	Spillage of chemical solutions during the dismantling of plant equipment, pipelines or pumps which were in contact with chemicals solution may contaminate the soils; Spillage of diesel, oils and greases from the dismantled plant equipment, resulting in hydrocarbon contamination of exposed soils.	Soil monitoring and management of spills Groundwater and surface water monitoring	Decommissioning and closure	Comply with the closure objectives Comply with provisions of the NWA Comply with provisions of the WUL
Grading of project site to ensure long-term drainage conditions on site	Soil compaction in areas where active heavy machinery will be mobilised for the shaping of the final landform; and Loss of soil organic matter due to increased aeration (caused by soil disturbance) and subsequent organic matter decomposition.	Soil monitoring	Decommissioning and closure	Comply with the closure objectives Comply with provisions of the NWA Comply with provisions of the WUL
Soil placement and revegetation of project site	Soil handling to convey soil from topsoil stockpile to project site for surface rehabilitation activities may result in erosion and sedimentation. Contamination of soil by handling of soil with contaminated earth moving machinery (machinery previously used for handling mine waste such as waste rock).	Management of erosion	Decommissioning and closure	Minimise soil loss
Vegetation clearing and earth works	Establishment and spread of alien invasive species	Control and management through implementation of the Alien Invasive Plant Species eradication programme	Decommissioning and closure	Comply with the Alien Invasive Species Eradication Programmes
Vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in-stream channel habitat	Control of access to aquatic habitat areas and within the 100 m buffer determined by the specialist. Monitoring of rehabilitation and reestablishment of vegetation	Decommissioning and closure	Comply with the closure objectives Comply with provisions of the NWA Comply with provisions of the WUL
Use of heavy machinery	Changes in surface water quality due to contamination from heavy construction equipment	Surface water quality monitoring	Decommissioning and closure	

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
Construction, operational and closure phase activities	Disturbance of aquatic habitat	Control of access to aquatic habitat areas and within the 100 m buffer determined by the specialist.	Decommissioning and closure	
Operational and closure phase activities	Water Quality Deterioration – Acidic Mine Drainage	Surface water quality monitoring	Decommissioning and closure	
Decommissioning and closure phase activities	Permanent alteration of site topographical and visual character of due to presence of overburden dump	• Monitor and manage visual impacts	Decommissioning and closure	Reprofile the area as much as possible Revegetate the dump to minimise visual impacts
Decommissioning and closure phase activities	Reinstatement of visual resource value due to dismantling of mining buildings and subsequent rehabilitation of footprint areas. Visible dust plumes during rehabilitation.	• Monitor and manage visual impacts • Dust control	Decommissioning and closure	
Downscaling and retrenchment	Loss of employment	• Manage qualifications of mine workers and implement programmes in the SLP to enable workers to source employment elsewhere on decommissioning of the mine.	Decommissioning and closure	Comply with provisions of the SLP Comply with provisions of the Labour Relations Act
Downscaling and retrenchment	Reduced regional economic development		Decommissioning and closure	
Downscaling and retrenchment	Reduced Fe and Mn Ore supply		Decommissioning and closure	
Downscaling and retrenchment	Reduced community investment		Decommissioning and closure	Comply with provisions of the SLP Comply with provisions of the Labour Relations Act
Closure phase	The closure and rehabilitation phase should have no impact on any identified cultural and heritage resources	• Manage and control access to heritage sites	Decommissioning and closure	Comply with provision of the NHRA
Movement of construction vehicles	Risk of vehicle collision	• Management and enforcement of road speed limits •	Decommissioning and closure	Comply with road speed limits
Movement of construction vehicles	Risk of pedestrian accidents	• Management and enforcement of road speed limits	Decommissioning and closure	
Movement of construction vehicles	Degradation of Public Roads	• Road upgrading	Decommissioning and closure	

38 Financial Provision

38.1 Description of closure objectives and extent to which they align with the baseline characterisation

The main aim in developing this rehabilitation plan is to mitigate the impacts caused by the mining activities and to restore land back to a satisfactory end land use. The rehabilitation plan must be developed as early as possible and maintained throughout the life of operation. It is important that the project's closure plan is clearly defined and understood by all involved before starting the process and is complementary to the rehabilitation objectives. The closure vision for the Midtron project is intended to inform the closure objectives and as such is currently stated as:

To implement a post mining landscape that is safe, stable and non-polluting over the long term, through collaboration with affected stakeholders

The overall closure objectives for the proposed project are as follows:

- Return land, mined by opencast methods, as far as possible to a land capable similar to that which existed prior to mining in consultation with the surrounding land uses;
- Ensure that as little water as possible seeps out of the various sections of the mine and where this is unavoidable, ensure that the water is contained or treated if the volume is significant and if it does not meet statutory water quality requirements;
- Remove mine infrastructure that cannot be used by a subsequent landowner or a third party.
- Where buildings can be used by a third party, arrangements will be made to ensure their long-term sustainable use;
- Clean up all stockpiles and loading areas and rehabilitate these as far as possible to a land capability similar to that which existed prior to mining;
- Rehabilitate the disturbed land to a state that facilitates compliance with applicable environmental quality objectives,
- Landscape the rehabilitated areas in alignment with the surrounding topography to prevent the unnecessary pooling of water which will reduce the runoff in the catchment;
- Implement progressive rehabilitation measures, beginning during the construction phase wherever possible, reducing the overall visual impact;
- Physically and chemically stabilise any remaining structures to minimise residual risks;
- Leave a safe and stable environment for both humans and animals;
- To limit soil and surface/groundwater contamination by managing all water on site;
- Comply with local and national regulatory requirements;
- Form active partnerships with local communities to take care of management of the land after mining, where possible; and
- To maintain and monitor all rehabilitated areas following re-vegetation and, if monitoring shows that the objectives have been met, making an application for closure.

Successful rehabilitation must be monitored to ensure sustainability. This requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

Once closure activities have been implemented, the operation will enter a five-year post closure monitoring period. During this time, erosion repair, vegetation establishment, and monitoring activities will be undertaken. This period should see biological processes establishing, leading to vegetation covers being stable and sustainable. Sufficient data will be collected to demonstrate that the closure is sustainable and that there are no unmitigated impacts to the receiving environment. Overall the relinquishment criteria and other statutory requirements would be achieved.

38.2 Confirmation that environmental objectives in relation to closure have been consulted with landowners

The draft EIA/EMPr will be made available to all registered I&APs for a 30-day review and comment period. All comments received and responses provided to the stakeholders will be incorporated into the final EIA/EMPr and will be collated into a Comments and Responses Register to be submitted to the DMR with the final EIA/EMPr for decision making.

38.3 Rehabilitation Plan

Refer to Appendix 6 for the complete Rehabilitation and Closure Plan associated with the proposed project.

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

A Rehabilitation Plan will be compiled in support of the primary closure objectives which are to remove the mining infrastructure and rehabilitate the land to a suitable land use which represent pre-mining conditions and provides a safe and sustainable environment for surrounding receptors. Refer to Appendix 6 for the complete Rehabilitation and Closure Plan associated with the proposed project.

38.5 Quantum of financial provision required to manage and rehabilitate the environment

The environmental liability only focused on the proposed mining activities and was calculated by means of the DMR standard method for assessment of mine closure. The areas for the mine which needed to be included in the current assessment were provided to Ndi Geological by the applicant as indicated in the MWP. These areas were assumed to be all that the applicant was liable for and no investigation was conducted to determine whether the applicant is responsible for and has any liabilities for additional areas. Activities incorporated into the calculation included the demolition and management of physical infrastructure, rehabilitation of the waste facilities as well as the rehabilitation of these affected areas.

Only the areas affected by the proposed mining blocks and associated infrastructure are included. Should additional mining blocks and infrastructure be identified during future exploration activities, these needs to be included.

The Master Rates will be updated on an annual basis, based on CPIX or a similar approved method, or should legislation change. The first of these updates will take place during 2020 and continue to the year in which the review is taking place, and the overall document will be reviewed and updated whenever necessary (minimum requirement of annual updates).

A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The rehabilitation forecast estimates to a total amount of R6 251 828.63.

The calculations of quantum for a period of 10 years have been calculated based on the planned activities. The ten forecasts are pasted in this section. It should be noted that although the activities stated in the Environmental Authorisation have not all been included in the rehabilitation calculation, the rehabilitation calculations will be reviewed every year depending on current disturbances.

Forecast has been calculated for a period of 10 years, nonetheless the LOM is 30 years.

Calculation of rehabilitation pasted are only for the first 3 years, going forward, the company will review the calculations every year

38.6 Confirmation that the financial provision will be provided as determined

Provided the Mining Right is approved, Midtron will provide for closure as per the legal requirements. A liability assessment will also need to be undertaken annually to ensure the financial provision is in line with the closure cost.

39 Compliance monitoring and performance assessment

Midtron will be responsible for the implementation of all monitoring, mitigation and management measures, as well as compliance with the EMPr. The recommended monitoring for the identified impacts is detailed below. The applicant will keep a record of all environmental monitoring taken on site.

39.1 Monitoring of Impact Management Actions

Please refer to Table 39-1.

39.2 Monitoring and Reporting Frequency

Please refer to Table 39-1.

39.3 Responsible Persons (Roles and Responsibilities)

In order to plan, construct and operate the proposed project, it is important that all parties understand their duties and responsibilities. Midtron and their contractors will be responsible for the construction of the proposed project and ensure that all activities undertaken by Midtron are undertaken in compliance with the project's EA and EMPr. Midtron will monitor construction activities at a frequency, which will be determined by the construction schedule. The following sections describe the functions of the key team members.

Generic roles that require to be defined for the project include:

- Competent Authority;
- Project Developer;
- Environmental Control Officer (ECO);
- Safety, Health and Environmental Representative; and
- Site Manager.

The typical requirements of each of the roles are provided in the following sections.

39.3.1 Competent Authority (DMR)

The DMR plays a lead role in the implementation of environmental policies, legislation and regulations. Their role is to ensure that the construction and operation of the proposed Midtron mining project is conducted in a sustainable manner, in compliance with the relevant environmental legislation. DMR is responsible for approving the EMPr for the project and any revisions and amendments thereto.

39.3.2 Project Developer

The Project Developer (Midtron) is the 'owner' of the project and as such is responsible for ensuring that the conditions of the EA/WML issued in terms of NEMA and NEM: WA (should the project receive such authorisation) are fully complied with, as well as ensuring that any other necessary permits or licenses are obtained and complied with. It is expected that Midtron will appoint the Environmental Control Officer, SHE Manager and Site Manager.

Midtron will be responsible for:

- Ensuring that all team members are aware of their roles and responsibilities;

- Taking overall responsibility for all activities that occur in the proposed project and associated infrastructure;
- Ensuring that all commitments/conditions contained in the EA and EMPr are communicated and adhered to by Midtron employees to all team members and contractors.

During the *construction phase* Midtron must:

- Appoint a Project Management Team to oversee the Contractor and act as a liaison between the Environmental Control Officer (ECO) and the Contractor;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedies problems timeously and to the satisfaction of the authorities;
- Appoint an independent and suitably qualified ECO to ensure that the Contractor abides by the EMPr;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During the *operation phase* Midtron must:

- Ensure that the Project Management Team oversees the Contractor/s and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

During *decommissioning phase* Midtron must:

- Ensure that the Project Management Team oversees the Contractor/s and act as a liaison between the ECO and the Contractor/s;
- Ensure that the Contractor is aware of and adheres to the provisions of this EMPr;
- Ensure that the Contractor remedy problems timeously and to the satisfaction of the authorities;
- Ensure that an independent ECO audits the site to ensure compliance with the respective environmental legislation by parties.

39.3.3 Operations Manager

The Operations Manager will report to Midtron and be responsible for:

- Complying with the EMPr and EA/WML commitments and any other legislative requirements as applicable to their workings;
- Adhering to any instructions issued by the project manager on advice of the ECO.

39.3.4 Contractor (s) and sub-contractors

The Contractor (s) (including Sub-Contractors) will report to the Project Management Team and be responsible for:

- Appointing an Environmental Representative who will ensure that all construction activities on site are undertaken in accordance with the EMPr;
- Drafting Environmental Method Statements to mitigate environmental impacts;
- Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;
- Ensuring that all employees and sub-contractors comply with this EMPr;
- Complying with the EMPr and EA commitments and any other legislative requirements as applicable to their workings;
- Adhering to any instructions issued by the project manager on advice of the ECO;
- Submitting an environmental report at identified site meetings on the environmental incidents that have occurred within the period before the site meeting;
- Arranging that all employees and those of the subcontractors receive appropriate training prior to the commencement of construction, taking cognisance of this EMPr and EA.

The Contractor has a duty to demonstrate respect and care for the environment in which they are operating. The Contractor will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

39.3.5 Environmental Control Officer

The ECO will report to Midtron and shall be an independent qualified environmental professional with the relevant environmental expertise and shall be responsible for:

- Fully understanding the commitments in the EMPr and EA;
- Ensuring that the EA conditions are upheld;
- Familiarising him / herself with the project and EMPr, and ensuring compliance with the relevant legislation applicable to the project and Midtron Safety Health and Environmental Policy and procedures;
- Advising management on environmental issues and recommendations for the proposed development;
- Informing key, on-site staff through initial environmental awareness briefing of their roles and responsibilities in terms of the EMPr;
- Communicating the contents of the EMPr and EA to the contractor and sub-contractor staff members. Training will be required to ensure all staff members are aware of the requirements of the EMPr;
- Liaising with environmental statutory bodies, including but not limited to, DMR and DWS, where deemed necessary;
- Monitoring the implementation of the EMPr and EA throughout the project, by means of site inspections and meetings;
- Arranging for liaison with Interested and Affected Parties (I&AP)s on environmental issues of concern;
- Authorising the removal of personnel and / or equipment should they contravene the conditions of the EMPr and EA;

- Compiling a checklist of areas of non-compliance;
- Identifying areas of non-compliance, and recommending measures to rectify them in consultation with Midtron and the Contractor;
- Ensuring follow-up and resolution of all non-compliance;
- Compiling monthly progress reports for submission to the Project Manager and DMR;
- Reporting directly to Midtron;
- Reviewing and approving Environmental Method Statements submitted by the contractor to mitigate environmental impacts;
- The audit report will be submitted to the Contractor for comment prior to submission to the Midtron;
- Undertaking a post-construction inspection, which may result in recommendations for additional clean-up and rehabilitation measures; and
- Undertaking regular site inspections to assess compliance with the EMPr and EA and take appropriate action to rectify non – conformances.

39.3.6 Safety, Health and Environmental Representative

The Safety, Health and Environmental (SHE) Representative will report to Project Management Team and be responsible for:

- Ensuring that all environmental and health and safety conditions are undertaken by all staff and contractors on site;
- Overseeing all work done by the ECO; and
- Ensuring that corrective actions are followed up and closed out.

39.4 Time Period for Implementing Impact Management Actions

Please refer to **Table 39-1**.

39.5 Mechanism for Monitoring Compliance

Please refer to **Table 39-1**.

Table 39-1: Compliance monitoring and performance assessment against EMPr

Aspect	Impacts requiring monitoring programmes / objectives	Functional requirements for monitoring			Roles and responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		Detailed Actions	Monitoring Location	Parameters		
Air quality	• Construction phase impacts and operational phase impacts	• Six (6) months prior to the construction phase (as agreed with the ECO), a suitable baseline dust fallout and particulate monitoring network should be installed along the boundary of the mining operation to establish baseline concentrations prior to the construction phase; • During construction, the baseline monitoring network should be maintained along the boundary of the mining operation to meet the NEM: AQA requirements; • The air monitoring network to include at a minimum dust fallout, PM_{10}, $PM_{2.5}$ and gaseous monitoring (SO_2 and NO_2). Due to the impact occurring to the west of the mine, monitors should be installed at the western boundary of the mine. A background point should be considered to the northeast of the mine boundary. • A meteorological station should be installed onsite one month prior to the construction phase as this data is required for several NEM: AQA reporting requirements; and • Any complaints as to the management of onsite air quality should be directed to the site management. Complaints and any actions arising from a complaint will be recorded in a complaint register to be maintained by site management.			Midtron, ECO, Contractors	Monthly monitoring and reporting
Soil quality	• Maintain the soil quality along areas which will be developed for mining as well as areas adjacent to mine waste storage facilities.	• Collection of at least one sample where visible signs of contamination is noted (spillage or seepage areas/zones)	• All areas which will be developed for mining	• pH and salinity; • Major anions and cations; • Sulphate, phosphate, Nitrate, total dissolved solids, electrical conductivity; • Heavy metals and hydrocarbons	Midtron, ECO, Contractors	Biannually
Soil stockpiles	• Maintain and minimise the quality and degradation of soil stockpiles	• Collection of at least one composite sample per stockpile	• Soil stockpiles	• pH and Salinity; • Major anions and cations; • Organic matter content for the topsoil; • Content of major plant nutrients (CEC); • Major cations and anions; • Metal and hydrocarbons; • Stockpile height (<3 m).	Midtron, ECO, Contractors	Biannually
Soil erosion	• Mitigate and minimise soil erosion	• Infrastructure and surface water bodies on-site to be maintained in accordance with the surface water management plan	• Soil stockpiles, developed areas and access and haul roads	• Visual assessment of soil stockpile heights and conditions (i.e., gullies and rills); • Assess the condition and effectiveness of vegetation on the stockpiles; • Assess any evidence of erosion (as per the Surface water management plan); • Assess the effectiveness of water versus other dust suppression	Midtron, ECO, Contractors	Quarterly

Aspect	Impacts requiring monitoring programmes / objectives	Functional requirements for monitoring			Roles and responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		Detailed Actions	Monitoring Location	Parameters		
				substances (e.g. molasses or bitumen).		
Land Use change	• Maintain and minimise land use change within the mining area	• Evaluation of changes in land use within the mining precinct using satellite imagery	• Mining right area	• Collection of satellite imagery	Midtron, ECO, Contractors	Every two years
Rehabilitated Areas	• Maintain the quality and condition of rehabilitated areas	• Continuous monitoring of rehabilitated areas for closure compliance	• Disturbed areas	• Organic content of topsoil; • Content of major plant nutrients; • Contamination assessment (pH, metals, hydrocarbons, electrical conductivity, total dissolved solids, nitrates, sulphate and phosphates); • Volume of soil replaced;	Midtron, ECO, Contractors	Annually
Groundwater	• Monitoring of groundwater levels and water quality	• A groundwater monitoring programme will be implemented. • The following boreholes will be monitored in terms of groundwater levels and water quality:			Midtron, ECO, Contractors Groundwater specialist	Quarterly water quality monitoring Water levels on an annual basis

Borehole ID	GPS Coordinates (WGS 84)	
	Latitude	Longitude
W4	-28.19145	23.11118
KN1	-28.19145	23.1274
KN2	-28.1605	23.14343
DT3	-28.20867	23.11424
DT4	-28.20933	23.1143
DT5	-28.22869	23.10749
KN6	-28.17439	23.12096
W1	-28.18493	23.09796
W2	-28.19608	23.11855
W3	-28.1838	23.12167
SBE1	-28.18711	23.12198
SBE2	-28.18696	23.12161
K1	-28.24233	23.0778
K2	-28.24427	23.07632
K3	-28.25652	23.10989
WP115	-28.17528	23.09539
WP116	-28.15955	23.1043
WP117	-28.16337	23.09627
WP118	-28.16269	23.09699
WP119	-28.16919	23.076
WP120	-28.21263	23.07686

<table>
<tr><th rowspan="2">Aspect</th><th rowspan="2">Impacts requiring monitoring programmes / objectives</th><th colspan="3">Functional requirements for monitoring</th><th rowspan="2">Roles and responsibilities</th><th rowspan="2">Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions</th></tr>
<tr><th>Detailed Actions</th><th>Monitoring Location</th><th>Parameters</th></tr>
<tr><td></td><td></td><td colspan="3">
<table>
<tr><td>WP121</td><td>-28.14541</td><td>23.10784</td></tr>
<tr><td>WP122</td><td>-28.11285</td><td>23.11917</td></tr>
<tr><td>WP123</td><td>-28.20302</td><td>23.09042</td></tr>
<tr><td>WP124</td><td>-28.15578</td><td>23.102253</td></tr>
</table>

All existing geological borehole data that is available should be incorporated into a more detailed and geological model update;
Update the existing numerical groundwater model to incorporate all the information collected
Groundwater will be monitored for the following parameters:

Physical Parameters
Groundwater levels
Physico Parameters
<table>
<tr><th>Physical Constituents</th><th>Macro-Constituents and Metals</th></tr>
<tr><td>pH, Electrical Conductivity (EC), Dissolved Solids, Suspended Solids, Chemical Oxygen Demand (COD), Dissolved Oxygen</td><td>Total Alkalinity as $CaCO_3$, Total Hardness as $CaCO_3$, Fluoride (F), Sodium (Na), Potassium (K), Chloride (Cl), Nitrite (NO_2), Nitrate (NO_3), Sulfate (SO_4), Calcium (Ca), Magnesium (Mg), Ammonia as NH_3 Iron (Fe), Manganese (Mn) and Aluminium (Al), zinc and nickel, arsenic, copper, and lead</td></tr>
</table>

Petroleum hydrocarbon contaminants (where applicable, near workshops and petroleum handling facilities)
Sewage related contaminants (E. coli, faecal coliforms) in borehole in proximity to sewage package plant.

</td><td></td><td></td></tr>
<tr><td>Surface water</td><td>Downstream water quality</td><td colspan="3">

In case where local tributaries within the mine right area start to flow water, it is recommended that water samples be taken to measure compliance of the operation. Establish a surface water monitoring programme upstream and downstream of the mine area
Surface water will be monitored for the following parameters:

Chemical Parameters:

Nutrients: Total Inorganic Nitrogen (TIN), phosphate
Metals: fluoride (F), Aluminium (Al), arsenic (As), cadmium (Cd), chromium VI (Cr VI), copper (Cu), mercury (Hg), manganese (Mn), nickel (Ni), lead (Pb), selenium (Se), zinc (Zn)
Major Ions: electrical conductivity (EC), calcium (Ca), potassium (K), magnesium (Mg) sodium (Na), chloride (Cl), sulphate (SO_4), alkalinity
Other: E. coli, faecal coliforms

Field Parameters:
Dissolved oxygen, pH, EC and temperature.
</td><td>Midtron, ECO, Contractors, water quality specialist</td><td>Monthly monitoring and reporting</td></tr>
<tr><td>Surface water</td><td>Earth works and vegetation clearing during construction, operation and decommissioning</td><td colspan="3">Assess area for erosion and spillages</td><td>Midtron, ECO, Contractors, water quality specialist</td><td>Weekly or daily during high rainfall periods until construction and decommissioning are complete</td></tr>
</table>

Aspect	Impacts requiring monitoring programmes / objectives	Functional requirements for monitoring			Roles and responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		Detailed Actions	Monitoring Location	Parameters		
Surface water	• Use and storage of chemicals, including refueling areas	• Maintain storage areas; • Clean and dispose in accordance with legislation.			Midtron, ECO, Contractors, water quality specialist	Daily inspection to ensure no leaks are visible; Clean-up in the event of spills.
Surface water	• Operations	• Monitor and maintain stormwater containment systems; • Clean and dispose in accordance with legislation. • Samples must be collected from the PCD and evaporation dams as necessary if stormwater is to be discharged and analyse for hydrocarbons and metals to assess level of contamination; • Monitor water resources.			Midtron, ECO, Contractors, water quality specialist	Weekly or daily inspection during high rainfall periods; Monthly/ quarterly water quality samples for PCD and downstream water resources.
Terrestrial Ecology	• Establishment and spread of alien invasive species.	• An alien invasive species (AIS) control programme must be developed and implemented during all phases of the proposed project; • AIS control should be undertaken in both the project site, and natural habitat and rehabilitated areas immediately adjacent to the site; • It is recommended that the programme include: o A combined approach using both chemical and mechanical control methods; o Periodic follow-up treatments, informed by regular monitoring; and o Monitoring should take place in disturbed areas, as well as adjacent undisturbed areas.			Midtron, ECO, Contractors, Ecologist	Bi-annually
Terrestrial Ecology	• Loss of SCC	• Permanent monitoring plots must be established in areas surrounding the surface infrastructure and rehabilitated areas. These plots must be designed to accurately monitor the following parameters: o Measurements of crown and basal cover; o Species diversity; o Species abundance; o Impact of dust on flora; o Recruitment of indigenous species; o Alien vs. Indigenous plant ratio; o Recruitment of alien and invasive plant species; o Erosion levels and the efficacy of erosion control measures; o Vegetation community structure including species composition and diversity which should be compared to pre-development conditions; and o Presence, abundance and condition of floral SCC communities.			Midtron, ECO, Contractors, Ecologist	Bi-annually
	• Rehabilitation success o The rehabilitation plan must be continuously updated in accordance with the monitoring results in order to ensure that optimal rehabilitation measures are employed; o Results of the monitoring activities must be taken into account during all phases of the proposed mining development and action must be taken to mitigate impacts as soon as negative effects from mining related activities become apparent; and o The method of monitoring must be designed to be				Midtron, ECO, Contractors, Ecologist	Every 5 years

<table>
<tr><th rowspan="2">Aspect</th><th rowspan="2">Impacts requiring monitoring programmes / objectives</th><th colspan="3">Functional requirements for monitoring</th><th rowspan="2">Roles and responsibilities</th><th rowspan="2">Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions</th></tr>
<tr><th>Detailed Actions</th><th>Monitoring Location</th><th>Parameters</th></tr>
<tr><td></td><td>subjective and repeatable in order to ensure consistent results.</td><td colspan="3"></td><td></td><td></td></tr>
<tr><td>Aquatic Ecology</td><td>Changes in surface water quality due to contamination from heavy construction equipment</td><td colspan="3">The mine should implement a monthly monitoring programme for surface water at all the aquatic habitat sites identified in the Aquatic habitats Report
The mine should also implement a monthly aquatic monitoring programme at points downstream and upstream of the rivers and streams for comparative analysis between the upstream and downstream sites;
Information from this monitoring can be used to quickly implement management actions should there be 1) a significant change in water quality directly downstream of the project area and/or 2) an exponential increase in TDS above 100mg/l.
More frequent surface water quality monitoring may be required during construction; this should be implemented in agreement with the mitigation measures set out in of the surface water report.
Post-closure monitoring of the aquatic habitats shall also be undertaken</td><td>Midtron, ECO, Contractors, Aquatic habitat Specialist</td><td>Monthly</td></tr>
<tr><td>Aquatic Ecology</td><td>Loss of ecological communities due to increased sedimentation and the potential mobilisation of pollutants</td><td colspan="3">Visual monitoring of soils within the 100m buffer of all aquatic habitats shall be undertaken.</td><td>Midtron, ECO, Contractors, Aquatic habitat Specialist</td><td>Monthly</td></tr>
<tr><td>Aquatic Ecology</td><td>Loss or alteration of habitat: riparian vegetation and/or in-stream channel habitat
Degradation of aquatic Ecosystems due to increased sedimentation and erosion
Changes in surface water quality due to contamination from heavy construction equipment
Loss of Ecological communities due to increased sedimentation and the potential mobilisation of pollutants</td><td colspan="3">An on-site ECO should be appointed to conduct on-site audits of the above mitigation measures, as well as an external auditor to conduct annual compliance.
Develop and implement aquatic biomonitoring programme for the Present Ecological Status (PES) and ensure the Recommended Ecological Category (REC) of category C of the aquatic habitats as provided in the Aquatic habitats Assessment Report with monitoring indices and frequencies as below:
<table>
<tr><th>Integrity</th><th>Aquatic biomonitoring index</th><th>Wet Season Monitoring</th><th>Dry Season Monitoring</th></tr>
<tr><td>Physico-chemical</td><td>In situ water quality (pH, TDS, DO, DO%, temperature)</td><td>√</td><td>√</td></tr>
<tr><td rowspan="2">Physical</td><td>IHAS</td><td>√</td><td>√</td></tr>
<tr><td>Physical habitat/site characteristics</td><td>√</td><td>√</td></tr>
<tr><td rowspan="3">Biological</td><td>SASS5</td><td>√</td><td>X</td></tr>
<tr><td>Ichthyofauna</td><td>√</td><td>X</td></tr>
<tr><td>Diatoms</td><td>√</td><td>√</td></tr>
</table></td><td>Midtron, ECO, Contractors, Aquatic habitat Specialist</td><td>As indicated under functional requirements</td></tr>
<tr><td>Noise</td><td>Noise Receptors</td><td colspan="3">One month prior to the construction phase, a suitable baseline noise monitoring assessment should be undertaken at the nearby sensitive receptors to establish baseline concentrations prior to the construction phase;
During construction, noise monitoring should be implemented quarterly;
During operations, noise monitoring should be implemented on an annual basis;
Any noise complaints should be directed to the site management. Complaints and any actions arising from a</td><td>Midtron, ECO, Contractors</td><td>Monthly monitoring and reporting</td></tr>
</table>

Aspect	Impacts requiring monitoring programmes / objectives	Functional requirements for monitoring			Roles and responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		Detailed Actions	Monitoring Location	Parameters		
		complaint will be recorded in a complaint register to be maintained by site management.				
Blasting	• Vibrations; • Flyrock • Destruction/damage to infrastructure	• The following elements should be part of such a monitoring program: o Ground vibration and air blast results; o Blast Information summary; o Meteorological information at time of the blast; o Video Recording of the blast; o Fly rock observations; • • A crack survey and vibration monitoring should be conducted at the nearest residence for each blasting cycle			Mine Engineer ECO SHE Officer	For each blasting cycle
Visual	• Visual Intrusion and loss of sense of place	• Visual monitoring shall be implemented around the mine; • The visual monitoring programme will be based on the following parameters: o Airborne dust (in line with air quality assessment) o Visibility of lights at night from surrounding receptors; o Number of lights visible; o Vegetation cover and height; and o Disturbance to receptors.			Contractors Midtron ECO	Annual
Traffic	• Risk of vehicle collision • Risk of pedestrian accidents • Degradation of Public Roads	• Develop a detailed traffic management plan that takes the following into account: o Indicate areas where heavy vehicles will be expected with adequate signage. o Provide adequate turning lanes at all access points to the mine. o Cover materials being transported with tarpaulins where possible, o Dust suppression on roads. o Clearly indicate pedestrian crossings. o Educate drivers on potential areas of high pedestrian and cyclist activity. o Educate community on dangers of construction vehicles new to their area. o The deterioration of public roads over time must be monitored and a maintenance plan must be negotiated with the Provincial Authority.			Contractors Midtron	
Health and Safety	• Health and safety of personnel	• Routine safety checks, safety training and Inspections to be carried out during the construction and operation phase to enforce the use of Personnel Protective Equipment (PPE). This must also be included in the safety requirements of the Contract.			ECO, Site Manager, Contractor	Routine inspection and Quarterly reporting

Aspect	Impacts requiring monitoring programmes / objectives	Functional requirements for monitoring			Roles and responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		Detailed Actions	Monitoring Location	Parameters		
Waste Management	• Waste Management	• Maintain a waste manifest book to record volumes of waste leaving the site, including recyclables. • Keep safe disposal certificates on file on site for Hazardous waste. • Way Bridge slips must be obtained for all other waste streams and kept on file on site			ECO, Site Manager	Monthly daily and report on a monthly basis
Heritage resources	• Destruction of graves and cultural resources	• No activities shall impact graves and sites of heritage or cultural importance			ECO, Site Manager Heritage Specialist-when required	Monthly monitoring and reporting
Paleontology	• Destruction and sealing of fossils	• No activities shall impact fossils			ECO, Site Manager Paleontologist, when required	Monthly monitoring and reporting
	• Stormwater Management	• Visual monitoring based on sediment • Clean water must be kept separate from contaminated water emanating from the project sites			ECO, Site Manager	Monthly daily and report on a monthly basis Annual GN704 audits

40 Frequency of submission of performance assessment report

A monthly site visit and report shall be compiled by the ECO and will include all aspects of the EMPr, as required.

Annual environmental audits must be undertaken to ensure compliance with the EMPr and EA/WML. The environmental audit reports must also include the financial provision and must be submitted to the DMR.

41 Environmental Awareness Plan

It is important to ensure that the Contractors and employees associated with the proposed project the appropriate level of training and awareness to ensure that continual environmental due diligence and conservation is exercised at all levels of work carried out. Employees, contractors and sub-contractors must be made aware of their responsibilities in terms of relevant legislation, guidelines as well as this EMPr and EA.

Environmental conditions will be included in the contracts issued to the contractors, making them aware of the potential environmental impacts and risks associated with the proposed project. The importance of implementing the conditions in the EMPr and the necessity of good housekeeping practices will be made known to the contractors and employees of Midtron and the contractors in order to prevent accidental spillages and avoid subsequent environmental impacts.

Training needs will be identified based on the EMPr requirements and capacity of Midtron employees and contractors. In order to ensure environmental due diligence and protection of environmental harm, it is vital that all employees are trained to perform their designated role in alignment with the EMPr and EA.

The aim of the environmental awareness plan is to:

- Promote environmental education and conservation within the working place;
- Inform employees and contractors on the applicable environmental procedures and programmes;
- Provide job specific training on the specification of environmental conservation and protection applicable to the respective construction activities.

41.1 Communication of environmental risks

The training pertaining to the environmental awareness will include the following:

- All personnel (construction and operation staff) will undergo induction, which as a minimum will include Safety, Health and Environmental awareness;
- All attendees will sign an acknowledgement register upon receiving and understanding the induction;
- Environmental risks will be identified together with the specific job training that may be required to address these risks. Construction and operation staff will be trained on the implementation of emergency procedures where relevant.

An Environmental Awareness and Risk Assessment Schedule has been developed and is outlined in Table 41-1. The purpose of this schedule is to ensure that onsite employees are not only rained, but that the principles are continuously re-enforced.

Table 41-1: Environmental Training and Awareness Schedule

Frequency	Time allocation	Objective
Induction (all staff and workers)	1-hour training on environmental awareness training as part of site induction	Develop an understanding of what is meant by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects. Establish a basic knowledge of the environmental legal framework and consequences of non -compliance. Clarify the content and required actions for the implementation of the EMPr. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.
Monthly Awareness Talks (all staff and workers)	30 minutes awareness talks	Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily task-based risk assessment	Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily toolbox talks.

41.2 Mitigation and management of Environmental Risks

As prescribed in Table 41-1, Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

41.2.1 Environmental Awareness Training Content

Induction Training: The following environmental awareness training will be provided to all staff and workers who will be involved in all the activities at the mine:

- Description of the approved activities and content of the mining right;
- An overview of the applicable legislation and regulations as they relate to environmental, health, safety and community;
- Content and implementation of the approved EMPr specifically:
  - Allocated roles and responsibilities;
  - Management and mitigation measures; and
  - Identification of risks and requirements adaptation.
- Sensitive environments and features:
- Description of environmentally sensitive areas and features; and
- Prohibitions as it relates to activities in or in proximity to such areas.
- Emergency Situations and Remediation:
  - Methodology for the identification of areas where accidents and emergencies may occur, communities and individuals that may be affected;
  - An overview of the response procedure;

  - Equipment and resources;
  - Designate of responsibilities;
- Communication, including communication with the potentially affected communities and responsible authorities; and
- Training schedule to ensure effective response.

41.2.2 Development of procedures and checklists

The following procedures will be developed, and all staff and workers will be adequately trained on the content and implementation thereof:

- Emergency Preparedness and Response: The procedure will be developed to specifically include risk identification, preparedness, response measures and reporting. The procedure will specifically include spill and fire risk, preparedness and response measures. The appropriate emergency control centres (fire department, hospitals etc.) will be identified and the contact numbers obtained and made available on site. The procedure must be developed in consultation will potentially affected landowners. In the even that risks are identified, which may affect adjacent landowners (or other persons), the procedure will include appropriate communication strategy to inform such persons and provide response measures to minimize the impact.
- Incident Reporting Procedure: Incident reporting will be undertaken in accordance with an established incident reporting procedure to:
  - Provide details of the responsible person, including any person who
  - Is responsible for the incident;
  - Owns any hazardous substance involved in the incident;
  - Was in control when the incident occurred.
  - Provide details of the incident (time, date, location);
  - The details of the cause of incident;
  - Identify aspects of the environment affected;
  - The details of corrective action taken; and
  - The identification of any potential residual or secondary risks that must be monitored and corrected or managed.
- Environmental and Social Audit Checklist: An environmental audit checklist will be established to include the environmental and social mitigation and management measures as developed and approved as part of the EMPr. Non-conformances will be identified, and corrective action taken where required.

42 Manner in Which Risks Will Be Dealt with In Order to Avoid Pollution or The Degradation of The Environment

The effectiveness and efficiency of this plan will be monitored by the performance of annual audits aimed at testing the environmental awareness of employees directly and the analysis of the root causes of environmental incidents, including non- conformance to legal requirements, to determine which incidents were caused by a lack of environmental awareness and training. Midtron will establish a trained and equipped emergency response team to deal with foreseeable incidents such as fires, accidents and environmental impacts and to evaluate the Environmental Awareness Plan. This evaluation will entail the auditing of the operation during the construction and operation phase once the activity has commenced.

Management shall establish and maintain procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external I&APs. The organisation shall consider processes for external communication on its significant environmental aspects and record its decision. Communication is a management responsibility. All line supervisors are responsible for effective communication within their own sections. Environmental risks will be dealt with through training and communication to ensure minimal degradation of the environment.

The Environmental Awareness Plan should be sufficient to make all those involved with the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks. Midtron and its contractors should take the Environmental Awareness Plan seriously in order to show that they are sensitive to the environment's well–being, empowerment of the local people and returning the land to appropriate use once the reclamation activities have been completed.

Non-compliance should be dealt with by the SHE and site manager on a case-to-case basis. Secondary offenders or serious offences should be dealt with immediately, and where necessary disciplinary hearings and suspension should be considered.

43 Specific Information Required by The Competent Authority)

All information committed to in the scoping report and as requested by the DMR to date has been incorporated in the EIA/EMPr.

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by NEMA, as amended, which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually as required by the DMR.

44 Conclusion and Recommendations

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed Midtron mining project in accordance with the requirements of the NEMA and National Environmental Management: Waste Act, 2008 (Act 59 of 2008) (NEM: WA). This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the Impact Assessment Phase of this study. Specialist input has been included for all key environmental aspects that were identified during the scoping phase of the process.

Various specialist studies were undertaken during the EIA Phase of the proposed project with the objective of identifying and weighing anticipated impacts and risks associated with the mining activities as well as in accordance to all relevant legislative requirements.

The findings of the impact assessment have shown that the proposed project will have negative impacts on the receiving environment, including:

- Land use change;
- The loss of aquatic habitat and ecoservices for the creation of the open cast mining blocks and construction of infrastructure;
- Reduction in catchment yields as dirty water runoff within the mine will be contained;
- Loss of floral species and species diversity;
- Loss and fragmentation of habitat of faunal species and direct loss of fauna which will be expected to move from the area as a result of increased anthropogenic activities;
- Groundwater and surface water contamination due to chemical contamination from hazardous substance and fuel to be stored at the mine;
- Groundwater loss and flow from the pit will also contribute toward baseflow reduction; and
- Nuisance noise, dust and visual impacts.

Where possible, mitigation and management measures, no-go areas, as well as further recommendations have been provided by specialists which will lead to a reduction in the significance of these impacts to medium and low significance, including:

- Ensuring the layout of the mining infrastructure does not impact on the aquatic habitats and 100 m regulated buffer;
- Stormwater management plan must be developed and implemented;
- Re-vegetation of the rehabilitated areas with indigenous species;
- Where possible rehabilitation will be conducted in tandem with construction and operational phases of the project;
- Develop and implement a biodiversity management plan; and
- The land use and the overall land capability as the soil can be rehabilitated to be reused for agricultural purposes.

Monitoring plans, which should be implemented throughout the life of the mine, have also been provided to ensure that adverse impacts are reduced, and continuous improvements are made.

With the correct and effective mitigation and management measures, including the protection of aquatic habitats located outside the footprints of the mining areas and infrastructure, the mining operations are feasible.

Furthermore, the indirect impacts from the proposed development could cause negative impacts on the surrounding natural environment, unless this is also managed and monitored in order to address adverse impacts immediately. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DFFE should monitor activities during the construction, operational and closure phases of the proposed mine.

An EMPr has been developed as part of this EIA to ensure the mitigation of these impacts as far as practicable. It is anticipated that it will be possible to mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented. The EMPr is considered adequate to assist the project in striving towards the principles of the NEMA.

The project team believes that the EIA undertaken for the proposed Midtron mining project fulfils the process requirements of the NEMA and the NEM: WA. The EAP recommends that an EA/WML be issued by the DMR and that the construction and operation of the mine should be conducted under duty of care and must be in accordance with the recommendations that were included in this EIA/EMPr Report as well as conditions that will be included in the EA/WML by the DMR.

46 Undertaking regarding correctness of information

I Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

Signature of the EAP

DATE: 25 July 2022

47 Undertaking regarding inclusion of comments and inputs from stakeholders and I&APs

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties have been correctly recorded in the report.

Signature of the EAP

DATE: 25 July 2022

48 Undertaking regarding inclusion of inputs and recommendations from the specialist reports

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the inputs and recommendation from the specialist reports have been included in the EIA/EMPr Report.

Signature of the EAP

DATE: 25 July 2022

49 Undertaking regarding the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed

I, Ndivhudzannyi Mofokeng herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

Signature of the EAP

DATE: 25 July 2022

50 Statement of Ndi Geological Consulting Services (Pty) Ltd independence

Neither Ndi Geological Consulting Services nor any of the authors of this report have any material present or contingent interest in the outcome of this report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of Ndi Geological Consulting Services.

Ndi Geological Consulting Services has no prior association with Midtron in regard to the mineral assets that are the subject of this report. Ndi Geological Consulting Services has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

Ndi Geological Consulting Service's fee for completing this report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the report.

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

Appendices

Appendix 1: EAP Qualifications

EAPASA
Unit 19 Oxford Office Park
3 Bauhinia Street
Highveld Techno Park
Centurion
0157
Tel. (+27) 12 880 2154

Environmental Assessment Practitioners Association of South Africa
Advancing environmental assessment practice in South Africa

Email: registrar@eapasa.org / Website: www.eapasa.org

Mrs Ndivhudzannyi Mofokeng
38 Ophelia street
38 Ophelia street
Kimberley
8301

Sent by email to: atshidzaho@gmail.com

Dear Mrs Mofokeng

Registered Environmental Assessment Practitioner: Number 2020/1554
Ndivhudzannyi Mofokeng : South African ID 8406210420080

The Environmental Assessment Practitioners Association of South Africa (EAPASA) herewith certifies that Ndivhudzannyi Mofokeng is a Registered Environmental Assessment Practitioner (EAP) in accordance with the prescribed criteria of Regulation 15.(1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Your registration is duly authorised by EAPASA as the single Registration Authority for EAPs in South Africa (appointed as per Regulation No. 104, Gazette No. 41434 of 8 February 2018, in terms of section 24H(3)(a) of the NEMA). Your status as a Registered EAP is displayed in the 'EAP Register' - please find your name and contact email address at

https://registration.eapasa.org/registered-practitioners

Your registration is effective for a period of five years from 31 August 2020, and expires on 31 August 2025. The renewal of your registration in 2025 will be contingent on you having met the requirements of EAPASA's Continuing Professional Development (CPD) policy during each year of registration.

As a Registered EAP you are required to uphold the EAPASA Code of Ethical Conduct and Practice in your professional endeavours, towards the goal of quality assurance in environmental assessment practice.

Please accept my congratulations on your registration.

Best regards

RCHill

Dr Richard Hill
Registrar
Date: 31 August 2020

University of Venda

KNOWLEDGE IS PRECIOUS

This is to Certify that the Degree of

Bachelor of Earth Sciences in Mining and Environmental Geology

was Awarded to

MUDAU NDIVHUDZANNYI

at a Ceremony held on the

19-SEP-2008

in Accordance with the Provisions of the Act and Statute

Vice Chancellor

University Registrar

Dean

Appendix 2: EAP CVs

Address: Herlear, Kimberley, Northern Cape Province, South Africa
Email: atshidzaho@gmail.com
Mobile: +27 (0) 82 760 8420
Citizen : Republic of South Africa

PERSONAL DETAILS

Names	: Ndivhudzannyi
Surname	: Mofokeng
ID Number	: 8406210420080
Nationality :	: South African
Gender :	: Female
Marital Status :	: Married
Drivers License	: Code 10
Home Language :	: Tshivenda
Other Languages	: English and Setswana

CAREER SUMMARY

Ndivhudzannyi graduated with an Honours degree in Earth Science majoring in Mining and Environmental Geology. She is a self-motivated and hardworking Geologist with 10 years' experience in the environmental, mining exploration, open cast work and consulting in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and Percussion Drilling). Proven field experience in exploration i.e. mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, supervisory duties in the field. Ndivhudza also has experience in writing geological reports including Prospecting Work Programmes and Environmental Management Plans, handling DMR documents in general.

KEY SKILLS

- Data management
- QAQC analysis
- Geological modeling
- Rock core logging
- Rock drilling supervision
- Geological surface mapping
- Surface mining supervision
- Geological and resource modelling in 3D
- Technical report writing

KEY PROFFESSIONAL ASSOCIATIONS AND QUALIFICATIONS

GEOLOGICAL SOCIETY OF SOUTH AFRICA (GSSA)

Membership No: 969222

2009 BACHELOR OF SCIENCE IN MINING AND ENVIRONMENTAL GEOLOGY (BESMEG), GEOLOGY (HONOURS)

University of Venda, South Africa

EMPLOYMENT HISTORY

May 2014 – to date **Consultant Geologist – NDI Geological Consulting**

Managing Director

Responsibilities:

- Compiling geological reports for various areas to be incorporated in the Prospecting Work Permits (PWP) and Mining Permit applications for various commodities in South Africa as required in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- Producing sketch plans and geological maps to be incorporated in the PWPs for Prospecting Right, Mining Permit and MWP applications
- Writing desktop studies reports for various commodities in South Africa and other african countries
- Interpretation of sampling analytical results and review of small scale mining projects
- Provide geological information for mining
- Conduct site visit for inspection on the mines
- Compiling Mining Work Programme
- Have the financial and technical ability to run a project
- Compilation of Environmental Management Plans/Programmes
- Writing of Scoping Report, Social& Labour Plan, Prospecting Work Programme. Reporting on Results of Consultation
- Section 11 and 102 Applications, Closure Applications
- Annual Reporting-Performance Assessment Report

February 2013 – May 2014 **Consultant Geologist – Centre for Advanced Satellite and Mineral Exploration- Geoscientific Mineral Resources Consulting**

In this role I reported to the CEO

Responsibilities:

- I was appointed as a geologist to compile Geological Packages for Africa and Asia (Liberia, Angola, Mali, Nigeria, Portugal, South Africa, Zambia, Republic of the Union of Myanmar and Mongolia).
- Interpretation based on Quickbird 600mm Resolution Archive Satellite Image Data, Digital Elevation Data, Satellite Image Data ASTER, Satellite Image Data LANDSAT LCDM, Satellite Image Data Pléiades, Spectral Analysis, Synthetic Aperture Radar and Satellite Image Data RapidEye).
- Provide geological information for mining
- Site visit for inspection in the mine
- Mining Work Programme
- Financial and technical ability
- Environmental management Plan/Programme
- Scoping Report
- Social and Labour Plan
- Prospecting work programme
- Report on Results of Consultation
- Section 11 and 102 Application
- Closure application

- Annual Reporting-Performance Assessment ReportSupervising and training of field staff on iron ore and gold projects

Major Projects
 Geological Desktop Study Report for Liberia, Angola, Mali, Nigeria, Portugal, South Africa, Zambia, Republic of the Union of Myanmar and Mongolia.
Achievements
 Successful Mining Right application, Mining Permit application and Prospecting Right

---

February 2012 – December 2012 **Geologist – Pikwane Diamonds Mining Company**

In this role I reported to the Chattered Accountant and the CEO (small scale mine).

Responsibilities:

- I was appointed as a geologist to uplift section 54 issued for Bo-Karoo Company (Douglas) in January 2012 in which it was successful. Furthermore, the company was standing due to failure of compliance with rehabilitation plan. The financial provision quantum required a guarantee of R16.5M to be paid immediately. After the negotiation with the DMR to give me 1month to show the company commitment on rehabilitation, in three weeks period when I was supervising the rehabilitation, the new financial provision quantum required drop down to R13M.
- I received complement from the 10 miners I was supervising, the work ethics, communication and motivation they received was overwhelming.
- Workers were refusing to work overtime in order to meet the DMR deadline due to some in house problems occurred previously, but with my negotiation skills, motivation, and problem solving skills we end up working on 10hrs shift Monday to Sunday. The target and deadline was met with positive results within 3 weeks.
- The management where impressed with my work but I give the guys credit for giving me the opportunity to work with them.
- Grade control, face mapping, pebbles counting and drawing of cross sections
- Capturing geological data and management of database
- Provide geological information for mining
- Continuous supervision to the mining process to improve quantity and quality mined
- Status Report on the DMR documents
- Compiling prospecting work programme
- Site visit for inspection in the mine
- Field mapping
- Minor report writing and give recommendation

Major Projects
 Bo-Karoo.
Achievements
 The financial provision quantum required a guarantee of R16.5M to be paid immediately. After the negotiation with the DMR to give me 1month to show the company commitment on rehabilitation, in three weeks period when I was supervising the rehabilitation, the new financial provision quantum required drop down to R13M.

January 2010 – October 2011 **Exploration Geologist- Geo-Rock International (Pty) Ltd**

In this role I reported to the Administrator, Manager and the Principal Geologist

Responsibilities:

- Directly managing 2 geo-technicians, 3 fields assistant and the drilling contractors. Received complement from my seniors and client when I was overseeing Lohatlha and Doornfontein project.
- Involved in the supervision of prospecting and mining of different commodities (which includes supervision of trenching sites, RC drilling, field mapping and taking manganese and iron samples to the laboratory for further analysis.
- Compiling prospecting work programme.
- Conduct basic assessments and Environmental Management Programme.
- Produce Sketch Plans (Survey plan, combined plan, Topographic plan, Locality plan and Prospecting plan using Arc view 9 software), and locating the areas using GPS, and map-source.
- Setting Borehole layouts and give coordinates using the Arcview 9 software.
- Digitizing maps using Global Mapper 9 Application.
- Geological report writing for the client (desktop study).
- Drawing of cross-sections using Rockworks, Turbo-Cad and Turbo-sketch.
- Database management
- Mentoring Geo-technicians

Major Projects

- **Lohatlha and Doornfontein project**

Achievements

- **When I was overseeing the Drilling at Lohatlha we Complete 350 boreholes of reverse circulation in three months period just before the client prospecting permit expires within 2 days.**

January 2010 – October 2011 **Exploration Geologist- Rockwell diamonds Mining Company**

In this role I reported to the Mineral Resource Manager

Responsibilities:

- Directly managing 2 Exploration drilling machines and attending to complaints from contractors on site.
- Supervise exploration drilling (Reverse Circulation) and Percussion drilling.
- Pit and trench logging.
- Phase mapping.
- Samples logging.
- Provide geological information for mining and pit planning.
- Continuous supervision to the mining process to improve quantity and quality of gravel mined.

- Sampling.
- Grade control, face mapping, pebbles counting and drawing of cross sections.
- Capturing geological data and management of database.
- Training vocational students and geologist assistance.

Major Projects
Klipdam 157, Holpan 161, Saxendrift 20, Lanyon Vale 376/ Wouterspan, Makoenskloof/ Rieds Drift 74, Blaauw Bosch 78, and Zweetfontein 76

Achievements
□ Completed over 2000 RC boreholes between 2007 and 2008.
□ Completed ±350 trenches in two months (October – November 2008).

Vacation Work

- IThemba Laboratory, Department of Geophysics December 2006 to January 2007
- Rio Tinto Mining and Exploration June 2005 – August 2006

PROFESSIONAL COURSES ATTENDED

Year	Course Attended	Course Offered By
22-23 August 2012	4th Annual Mineral Resources Compliance & Reporting Conference	Department of Mineral and Resources
June - September 2010	Microsoft office and excel 2007 Training	Georock International
2008	Mentoring course	Macvlei Company
24 - 24 August 2007	Annual diamond and kimberlite symposium Kimberley, South Africa	Geological Society of South Africa Directorate of Professional Programmes' (DPP)

TECHNICAL SKILLS AND PERSONAL ATTRIBUTES

COMPUTING

- Microsoft Office (Word, Excel, PowerPoint)
- GIS (arc view) software
- Google earth
- Map Source
- Global mapper
- Topo and Rec map
- Turbo-sketch
- Turbo-Cad
- Corel Draw
- Rockwork 2006
- Base Map

KEY PERSONAL ATTRIBUTES

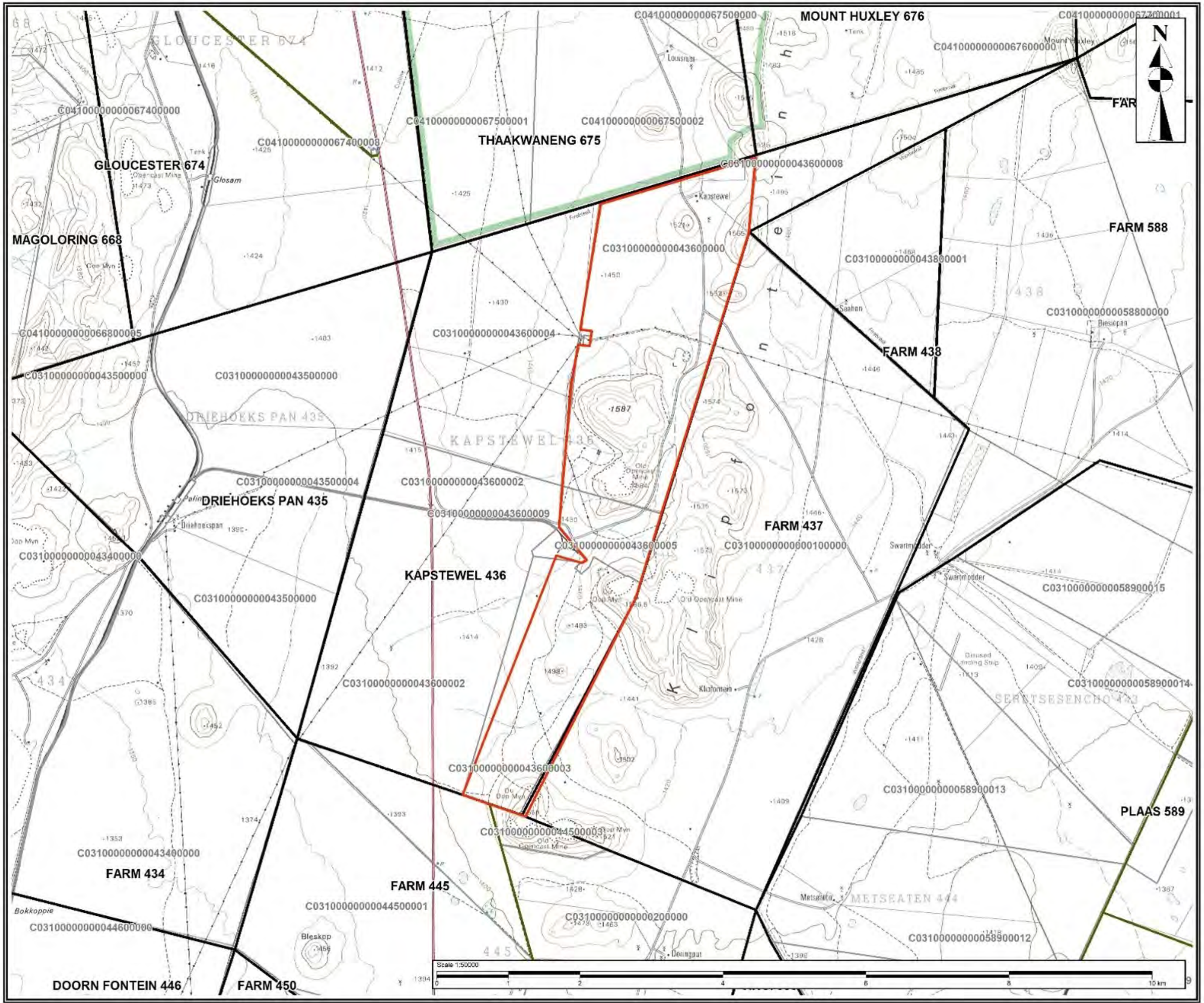
- Adaptable
  - Able to handle change and adapt to new situations.
  - Flexibility and positive attitude to change
- Communication
  - Able to communicate orally, in writing, or via electronic means
  - Excellent listener and communicator, effectively conveys information verbally and in writing.
  - Able to interact with other people at all levels of the organization.
- Confident
  - Effective judgment and decision making skills.
  - Able to see opportunities and to set and achieve goals.
  - Able to work on own initiative, with minimum supervision.

- Customer Service
  - Service oriented attitude and great customer facing skills
  - Excellent internal and external negotiation skills with ability to engage and influence clients.
  - Experience in recognition of customer needs and how to deliver an effective customer experience.
- Enthusiasm
  - Willing to learn and adapt to changing environments
  - Enthusiastic with the ability to motivate self and others in a pressurized environment.
- Leadership
  - An inspiring leader with the ability to think laterally, provide solutions and exercise independent judgment in the resolution of problems.
  - Proven leadership skills involving managing, developing and motivating teams to achieve their objectives.
- Motivated
  - Focused, self motivated and target driven; determined to succeed.
  - Self-motivated
  - High personal drive

REFEREES

Available on request

Appendix 3: Locality Maps



Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Cadastral

Legend

- Erven
- Farm Portions
- Parent Farms
- Servitude Areas
- Midtron Mining Right Area

Locality

Map by:

NDI GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Affected and Adjacent Properties

Legend

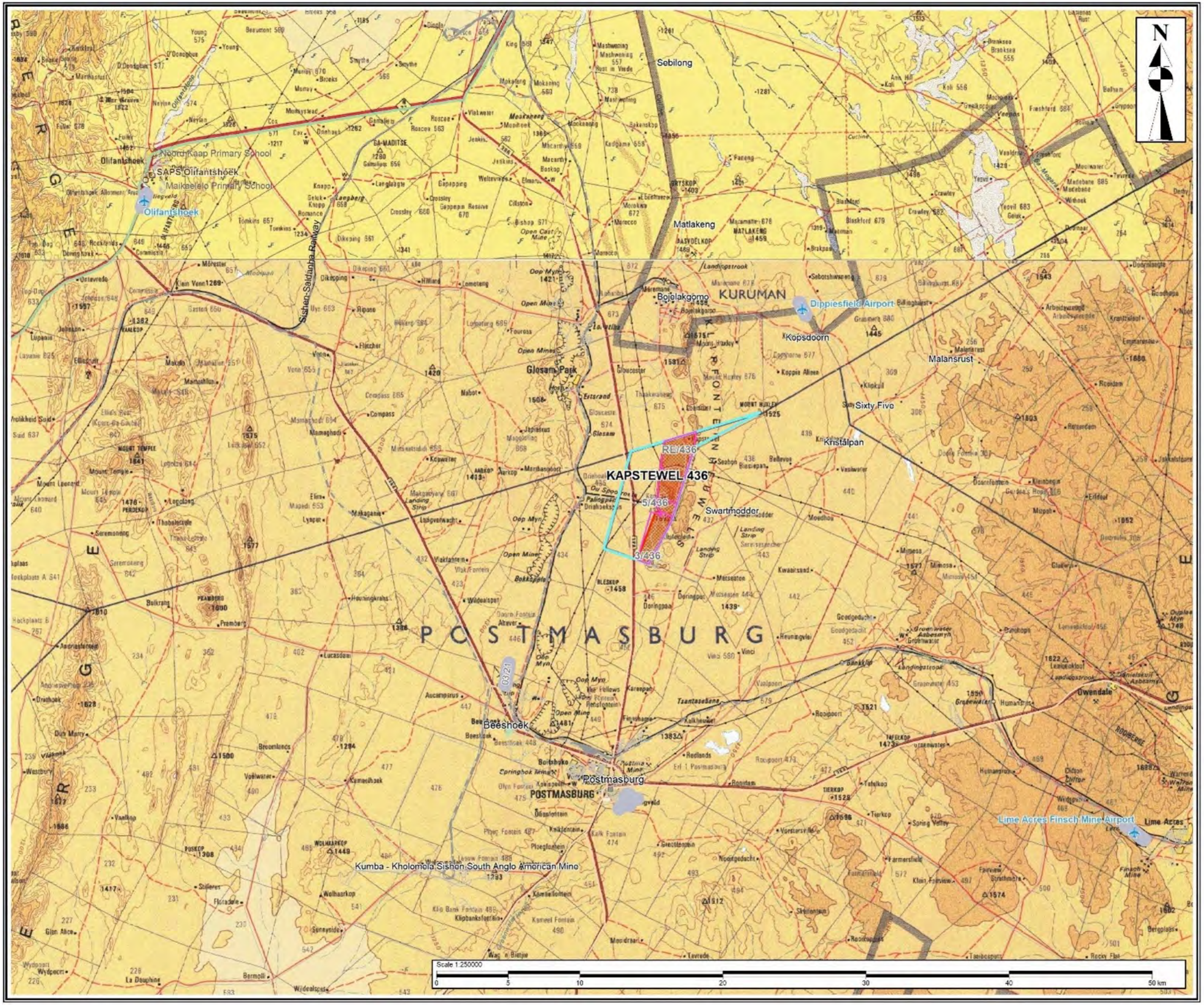
- Erven
- Farm Portions
- Parent Farms
- Servitude Areas
- Mining Right Area (Affected Propoerties)
- Adjacent Properties

Locality

Map by:

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84



Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Locality Map

Legend

- Mining Right Area Boundary
- Affected Farm
- Affected Farm Portions

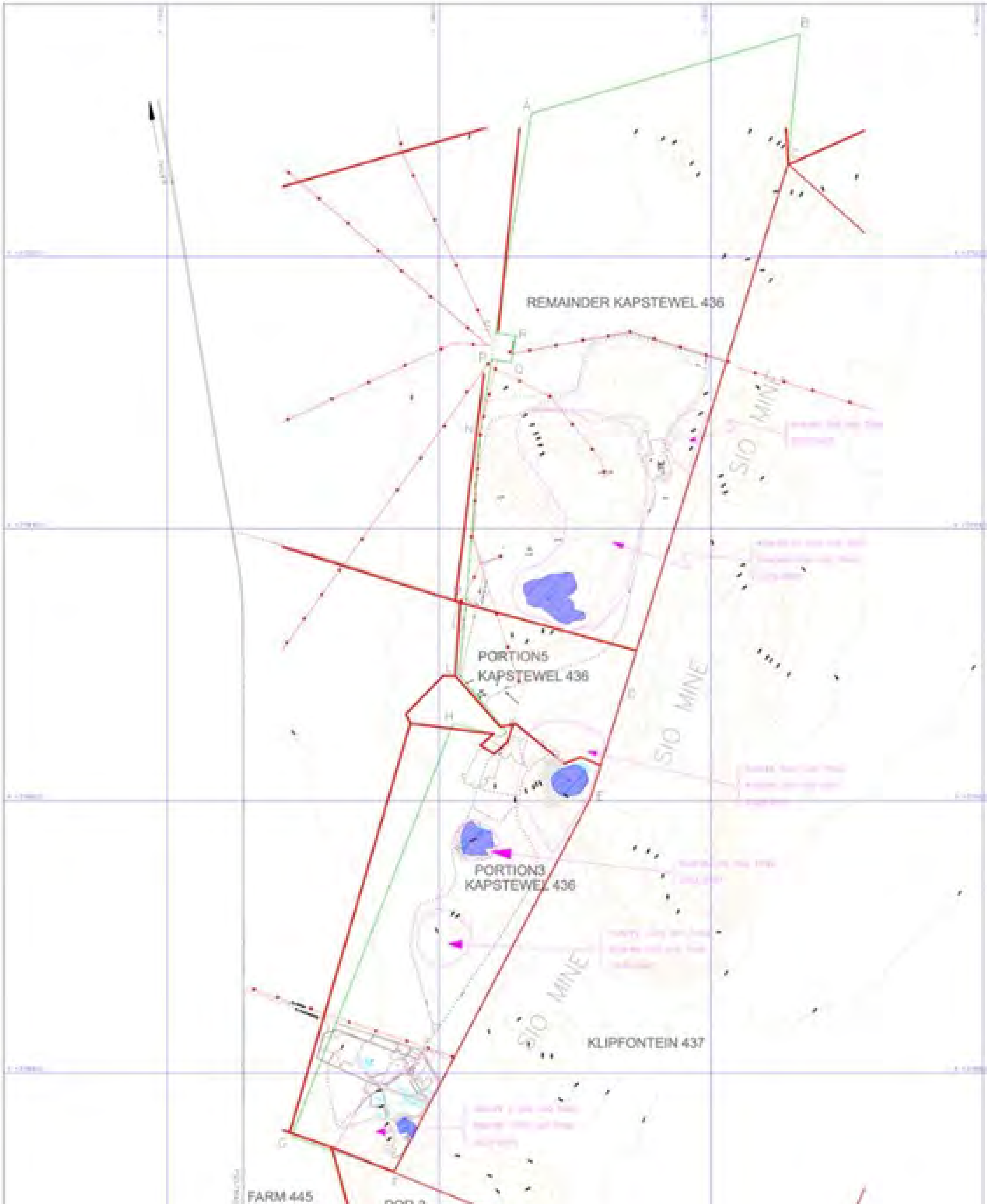
Layout:

Map by:

GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

Appendix 4: Listed Activities Map



GENET MANGANESE (PTY) LTD

GENERAL SURFACE PLAN

KAPSTEWEL

SCALE 1:11 000

HARTEBEESHOEK 94 DATUM
SURVEY SYSTEM : WGS 23
CONSTANTS Y= 0 X= 0
ALL ELEVATIONS ABOVE MEAN SEA LEVEL

SITUATED ON THE FARM KAPSTEWEL 436
MAGISTERIAL DISTRICT POSTMASBURG,
PROVINCE OF THE NORTHERN CAPE.

G.M.E. 16/15/2/....

DATE	NAME	SIGNATURE
[illegible]	[illegible]	

LEGEND

MIDTRON MINERALS (PTY) LTD

SCALE 1 : 75 000

Northern Cape Province

Administrative District of Hay

PLAN PREPARED IN ACCORDANCE WITH

REGULATION 42

OF THE REGULATIONS PUBLISHED UNDER THE
MINING TITLES REGISTRATION ACT
(ACT 16 OF 1967)

DESCRIPTION OF LAND

PROSPECTING RIGHT (NC11645PR)

THE FIGURE A, B, C, D, E, F, G, H, J, K, L, M, N, O, P Q, R, S AND A COMPRISES OF REMAINING EXTENT, REMAINING EXTENT OF PORTION 3 & PORTION 5 OF KAPSTEWEL 436, MEASURING 1584.1982ha. ADMINISTRATIVE DISTRICT OF HAY, NORTHERN CAPE PROVINCE.

SURVEY SYSTEM WGS 84WGS 84 LO 23°
HARTEBEESTHOEK 94 DATUM

CO-ORDINATES:

A	Y-10 344.188	X+3 111 038.140	P	Y-10 024.019	X+3 113 026.381
B	Y-12 522.570	X+3 110 392.275	Q	Y-10 183.282	X+3 113 051.847
C	Y-12 424.520	X+3 111 455.604	R	Y-10 216.786	X+3 112 842.271
D	Y-11 197.628	X+3 115 397.105	S	Y-10 057.459	X+3 112 816.892
E	Y-10 829.981	X+3 116 578.239			
F	Y -9 239.384	X+3 119 603.782			
G	Y -8 402.670	X+3 119 318.190			
H	Y -9 714.009	X+3 115 969.104			
J	Y-10 100.484	X+3 116 080.344			
K	Y-10 145.132	X+3 116 042.717			
L	Y -9 758.118	X+3 115 579.487			
M	Y -9 817.369	X+3 114 979.663			
N	Y -9 930.102	X+3 113 607.153			

PLAN APPROVED: ______________________

REGIONAL MANAGER NORTHERN CAPE

DATE: ______________

NAME OF APPLICANT: ______________________

SIGNED: ______________________

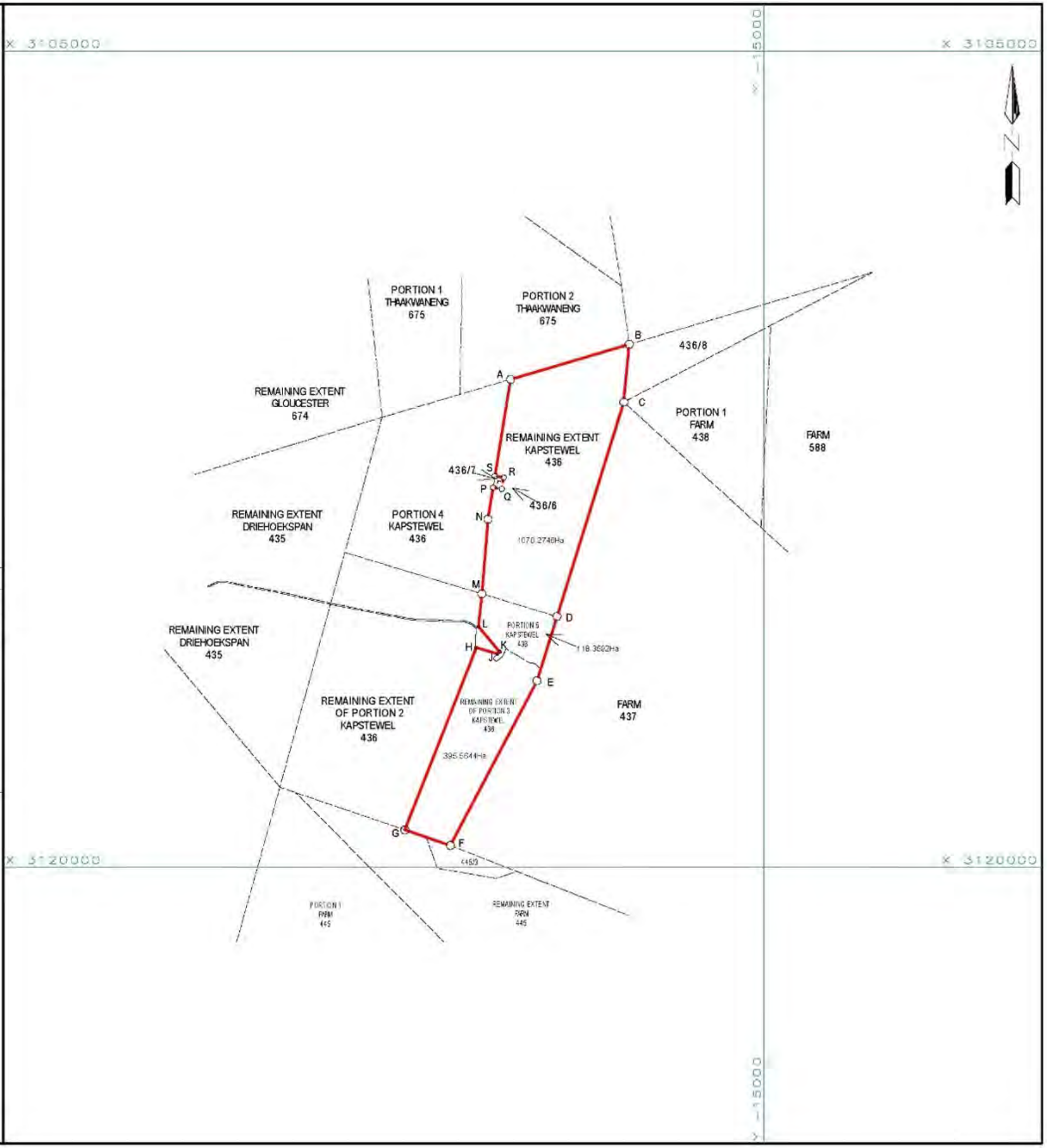
DATE: ______________

DRAWN BY: F.D. v.d. Merwe

[illegible]

[illegible]: ______________________

[illegible]



Appendix 5: Stakeholder Engagement Documentation

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
Sonny Olifant	061 254 5445	NA Geological Consu	
Itumeleng Leberegane	0735601969/0659601779	Maremane	
Andrew Momphi	0664036308	MAREMANE	
Ishmael Kanepa	0721095859-0726691128	Maremane	
Boniface Masiane	chairperson@maremanecpa.co.za 0648581934	Chairperson Maremane CPA	
Billy Dipone	tuelod@assmang.co.za 0836708609	Maremane	

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
Thabo Monamafoka	060 748 5929	MAREMANE	
Keditsente Mogaseng	0665417818	MAREMANE	
Lenna Lekgari	—	MAREMANE	
Martha Modise	—	Maremane	K Modise
Nolo Disemela	0606527795	MAREMANE	
Moloki Molofo1	076896551 4	Maremane	

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
Neo Moitalefsi	Neo.Moitalefsi@webmail.co.za 082 445 6194	Deputy Chair Maremane CPA	
Ishegofatso Polelo	067 439 3628	Maremane	
Thomas Monthi	0748739259	Makamane	
S Tshofo	072 6566484	Makamane	
Thapelo Kunene	0718359908	Makamane	
Veronica Tlhopile	0799871916	Maramane	

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
Maria Mouaberg	0761550287	Maremane	Ofogabeng
Tshoganetso Seane	079 26 10978	Maremane	
Boitumelo Tatas	0723770377	Maremane	
Meo Pelosera	0723194494	Maremane	Pelosera
Julias Samotse		Maremane	X
Andrew Legeledi	0763153292	Maremane	

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
KABELO SETLHOBI	0712888119		[signature]
Lucky Vos	0768622801	Mareman	[signature]
LopANG Gaobsenwe	0723631622	Mereman	[signature]
KAME JOY TSIMA	~~KANE~~ 0790228189	Mareman	[signature]
SANH	~~Kagbi~~ 0833855514	Kagbi	[signature]
MYAba ANNah		Mereman	[signature]

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
M Darries	0828790948	Mine Manager - Kapsteel	
Tshepang Sibanda	0794215613	Maremane	A.D. Sibanda
[illegible]	083 658 0908	[illegible]	
A V Tyanina	079 818 9548	LAXEY	
K.E. LADI	0649237024	LAXEY	
K.E Sipone	0799129474	LAXEY	

MIDTRON MINERALSPTY(LTD)-SCOPING-SLP PUBLIC MEETING 03RD JUNE 2022

POPIA DISCLAIMER: The Company complies with the Protection of Personal Information Act (POPIA) and has adopted a policy to this effect.

Name & Surname	Contact details	Designation	Signature
ANDRIES SENXE	064 886 9058	LAXEY	Senye
POPPY MOLEFI	0649730381	LAXEY	FJMolefi
GETRUDE KAOTSANE	0767811692	Laxey	[illegible]
SYLVIA MORONGWE	079 3 888 049	LAXEY	BMorongwe
Gabasekolwe Goete	0791538174	Laxey	Goete

Application for a Mining Right and Associated Environmental Authorisation and Waste Management Licence (WML) and Water Use Licence Application (WULA) for proposed Manganese and Iron Ore on the Remaining Extent of Kapstewel 436, Remaining Extent of Portion 3 of Kapstewel 436 and Portion 5 of Kapstewel 436 in the Tsantsabane Local Municipality, Northern Cape Province

REGISTRATION AND COMMENT SHEET

APRIL 2022

INITIALS		SURNAME	
ORGANISATION			
POSTAL ADDRESS			
		POSTAL CODE	
LAND LINE TEL NO		CELL NO	
FAX NO		EMAIL	

REGISTRATION AS AN INTERESTED AND AFFECTED PARTY (I&AP) (please mark applicable box with X)

Please formally register me as an interested and affected party (I&AP) so that I may receive further information and notifications during the Environmental Authorisation processes	**YES**	**NO**

I would like my notifications by:			
E-mail:	**Letter:**	**Fax/Tel:**	**SMS:**

In terms of GNR 326 (EIA regulations) I disclose below any direct business, financial, personal or other interest that I may have in the approval or refusal of the application:

....

....

Comments (Use a separate sheet if you wish to)

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street, Kimberley, 8301
Cell: 082 760 8420
Tel: 053 842 0687, Fax: 086 538 1069
atshidzaho@gmail.com, ndi@ndigeoservices.co.za

THANK YOU FOR YOUR CONTRIBUTION

By registering as an Interested and Affected Party, you consent to Ndi Geological processing your personal data for the purposes of obtaining feedback for the environmental authorisation process and to provide you with relevant information about it. Your information may be shared with selected third parties for these purposes only.

NAME:	**SIGNATURE:**	**DATE:**

711 LOST DEED

LOST OR DESTROYED DEED

NOTICE IS HEREBY GIVEN IN TERMS OF REGULATION 68 OF THE DEEDS REGISTRIES ACT, 1937, OF THE INTENTION TO APPLY FOR THE ISSUE OF A CERTIFIED COPY OF Deed of Transfer T58/2005 passed by Anna Adriana Susanna Elizabeth Viljoen in favour of Getruida Johanna Dorothea Vermeulen in respect of Erf 161 Ritchie, situated in the Sol Plaatje Municipality Province of the Northern Cape which has been lost or destroyed.

All interested persons having objection of issue of such copy are hereby required to lodge same in writing with the Registrar of Deeds at Kimberley within two weeks from the date of the publication of this notice.

Dated at Kimberley This 5th day of May 2022

Duncan & Rothman
PO Box 64, Kimberley, 8300
Ilene@duncan-rothman.co.za
Telnr : 053 838 4700
File Ref: STA9/1761

711 LOST DEED

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of:

Deed of Transfer No. T 3058/2008 passed by **ROSS WILLIAMS, IDENTITY NUMBER 640323 5034 08 9**, Married out of community of property, in favour of **CA AUTOLEK CC, REGISTRATION NUMBER 2005/170184/23**, in respect of **ERF 1743 KIMBERLEY, SITUATE IN THE SOL PLAATJE MUNICIPALITY, DISTRICT KIMBERLEY**, Province of the Northern Cape, In extent 429 (FOUR HUNDRED AND TWENTY NINE) square metres, which has been lost or destroyed.

All interested persons having objection of issue of such copy are hereby required to lodge same in writing with the Registrar of Deeds at Corner of Knight & Stead street, Kimberley within two weeks from the date of the publication of this notice.

Dated at Kimberley on this 04 MAY 2022.

Van De Wall Inc
DS Corns Office Park
Second Floor
69 Memorial Road
Kimberley, 8300
Tel nr : (053) 830 2900
Email : gladys@vanwall.co.za
File Ref : D15946/Gladys Venter

711 LOST DEED

LOST OR DESTROYED DEED

NOTICE IS HEREBY GIVEN IN TERMS OF REGULATION 68 OF THE DEEDS REGISTRIES ACT, 1937, OF THE INTENTION TO APPLY FOR THE ISSUE OF A CERTIFIED COPY OF

Title Deed Transfer Number T5246/2004
In favour of Thapelo Samuel Moahlodi and Molemoeng Sophie Moahlodi
In respect of certain Erf 24926 Galeshewe, situated In Sol Plaatje Local Municipality, Registration Division Kimberley, Province of the Northern Cape Which was lost or destroyed.
All interested persons having objection of issue Of such copy are hereby required to lodge the same In writing with the Registrar of Deeds At Kimberley Within two weeks from date of the publication of This notice.

Dated at KIMBERLEY
This 03rd day of May 2022.
Motlhamme Attorneys
1st Floor
4 Jacobus Smit Avenue
Labram
Kimberley, 8300
motlhamme@motlhamme.co.za
Tel: 053 244 0063
Ref: BLM/1256

LOST OR DESTROYED DEED

Notice is hereby given in terms of Regulation 68 of the Deeds Registries Act, 1937, of the intention to apply for the issue of a certified copy of Deed of Transfer Number **T1301/2003** passed by **HENDRIK PETRUS COETZEE** and **HESTER SOPHIA COETZEE** in favour of **RENé DELPHENE BEZUIDENHOUT** in respect of certain **ERF 30581 KIMBERLEY, SITUATE IN THE SOL PLAATJE MUNICIPALITY, DISTRICT KIMBERLEY,** has been lost or destroyed. All interested persons having objection to the issue of such copy are hereby required to lodge the same in writing with the Registrar of Deeds at Kimberley within two weeks from the date of publication of this notice.

Dated at **Kimberley** on this **4th day** of **May 2022.**

PGMO ATTORNEYS INC
3A Bean Street, Kimberley
Tel: (053) 831-3221
E-mail: **magda@hmoattorneys.co.za**
Ref: ABS2/3260

714 PUBLIC NOTICES

APPLICATION FOR A MINING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/2/2/10207MR.

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE MRA/ EA/WML APPLICATION PROCESSES

Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

Ndi Geological Consulting Services (Ndi Geological) was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the EA/WML process.

Location: The above mining project will cover an area of 1 584.198 hectares and is located approximately 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province

Environmental Authorisation Process: The project triggers activities listed in Listing Notice 1, 2 and 3, which requires that a full Environmental Impact Assessment (EIA) (with Scoping and Impact Assessment phases) process be followed.

Draft Scoping Report Available for Comment: Stakeholders are invited to register as Interested and Affected Parties (I&APs), attend public meeting and to comment on the Draft Scoping Report (draft SR). The Draft SR will be available for public review for a 30-day period from 06 May 2022 to 06 June 2022. All comments received on the report will be incorporated into the final SR that will be submitted to the DMR for final decision making.

Stakeholder Engagement and Public Comments Invited: Chapter 6 of the NEMA requires the applicant to inform all potential Interested and Affected Parties (I&APs) of the proposed project and application for EA. We hereby invite you to register as an I&APs and provide comments on the application and draft SR though written submissions and/or comment by email, fax or telephone on the contact details below.

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Ndivhudzannyi Mofokeng
38 Ophelia Street, Kimberley, 8301
Contact Numbers:
082 760 8420/ 053 842 0687
Fax: 086 538 1069
atshidzaho@gmail.com/ndi@ndigeoservices.co.za

Please submit written comments by mail, fax or email by 06 June 2022.

714 PUBLIC NOTICES

ELECTORAL COMMISION

NOTICE OF APPLICATION FOR REGISTRATION OF A PARTY IN TERMS OF SECTION 16(1)(a) OF THE ELECTORAL COMMISION ACT, 1996(ACT No. 51 of 1996)

1. Notice is hereby given that the COMMUNITY ALLIANCE SOUTH AFRICA is applying for registration in terms of the Electoral Commission Act, 1996 (Act No 51 of 1996).
2. Date on which the application will be or has been submitted to the Chief Electoral Officer: 15 July 2022
3. The abbreviation of the name of the party. CASA
4. The distinguishing mark or the symbol of the party is printed underneath
5. Anyone wishing to raise an objection against the intended registration must do so by written notice in which are set out the grounds for the objections and which must be delivered at the office of the Chief Electoral Officer within fourteen days after the publication of this notice.

This advertisement was paid for by the specific political party.

714 PUBLIC NOTICES

APPLICATION FOR A MINING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/2/2/10207MR.

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE MRA/EA/WML APPLICATION PROCESSES

Notice is hereby given that the draft Environmental Impact Assessment Report (draft EIR) for Midtron Minerals (Pty) Ltd (Midtron) proposed mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended is available for review and comment for a 30-day period, from 25 July 2022 to 25 August 2022.

Location: The above mining project will cover an area of 1 584.198 hectares and is located approximately 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province

Copies of the Draft EIR are available on **https://www.ndigeoservices.co.za/** or can be obtained from the Independent Environmental Assessment Practitioner (EAP) on the details below. The consultant team will be available for questions and answers on the

We hereby invite you to attend a public meeting scheduled for the 29 July 2022 @ PMG Guest Lodge, 13 Jordaan Street from 09h00 -11h00am.

Please submit your written comments by mail, fax or email by **25 August 2022 to the EAP:**

Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street, Kimberley, 8301
Contact Numbers 082 760 8420
Fax: 086 538 1069
atshidzaho@gmail.com/ndi@ndigeoservices.co.za

714 PUBLIC NOTICES

NOTICE OF AN ENVIRONMENTAL IMPACT ASSESSMENT FOR THE CLEARING OF 70Ha and 226Ha RESPECTIVELY OF VEGETATION ON PORTION 2 (A PTN OF PTN 1) OF FARM CLYDESDALE NO. 156, HERBERT

Notice is hereby given in terms of Section 41 of the Schedule published in GNR 326, of the NEMA Regulations (2014 as amended in April 2017) of t h e intent to submit two Scoping Reports and Environmental Impact Assessments for two separate applications that is on the same property and the same applicant, to undertake the following:

Location:
Ptn 2 (a Ptn of Ptn 1) of the Farm Clydesdale No. 156, Herbert, Northern Cape
70Ha: 29° 14' 52.42"S; 23°48' 17.79"E
226Ha: 29° 14' 24.57"S; 23°50' 01.09"E

Proponent:
Duikersvlei Boerdery (Pty) Ltd.

Activities:
1. GNR 325: 7 April 2017, Activity (15): The clearance of an area of 20Ha or more of indigenous vegetation.
2. GNR 324: 7 April 2017, Activity (12) g.ii.: The clearance of an area of 300m2 or more indigenous vegetation in the Northern Cape within a critically biodiversity area identified in bioregional plans.
3. GNR 324: 7 April 2017, Activity (4) g.ii.gg.:The development of a road wider than 4m with a reserve less than 13.5m in the Northern Cape, outside of urban areas where the site is within 10km from a national park or world herniate site or 5km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas.

If you consider yourself an interested and/or affected person/party, you must register and comment in writing to Digital Soils Africa before or on 15 August 2022 before 5pm. Should you require further information or access to environmental documentation, please contact the office before the said date.

Please send your enquiries and/or comments to:
Digital Soils Africa Tel: 067 622 5687
1 Kemsley Street Email: natalie@dsafrica.co.za
Port Elizabeth
6001

Date of Notice:
15 July 2022

714 PUBLIC NOTICES

NOTICE FOR PUBLIC MEETING FOR APPLICATION FOR A MINING RIGHT APPLICATION

DMR REFERENCE NUMBER: NC 30/5/1/2/2/10184 MR

Notice is hereby given to the general public in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002 as amended), the National Environmental Management Act, 1998 (Act 107 of 1998 as amended "NEMA") with the Environmental Impact Assessment Regulations 2014 (EIA Regulations- Chapter 6) as well as the National Environmental Management: Waste Act 2008 (Act 59 of 2008 and the National Water Act 1998 (Act 36 of 1998) where applicable.

NAME OF APPLICANT
Lewapi Mining (Pty) Ltd

BACKGROUND/ DESCRIPTION AND LOCATION
Lewapi Mining (Pty) Ltd has applied for the Mining Right with the Department of Mineral Resources (Kimberley Region) and has been accepted for Diamonds on Remainder of Portion 2 of the Farm Torquary 157, Portion 2 (A Portion of Portion 1) and Remainder of the Farm Tullocgorum 158 situated within the administrative district of Herbert in the Northern Cape Province. The Farm is approximately 5160.9734 Ha and located in the immediate surroundings of Hay district near the Douglas in the Northern Cape

INVITATION TO PARTICIPATE AND COMMENT
All interested and affected parties are invited to the public participation meeting where information regarding the project will be shared and discussed:

VENUE: Salt Lake Community Hall
DATE: 13th August 2022
TIME: 12h00 pm 13h00 pm

For more information contact Ms. T Manena on the following details:
E-mail Address: tshivheaho@gmail.com Office Number. 072 935 9379.
Postal address 27 De Beers Road, Kimberley, 8301, Kimberley 8301

To advertise in the classifieds call 053 832 6261

714 PUBLIC NOTICES

NOTICE IN RESPECT OF A LICENCE APPLICATION IN TERMS OF SECTION 21, 27, 40 and 41 OF THE NATIONAL WATER ACT NO 36 OF 1998

This notice serves to inform all interested and affected parties that Agricola Nova (Pty) Ltd, herein referred to as the applicant has applied for a Water Use Licence on:

The farm: Stoffelshoek no 81
Registration Division: Hopetown
Deeds registry: Cape Town
Municipality: Thembelihle

The purpose of the application is for the applicant to be granted a licence to engage in agriculture irrigation development activities.

Any objections or comments in respect of the application can be lodged by contacting the department of water and Sanitation, Bloemfontein at the below contact details within a period of thirty (30) working days from the date of publication of this notice.

For any enquiries contact Department of Water and Sanitation at the Bloemfontein Office on 051- 405 9000.

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APPLICATION FOR A PROSPECTING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON PORTION 4 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/1/2/13077PR.

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE PR/EA/WUL APPLICATION PROCESSES

Notice is hereby given that Refentse Mining Resources (Pty) Ltd (Refentse) applied for a Prospecting Right (PR) on the 15th August 2021 and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended. The application was accepted on the 01st June 2022.

Refentse appointed Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological) as the independent Environmental Assessment Practitioner (EAP) to facilitate the EA/WML process for the proposed Manganese and Iron ore prospecting project.

Location: The above PR project will cover an area of 780.50 hectares and is located 23km north of the town of Postmasburg and approximately 40km southeast of the town of Olifantshoek in the Northern Cape Province.

Environmental Authorisation Process: The project triggers activities listed in Listing Notice 1, 2 and 3, which requires that a full Environmental Impact Assessment (EIA) (with Scoping and Impact Assessment phases) process be followed.

Draft Scoping Report Available for Comment: Stakeholders are invited to register as Interested and Affected Parties (I&APs), attend public meeting and to comment on the draft SR. The Draft SR will be available for public review for a 30-day period from 15 July 2022 to 15 August 2022. All comments received on the report will be incorporated into the final SR that will be submitted to the DMR for final decision making.

We hereby invite you to attend a public meeting scheduled for the 29 July 2022 @ PMG Guest Lodge, 13 Jordaan Street from 11h30-13h30.

Stakeholder Engagement and Public Comments Invited: Chapter 6 of the NEMA requires the applicant to inform all potential I&APs of the proposed project and application for EA. We hereby invite you to register as an I&APs and provide comments on the application and draft SR though written submissions and/or comment by email, fax or telephone on the contact details below.

Ndivhudzannyi Mofokeng
38 Ophelia Street, Kimberley, 8301
Contact Numbers: 082 760 8420/ 053 842 0687
Fax: 086 538 1069
atshidzaho@gmail.com/ndi@ndigeoservices.co.za

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Please submit written comments by mail, fax or email by 15 August 2022.

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DIKGATLONG LOCAL MUNICIPALITY

IDP, BUDGET AND PMS PROCESS PLANS FOR THE REVIEW OF THE 2022/2023 AND PREPARATION FOR THE 2023/2024 FINANCIAL YEAR

The Municipal Systems Act (2000) Mandates all municipalities to annually review their Integrated Development Plans (IDP's), to make amendments in response to changing circumstances and to make the necessary contents and process improvements.

Dikgatlong Municipality Council is planning to adopt the Process Plans for the IDP, Budget and Performance Management Systems in August 2022 and agree on a public participation schedule (consultation process with the community) to review their priority issues accordingly.

Broader Stakeholders and all affected parties are encouraged to make comments on the Draft Process plan that is due to be tabled for approval by the end of August 2022. All the stakeholders are invited to make their inputs on the draft document at the municipal offices (Monday to Friday) (7h30-16h30) or alternatively send a mail to **mseele@dikgatlong.co.za** on or before the 15th August 2022.

The process plan will be placed on the municipal website **www.dikgatlong.co.za** for perusal and comment.

For more information please contact the IDP Manager, Mr L.M. Seele at Tel: (053) 531 6500 during office hours.

Ms B Tsinyane
Acting Municipal Manager

Private Bag X5
Barkly West
8735
Tel: 053 531 6500
Fax: 053 531 0624

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UMSOBOMVU LOCAL MUNICIPALITY
Continuously Rising

UMSOBOMVU MUNICIPALITY: REQUEST FOR PRICE QUOTATIONS: FOURTEEN DAYS NOTICE

Requests for price proposals are herewith invited for the following bids:

1. Security Services: Bid No. 07/07/2022: Security Services Colesberg Workshop/Traffic Complex: Colesberg

Type of Service	Time of Duty	Duration	Type of Guard
Security of Fixed and Moveable Assets	16:30 to 07:45 Mondays to Fridays Saturdays, Sundays and Public Holidays 24hrs	12 months	Grade F

2. Security Services: Bid No. 08/07/2022: Security Services: Noupoort Workshop Complex: Noupoort

Type of Service	Time of Duty	Duration	Type of Guard
Security of Fixed and Moveable Assets	16:30 to 07:45 Mondays to Fridays Saturdays, Sundays and Public Holidays 24hrs	12 months	Grade F

4. Please Note:

- Sealed bids, endorsed with the corresponding description must be placed in the Bid Box at the office of Umsobomvu Municipality, 21 A Church Street, COLESBERG. Postal and hand deliveries must reach Umsobomvu Municipality, Private Bag X 6, COLESBERG, 9795, not later than **12:00 on 29 July 2022**, after which the bids will be opened in public.
- Bids which are deposited late, incomplete, unsigned, not accompanied by the documents required or submitted per facsimile or electronically will not be considered.
- All bids will be adjudicated and awarded in terms of the Umsobomvu Supply Chain Management Policy, the Preferential Policy Framework Act 2000 (Act No. 5 of 2000) and the regulations promulgated in terms of this Act and on the following criteria: Price = 80 points. BBBEE contribution level = 20 points.
- All bidders must be registered on the Central Suppliers Database (log on **www.csd.gov.za** for registration and the tax status on the CSD must be compliant.
- Service Providers must be registered with PSIRA and registration documents must accompany the bid.
- Bids are to hold good for a period of 90 days.
- A certification must be submitted that the bidder does not have undisputed commitments for municipal services or rates towards a municipality which is overdue more than 30 days.
- A current original SARS Tax Clearance Certificate or a SARS Verification PIN must be supplied.
- Certified evidence of BBBEE status issued by SANAS, IRBA or SANAS accredited agencies to claim preference points.
- Council is not bound to accept the lowest or any bid and reserves the right to any bid or part of part thereof.
- Bids submitted by persons in the service of government (national, provincial, local or SOCs') will not be considered.
- Further specifications and or information can be obtained from the Snr. Manager Corporate Services, at (051) 7530777.
- These bids are subject to the General Conditions of Contract (GCC) and, if applicable, any other Special Conditions of Contract.
- MBD 4, 6.1, 6.2, 7.1, 8 and 9, obtainable from Umsobomvu Municipality or on the website (www.umsobomvumun.co.za), must be completed and signed.

Mr. A.C. Mpela
Umsobomvu Municipality
Private Bag X6
COLESBERG
9795

Notice No. 20/2022
Date: 8 July 2022

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KATHU GAZETTE
www.nkmedia.co.za
www.facebook.com/Kathu.Gazette

KATHU

Kumba Sishen mine closes Youth Month with motivation for the youth

Kumba Iron Ore's Sishen mine used the last days of Youth Month, June 2022, to present an inspirational workshop for the youth.

The objective of the workshop was to promote sustainable livelihoods and develop the resilience of young people to empower them for a better tomorrow.

This multi-faceted workshop, presented at the Mapoteng multipurpose centre, covered the second-chance matric programme offered by the Socio Economic Development section, how to write a CV, interview etiquette and learnership programmes.

Representatives from Sishen mine presented sessions on SMME registration and procurement procedures for entrepreneurs and opportunities for women in mining.

FAMSA presented the importance of taking care of one's mental health and the realities of human trafficking in the area and the assistance they offer.

Local entrepreneurs, teachers, members of the Gamagara local municipality, Women in Mining, LoveLife and local SMMEs partnered with the mine to ensure the success of the event. While some were part of the programme, others motivated young people to participate.

Local businesses provided goods and services, such as transporting the young people to the event, refreshments for those who attended and entertainment, this, in the mine's bid to empower local SMMEs.

Women in mining

"Being a woman does not bar you from studying and working as a mining engineer. Women bring a diversity of perspectives to mining and also play a significant role in its transformation. We are generally more risk-averse and contribute to a healthier and safer workplace. I want to encourage young people to create a world that embraces diversity. The language we use when speaking about differences and diversity in society is a key factor in bringing this change about," said Sandra Seabela, Section Manager and WIM Chairperson at Sishen mine.

Thandiwe Mapi, Specialist Community Liaison at Kumba Iron Ore Sishen mine addressed the youth.

Addressing unemployment

"Our youth development initiatives have equipped thousands of young people to be absorbed by local businesses, and it has delivered excellent candidates for top management positions in the company. Our talent management programmes show how mining can stimulate growth and development in a country with a staggering high youth unemployment rate of more than 60%," said Thandiwe Mapi, Specialist Community Liaison.

Sishen's youth development programmes include opportunities for emerging talent, learnerships in the mining, plant and engineering fields, portable skills development and projects to create opportunities for enterprising young people outside the mining environment. The motivation for this long-term approach is to build a self-sustaining regional economy beyond the life of the mine.

Our Sustainable Mining Plan

"Our youth development activities align with our Sustainable Mining Plan, which aims to build thriving communities through sustainable interventions in education, health and well-being, and livelihoods. The plan sets out an ambitious target for all learners living in our host communities to perform nationally within the top 20% of state schools. We also aim to create five jobs offsite for every direct job we create in our operational sites. This will enable us to contribute positively to eradicating South Africa's triple challenges of poverty, inequality and unemployment," said George Benjamin, Manager Corporate Affairs and Social Performance.

Anglo American communication

VRYBURG

Stock Theft : Minibus loaded with 21 sheep

The vigilance of two SAPS Vryburg officers resulted in the arrest of a 43-year-old minibus occupant on Saturday 09 July 2022 for possession of 21 suspected stolen sheep.

The Vryburg K9 unit members were conducting patrol on the N14 road between Vryburg and Kuruman at about 01:00 when they spotted a suspicious and stationary minibus along the road. Upon approaching the vehicle for enquiries, the police saw two individuals fleeing from the scene leaving the 43-year old man behind. A subsequent search led to the discovery of 21 sheep which were found loaded in the minibus. The suspect was arrested after failing to account for the possession and the vehicle was impounded.

Preliminary investigation showed that the minibus ran out of petrol while the suspects travelled to a yet to be determined destination from where the sheep were allegedly stolen at Tsineng village. The lawful owner of the sheep was traced through tattoo marks on the sheep.

Investigation into the matter is underway and the suspect appeared in the Vryburg Magistrates Court on Monday 11 July 2022.

APPLICATION FOR A PROSPECTING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON PORTION 4 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/1/2/13077PR.

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Refentse appointed Ndi Geological Consulting Services (Pty) Ltd (Ndi Geological) as the independent Environmental Assessment Practitioner (EAP) to facilitate the EA/WML process for the proposed Manganese and Iron ore prospecting project.

Location: The above PR project will cover an area of 780.50 hectares and is located 23km north of the town of Postmasburg and approximately 40km southeast of the town of Olifantshoek in the Northern Cape Province.
Environmental Authorisation Process: The project triggers activities listed in Listing Notice 1, 2 and 3, which requires that a full Environmental Impact Assessment (EIA) (with Scoping and Impact Assessment phases) process be followed.

Draft Scoping Report Available for Comment: Stakeholders are invited to register as Interested and Affected Parties (I&APs), attend public meeting and to comment on the draft SR. The Draft SR will be available for public review for a 30-day period from 15 July 2022 to 15 August 2022. All comments received on the report will be incorporated into the final SR that will be submitted to the DMR for final decision making.

We hereby invite you to attend a public meeting scheduled for the 29 July 2022 @ PMG Guest Lodge, 13 Jordaan Street from 11h30-13h30.

Stakeholder Engagement and Public Comments Invited: Chapter 6 of the NEMA requires the applicant to inform all potential I&APs of the proposed project and application for EA. We hereby invite you to register as an I&APs and provide comments on the application and draft SR though written submissions and/or comment by email, fax or telephone on the contact details below

Ndivhudzannyi Mofokeng
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Contact Numbers: 082 760 8420/ 053 842 0687 | Fax: 086 538 1069
atshidzaho@gmail.com / ndi@ndigeoservices.co.za
Please submit written comments by mail, fax or email by **15 August 2022.**

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

APPLICATION FOR A MINING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/2/2/10207MR.

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE MRA/EA/WML APPLICATION PROCESSES

Notice is hereby given that the draft Environmental Impact Assessment Report (draft EIR) for Midtron Minerals (Pty) Ltd (Midtron) proposed mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended is available for review and comment for a 30-day period, from 25 July 2022 to 25 August 2022.

Location: The above mining project will cover an area of 1 584.198 hectares and is located approximately 15km north of the town of Postmasburg, approximately 40km south-east of the town of Olifantshoek, approximately 50km south of the town of Kathu in the Northern Cape Province

Copies of the Draft EIR are available on https://www.ndigeoservices.co.za / or can be obtained from the Independent Environmental Assessment Practitioner (EAP) on the details below. The consultant team will be available for questions and answers on the

We hereby invite you to attend a public meeting scheduled for the 29 July 2022 @ PMG Guest Lodge, 13 Jordaan Street from 09h00-11h00am.

Please submit your written comments by mail, fax or email by **25 August 2022 to the EAP:**

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street, Kimberley, 8301
Contact Numbers 082 760 8420 | Fax: 086 538 1069
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KATHU GAZETTE
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SIYATHEMBA

JTG DSAC hosted Freedom Day

Officials from JTG DSAC, Gamagara local municipality, Siyathemba SAPS, loveLife, JTG and GCIS.

Freedom Day is the commemoration of the first democratic elections held in South Africa on 27 April 1994. These were the first post-apartheid national elections to be held in South African where anyone could vote regardless of race.

On 27 April 2022 a joined-partnership between JTG Department of Sports, Arts and Culture (DSAC), Liberty Foundation, Gamagara local municipality, Siyathemba SAPS, JTG GCIS and the community of Siyathemba hosted the Freedom Day commemorations at Siyathemba community hall.

Representatives from government and NGO's gave a message of support as part of their contribution.

The keynote speaker was Councillor Virginia Keloneilwe Dithupa from Ward 2. She represented the office of the mayor at the auspicious event.

The government calls on everyone to use the Freedom Month and Freedom Day celebrations to pull together over the coming weeks and months. Let us continue to fight the virus while striving for greater inclusion and social cohesion.

Although we have made remarkable progress since 1994, the spectre of inequality, poverty and unemployment remains one of the most glaring impediments to South Africa's goal of national unity and social cohesion.

We also dare not forget the terrible past from which we have come, nor should we forget the many sacrifices made by patriots to ensure our democracy and freedom. Our history abounds with selfless patriots who paved the way for a democratic and free South Africa.

This year marks the 150th anniversary of struggle icon and human rights campaigner Charlotte Maxeke. She and other selfless women of her generation fought against oppression at a time when such defiance was met with unrelenting force.

APPLICATION FOR A MINING RIGHT AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) AND WATER USE LICENCE APPLICATION (WULA) FOR PROPOSED MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE. DMR REFERENCE: NC30/5/1/2/2/10207MR.

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE MRA/EA/WML APPLICATION PROCESSES

Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

Ndi Geological Consulting Services (Ndi Geological) was appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the EA/WML process.

Location: The above mining project will cover an area of 1 584.198 hectares and is located approximately 15 km north of the town of Postmasburg, approximately 40 km south-east of the town of Olifantshoek, approximately 50 km south of the town of Kathu in the Northern Cape Province

Environmental Authorisation Process: The project triggers activities listed in Listing Notice 1, 2 and 3, which requires that a full Environmental Impact Assessment (EIA) (with Scoping and Impact Assessment phases) process be followed.

Draft Scoping Report Available for Comment: Stakeholders are invited to register as Interested and Affected Parties (I&APs), attend public meeting and to comment on the Draft Scoping Report (draft SR). The Draft SR will be available for public review for a 30-day period from 06 May 2022 to 06 June 2022. All comments received on the report will be incorporated into the final SR that will be submitted to the DMR for final decision making.

Stakeholder Engagement and Public Comments Invited: Chapter 6 of the NEMA requires the applicant to inform all potential Interested and Affected Parties (I&APs) of the proposed project and application for EA. We hereby invite you to register as an I&APs and provide comments on the application and draft SR through written submissions and/or comment by e-mail, fax or telephone on the contact details below.

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Fax: 086 538 1069
atshidzaho@gmail.com / ndi@ndigeoservices.co.za

Please submit written comments by mail, fax or e-mail by **06 June 2022.**

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

POSTMASBURG

Lief & Leed

Mimi Swart

Siek/hospitaal: Mev Magda van der Walt wat eers in Bloemfontein in die hospitaal was, is nou in Kimberley in die hospitaal nadat komplikasies ingetree het. Ons verneem sy maak goeie vordering.

Mev Minnie van Rensburg van Shamstraat is ongesteld en wagtend op 'n moontlike operasie. Sy teenwoordigheid by u toegebid.

Spreuke vir die week

Teëspoed sif die vriende uit wat voorspoed geoes het.
C J Langenhoven

Maak in die somer hout bymekaar en sit in die winter by die vuur.
C J Langenhoven

Dagboekdatum: 7 Mei 2022 - Fondsinsameling. Verkoping vir Huis Jan Vorster by gemeentesentrum om 09:00. Gebak: koek, brood, tert, beskuit ens.

Kathu Gazette wishes all our Mothers a lovely day with your loved ones on Mother's Day !

Aan al ons Moeders, mag u 'n wonderlike Moedersdag geniet saam met u geliefdes ! Van Kathu Gazette

GEOLOGICAL CONSULTING SERVICES
PTY (LTD)

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MINUTES OF CONSULTATION AND PUBLIC PARTICIPATION

VENUE : MAREMANE CPA HALL

DATE : 04 June 2022 ; TIME 11H00

AGENDA

1. WELCOME AND INTRODUCTION: -

Ndi Geological Consulting Services lead by Mrs N. Mofokeng (Ndi) welcomed everyone present and introduced themselves as the Lead Consultant appointed by Midtron Minerals (Pty) Ltd. Ndi went on to explain the purpose of the meeting and informed every one of the general rules of the meeting.

2. Opening by prayer: -

A volunteer (name not recorded) from one of the members of the community opened the meeting with a prayer.

3. ATTENDANCE AND OR APOLOGIES: -

The rules on how the meeting was going to be conducted were read out to everyone
Attendance register was circulated.

4. PURPOSE OF THE MEETING: -

It was indicated that the purpose of the meeting was:

- to inform the public regarding the Mining Right Application;
- to explain the legal procedures regarding the EIA and SLP process;
- to convey information and the current status regarding the draft Scoping report and
- to allow the general public to raise concerns and/or support regarding these matters.

5. APPLICATION FOR MINING RIGHT: -

Solly from Ndi Geological Consulting Services conducted the presentation and for the purpose of the meeting, the presentation was conducted in two languages, i.e., English and Setswana – **Annexure A-Presentation Attached**

5.1 QUESTIONS AND COMMENTS ARISING FROM THE PRESENTATION: -

In wrapping up the presentation, Ndi explained the importance of communities to attend the meetings as this is where information regarding the impact of the mining operation on the environment is shared, as well as how communities can protect their environment by making sure that mining companies follow the right process. She further explained that it is in this type of consultation where communities are informed about the developments that the mining company can bring to their communities.

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From the presentation, attached herewith, Ndi explained how Midtron Minerals Pty (Ltd) selected the LED project and that should the community not accept the identified project, the project will not be adopted. The community has the right to give consent to the LED project identified.

She further explained that besides the identified projects on the SL, the mine also makes commitments for Human Resource Development where beneficiaries are encouraged to apply for bursaries and internships that the mine will continue to allocate to members of the community for as long as the mine is in existence.

Lastly, it was indicated that the budget for all SLP projects amounts to 1% of the Mines Annual Profit and is budgeted for a period of 5 years.

Comment:

The chairman Mr Boniface Masiane indicated that, as community members of Maremane, they appreciate the information shared with them especially on the issue of study opportunities like bursaries that are going to be made available within their community. The speaker also said that they have requested this from the other mines that as the community of Maremane, they do not want their SLP to form part of the Municipality because most of the time, mining companies only focus on developing communities and towns like Postmasburg, and development never reach them.

Response by **Ndi:** Ndi noted the speaker's comments.

Comment: Mr Neo Moitaletsi

The speaker indicated that it was not the first time that they had this type of meetings in their community, however requested that the next time these types of meeting take place, DMR must also be present. He requested for clarity regarding the applicant as he could not remember if it was announced.

Response by Ndi: She indicated that Midtron Minerals was the applicant and Kapstewel was the area of application (Mining area).

Mr Neo Moitaletsi: Again, reiterated that the reason for insisting that the DMR be present was because they are the ones issuing licenses to mining companies and they were the right party to hold mining companies responsible for commitments made in their presence. He indicated that DMR was failing communities in this regard since most companies are none-compliant, but nothing is being done, to a point where one would think that DMR is receiving brown envelopes from the non-compliant companies.

His second point was that he has noted that the document that was recently presented was not inclusive in that what was mentioned on the document addresses only one component on the SLP which is the social aspect and there was no mention of the Enterprise development and the Labour component of the SLP,

Mr Neo Moitaletsi also added that as the community they would like to be provided with the whole plan of what the mine is going to implement in the community of Maremane on an annual basis in terms of skills development, enterprise development and community development. This was for the community to be able to monitor the mining company based on the document provided to them as it seemed then that the consultant team was only there to consult and get the application submitted for approval/ granting. The bottom line was that as the community they wanted to know the numbers and budget allocated for each item listed on the SLP document, the consultant team

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needed to come back to the community with the plan so that they can agree with what is in the SLP before the right is granted.

Ndi's response was that: It was indicated in the opening stage of the meeting that transparency was very important. She made it clear that when Mr Olifant started with the presentation, he did indicate that the Mine Works Plan and the SLP are public documents and are available. Everything that **Mr Neo Moitaletsi** has mentioned was available for public review. She indicated that the SLP document was still a draft document and had not yet been approved by the DMR, pointing out to the slide in the presentation which reflected the SLP financial provision.

It was also mentioned that another very important issue to note was that the mines are expected to spend 1% of their annual profit on SLP, this includes all aspects in the SLP such as skills development and LED projects. Whatever it is that the mine will be committing itself to, will be based on projections of how the operation will perform financially.

Ndi also confirmed that the meeting was recorded, and everything discussed was going to be submitted to the DMR in a form of minutes, and in that way DMR will be aware of everything that has been discussed. She also made **Mr Neo Moitaletsi** aware that as a member of the community of Maremane, he had every right to go and knock on the doors of DMR to make his voice heard.

Mr Neo Moitaletsi's other concern was that the mine must determine the skills that will be required for the mine to start operating and based on that train the community before the mine starts operating.

Ndi's response: She stated that Midtron cannot implement anything until the right is granted as they are operating under a prospecting right. All that needed to be done was to speed up the process of the application of the mining right so that the mine can start operating under mining right and implement its commitments.

Mr Neo Moitaletsi said that the DMR which they as the community are being sent to, was a very useless department, DMR had failed them on several occasions. The meetings that were held between the community and the DMR were not fruitful to a point where the community even wrote to the Minister, but nothing was done still. **Mr Neo Moitaletsi** went on to advice the consultant team that the involvement of DMR in the project will result in failure. He alleged that DMR sold the community land to the mines that do not benefit anything to the community.

Ndi responded by saying that as an EAP, one of her responsibilities was to not take sides. Hearing what **Mr Neo Moitaletsi** said that all previous attempts with the department were in vain, they needed to keep trying. She promised to get them contact details for the DMR.

Comment: Elizabeth Mogabeng

Elizabeth Mogabeng mentioned that she has been a resident of Maremane since 2007. She has expressed her anger on several issues related to housing and the road. She indicated that the mention of the word mines breaks her heart and angers her. What further breaks her heart is that during the apartheid era, most of them never got the opportunity to go to school and that they were basically illiterate. She expressed disappointment in the Maremane leadership which they referred to as the CPA and the mining companies around the community that were letting them down. Mines like Kitso, Futureshine, Ladino etc are operational in the area but the community remain

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disadvantaged. No developments taking place in the community, people have been struggling to get water for the past 15 years, there's lack of infrastructure, there's totally nothing happening in Maremane. When people get sick, they are expected to seek medical attention in Postmasburg by hikes/taxis, while they are unemployed.

Elizabeth Mogabeng further expressed her disappointment with the mines in that when they want their applications to be successful, they make a lot promises to the communities that they never fulfil. She also added that she was temporarily blind because of the teargas that was used by the police on them and that her son was also walking around with rubber bullets because they were protesting the mines. She went on to say that she was living in poverty because she was uneducated, and that most of the kids in the community were unemployed and those that are working have been earning R3000.00 for the past 6 years. Hence, she said she was not sure if they were being failed by their CPA since they were meant to represent the community or if they were being failed by the mines themselves.

The instruction was that when a mine is not serving the interest of the community, its right needs to be cancelled. The community has been there for 15 years and yet there was no school built for them. She indicated that they have been called for a meeting where they will need to express their needs but that is where it was going to end just like with the previous applicant, and that the current applicant may never come back again.

The CPA leadership was again pleaded with to cancel the permit of mines that were not serving the community. Previous applicants or mining companies left the area without rehabilitating it, leaving it with diggings. In some instances, skeletons were also found in Maremane and were taken away, it is not clear what happened to that matter.

Ndi's response was that she cannot speak on behalf of other mines, but the community's comments have been noted. And that going forward, any letter that will be written, should be written by the community, and not the CPA to show unity.

Comment: Mr M Moloka

Mr Maloka thanked Ndi for her wonderful words but went on to say that everyone looking for work would say the same things. He made it clear that he does not believe that anything different will be done by the current applicant. They have never received any assistance from the mines even when they have requested for assistance, they would be told of the community that don't even know of. He complained that their kids must be up at 06: 00am to travel to school in Postmasburg. He also mentioned his doubt for DMR, that nothing good was going to out of their involvement.

He gave an example of when the community called a government official to come and witness the dust that was being emitted from the area by the mines. Needless to say, that no assistance was received in that regard.

Ndi's comment was that: she felt sad to be listening to the issues that communities had to deal with, not because she was being paid but because she was human. She promised to incorporate all their comments on the final scoping and EIA/EMPr. Ndi explained that the employees can approach department of labour for issues related to salaries, with issues related to SLP implementation they must approach DMR.

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Comment: Mr Billy

Should the community get any proof that the mine was not compliant in terms of its commitments, the community was going to put the mining operation to a halt.

He did not understand why companies would be allowed to work with Prospecting right without committing to do anything for the communities. The state of roads was said to be bad and that there were a lot of trucks on the roads carrying a lot of minerals from the mines that have prospecting rights. He seemed to think that by the time companies with prospecting rights applied for mining right, mining companies are already full.

Ndi's comment was that: It is evident that Midtron doesn't want to repeat the same offence to continue to mine under a prospecting; hence the company recently lodged the mining right application in March 2022 even though their existing prospecting right allows them to prospect for five years.

A question by a speaker whose name was Who is the owner of all portions of Kapstewel where the mine is situated and who is the owner of the mine?

Response: The owner of the proposed Mine is Midtron Minerals and the owners of Kapstewel portions are as follows:

Remaining Extent of Kapsteewel 436- Victor Schalk Willem
Remaining Extent of Portion 3 -Autumn Skies Resources and Logistics
Portion 5 of Kapsteewel 436 -Sincerity Resources SA Pty Ltd

The chairman of Maremane CPA, Mr Boniface Masiane indicated that the visitors will be closing the meeting because they still have to go and consult with the Maremane CPA in Lexey.

After the question-and-answer session, Ndi thanked all attendees for taking the time to attend the meeting and the meeting was adjourned.

PUBLIC CONSULTATION

Midtron Minerals Pty (Ltd)

GEOLOGICAL CONSULTING SERVICES
PTY (LTD)

DRAFT SCOPING

AND

SOCIAL AND LABOUR PLAN

General rules related to this Interested and affected parties public meeting

1. In case of a fire/emergency the escape route to the outside of this hall is as follows (Ndi will show the doors to the outside area);

2. The toilets will be indicated to you by Ndi;

3. Ndi Geological Consulting Services has been appointed by Midtron Minerals Pty (Ltd), as lead consultant to head the process of Consultation which is required as due process for the application in terms of the Environmental Management Act (Act No 107 of 1998) and Section 16(4)(b) of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA), the landowner or lawful occupier of the land, as well as any other interested and/or affected parties must be notified and consulted with regarding the proposed.

4. Ndi Geological Consulting Services has been appointed to conduct a public meeting with the interested and affected parties.

5. This meeting will be chaired by Ndi from Ndi Geological Consulting Services and all questions must be directed to her;

6. A secretary will also take notes and additional to this will the meeting be recorded, to ensure the accurate compiling of the minutes, that will be forwarded to the interested and affected parties on request;

7. No smoking will be allowed in the hall at any time;

8. This is a consulting meeting not a negotiation meeting;

9. Please treat each person present with respect and allow him/her to raise their concern;

Purpose of the Meeting

- To **inform** the general public regarding the Mining Charter Implementation Guidelines and Amendments to the Mining Charter published;
- To **explain** the legal procedures regarding the EIA and SLP process;
- To **convey** information and the current status regarding the Social and Labour Plan and
- To **allow** the general public to raise concerns and/or support regarding these matters.

Purpose of Public Participation

- Public participation is a process leading to a joint effort by:
- ✓ stakeholders
- ✓ the authorities
- ✓ the proponent

who work together to **produce better decisions** than if they had acted independently.

Role Players

The Applicant:
- Midtron Minerals Pty (Ltd)

Independent Environmental Consultant:
- Ndi Geological Consulting Services

Relevant Authority:
- Department of Mineral Resources (Northern Cape)

Interested and Affected Parties (I&APs):

- ZF Mgcawu District Municipality (ZFMDM)
- Tsantsabane Local Municipality (TLM)
- Host Community
- Landowners
- Surrounding farm owners/Landowners or lawful occupiers on adjacent properties

Background Information

- Midtron Minerals applied for a Mining Right on Kapstewel, which is located 15 kilometres north of Postmasburg, 40 kilometres south-east of Olifantshoek, and 50 kilometres south of Kathu in the Northern Cape Province of South Africa, in the Tsantsabane Local Municipality (TLM) of the ZF Mgcawu District Municipality (ZFMDM).

Social Labour Plan

WHAT IS A SOCIAL AND LABOUR PLAN?

A social and labour plan is a document that mining companies are required to submit to the Department of Mineral Resources as part of their applications or renewal for mining rights. It is basically a collection of promises the mine makes which become legal commitments once the application is approved by the DMR.

The SLP sets out both what the company will do for communities and workers and how and when the company will do this.

The purpose of the SLP is to promote employment, advance social and economic welfare, contribute to transforming the mining industry and ensure that mining companies contribute to the development of the areas where they operate.

Public Participation Process

WHAT IS THE PUBLIC PARTICPATION PROCESS?

The SLP guidelines say that mining companies must consult with the public before finalising their SLPs. However, when companies are applying for a mining right, they are required by the MPRDA to consult affected communities on the application as a whole (even though consultation on SLPs are not specifically mentioned) under the NEMA and MPRDA.

Social Labour Plan

WHAT SHOULD BE INCLUDED IN A SOCIAL AND LABOUR PLAN?

The MPRDA Regulations specifically set out that an SLP must contain a number of sections. These sections are described below.

1 Local Economic Development Programme

The local economic development section of SLPs is designed to ensure that mining contributes to the development of communities in the areas where mining takes place, as well as the areas where mine workers are recruited.

In this section of the SLP, you will find the greatest number of programmes that exist to benefit the broader community.

Two of the most important programmes involve infrastructure development and poverty eradication.

Social and Labour Plan

I. Infrastructure programmes refer to projects where mining companies contribute towards providing basic services like water, sanitation, housing and roads (over and above what government plans to supply).

II. Poverty eradication or income generating projects refer to the support mining companies intend to provide to community businesses. This can include funding, technological support and training. All infrastructure and poverty eradication programmes need to be aligned with the Integrated Development Plan in place in the municipal area the programme targets. (IDP).

Identification of Local Economic Development Programs from Municipal IDP

I. Each and every municipality has a document called, Intergrated Development Planning (IDP). This document is compiled by the municipality, in consultation with the all their municipal wards. It's during these consultations where communities are afforded the opportunity to can comment / provide inputs of their needs, not individual needs but the needs of the community. Mining companies than approaches the municipality in order to get a copy of the IDP, To identify projects that the mine can adopt and implement in the community it operates in.

Identification of Local Economic Development Programs from Municipal IDP

Midtron Minerals identified the following projects from the IDP

Project Name : Maremane Water Project

Location - Maremane Community

The idea behind the project came as a result of the great need and hunger in the community for clean running water.

Projected Budget for the project : R500 000.00

Midtron Minerals commits to this projects and community will be informed of the starting date.

Summary of Financial Provisions for Key Elements of Midtron Mineral’s SLP for five (5) Years

COMPONENT	Year 1	Year 2	Year 3	Year 4	Year 5	Total
	HUMAN RESOURCE DEVELOPMENT					
AET – Internal	R0.00	R12 000,00	R12 000,00	R12 000,00	R12 000,00	R48 000,00
AET – External	R0.00	R12 000,00	R12 000,00	R12 000,00	R12 000,00	R48 000,00
Core Business Training	R30 000.00	R30 000.00	R30 000.00	R30 000.00	R30 000.00	R150 000,00
Learnerships – Internal (18.1)	R0.00	R72 000,00	R72 000,00	R72 000,00	R72 000,00	R288 000,00
Learnerships – External (18.2)	R0.00	R72 000,00	R72 000,00	R72 000,00	R72 000,00	R288 000,00
Career Progression	R0.00	R30 000.00	R30 000,00	R30 000,00	R30 000,00	R120 000,00
Bursaries & Internships – Internal	R30 000.00	R30 000.00	R30 000.00	R30 000.00	R30 000.00	R150 000.00
Bursaries & Internships – External	R20 000.00	R30 000.00	R30 000.00	R30 000.00	R30 000.00	R120 000.00
Portable Skills	R55 000.00	R55 000.00	R55 000.00	R55 000.00	R55 000.00	R275 000.00
HRDP TOTAL	R135 000.00	R343 000.00	R343 000,00	R343 000,00	R343 000,00	R1 487 000,00
	LOCAL ECONOMIC DEVELOPMENT					
SMME Development Programme	R0.00	R0.00	R0.00	R0.00	R0.00	R0.00
LED TOTAL	R100 000.00	R100 000.00	R100 000.00	R100 000.00	R100 000.00	R500 000.00
	DOWNSCALING & RETRENCHMENT					
Provision for Downscaling & Retrenchment	R0.00	R0.00	R0.00	R0.00	R0.00	R0.00
SLP TOTAL	R235 000.00	R443 000	R443 000	R443 000	R443 000	R1 987 000,00

Summary of Scoping Findings

The scoping phase included the baseline characterisation of the project area.

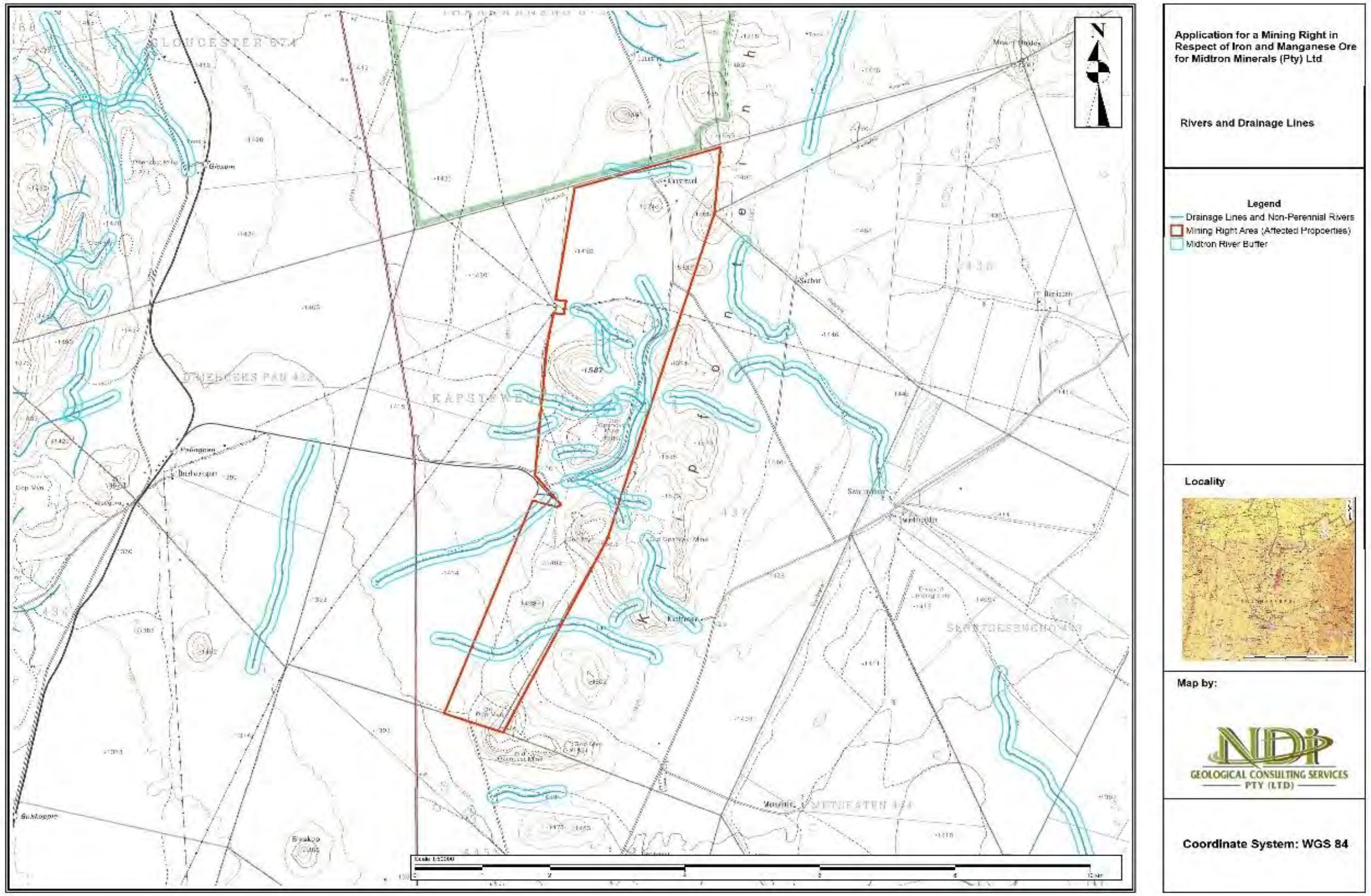
The assessment was based on existing information from previous studies and / or environmental databases.

The potential impacts of the project on the environmental baseline will be assessed in detail during the impact assessment phase of the process.

Water Resources

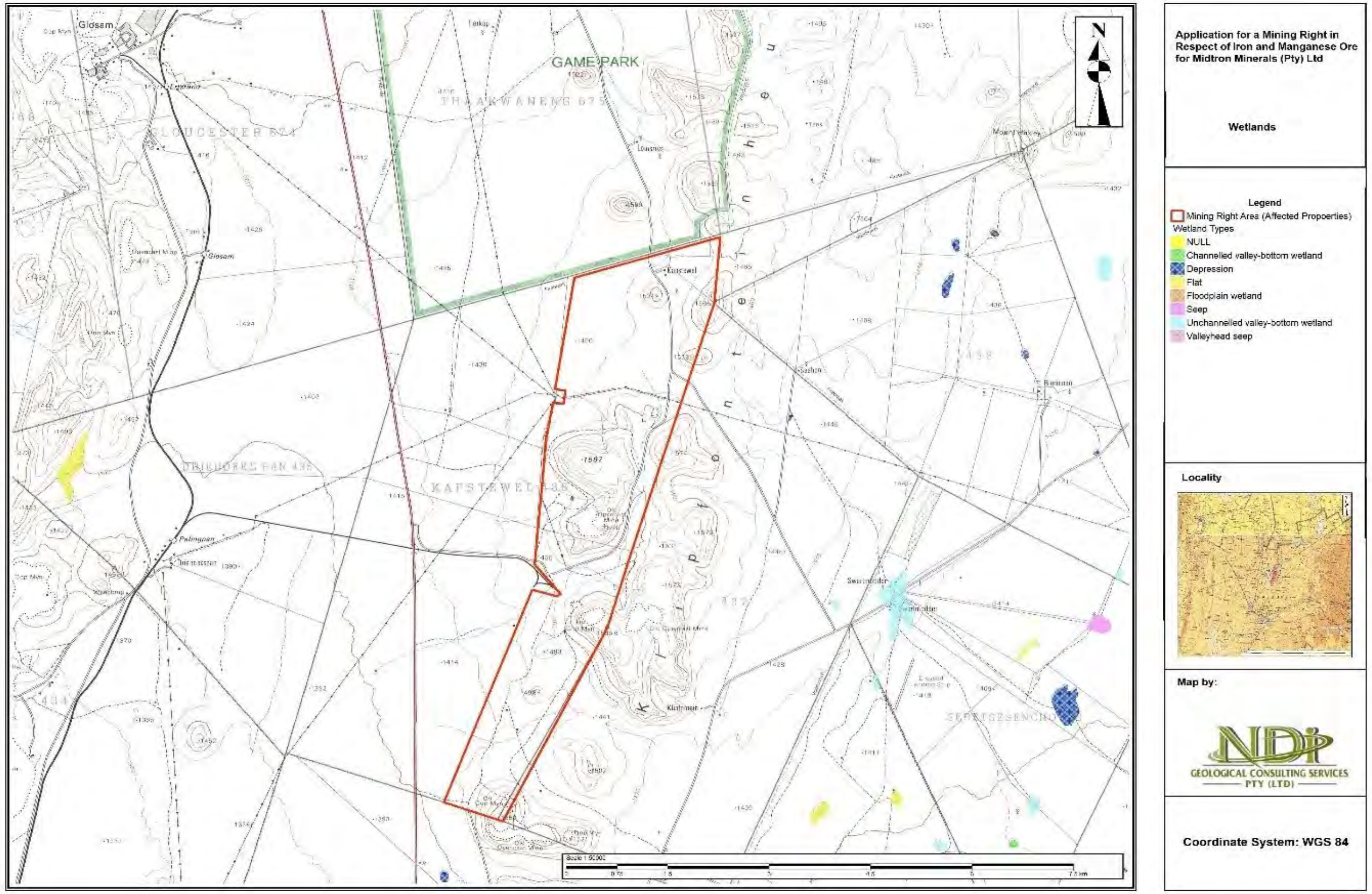
The project is located within quaternary catchment D73A which is located within the Lower Vaal Water Management Area (WMA)

There are drainage lines that traverse the project area



Wetlands

The SANBI data shows that there are no wetlands occurring on the study area

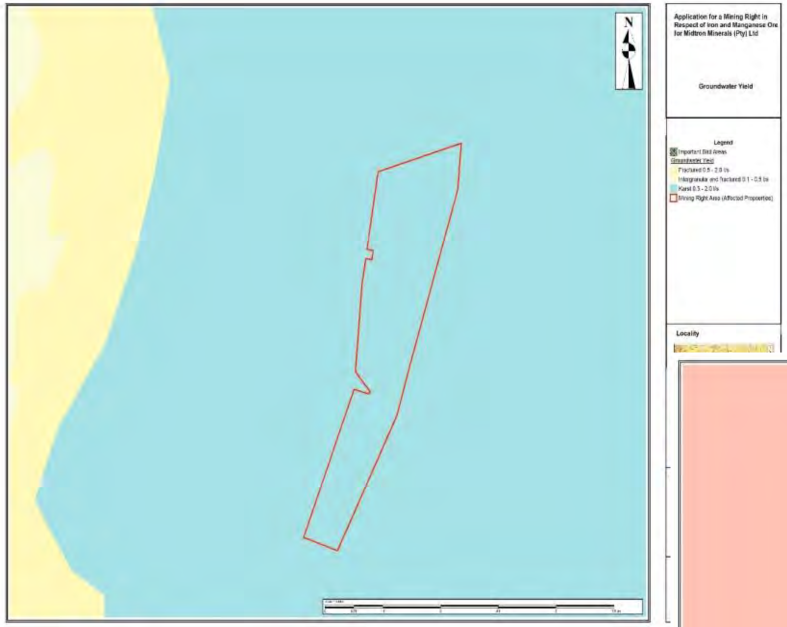


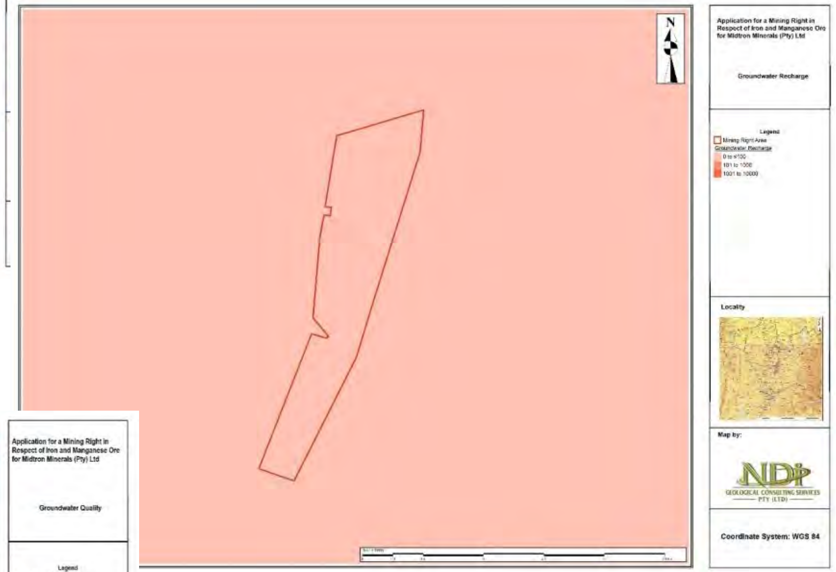
Groundwater

The groundwater yield in the mining area is between 0.5 and 2.0l/s and that the aquifer is classified as karst

Groundwater recharge is low between 0 and 1 000 l/s

The groundwater quality is generally of good quality, with Electrical Conductivity (EC) levels between 70-300mS/m





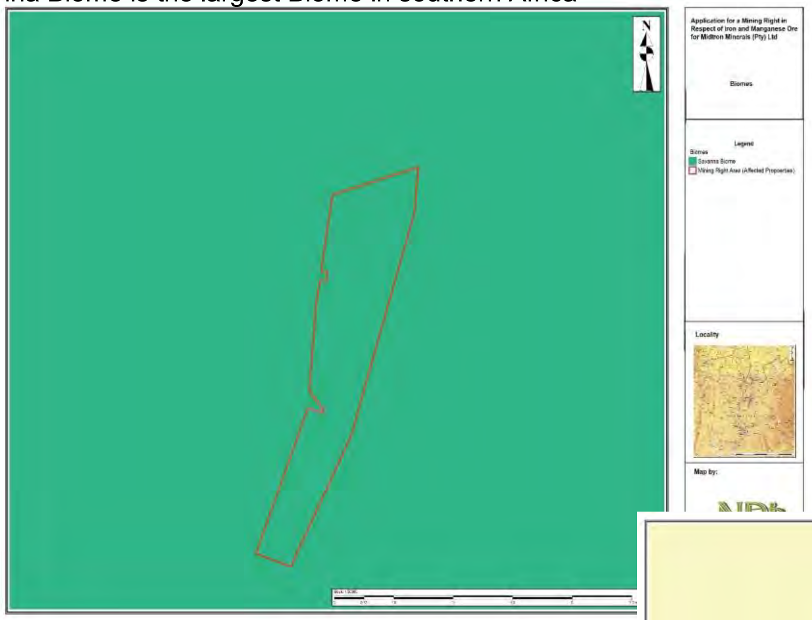
Biodiversity

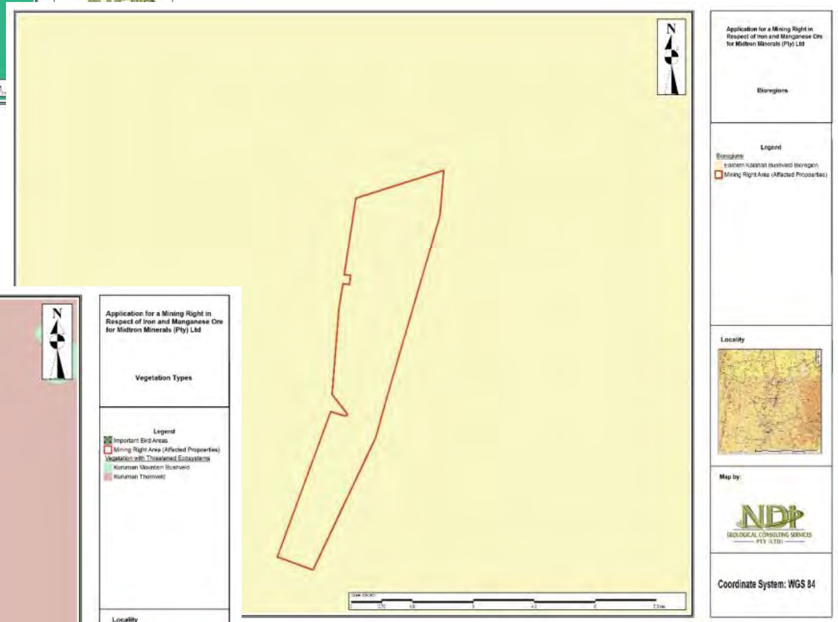
The proposed mining area is located in the Savanna Biome, the largest Biome in southern Africa.

The affected Bioregion is the Eastern Kalahari Bushveld Bioregion, the largest savanna bioregion.

The threatened ecosystems associated with the site are the Kuruman Mountain Bushveld, classified at Least Threatened.

vanna Biome is the largest Biome in southern Africa

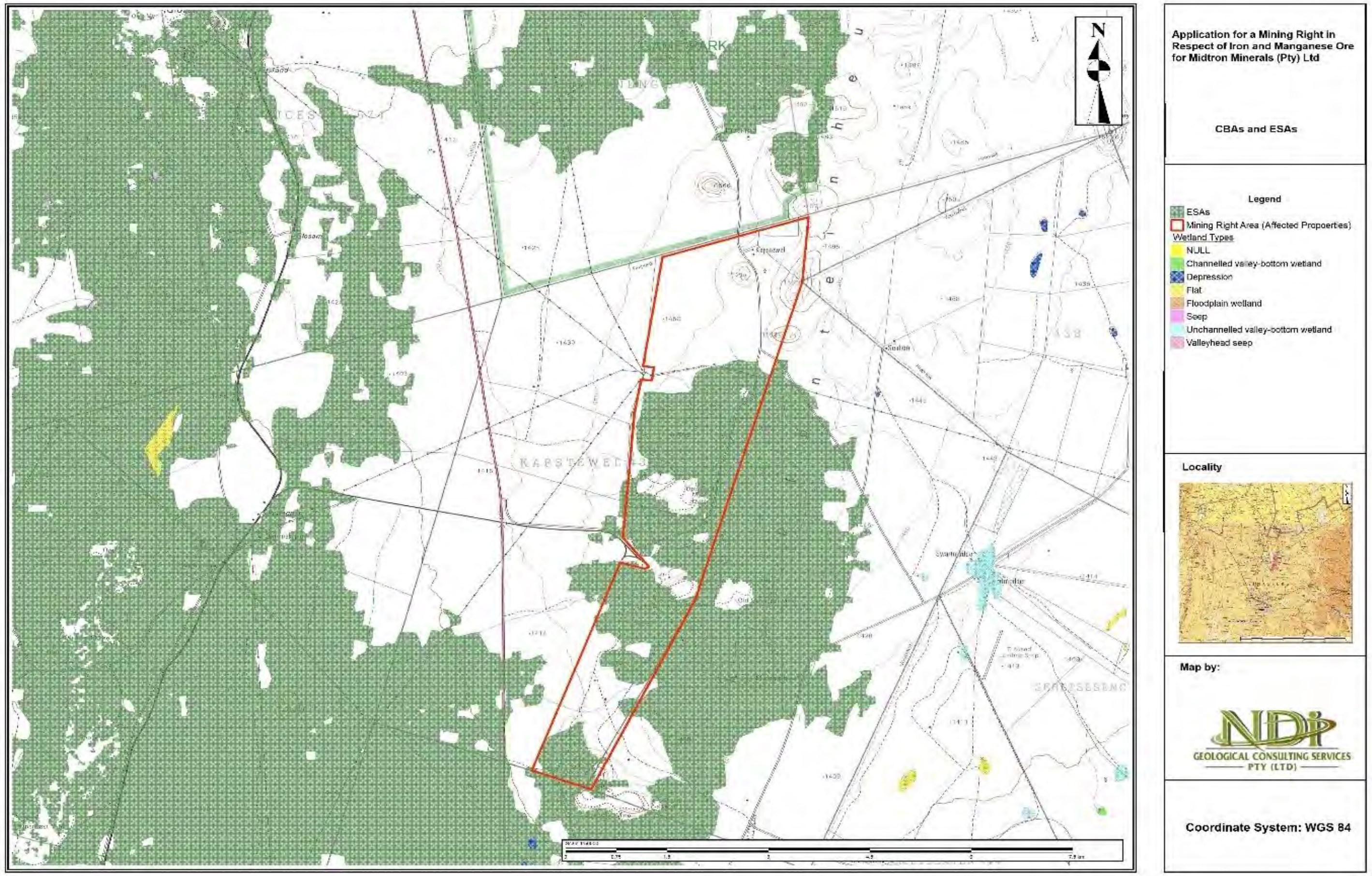




Conservation Plan

According to the Northern Cape Provincial Biodiversity Conservation Plan (C Plan), a portion of the affected property is classified as an Ecological Support Area (ESA).

Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas (CBAs)



Anticipated Environmental Impacts to be assessed in the impact assessment phase

Element of Environment	Potential Impact Descriptions
Socio-Economic	Possible job opportunities during the construction and operation
Geohydrology	Possible groundwater contamination
Surface water	Possible surface water contamination
Air Quality	Possible impact on Air Quality in the area
Climate Change	Possible contribution to climate change through emission of Green House Gases
Drilling and Blasting	Possible impacts on private property, infrastructure and fauna due to drilling and blasting activities
Noise	Possible generation of noise during construction and operation
Visual	Possible visual impacts during construction and operation
Biodiversity	Disturbance and loss of biodiversity, especially floral and faunal SCC
Aquatic ecology	Possible loss, sedimentation and contamination of aquatic resources
Heritage	Possible impact on heritage and cultural resources (including graves) in the area
Traffic	Potential safety issues due to the increased traffic
Cumulative Impacts	Cumulative Impacts

Specialist Studies to be undertaken

The following specialist studies will be undertaken during the impact assessment phase:

- Surface Water and floodline determination;
- Blasting and Vibration
- Geohydrology and waste classification;
- Cultural and Heritage Resources;
- Palaeontology Assessment
- Socio-Economic Impacts;
- Air Quality Study;
- Noise Studies;
- Visual Impact Assessment;
- Terrestrial biodiversity;
- Climate Change Assessment; and
- Aquatic and Wetland Delineation and impact assessment.

Way Forward

- Incorporation of comments into the final Scoping Report and Plan of Study
- Submission of the final Scoping Report and Plan of Study to the DMRE for decision making
- Specialist studies
- Compilation of the Environmental Impact Assessment Report and Environmental Management Programme (EIR/EMPr Report)
- 30-day stakeholder review and comment period for the EIR/EMPr Report and further consultation (if required)
- Incorporation of stakeholder comments into the final specialist reports, EIR/EMPr Report
- Submission of final EIR/EMPr Report to the DMRE
- DMRE Decision making
- Communication of decision to stakeholders and appeal period

28 April 2022

Dear Stakeholder- Maremane CPA

APPLICATION FOR A MINING RIGHT, SOCIAL AND LABOUR PLAN AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) FOR THE PROPOSED MINING OF MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

DMR REFERENCE: NC30/5/1/2/2/10207MR

INVITATION TO REGISTER, PARTICIPATE AND COMMENT ON THE MRA/EA/WML APPLICATION PROCESSES

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Who is conducting the EIA?

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The reports and documentation for the integrated EA/WML application process will be compiled and finalised for submission to the DMR for the EA/WML in terms of the NEMA for consideration and decision making. The DMR will consult with other government authorities as required in terms of Section 24(K) of the NEMA.

Who will evaluate the EIA?

Before the proposed development can proceed, approval must be obtained from the regulatory authorities.

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Ndivhudzannyi Mofokeng

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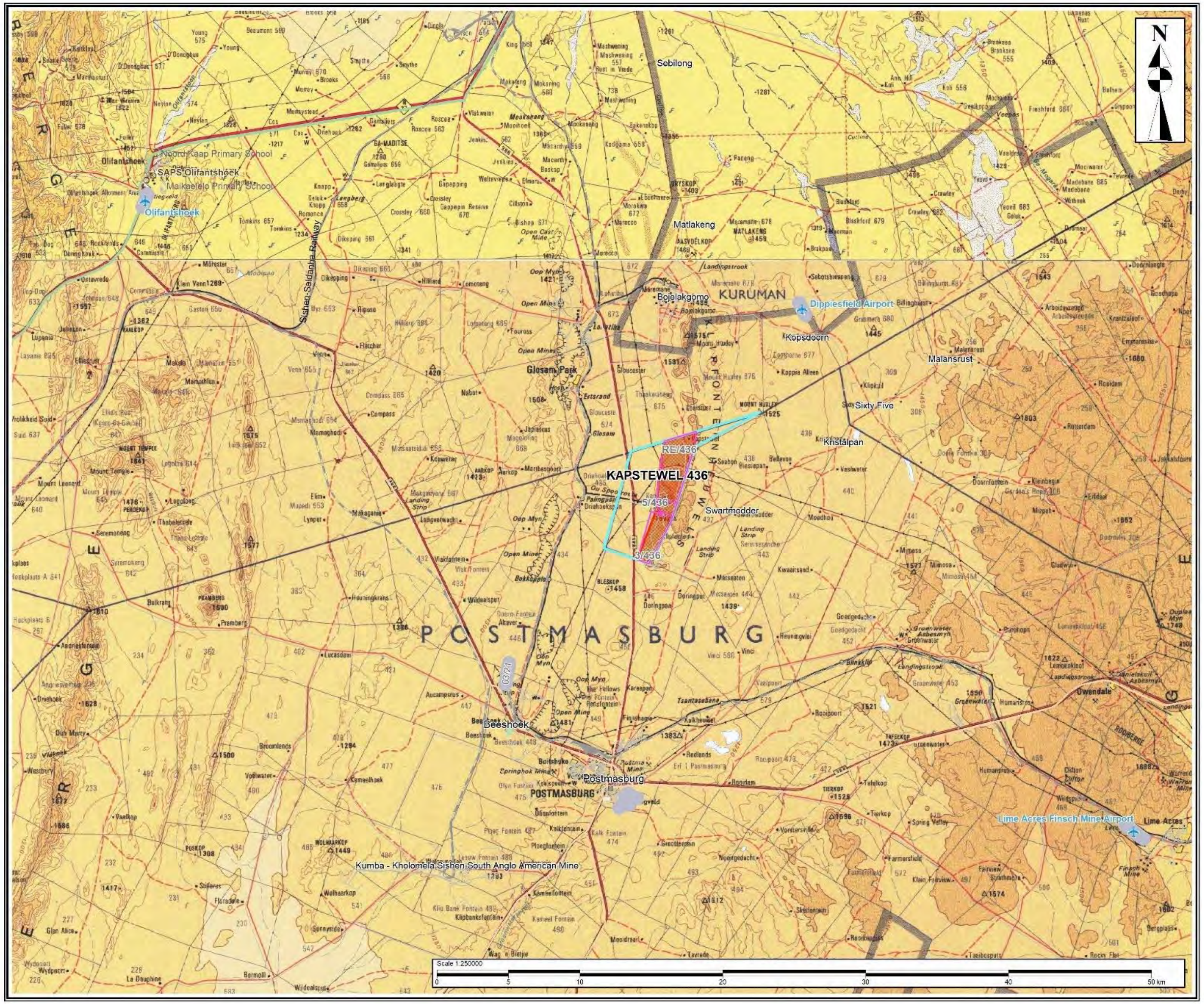

Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Locality Map

Legend

- Mining Right Area Boundary
- Affected Farm
- Affected Farm Portions

Layout:

Map by:

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

Figure 1: Locality Map

06 May 2022

Dear Stakeholder- Annalie Victor

Email: victora@lantic.net

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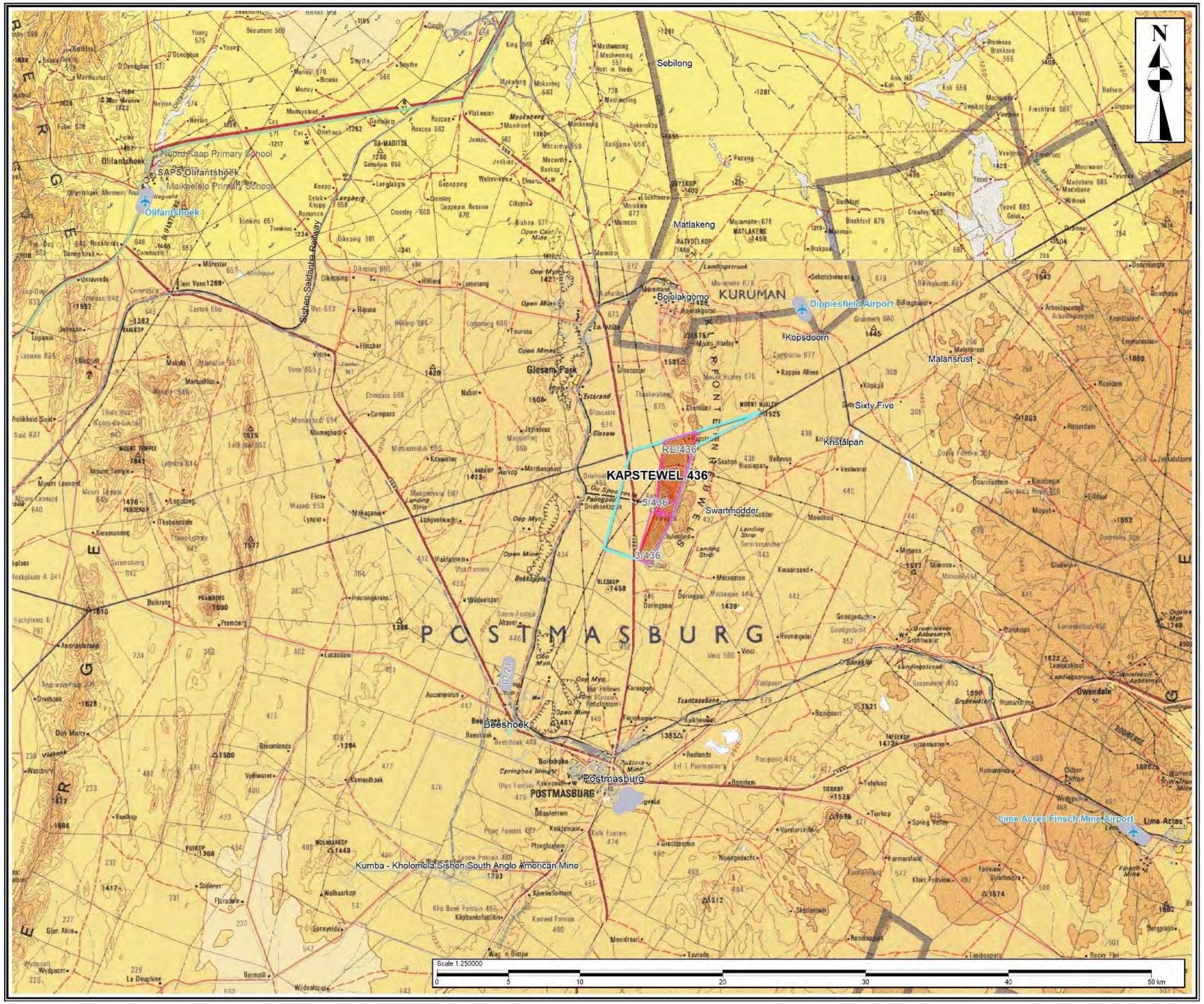

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Layout:

Map by:

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

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06 May 2022

Dear Stakeholder- Maremane CPA Chairperson

Boniface Masiane

Email: chairperson@maremanecpa.co.za

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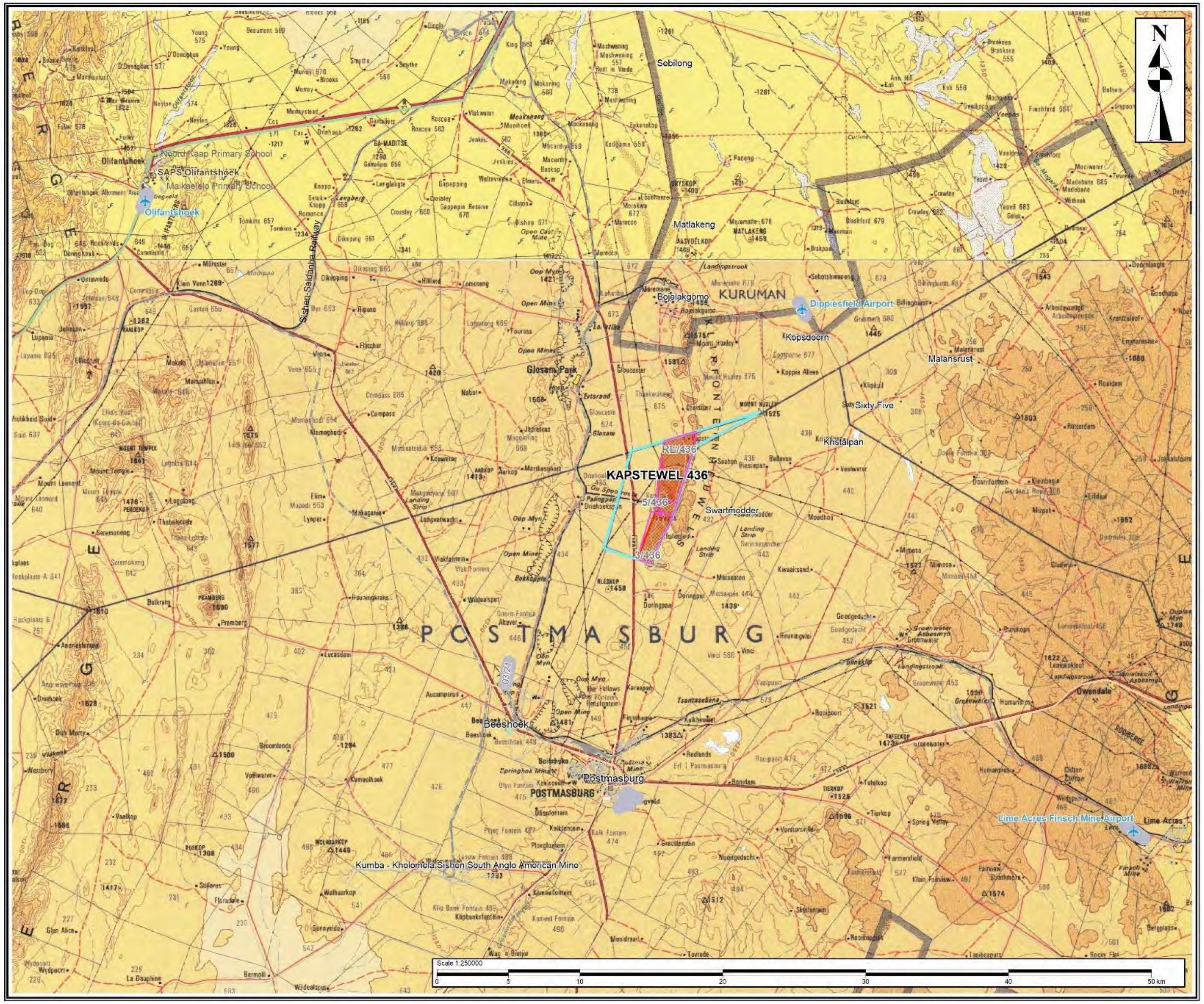

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Map by:

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Email: secretary@maremanecpa.co.za

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Please submit written comments by mail, fax or email by **06 June 2022** to Ndi Geological:

Please submit comments to the EAP:

Ndivhudzannyi Mofokeng

Ndi Geological Consulting Services (Pty) Ltd

38 Ophelia Street, Kimberley, 8301

Contact Numbers 082 760 8420/053 842 0687

Fax: 086 538 1069

atshidzaho@gmail.com/ndi@ndigeoservices.co.za

Please do not hesitate to contact us should you require additional information or clarification regarding the proposed project. Our team welcomes your participation and looks forward to your involvement throughout the Stakeholder Engagement Process.

Yours faithfully,

Ndi Geological Consulting Services (Pty) Ltd

Ndivhudzannyi Mofokeng

Environmental Assessment Practitioner

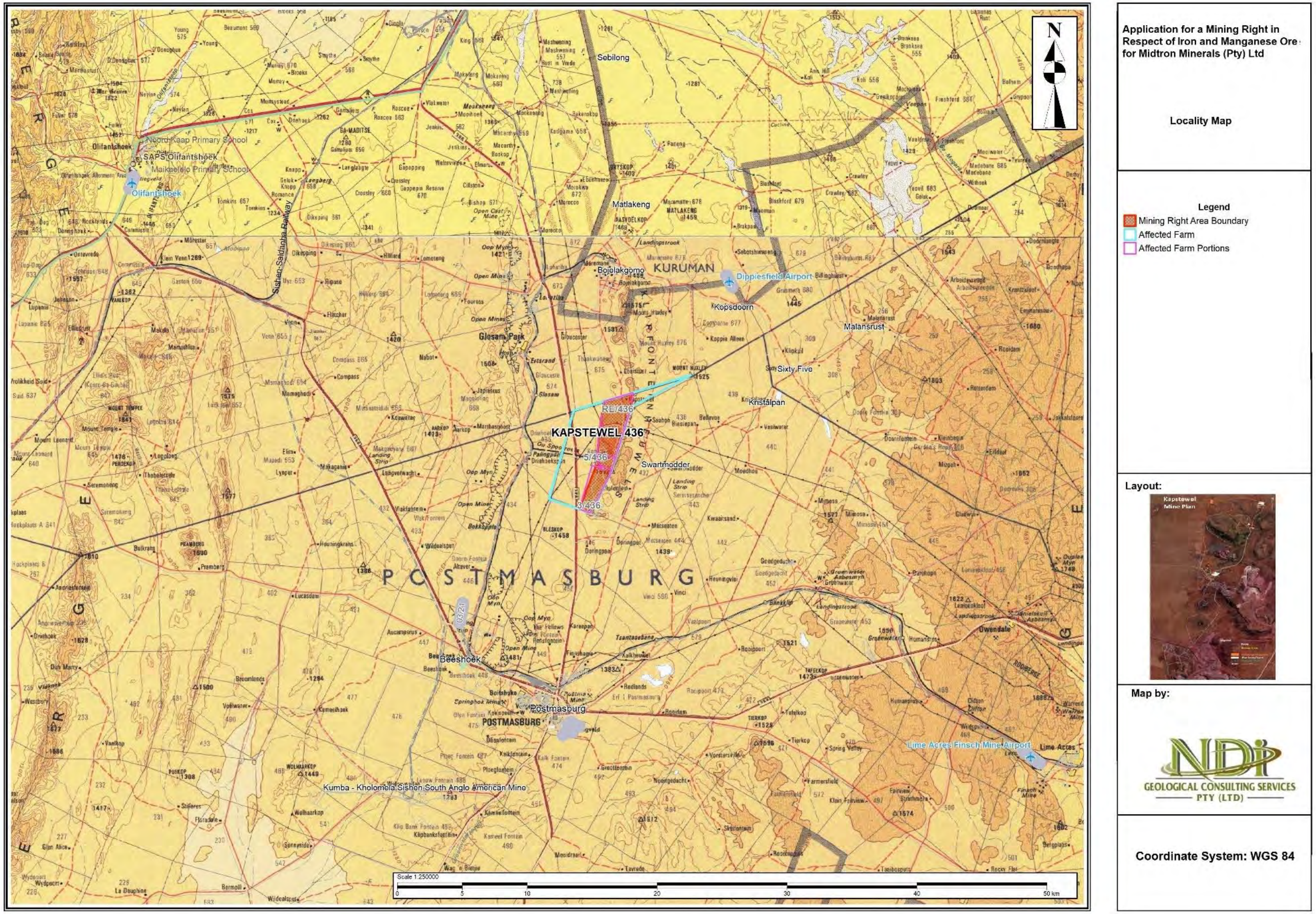

Figure 1: Locality Map

06 May 2022

Dear Stakeholder- Mathobela

Email: gaonyadiwemathobela@gmail.com

APPLICATION FOR A MINING RIGHT, SOCIAL AND LABOUR PLAN AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) FOR THE PROPOSED MINING OF MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

DMR REFERENCE: NC30/5/1/2/2/10207MR

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Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

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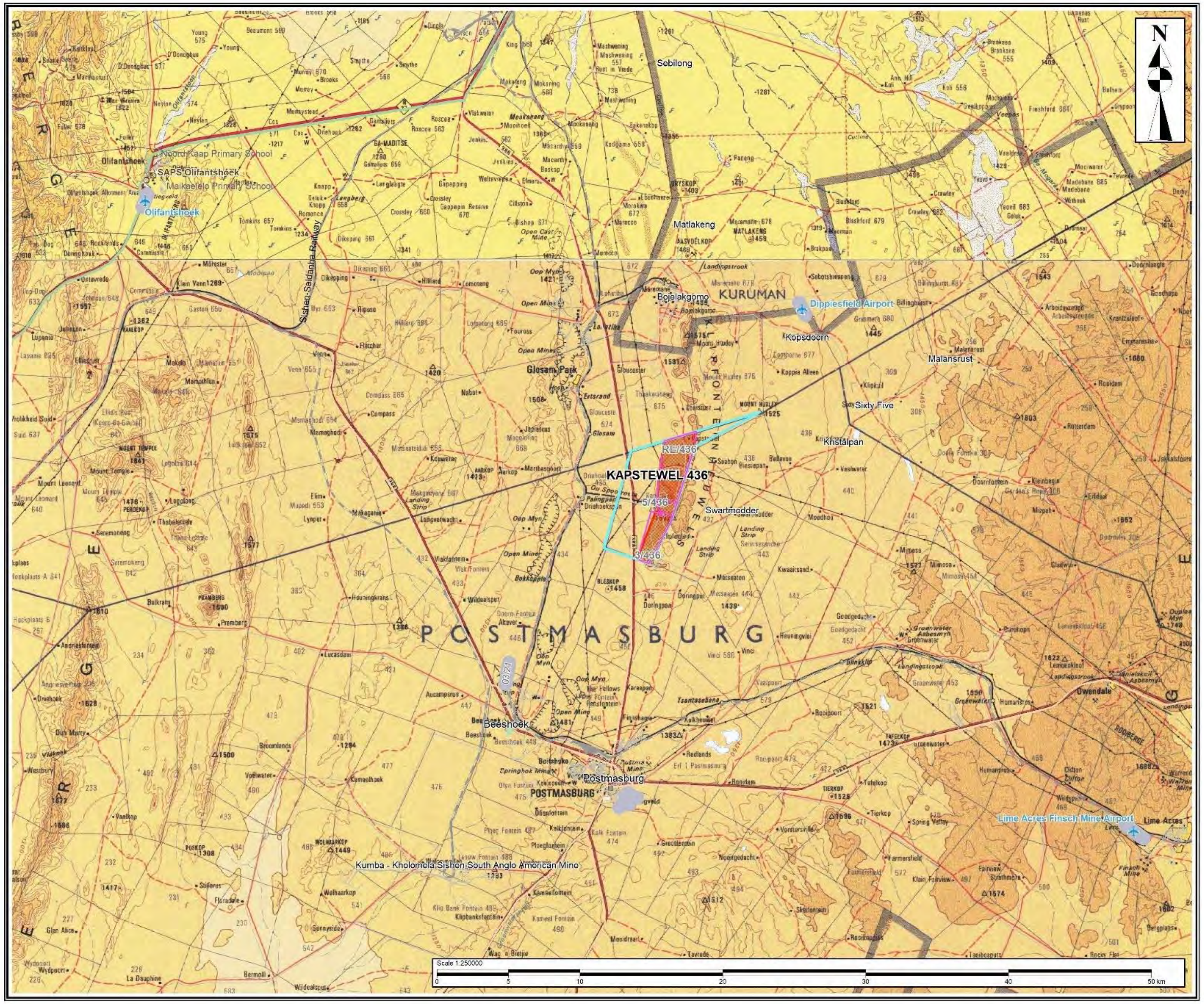
Ndivhudzannyi Mofokeng

Environmental Assessment Practitioner



Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Locality Map

Legend

Mining Right Area Boundary
Affected Farm
Affected Farm Portions

Layout:

Map by:

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

Coordinate System: WGS 84

Figure 1: Locality Map

06 May 2022

Dear Stakeholder- Tsantsabane Local Municipality

Email: mayor@tsantsabane.gov.za

APPLICATION FOR A MINING RIGHT, SOCIAL AND LABOUR PLAN AND ASSOCIATED ENVIRONMENTAL AUTHORISATION AND WASTE MANAGEMENT LICENCE (WML) FOR THE PROPOSED MINING OF MANGANESE AND IRON ORE ON THE REMAINING EXTENT OF KAPSTEWEL 436, REMAINING EXTENT OF PORTION 3 OF KAPSTEWEL 436 AND PORTION 5 OF KAPSTEWEL 436 IN THE TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

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PTY (LTD)

Ndivhudzannyi Mofokeng

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Contact Numbers 082 760 8420/053 842 0687

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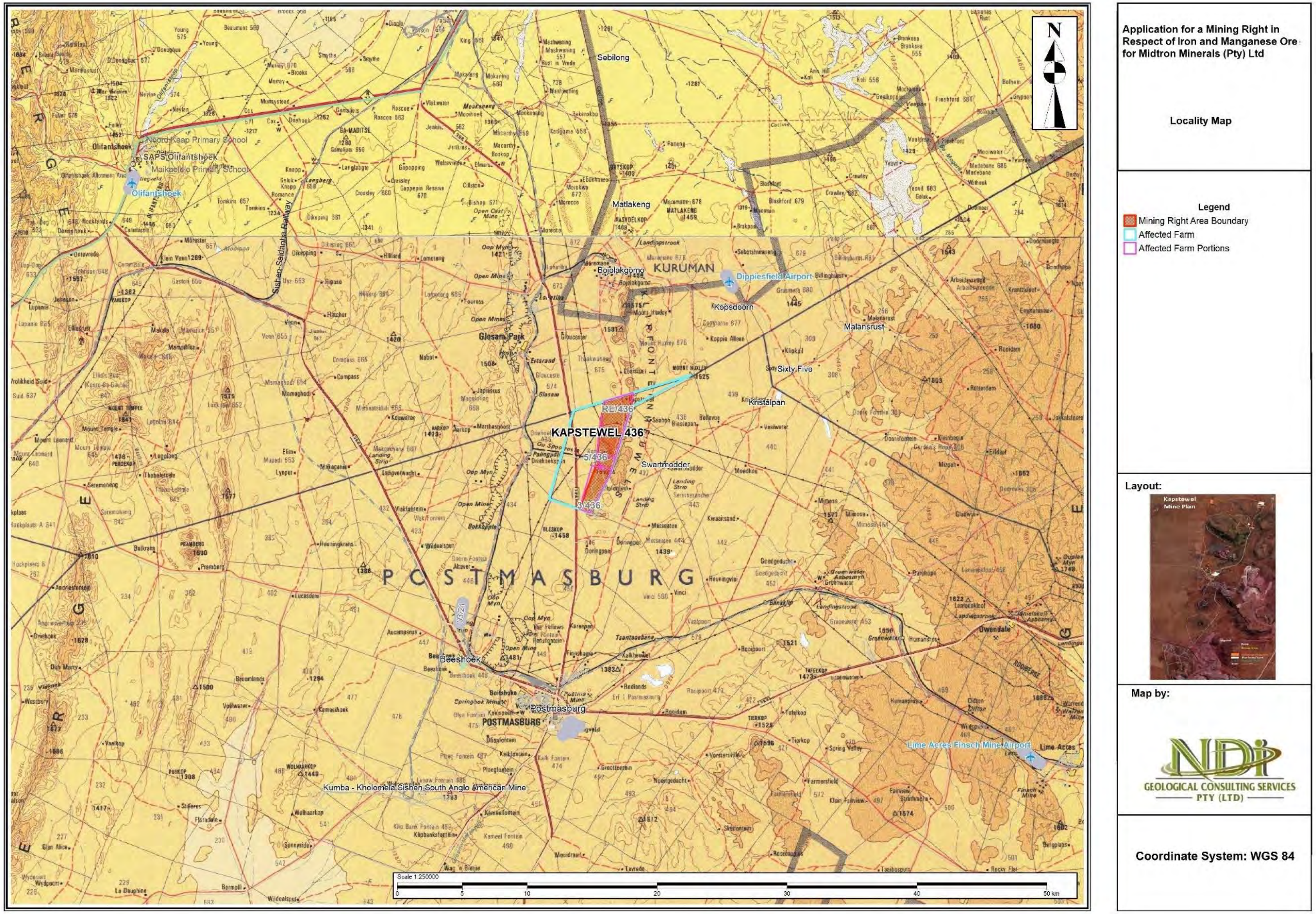

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Email: mm@tsantsabane.gov.za

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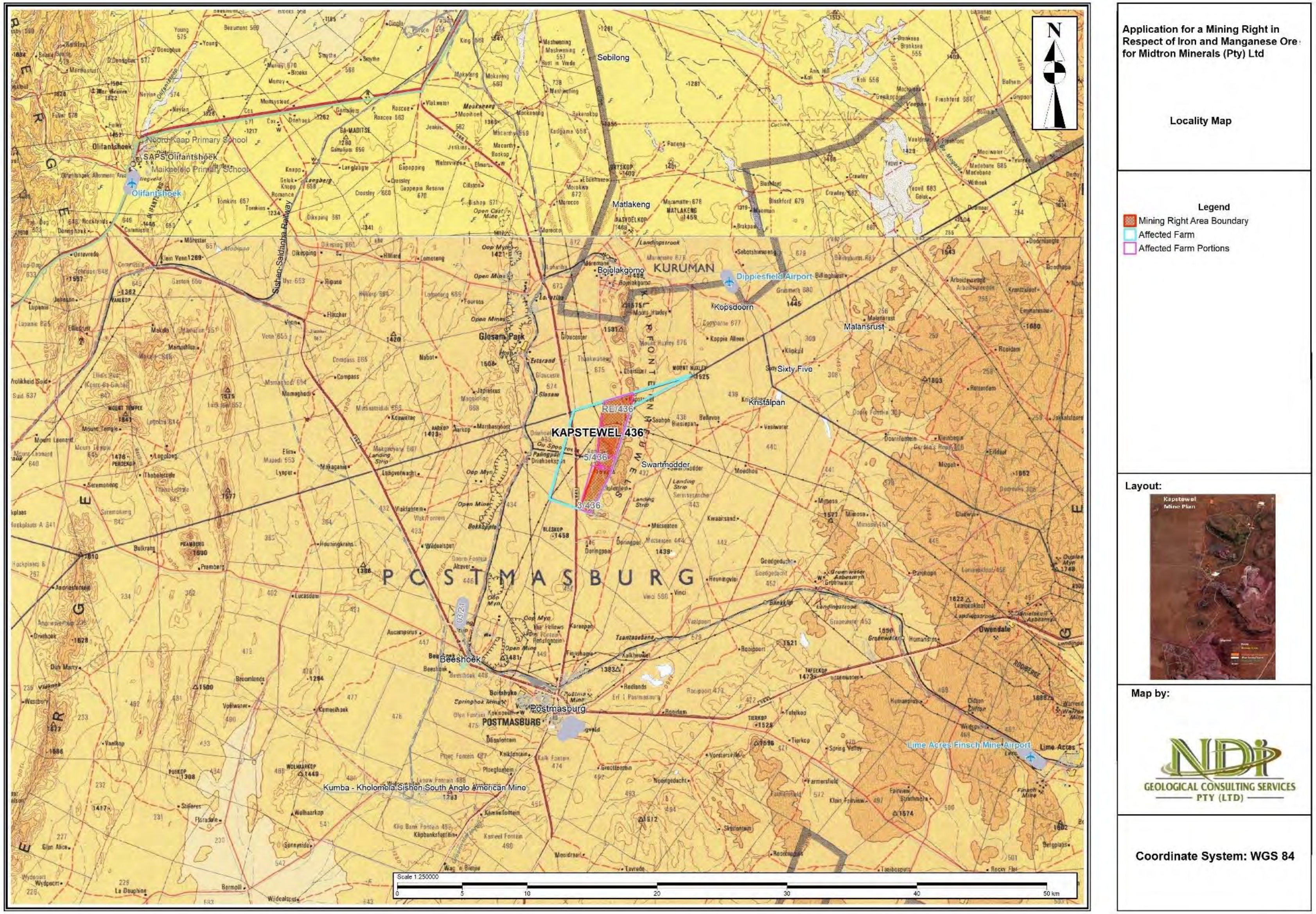

Figure 1: Locality Map

Fwd: FW: Stakeholder Notification

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:27 PM GMT+2

---------- Forwarded message ---------
From: <ndi@ndigeoservices.co.za>
Date: Sun, May 8, 2022 at 10:22 PM
Subject: FW: Stakeholder Notification
To: <victora@lantic.net>
Cc: <atshidzaho@gmail.com>

Dear Stakeholder

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Please see attached letter for more information.

Kind Regards

N Mofokeng

NDi GEOLOGICAL CONSULTING SERVICES PTY (LTD)

38 Ophelia Street
Kimberley, 8301
C: 082 760 8420
T: 053 842 0687
F: 086 538 1069
E: ndi@ndigeoservices.co.za
W: www.ndigeoservices.co.za

Comment Form.pdf
95.7kB

Notification letter-Annalie Victor.pdf
748.1kB

Fwd: minutes of the meeting

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:14 PM GMT+2

fyi

Thank you and Kind Regards

NDI GEOLOGICAL CONSULTING SERVICES (PTY) LTD

N Mofokeng

38 Ophelia Street

Kimberley, 8301

Cell: 082 760 8420

Tel: 053 842 0687

Fax: 086 538 1069

atshidzaho@gmail.com

ndi@ndigeoservices.co.za

---------- Forwarded message ---------
From: **Ndivhudzannyi Mofokeng** <atshidzaho@gmail.com>
Date: Mon, Jun 13, 2022 at 6:08 PM
Subject: minutes of the meeting
To: sctcn <sctcn@126.com>
Cc: Mthuthuzeli Leonard Daniels <mthuthuzeli.daniels@gmail.com>

Dear Lloyd

I've attached the meeting notes from Friday, the 3rd of June, 2022. Please note that we are left with one public meeting during Phase 3 EIA/EMPr process. We will schedule the meeting somewhere towards the end of July 2022.

Please find attached the acknowledgement letter from the DMR.

Thank you and Kind Regards

NDI GEOLOGICAL CONSULTING SERVICES (PTY) LTD

N Mofokeng

38 Ophelia Street

Kimberley, 8301

Cell: 082 760 8420

Tel: 053 842 0687

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atshidzaho@gmail.com

ndi@ndigeoservices.co.za

MIDTRON MINERALS (PTY) LTD PRESENTATION FINAL-02-06-2022 (4).pdf
1.2MB

Meeting Minutes_2022-06-06 Midtron Minerals.pdf
138.8kB

Acknowledgement letter.PDF
122.1kB

10207 MR Acceptance.pdf
295.7kB

Attendance register-midtron.PDF
477.5kB

Fwd: MRA/EA/WML Application Processes DMR Reference: NC30/5/1/2/2/10207MR

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:22 PM GMT+2

Forwarded Conversation

Subject: MRA/EA/WML Application Processes DMR Reference: NC30/5/1/2/2/10207MR

From: **Mthuthuzeli Leonard Daniels** <mthuthuzeli.daniels@gmail.com>
Date: Tue, May 3, 2022 at 11:56 AM
To: <chairperson@maremanecpa.co.za>, <secretary@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>
Cc: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>

Morning CPA Leadership, Madam Mayor and Municipal Manager of Tsantsabane Local Municipality,

Please see attached letter indicating our intention to start a Public Participation Process.

We would like the Maremane CPA Leadership to please assist us with a venue for the Public Participation sessions at Maremane.

Hope all is in order. Looking forward to hearing from you.

Regards,

Mthuthuzeli "Thuthu" Daniels Pr. Eng. BSc Mining (Eng.) MBL MMCC

Mine Manager

Kapstewel Mine – Midtron Minerals (Pty)Ltd

mthuthuzeli.daniels@gmail.com

W +27(0) 82 879 0948

H +27(0) 76 897 4711

From: **Mthuthuzeli Leonard Daniels** <mthuthuzeli.daniels@gmail.com>
Date: Thu, May 19, 2022 at 10:20 AM
To: <chairperson@maremanecpa.co.za>, <secretary@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>
Cc: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>

Morning Mr. Masiane (Chairman Maremane CPA) and Mr. Mphafi (Secretary Maremane CPA)

Mr. Masiane thanks for taking my call this morning. As indicated to you the Public Participation period ends on the 06 June 2022. If the CPA elects to have this public participation on the 03 June 2022, which is Friday, this will give the CPA only 3 days to make submissions on the 06 June 2022 which is a Monday.

The reason we started as early as 03 May 2022, to get at least 2 dates and a venue for the public participation, was to afford you the time to make submissions on time before the 06 June 2022. The date of the 03 June 2022 may not afford you enough time for submissions. In addition, other stakeholders also need to be informed on time so that they have enough time to attend the meeting as well.

As a result, we advise that we have the public participation next week on one of the following dates:

- 27 May 2022 Friday
- 28 May 2022 Saturday
- 29 May 2022 Sunday

This will give the CPA and the community time to make submissions and other stakeholders time to make arrangements to attend the Public Participation meeting.

NB: It should be noted however that it is up to the CPA to decide on dates and should the CPA settle on the date of the 03 June 2022, we will accept this date. The final decision lies with the CPA and the community.

Regards,

Mthuthuzeli "Thuthu" Daniels Pr. Eng. BSc Mining (Eng.) MBL MMCC

Mine Manager

Kapstewel Mine – Midtron Minerals (Pty)Ltd

mthuthuzeli.daniels@gmail.com

W +27(0) 82 879 0948

H +27(0) 76 897 4711

From: <secretary@maremanecpa.co.za>
Date: Thu, May 19, 2022 at 1:23 PM
To: Mthuthuzeli Leonard Daniels <mthuthuzeli.daniels@gmail.com>, <chairperson@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>
Cc: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>

Good day Ntate Mthuthuzeli

My apology for your miss calls as I am working as the manager in the municipality.At times my work is so hectic.

My intention to suggest the 3rd of June 2022 to have a meeting with you is for you to know the CPA as the immediate community on your mine. And to pave way for community participation.And also to establish whether is the right you have applied for is not in our land.To forge a good relationship going forward.

The venue for the meeting will be communicated soon tomorrow before the end of business.

Do not hesitate to contact me or the chairperson should the need arise.

Hope you find the above in order

Kind regards

From: **Mthuthuzeli Leonard Daniels** <mthuthuzeli.daniels@gmail.com>
Date: Thu, May 19, 2022 at 1:27 PM
To: <secretary@maremanecpa.co.za>
Cc: <chairperson@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>, Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>

Afternoon Sir,

Much appreciated. Will await your feedback.

Regards,

Mthuthuzeli "Thuthu" Daniels Pr. Eng. BSc Mining (Eng.) MBL MMCC

Mine Manager

Kapstewel Mine – Midtron Minerals (Pty)Ltd

mthuthuzeli.daniels@gmail.com

W +27(0) 82 879 0948

H +27(0) 76 897 4711

From: <secretary@maremanecpa.co.za>
Date: Mon, May 30, 2022 at 7:29 AM
To: Mthuthuzeli Leonard Daniels <mthuthuzeli.daniels@gmail.com>
Cc: <chairperson@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>, Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>, <kehumile@magafrica.co.za>, <neo.moitaletsi@webmail.co.za>

Good morning Sir

Our telephone conversation refers

I am reminding and officially inviting you to our executive meeting which will be held pon the 1st of June 2022.

The venue of the meeting is Oleville Guest in. In Kuruman.

TIME : 13H00.

Hope you find the above in order.

From: **Mthuthuzeli Leonard Daniels** <mthuthuzeli.daniels@gmail.com>
Date: Mon, May 30, 2022 at 11:59 AM
To: <secretary@maremanecpa.co.za>
Cc: <chairperson@maremanecpa.co.za>, <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>, <gaonyadiwemathobela@gmail.com>, Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>, <kehumile@magafrica.co.za>, <neo.moitaletsi@webmail.co.za>

Morning Secretary Mr. Mphafi,

As indicated during our telephonic conversation last week, I will attend the meeting. In my attendance I will cover the process we are going through so that everyone can understand why we do Public Participation.

As indicated we will have our Public Participation meeting on the 03 June 2022 at 11:00am at Maremane Hall in Doornpan about 15 km away from Postmasburg.

I look forward to the meeting.

Regards,

Mthuthuzeli "Thuthu" Daniels Pr. Eng. BSc Mining (Eng.) MBL MMCC

Mine Manager

Kapstewel Mine – Midtron Minerals (Pty)Ltd

mthuthuzeli.daniels@gmail.com

W +27(0) 82 879 0948

H +27(0) 76 897 4711

Comment Form.pdf
95.7kB

Notification letter.pdf
747.6kB

Fwd: Public Participation DMR REFERENCE:NC30/5/1/2/2/10207MR

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:24 PM GMT+2

Forwarded Conversation

Subject: Public Participation DMR REFERENCE:NC30/5/1/2/2/10207MR

From: **mpho mogolegeng** <mphomogolega@gmail.com>
Date: Sat, May 7, 2022 at 8:00 PM
To: <atshidzaho@gmail.com>
Cc: <ndi@ndigeoservices.co.za>

Good day

I am hereby writing this email as an interested party in participating in the mining activities as an emerging mining contract.
Please find attached business proposal of my companies diverse interest.
I would be highly be grateful if you consider us for at least one of the services that we could provide for the mine.Thanking you in advance.

Regards
Mpho K.I Mogolegeng
0798880100

From: <ndi@ndigeoservices.co.za>
Date: Tue, May 10, 2022 at 4:52 PM
To: <atshidzaho@gmail.com>

From: **Ndivhudzannyi Mofokeng** <atshidzaho@gmail.com>
Date: Tue, May 10, 2022 at 4:57 PM
To: mpho mogolegeng <mphomogolega@gmail.com>
Cc: <ndi@ndigeoservices.co.za>

Dear Mpho

I would like to confirm that you have been registered as an Interest and Affected Party in the proposed mining project and noted the content of your email.

As the registered Interested and Affected Party (I&APs) you are provided with an opportunity to review and comment on the draft Scoping Report over a 30-day period. Comments from I&APs will be incorporated into the final Scoping report and will be submitted to the DMR for decision making.

Thank you and Kind Regards

NDI GEOLOGICAL CONSULTING SERVICES (PTY) LTD

N Mofokeng

38 Ophelia Street

Kimberley, 8301

Cell: 082 760 8420

Tel: 053 842 0687

Fax: 086 538 1069

atshidzaho@gmail.com

ndi@ndigeoservices.co.za

From: **Ndivhudzannyi Mofokeng** <atshidzaho@gmail.com>
Date: Tue, May 10, 2022 at 4:58 PM
To: sctcn <sctcn@126.com>
Cc: Mthuthuzeli Leonard Daniels <mthuthuzeli.daniels@gmail.com>

Dear William

Please find the email attached from the registered I&AP.

Thank you and Kind Regards

NDI GEOLOGICAL CONSULTING SERVICES (PTY) LTD

N Mofokeng

38 Ophelia Street

Kimberley, 8301

Cell: 082 760 8420

Tel: 053 842 0687

Fax: 086 538 1069

atshidzaho@gmail.com

ndi@ndigeoservices.co.za

---------- Forwarded message ---------
From: **mpho mogolegeng** <mphomogolega@gmail.com>
Date: Sat, May 7, 2022 at 8:00 PM
Subject: Public Participation DMR REFERENCE:NC30/5/1/2/2/10207MR
To: <atshidzaho@gmail.com>
Cc: <ndi@ndigeoservices.co.za>

From: **mpho mogolegeng** <mphomogolega@gmail.com>
Date: Fri, May 13, 2022 at 6:44 AM
To: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>

Good morning

Where can I get the draft Scoping Report so that I can review it?

Best Regards

Mpho

Maitemogelo GeoSurv & Mining Public Paricipation.docx
77.6kB

Fwd: Stakeholder Notification

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:25 PM GMT+2

---------- Forwarded message ---------
From: <ndi@ndigeoservices.co.za>
Date: Sun, May 8, 2022 at 10:00 PM
Subject: Stakeholder Notification
To: <mayor@tsantsabane.gov.za>, <mm@tsantsabane.gov.za>
Cc: <atshidzaho@gmail.com>

Dear Stakeholder

Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

Please see attached letter for more information.

Kind Regards

N Mofokeng

NDi
GEOLOGICAL CONSULTING SERVICES
PTY (LTD)

38 Ophelia Street
Kimberley, 8301
C: 082 760 8420
T: 053 842 0687
F: 086 538 1069
E: ndi@ndigeoservices.co.za
W: www.ndigeoservices.co.za

Notification letter-mm.pdf
748.1kB

Notification letter-mayor.pdf
748.1kB

Comment Form.pdf
95.7kB

Fwd: Stakeholder Notification

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:27 PM GMT+2

---------- Forwarded message ---------
From: <ndi@ndigeoservices.co.za>
Date: Sun, May 8, 2022 at 10:18 PM
Subject: Stakeholder Notification
To: <secretary@maremanecpa.co.za>
Cc: <atshidzaho@gmail.com>, <chairperson@maremanecpa.co.za>

Dear Maremane CPA

Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

Please see attached letter for more information.

Kind Regards

N Mofokeng

NDi
GEOLOGICAL CONSULTING SERVICES
PTY (LTD)

38 Ophelia Street
Kimberley, 8301
C: 082 760 8420
T: 053 842 0687
F: 086 538 1069
E: ndi@ndigeoservices.co.za
W: www.ndigeoservices.co.za

Comment Form.pdf
95.7kB

Notification letter-Maremane CPA secretary.pdf
748.2kB

Notification letter-Maremane CPA Chairperson.pdf
748.3kB

Fwd: Stakeholder Notification

From: Ndivhudzannyi Mofokeng (atshidzaho@gmail.com)

Date: Wednesday, June 15, 2022, 06:27 PM GMT+2

---------- Forwarded message ---------
From: <ndi@ndigeoservices.co.za>
Date: Sun, May 8, 2022 at 10:23 PM
Subject: Stakeholder Notification
To: <gaonyadiwemathobela@gmail.com>
Cc: <atshidzaho@gmail.com>

Dear Stakeholder

Notice is hereby given that Midtron Minerals (Pty) Ltd (Midtron) is applying for a mining right and associated Environmental Authorisation (EA) and Waste Management Licence (WML) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the National Environmental Management Waste Act (Act No. 59 of 2008) (NEM: WA) and the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), as amended.

Please see attached letter for more information.

Kind Regards

N Mofokeng

GEOLOGICAL CONSULTING SERVICES
PTY (LTD)

38 Ophelia Street
Kimberley, 8301
C: 082 760 8420
T: 053 842 0687
F: 086 538 1069
E: ndi@ndigeoservices.co.za
W: www.ndigeoservices.co.za

Comment Form.pdf
95.7kB

Notification letter-mathobela.pdf
748.1kB

N Mofokeng

38 Ophelia Street

Kimberley, 8301

Cell: 082 760 8420

Tel: 053 842 0687

Fax: 086 538 1069

atshidzaho@gmail.com

ndi@ndigeoservices.co.za

On Wed, Jun 8, 2022 at 8:37 AM Jaco Grobler <jaco.grobler@amggroup.com> wrote:

From: **Jaco Grobler** <jaco.grobler@amggroup.com>
Date: Thu, Jun 9, 2022 at 8:32 AM
To: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>
Cc: ndi@ndigeoservices.co.za <ndi@ndigeoservices.co.za>, Chaneen Botha <chaneen@amggroup.com>

Good morning.

Thank you very much.

Regards

From: **Jaco Grobler** <jaco.grobler@amggroup.com>
Date: Thu, Jun 9, 2022 at 8:33 AM
To: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>
Cc: ndi@ndigeoservices.co.za <ndi@ndigeoservices.co.za>, Chaneen Botha <chaneen@amggroup.com>

Thank you very much.

Regards

From: Ndivhudzannyi Mofokeng <atshidzaho@gmail.com>
Sent: Wednesday, 08 June 2022 17:58
To: Jaco Grobler <jaco.grobler@amggroup.com>
Cc: ndi@ndigeoservices.co.za; Chaneen Botha <chaneen@amggroup.com>

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167.5kB

Tsantsabane letter.pdf

29kB

Appendix 6: Specialist Studies Reports

PHASE 1 ARCHAEOLOGICAL AND HERITAGE IMPACT ASSESSMENT REPORT FOR THE PROPOSED MINING RIGHT APPLICATION ON VARIOUS PORTIONS OF THE FARM KAPSTEWEL 436 WITHIN TSANTSABANE LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY IN THE NORTHERN CAPE PROVINCE

DATE: 12 APRIL 2022

Document Information

Item	Description
Proposed development and location	Proposed mining right application on various portions of the Farm Kapstewel 436 within Tsantsabane Local Municipality, ZF Mgcawu District Municipality, in the Northern Cape Province.
Purpose of the study	To carry out an archaeological and Heritage Impact Assessment to determine the presence/absence of cultural heritage sites and the impact of Proposed Mining Right Application.
Coordinates	See Table and Figure 3
Municipalities	Tsantsabane Local Municipality, under ZF Mgcawu District Municipality
Predominant land use of surrounding area	Agriculture, residential and mining
Applicant	Genet Manganese (Pty) Ltd
EAP	NDI GEOLOGICAL CONSULTING SERVICES (PTY) LTD 38 Ophelia Street, Kimberley, 8301 Cell: 082 760 8420 Tel: 053 842 0687 Fax: 086 538 1069 Email: ndi@ndigeoservices.co.za
Heritage Consultant	Integrated Specialist Services (Pty) Ltd Constantia Park, Building 16-2, 546, 16th Road, Midrand, 1685 Tel: 010 492 4330, Fax: 086 652 9774, Cell: 071 685 9247 Email: trust@issolutions.co.za
Author	Trust Mlilo (Archaeology and Heritage Specialist)
Date of Report	10/05/ 2022

NATIONAL LEGISLATION AND REGULATIONS GOVERNING THIS REPORT

This is a specialist report' and is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014.

DECLARATION OF INDEPENDENCE

In terms of Chapter 5 of the National Environmental Management Act of 1998 specialists involved in Impact Assessment processes must declare their independence.

I, Trust Mlilo, do hereby declare that I am financially and otherwise independent of the client and their consultants and that all opinions expressed in this document are substantially my own, notwithstanding the fact that I have received fair remuneration from the client for the preparation of this report.

Expertise:

Trust Mlilo, MA. (Archaeology), BA Hons, PDGE and BA & (Univ. of Pretoria) ASAPA (Professional member) with more than 15 years of experience in archaeological and heritage impact assessment and management. Mlilo is an accredited member of the Association for Southern African Professional Archaeologists (ASAPA), Amafa akwaZulu Natali and Eastern Cape Heritage Resources Agency (ECPHRA). He has conducted more than a hundred AIA/HIA Studies, heritage mitigation work and heritage development projects over the past 15 years of service. The completed projects vary from Phase 1 and Phase 2 as well as heritage management work for the government, parastatals (Eskom) and several private companies such as BHP Billiton/South32, Afrimat, Rhino Minerals and GIBB.

Independence

The views expressed in this document are the objective, independent views of Mr Trust Mlilo and the survey was carried out under NDI Geological Consulting Services (Pty) Ltd. Integrated Specialist Services (Pty) Ltd has no business, personal, financial or other interest in the proposed development project apart from fair remuneration for the work performed.

Conditions relating to this report

The content of this report is based on the author's best scientific and professional knowledge as well as the available information. Integrated Specialist Services (Pty) Ltd reserves the right to modify the report in any way deemed fit should new, relevant or previously unavailable or undisclosed information becomes known to the author from on-going research or further work in this field or pertaining to this investigation.

Authorship: This AIA/HIA Report has been prepared by Mr Trust Mlilo (Professional Archaeologist). The report is for the review of the Heritage Resources Agency (PHRA).

Geographic Co-ordinate Information: Geographic coordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps: Maps included in this report use data extracted from the NTS Map and Google Earth Pro.

Disclaimer: The Authors are not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

The Archaeological and Heritage Impact Assessment Study was carried out within the context of tangible and intangible cultural heritage resources as defined by the SAHRA Regulations and Guidelines as to the authorisation of the proposed Mining Right Application being proposed by Genet Manganese (Pty) Ltd.

Signed by

12/ 04/ 2022

EXECUTIVE SUMMARY

Integrated Specialist Services (Pty) Ltd was tasked by NDI Geological Consulting Services (Pty) Ltd on behalf of Genet Manganese (Pty) Ltd to carry out a Phase 1 Archaeological Impact Assessment for the proposed Mining Right Application on various Portions of the Farm Kapstewel 436 within Tsantsabane Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. The study was conducted to fulfil the requirements of Section 38 of the National Heritage Resources Act 25 of 1999. The general project area is predominantly mining and stock farming. The study aims to identify and document archaeological sites and any heritage resources that may be affected by the proposed mining development. This will in turn assist the applicant and contractors to ensure proper conservation measures in accordance with the National Heritage Resource Act, 1999 (Act 25 of 1999). The findings of this study have been informed by a desktop study and field survey within the proposed development sites. The desktop study was undertaken through SAHRIS in search of previous Cultural Heritage Impact Assessment studies conducted in the region and Postmasburg in particular as well as systematic archaeological research that has been carried out in the project area over the past years.

Archaeological Resources in the general project area stretch into deep time starting with australopithecines. These australopithecines were gradually displaced by early hominid (Homo Habilis) that was later replaced by the early crude stone tool using hominid (Homo erectus around 1.8 million years ago). This marked the beginning of the Stone Age (ESA), which is not very widespread in the study area. Nonetheless, the area has isolated occurrences of the Middle Stone Age (MSA) industries associated with anatomically modern humans, Homo sapiens that replaced the ESA around 250000 years ago. The subsequent replacement of the MSA by the Later Stone Age (LSA) occurred about 20000 years ago and the new technology is also represented in isolated occurrences. The LSA triggered a series of technological innovations and social transformations within these early hunter-gatherer societies that included the advent of rock art (paining and engravings), associated with the Khoisan communities.

Receiving Environment

The proposed mining site is located in a partially disturbed landscape owing to previous and current land use activities such as agriculture, mining and roads (see Figure 1).

2. Impact statement

The proposed mining has the potential to disturb archaeological remains although limited. It is important to note that all categories of heritage resources are generally known to occur in the wider area where the proposed development site is located. The presence of stockpiled soils and debris as a result of mining activities will have a moderate visual impact on pass-by motorists along the Road R325, and this impact will last for the lifespan of this proposed mining site. However, this is not addressed in this report in detail.

3. Restrictions and Assumptions

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be remembered that archaeological deposits (including graves and traces of mining heritage) usually occur beneath the surface. Should artefacts or skeletal material be revealed at the site during mining, such activities should be halted immediately, and a competent heritage practitioner, SAHRA or PHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. Integrated Specialist Services (Pty) Ltd assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

4. Site-Location Model

This report employed a site-location model championed by Maggs (1980). The model suggests that inland sites will be found in locations which bear the following:

- Limited to below an altitude of 1000 m asl;
- Situated on the riverside or streamside locations, on deep alkaline colluvial soils; and
- In areas appropriate for dry farming (with sufficient summer rainfall).

5. Background study

The closest town to the proposed development is Postmansburg which is located approximately 15km east of the site, while the prehistory of this region spans over a thousand years, the history of the Town of Postmasburg extends for over a century, as such the town itself is a heritage arena and bear many signatures of the past (see Figure 1).

6. Survey findings

The Phase I Archaeological Impact Assessment for the proposed mining right application site did not identify any significant archaeological heritage within the mining right site to warrant abandonment of the site. The study encountered isolated lithic tools in secondary deposition sites.

7. Recommendations

The proposed mining may proceed as planned subject to the following recommendations:

The applicant is reminded that should any archaeological material be unearthed accidentally during prospecting, SAHRA must be alerted immediately, and mining activities be stopped within a radius of at least 10m of such indicator. The area should then be demarcated by a danger tape. Accordingly, a professional archaeologist should be contacted immediately. In the meantime, it is the responsibility of the Environmental Officer and the contractor to protect the site from publicity (i.e., media) until a mutual agreement is reached. It is mandatory to report any incident of human remains encountered to the South African Police Services, SAHRA staff members and professional archaeologists. Any measure to cover up the suspected archaeological material or to collect any resources is illegal and punishable by law under Section 35(4) and 36(3) of the National Heritage Resources Act, Act 25 of 1999. The applicant should induct field workers about archaeology, and steps that should be taken in the case of accidentally exposing archaeological materials.

8. Should Mining work commence for this project

- The mining teams should be inducted on the significance of the possible archaeological material that may be encountered during subsurface clearance and mining work. It should be noted that the applicant must induct field workers about archaeology, and steps that should be taken in the case of exposing materials;
- The applicant should take note that, only the site demarcated for mining was surveyed, and that the mining team should work within such an area. Any attempt to alter beyond the surveyed area will be illegal, and SAHRA might take legal steps against the applicant.

9. Conclusions

A thorough background study and survey of the proposed mining right application site was conducted, and findings were recorded in line with SAHRA guidelines. In accordance with the recommendations above, there are no major archaeological reasons why the proposed mining rights application should not be approved. Thus, it is recommended that the proposed mining proceeds on the condition that the recommendation indicated above are adhered to. Note that this report as well as its recommendations are inadequate without comments from SAHRA.

Acknowledgements

The author acknowledges NDI Geological Consulting Services (Pty) Ltd for their assistance with project information and for responding to technical queries related to the project. Specials thanks go to landowners who provided access and vital information about the study area.

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ABBREVIATIONS

AIA	Archaeological Impact Assessment
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EM	Environmental Manager
EMP	Environmental Management Plan
HIA	Heritage Impact Assessment
LIA	Late Iron Age
NHRA	Nation Heritage Resources Act, Act 25 of 1999
PM	Project Manager
PHRA	Provincial Heritage Agency
SM	Site Manager
SAHRA	South African Heritage Resources Agency

KEY CONCEPTS AND TERMS

Periodization Archaeologists divide the different cultural epochs according to the dominant material finds for the different periods. This periodization is usually region-specific, such that the same label can have different dates for different areas. This makes it important to clarify and declare the periodization of the area one is studying. These periods are nothing a little more than convenient time brackets because their terminal and commencement are not absolute and there are several instances of overlap. In the present study, relevant archaeological periods are given below;

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

Early Iron Age (~ AD 200 to 1000)

Late Iron Age (~ AD1100-1840)

Historic (~ AD 1840 to 1950, but a Historic building is classified as over 60 years old)

Definitions Just like periodization, it is also critical to define key terms employed in this study. Most of these terms derive from South African heritage legislation and its ancillary laws, as well as international regulations and norms of best practice. The following aspects have a direct bearing on the investigation and the resulting report:

Cultural (heritage) resources are all non-physical and physical human-made occurrences and natural features that are associated with human activity. These can be singular or in groups and include significant sites, structures, features, ecofacts and artefacts of importance associated with the history, architecture, or archaeology of human development.

Cultural significance is determined by means of aesthetic, historic, scientific, social, or spiritual values for past, present, or future generations.

Value is related to concepts such as worth, merit, attraction or appeal, concepts that are associated with the (current) usefulness and condition of a place or an object. Although significance and value are not mutually exclusive, in some cases the place may have a high level of significance but a lower level of value. Often, the evaluation of any feature is based on a combination of balance between the two.

Isolated finds are occurrences of artefacts or other remains that are not in-situ or are located apart from archaeological sites. Although these are noted and recorded but do not usually constitute the core of an impact assessment unless they have intrinsic cultural significance and value.

In-situ refers to material culture and surrounding deposits in their original location and context, for example, an archaeological site that has not been disturbed by farming.

Archaeological sites/materials are remains or traces of human activity that are in a state of disuse and are in, or on, land and which are older than 100 years, including artefacts, human and hominid remains, and artificial features and structures. According to the National Heritage Resources Act (NHRA) (Act No. 25 of 1999), no archaeological artefact, assemblage, or settlement (site) and no historical building or structure older than 60 years may be altered, moved, or destroyed without the necessary authorisation from the South African Heritage Resources Agency (SAHRA) or a provincial heritage resources authority.

Historic materials are remains resulting from human activities, which are younger than 100 years, but no longer in use, including artefacts, human remains and artificial features and structures.

Chance finds means archaeological artefacts, features, structures or historical remains accidentally found during development.

A grave is a place of interment (variably referred to as burial) and includes the contents, headstone, or another marker of such a place, and any other structure on or associated with such place. A grave may occur in isolation or in association with others where upon it is referred to as being situated in a cemetery (contemporary) or burial ground (historic).

A site is a distinct spatial cluster of artefacts, structures, and organic and environmental remains, as residues of past human activity.

Heritage Impact Assessment (HIA) refers to the process of identifying, predicting, and assessing the potential positive and negative cultural, social, economic, and biophysical impacts of any proposed project, which requires authorisation of permission by law, and which may significantly affect the cultural and natural heritage resources. Accordingly, an HIA must include recommendations for appropriate mitigation measures for minimising or circumventing negative impacts, measures enhancing the positive aspects of the proposal and heritage management and monitoring measures.

Impact is the positive or negative effects on human well-being and/or on the environment.

Mitigation is the implementation of practical measures to reduce and circumvent adverse impacts or enhance beneficial impacts of an action.

Mining heritage sites refer to old, abandoned mining activities, underground or on the surface, which may date from the prehistorical, historical or the relatively recent past.

Study area or 'project area' refers to the area where the developer wants to focus its development activities (refer to plan).

Phase I studies refer to surveys using various sources of data and limited field walking in order to establish the presence of all possible types of heritage resources in any given area

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1 INTRODUCTION

Background

Most heritage sites occur within communities, whose development should not be neglected in the name of heritage preservation but should be encouraged and embraced within legal and adaptive management frameworks (Carter and Grimwade 1997; Salafsky *et al* 2001). This case is true for the mining project area, which may host palaeontological, archaeological, historical, natural, and contemporary heritage resources. Genet Manganese (Pty) Ltd is applying for a mining right on various Portions of the Farm Kapstewel 436 within Tsantsabane Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province. Previous heritage studies (Kusel *et al* 2009, Webley 2012, Orton 2013, 2016, 2017, Morris 2010a, 2010b, 2010c, Webley &Halket 2012, Kaplan 2012a, 2012b) mention the occurrence of significant heritage resources in parts of the region under which the proposed project site is located.

The purpose of this Archaeology and Heritage Study is to assess the presence/absence of heritage resources on the proposed mining right application site. The study was designed to ensure that any significant archaeological or cultural physical property or sites are located and recorded, and site significance is evaluated to assess the nature and extent of expected impacts from the proposed mining. The assessment includes recommendations to manage the expected impact of the proposed mining. The report includes recommendations to guide heritage authorities in making the appropriate decision with regard to the environmental approval process for the mining rights application. The report concludes with detailed recommendations on heritage management associated with the mining rights application. Integrated Specialist Services (Pty) Ltd (ISS), an independent consulting firm, conducted an assessment; research and consultations required for the preparation of the archaeological and heritage impact report in accordance with its obligations set in the NHRA as well as the environmental management legislations.

In line with SAHRA guidelines, this report, not necessarily in that order, provides:

1) Management summary
2) Methodology
3) Information with reference to the desktop study
4) Map and relevant geodetic images and data
5) GPS co-ordinates
6) Directions to the site
7) Site description and interpretation of the cultural area where the project will take place
8) Management details, description of affected cultural environment, photographic records of the project area
9) Recommendations regarding the significance of the site and recommendations regarding further monitoring of the site.
10) Conclusion

Description of the proposed project.

Midtron Minerals (Pty) Ltd is applying for a mining right, on various Portions of the Farm Kapstewel 436 within Tsantsabane Local Municipality, ZF Mgcawu District Municipality, in the Northern Cape Province triggering the basic assessment process of the HIA/AIA regulations. These mining works are divided into 3 phases which are explained in detail below;

PHASE 1: Operational/ Mining Phase

The proposed development entails mining the ore through the conventional opencast mining method. Each mining area will be treated separately with the choice of mining method largely affected by the nature and geology of the ore deposit in the mine. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals. The mining process will include drilling, blasting, loading and hauling.

Drilling

This phase of drilling will consist of an RC drill. RC drilling involves the process of blasting and crushing the rock material into fragments. A typical drilling pattern is a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.

Blasting

The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted.

Loading

The applicant will utilize excavators and FELs to load the minerals onto the dump trucks and ADTs. Waste and Roms will be loaded separately onto different trucks and hauled to designated areas.

Hauling

Minerals will be hauled to either mobile plants or at a later stage to fixed plants. The waste materials will be hauled to the designated dumps or hauled to mined out areas for backfilling purposes.

PHASE 2: Processing

The Ore <600mm is fed to the primary JAW crusher where ore is crushed down to 140mm. Ore is then fed to the primary cone crusher where it is crushed down to 25mm. From here the ore is fed to the secondary cone crusher where it is crushed down to -15mm. The ore is then fed to a vibrating three deck screen. The first deck separates the -25mm +15mm material from the +25mm material. The +25mm material is conveyed back to the secondary cone crusher for re-crushing. The second deck screens out the -15mm +6mm material and the third deck screens out the -6mm material. The -25mm +15mm and -15mm +6mm ore go through a dry magnetic separation process. The -6mm ore goes through another magnetic separation process. After this process, there are three stockpiles, each consisting of a different size.

Quality control

The chemical quality of the final products is partly controlled by supplying the plant with a suitable mixture of run-of-mine ore. Samples are taken at regular intervals from the manganese ore that has been crushed and screened and chemically analyzed at the onsite laboratory to ensure that the final product contains the correct silica, potassium oxide, phosphorus, and sulphur and alumina content. A comprehensive record shall be kept of the sample analyses. The manganese ore that has been processed in the crushing and screening plant will be put through the magnetic separating plant to ensure that the final product's grade adheres to the customer specifications.

Magnetic Separation

Magnetic separation is a process in which magnetically susceptible material is extracted from a mixture using a magnetic force. This separation technique can be useful in mining iron and manganese as it is attracted to a magnet. Magnetic separation is one of the most reliable ways to remove unwanted ferrous metals by adjusting the strength of the magnetic separators. All materials possess magnetic properties. Substances that have a greater permeability than air are classified as paramagnetic; those with a lower permeability are called diamagnetic. Paramagnetic materials are attracted to a magnet; diamagnetic substances are repelled. Very strongly paramagnetic materials can be separated from weakly or nonmagnetic materials by the use of low-intensity magnetic separators. Minerals such as hematite, limonite, and garnet are weakly magnetic and can be separated from non magnetics by the use of high intensity

PHASE 3: Closure

Waste Management

The waste that is screened out is dumped on a temporary tailings stockpile from where waste is either used for back-filling of excavations or hauled to the waste rock dump. Throughout the production process, at various times during the mining of the ore and from the stockpiles after the plant process, the ore is sampled and analysed in order to maintain the correct manganese grade.

The following section provides a detailed description of the proposed mining right application site.

Location of the proposed development

The proposed project is located on the outskirts of Postmasburg along the R325 road between Postmasburg and Kathu in the Northern Cape Province. The mining right application site is situated approximately 15km north of the town of Postmasburg, and approximately 40km southeast of the town of Olifantshoe.

Table 1: Property details

FARM NAME	PORTION	21-DIGIT SURVEYOR GENERAL CODE	COORDINATES
Farm Kapstewel 436	3 (RE)	C03100000000043600003	28°10'25.04S, 23°5'49.87E
Farm Kapstewel 436	5	C03100000000043600005	28°9'19.79S, 23°6'21.45E
Farm Kapstewel 436	RE	C03100000000043600000	28°7'47.94S, 23°6'43.87E

Figure 1: Locality Map of Kapstewel (NDI Geological Consulting Services (Pty) Ltd 2022)

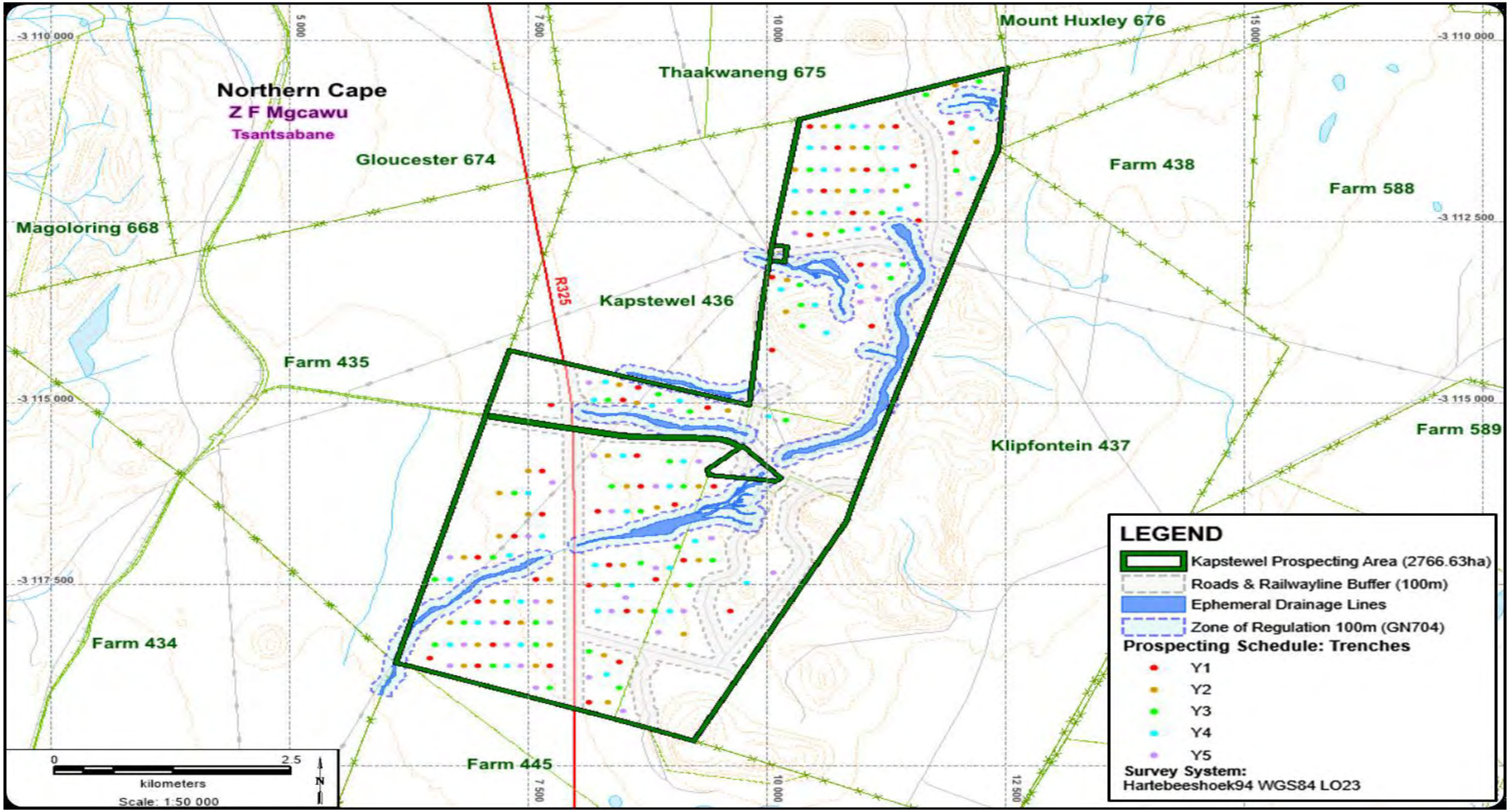

Figure 2: Proposed mining right application site (NDI Geological Consulting Services (Pty) Ltd 2022)

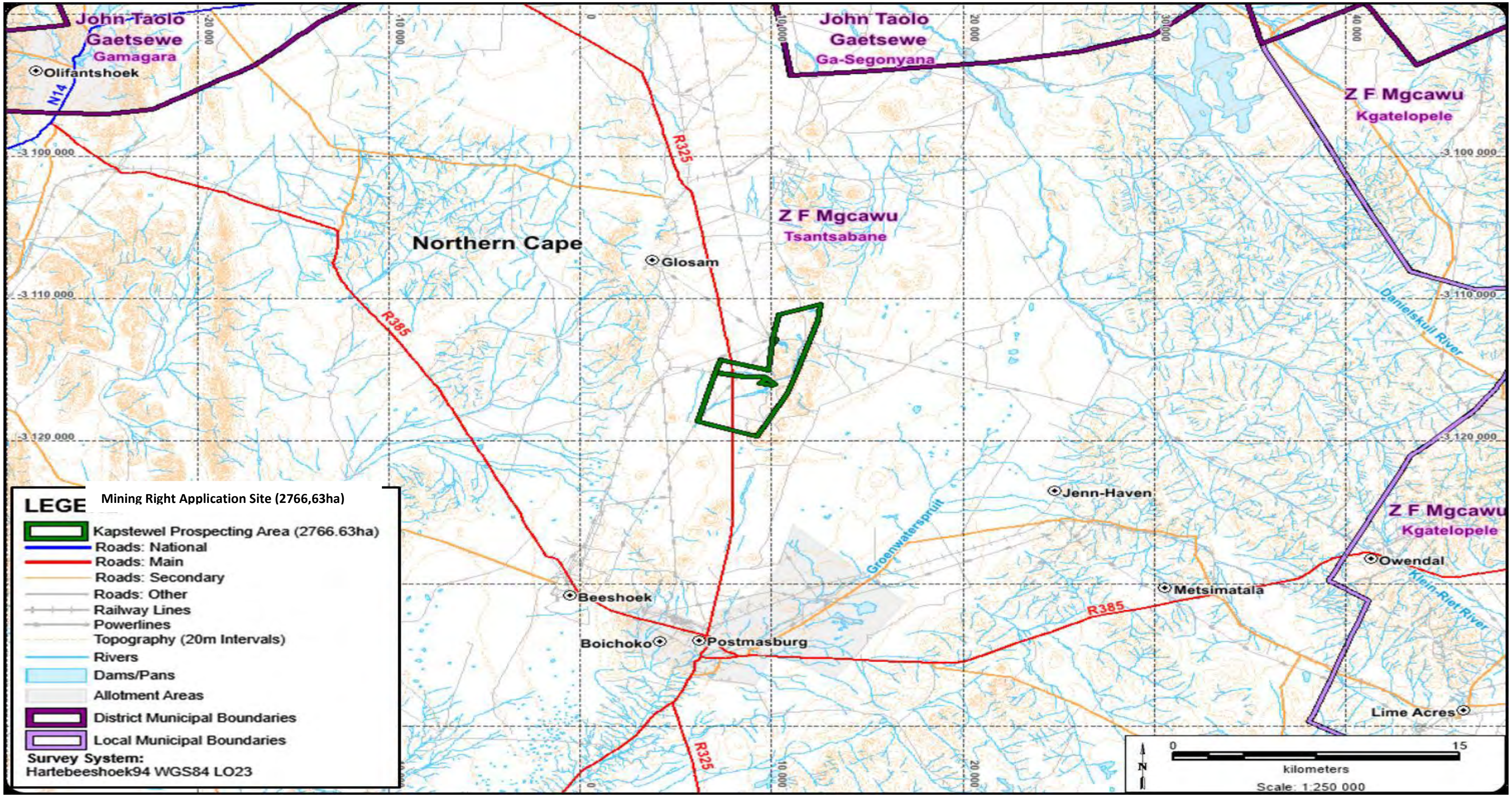

Figure 3: Locality of the proposed mining right application site (NDI Geological Consulting Services (Pty) Ltd 2022)

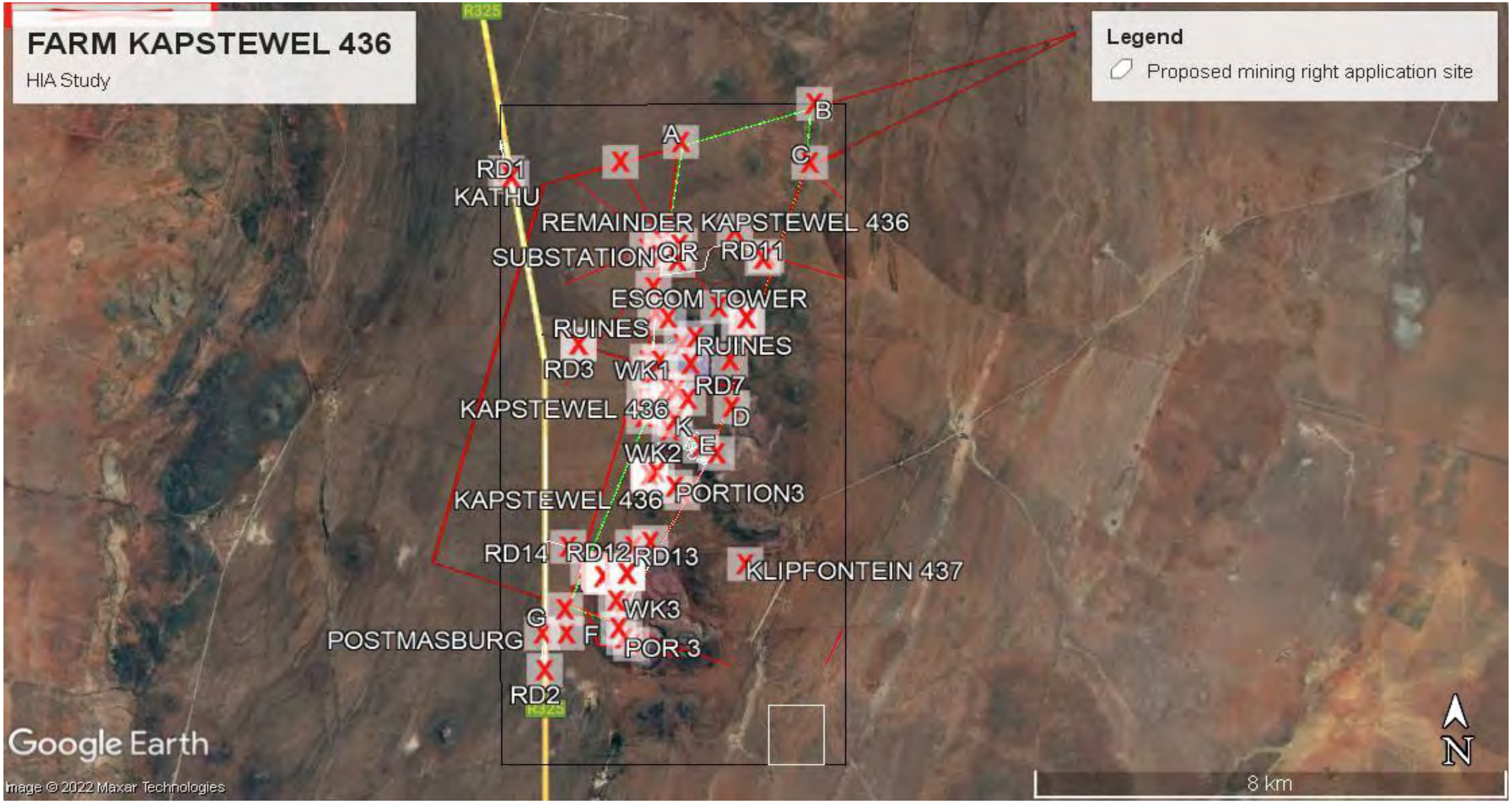

Figure 4: Showing the base plan of the proposed mining right application site (Integrated Specialist Services (Pty) Ltd 2022)

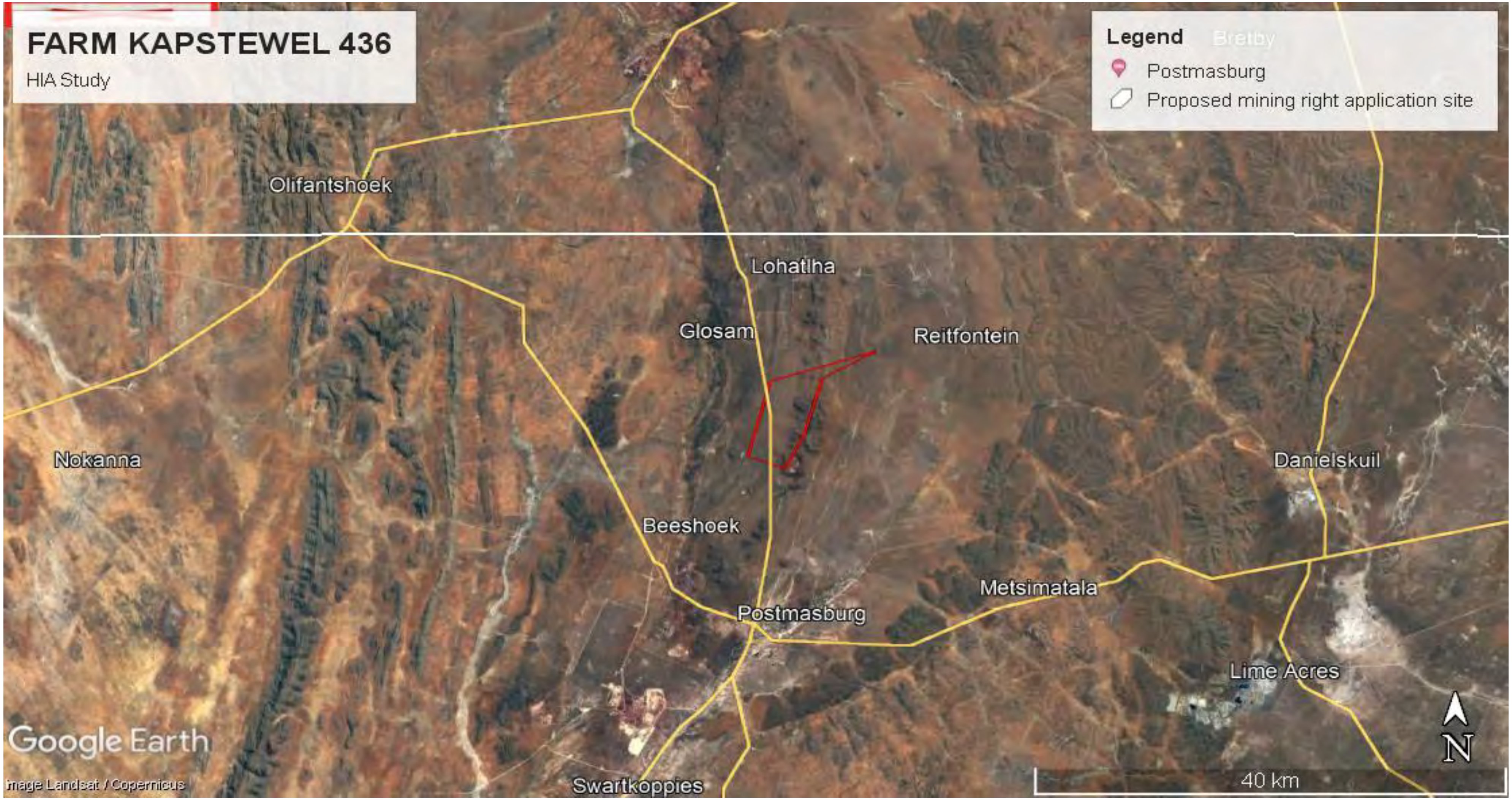

Figure 5: Locality of the proposed mining right application site (Integrated Specialist Services (Pty) Ltd 2022)

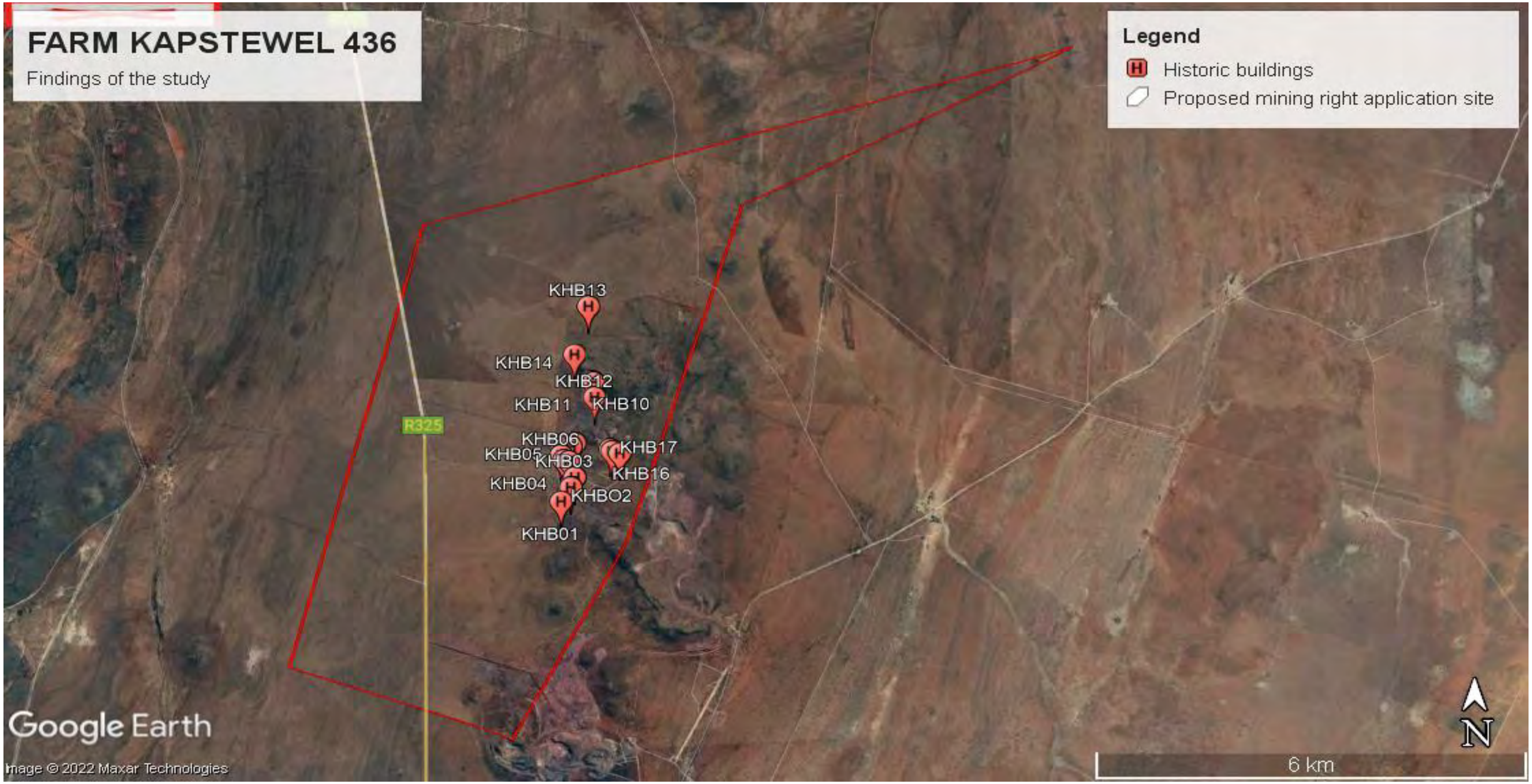

Figure 6: Locality of the proposed mining site (Integrated Specialist Services (Pty) Ltd 2022)

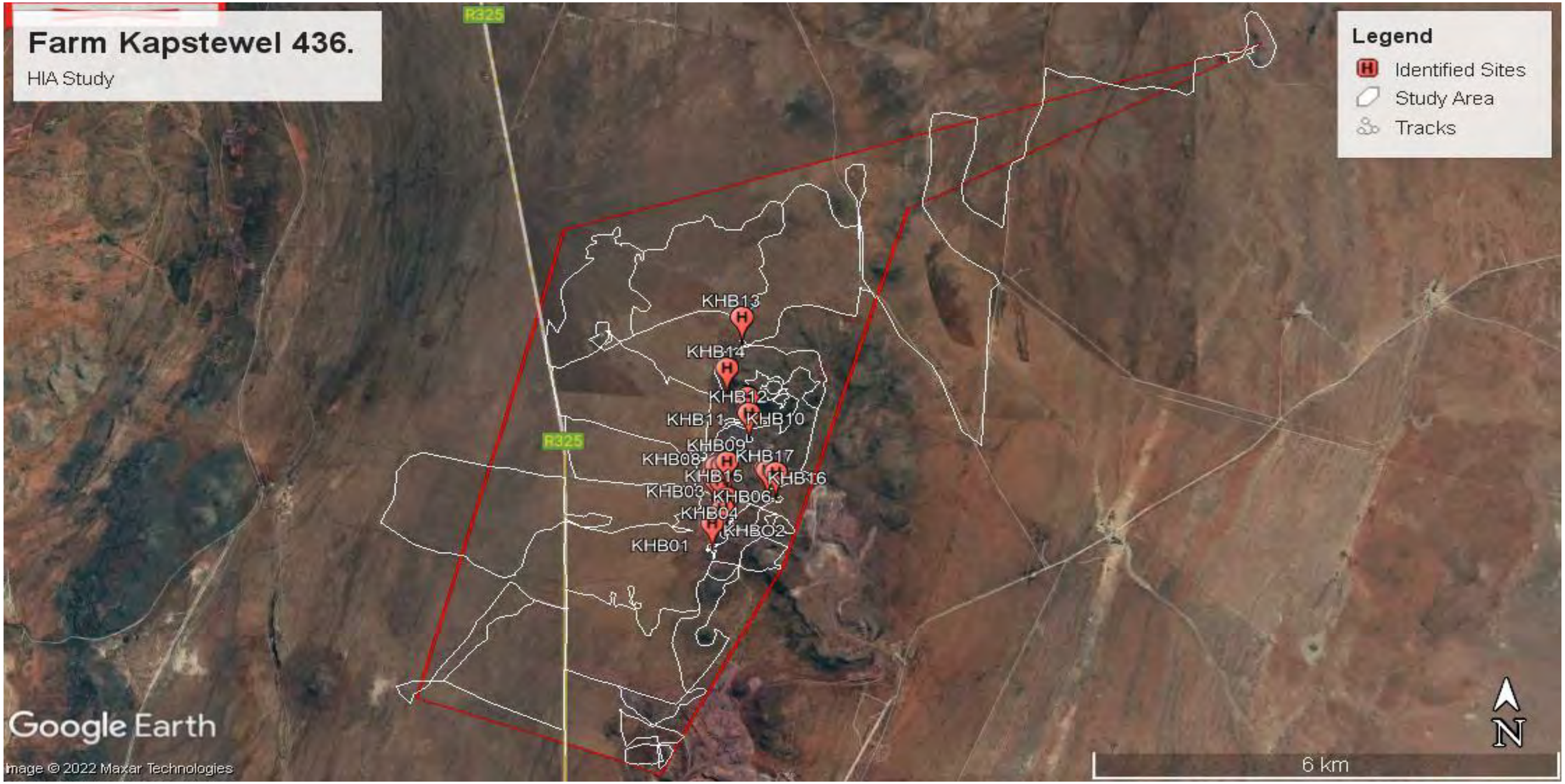

Figure 7: Locality of the proposed mining site and tracklogs (Integrated Specialist Services (Pty) Ltd 2022)

2 LEGAL REQUIREMENTS

Relevant pieces of legislation to the present study are presented here. Under the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA), Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), and the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and 2014 Regulations, an AIA or HIA is required as a specialist sub-section of the EIA.

Heritage management and conservation in South Africa is governed by the NHRA and falls under the overall jurisdiction of the SAHRA and its PHRAs. Different sections of the NHRA are relevant to this study. The proposed development is a listed activity in terms of Section 38 of the NHRA which stipulates that the following development categories require an HIA to be conducted by an independent heritage management consultant:

- Construction of a road, wall, powerline, pipeline, canal or other linear forms of development or barrier exceeding 300m in length
- Construction of bridge or similar structure exceeding 50m in length
- Development or other activity that will change the character of a site -
    - Exceeding 5000 sq. m
    - Involving three or more existing erven or subdivisions
    - Involving three or more erven or divisions that have been consolidated within the past five years
    - Rezoning of site exceeding 10 000 sq. m
    - The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority
- Any other development category, public open space, squares, parks, recreation grounds

Thus, any person undertaking any development in the above categories, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. Section 38 (2) (a) of the NHRA also requires the submission of a heritage impact assessment report for authorization purposes to the responsible heritage resources agencies (SAHRA/PHRAs).

Related to Section 38 of the NHRA are Sections 34, 35, 36 and 37. Section 34 stipulates that no person may alter, damage, destroy, relocate etc. any building or structure older than 60 years, without a permit issued by SAHRA or a provincial heritage resources authority. Section 35 (4) of the NHRA stipulates that no person may, without a permit issued by SAHRA, destroy, damage, excavate, alter, or remove from its original position, or collect, any archaeological material or object. This section may apply to any significant archaeological sites that may be discovered before or during construction. This means that any chance find must be reported to SAHRA or PHRA (the relevant PHRA), who will assist in investigating the extent and significance of the finds and inform about further actions. Such actions may entail the removal of material after documenting the find site or mapping of larger sections before destruction. Section 36 (3) of the NHRA also stipulates that no person may, without a permit issued by the SAHRA, destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority. This section may apply in the case of the discovery of chance burials, which is unlikely. The procedure for reporting chance finds also applies to the likely discovery of burials or graves by the developer or contractors. Section 37 of the NHRA deals with public monuments and memorials which exist in the proposed project area.

In addition, the new EIA Regulations (4 December 2014) promulgated in terms of NEMA (Act 107 of 1998) determine that any environmental reports will include cultural (heritage) issues. The new regulations in terms of Chapter 5 of the NEMA provide for an assessment of development impacts on the cultural (heritage) and social environment and Specialist Studies in this regard. The end purpose of such a report is to alert the applicant, SAHRA or PHRA and interested and affected parties about existing heritage resources that may be affected by the proposed mining right application and to recommend mitigatory measures aimed at reducing the risks of any adverse impacts on these heritage resources.

Assessing the Significance of Heritage Resources

The appropriate management of cultural heritage resources is usually determined based on their assessed significance as well as the likely impacts of any proposed developments. Cultural significance is defined in the Burra Charter as meaning aesthetic, historic, scientific, or social value for past, present, or future generations (Article 1.2). Social, religious, cultural, and public significance are currently identified as baseline elements of this assessment, and it is through the combination of these elements that the overall cultural heritage values of the site of interest, associated place or area are resolved.

Not all sites are equally significant and not all are worthy of equal consideration and management. The significance of a place is not fixed for all time, and what is considered of significance at the time of assessment may change as similar items are located, more research is undertaken, and community values change. This does not lessen the value of the heritage approach but enriches both the process and the long-term outcomes for future generations as the nature of what is conserved and why also changes over time (Pearson and Sullivan 1995:7). This assessment of the Indigenous cultural heritage significance of the Site of Interest as its environments of the study area will be based on the views expressed by the traditional authority and community representatives, consulted documentary review and physical integrity.

African indigenous cultural heritage significance is not limited to items, places or landscapes associated with pre-European contact. Indigenous cultural heritage significance is understood to encompass more than ancient archaeological sites and deposits, broad landscapes, and environments. It also refers to sacred places and story sites, as well as historic sites, including mission sites, memorials, and contact sites. This can also refer to modern sites with resonance to the indigenous community. The site of interest considered in this project falls within this realm of broad significance.

Archaeological sites, as defined by the National Heritage Resources Act (Act 25 of 1999) are places in the landscape where people once lived in the past – generally more than 60 years ago – and have left traces of their presence behind. In South Africa, archaeological sites include hominid fossil sites, places where people of the Earlier, Middle and Later Stone Age lived in open sites, river gravels, rock shelters and caves, Iron Age sites, graves, and a variety of historical sites and structures in rural areas, towns and cities. Palaeontological sites are those with fossil remains of plants and animals where people were not involved in the accumulation of the deposits. The basic principle of cultural heritage conservation is that archaeological and other heritage sites are valuable, scarce and non-renewable. Many such sites are unfortunately lost daily through infrastructure developments such as powerlines, roads and other destructive economic activities such as mining and agriculture. This is true for the proposed project area whose main economic activities are stock farming and mining. It should be noted that once archaeological sites are destroyed, they cannot be replaced as site integrity and authenticity are permanently lost. Archaeological heritage contributes to our understanding of the history of the region and of our country and continent at large. By preserving links with our past, we may be able to appreciate the role past generations have played in the history of our country and the continent at large.

Categories of Significance

Rating the significance of archaeological sites, and consequently grading the potential impact on the resources is linked to the significance of the site itself. The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and culturally significant sites, places and features, are generally determined by community preferences. The guidelines as provided by the NHRA (Act No. 25 of 1999) in Section 3, with special reference to subsection 3 are used when determining the cultural significance or other special value of archaeological or historical sites. In addition, ICOMOS (the Australian Committee of the International Council on Monuments and Sites) highlights four cultural attributes, which are valuable to any given culture:

Aesthetic Value:

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria include consideration of the form, scale, colour, texture and material of the fabric, the general atmosphere associated with the place and its uses, and the aesthetic values commonly assessed in the analysis of landscapes and townscapes.

Historical Value:

Historic value encompasses the history of aesthetics, science, and society and therefore to a large extent underlies all the attributes discussed here. Usually, a place has historical value because of some kind of influence by an event, person, phase or activity.

Scientific Value:

The scientific or research value of a place will depend upon the importance of the data involved, its rarity, quality and the degree to which the place may contribute further substantial information.

Social Value:

Social value includes the qualities for which a place has become a focus of spiritual, political, national or another cultural sentiment to a certain group. Heritage specialist input in the EIA process needs to consider the heritage management structure set up by the NHR Act. It makes provision for a 3-tier system of management including the South Africa Heritage Resources Agency (SAHRA) at a national level, Provincial Heritage Resources Authorities (PHRAs) at a provincial and the local authority. The Act makes provision for two types or forms of protection of heritage resources, i.e., formally protected and generally protected sites:

Formally Protected Sites

- Grade 1 or national heritage sites, which are managed by SAHRA
- Grade 2 or provincial heritage sites, which are managed by the PHRA.
- Grade 3 or local heritage sites.

General Protection

- Human burials older than 60 years.
- Archaeological and palaeontological sites.
- Shipwrecks and associated remains older than 70 years.
- Structures older than 60 years.

The certainty of prediction is definite unless stated otherwise and if the significance of the site is rated high, the significance of the impact will also result in a high rating. The same rule applies if the significance rating of the site is low. The significance of archaeological sites is generally ranked into the following categories:

Significance Rating Action

No significance: sites that do not require mitigation.

Low significance: sites, which may require mitigation.

2a. Recording and documentation (Phase 1) of the site; no further action required

2b. Controlled sampling (shovel test pits, auguring), mapping and documentation (Phase 2 investigation); permit required for sampling and destruction

Medium significance: sites, which require mitigation.

3. Excavation of representative sample, C14 dating, mapping and documentation (Phase 2 investigation); permit required for sampling and destruction [including 2a & 2b]

High significance: sites, where disturbance should be avoided.

4a. Nomination for listing on Heritage Register (National, Provincial or Local) (Phase 2 & 3 investigation); site management plan; permit required if utilised for education or tourism

High significance: Graves and burial places

4b. Locate demonstrable descendants through social consulting; obtain permits from applicable legislation, ordinances, and regional by-laws; exhumation and reinternment [including 2a, 2b & 3]

Furthermore, the significance of archaeological sites was based on six main criteria:

- Site integrity (i.e. primary vs. secondary context),
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures),
- Density of scatter (dispersed scatter),
- Social value,
- Uniqueness, and
- Potential to answer current and future research questions.

An important aspect in assessing the significance and protection status of a heritage resource is often whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. When for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and mitigated in order to gain data /information, which would otherwise be lost.

Table 2: Evaluation of the proposed development as guided by the criteria in NHRA, MPRDA and NEMA

ACT	Stipulation for developments	Requirement details
NHRA Section 38	Construction of the road, wall, power line, pipeline, canal or other linear forms of development or barrier exceeding 300m in length	No
	Construction of bridge or similar structure exceeding 50m in length	No
	Development exceeding 5000 sq. m	Yes
	Development involving three or more existing erven or subdivisions	No
	Development involving three or more erven or divisions that have been consolidated within the past five years	No
	Rezoning of site exceeding 10 000 sq. m	No
	Any other development category, public open space, squares, parks, recreation grounds	No
NHRA Section 34	Impacts on buildings and structures older than 60 years	No
NHRA Section 35	Impacts on archaeological and paleontological heritage resources	Subject to identification during Phase 1 walk down survey
NHRA Section 36	Impacts on graves	Subject to identification during Phase 1
NHRA Section 37	Impacts on public monuments	No
Chapter 5 (21/04/2006) NEMA	HIA is required as part of an EIA	Yes
Section 39(3)(b) (iii) of the MPRDA	AIA/HIA is required as part of an EIA	Yes

Other relevant legislation

The Human Tissue Act

Human Tissue Act of 1983 and Ordinance on the Removal of Graves and Dead Bodies of 1925 Graves 60 years or older are heritage resources and fall under the jurisdiction of both the National Heritage Resources Act and the Human Tissues Act of 1983. However, graves younger than 60 years are specifically protected by the Human Tissues Act (Act 65 of 1983) and the Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) as well as any local and regional provisions, laws and by-laws. Such burial places also fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial Member of the Executive Committee (MEC) as well as the relevant Local Authorities.

Terms of Reference

The author was instructed to conduct an AIA/HIA study addressing the following issues:

- Archaeological and heritage potential of the proposed mining right application including any known data on affected areas;
- Provide details on methods of study; potential and recommendations to guide the PHRA/ SAHRA to make an informed decision in respect of authorisation of the waste management licence Application.
- Identify all objects, sites, occurrences, and structures of an archaeological or historical nature (cultural heritage sites) located in and around the proposed mining right application site;
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value;
- Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions;
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources;
- Review applicable legislative requirements;

PHOTOGRAPHIC PRESENTATION OF THE PROJECT SITE

Plate 1: Photo 1: View of the proposed mining right application site (Photograph © by Author 2022).

Plate 2: Photo 2: View of the mining right site (Photograph © by Author 2022).

Plate 3: Photo 3: View of access road to the farm dwellings (Photograph © by Author 2022).

Plate 4: Photo 4: View of proposed development site (Photograph © by Author 2022).

Plate 5: Photo 5: View of the proposed mining right application site (Photograph © by Author 2022)

Plate 6: Photo 6: View of proposed development site (Photograph © by Author 2022).

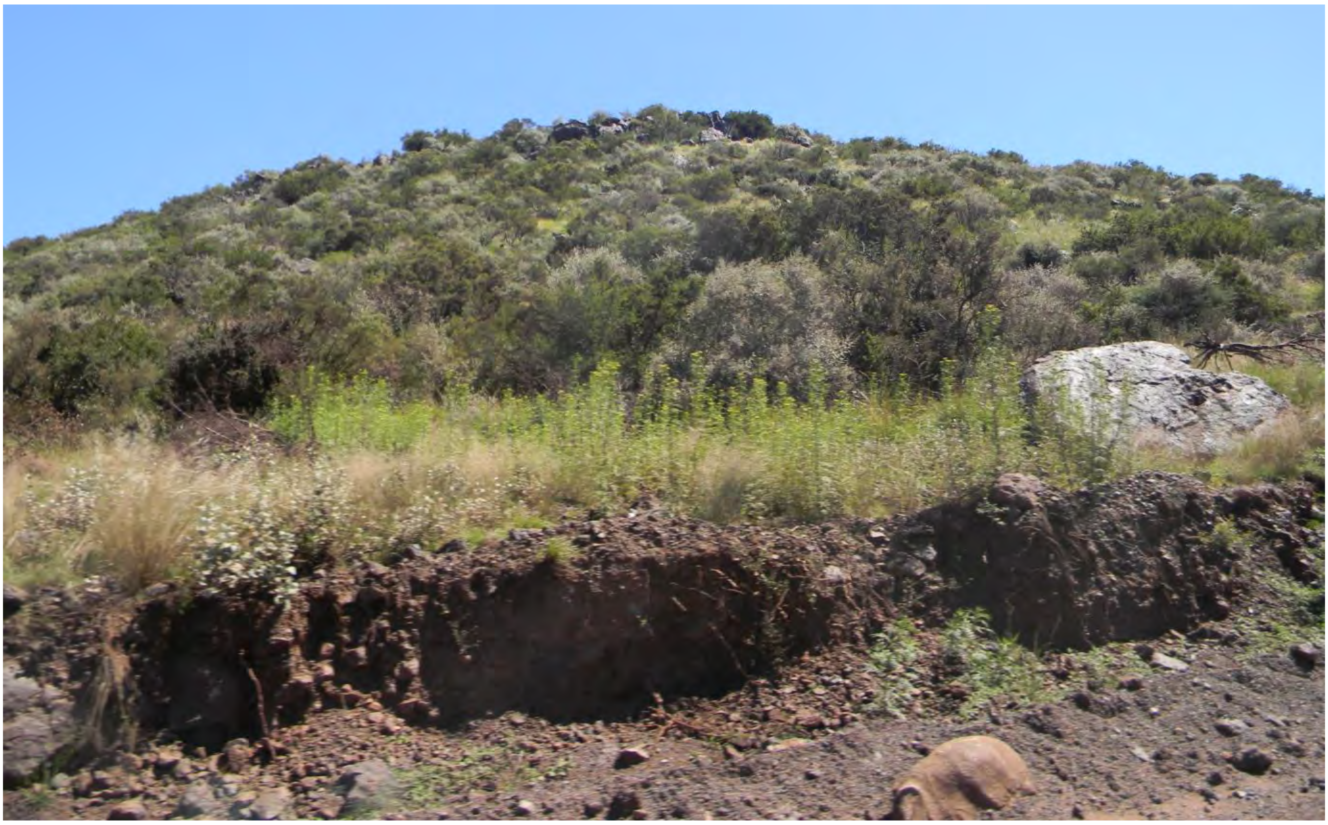

Plate 7: Photo 7: View of farm structures within the proposed mining right application site (Photograph © by Author 2022).

Plate 8: Photo 8: View of farm dwellings within the proposed development site (Photograph © by Author 2022).

Plate 9: Photo 9: View of the site earmarked for the proposed mining right application (Photograph © by Author 2022).

Plate 10: Photo 10: View of proposed mining right application site (Photograph © by Author 2022).

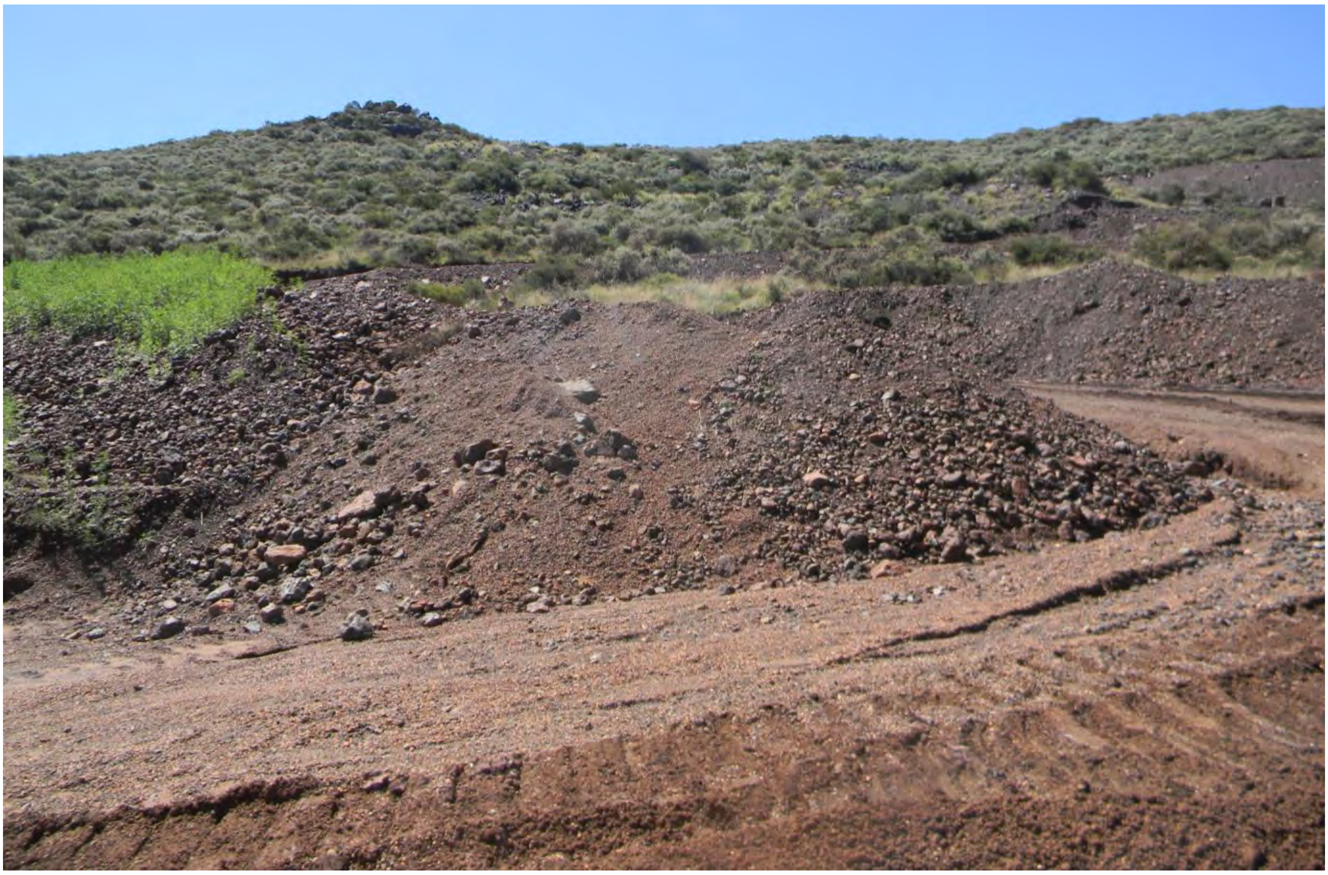

Plate 11: Photo 11: View of farm tracks cutting across the site earmarked for the proposed development (Photograph © by Author 2022).

Plate 12: Photo 12: View of proposed project site (Photograph © by Author 2022).

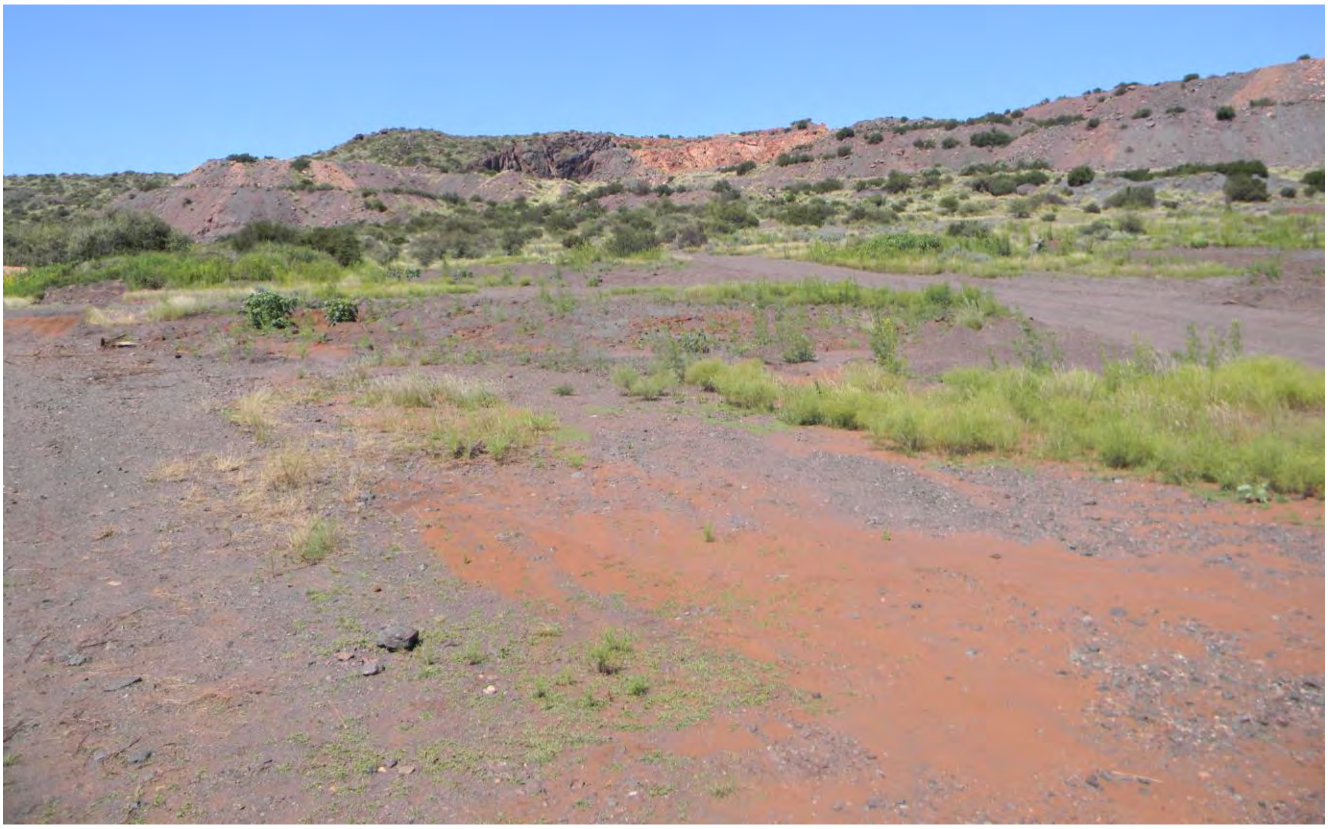

Plate 13: Photo 13: View of proposed mining right application site (Photograph © by Author 2022).

Plate 14: Photo 14: View of the project receiving environment (Photograph © by Author 2022).

Plate 15: Photo 15: View of the proposed mining right application site (Photograph © by Author 2022).

Plate 16: Photo 16: View of proposed mine site (Photograph © by Author 2022).

Plate 17: Photo 17: View of proposed mining right application site (Photograph © by Author 2022).

Plate 18: Photo 18: View of proposed mining right application site (Photograph © by Author 2022).

Plate 19: Photo 19: View of the mining right site (Photograph © by Author 2022).

Plate 20: Photo 20: View of access road cutting across the site (Photograph © by Author 2022).

3 METHODOLOGY

Relevant published and unpublished sources were consulted in generating desktop information for this report. This included online databases such as the UNESCO website, Google Earth, Google Scholar and SAHRIS. Previous HIA in the project area was also consulted (Morris 2010, Kaplan 2010, 2012a, 12b. Pelser 2011, Webley &Halket 2012, Orton& Webley 2013). Several published works on archaeology, history and palaeontology were also consulted. This included dedicated archaeological, paleontological and geological works by (Breutz 1956; 1968; 1987; Humphreys & Thackeray 1983, Deacon & Deacon 1999, Beaumont & Vogel 2006, Beaumont & Vogel 1984; Beaumont and Morris 1990; Beaumont 1999; Holmgren *et al*. 1999; Johnson *et al.* 1997; Peabody 1954; Shillington 1985; Wills 1992; Young 1934; 1940, Huffman 2007, Beaumont *et al* 1995, 2005). Thus, the proposed mining right application by Genet Manganese (Pty) Ltd was considered in relation to the broader landscape, which is a key requirement of the ICOMOS and SAHRA Guidelines.

This document aims at providing an informed heritage-related opinion about the proposed mining right application. This is usually achieved through a combination of a review of any existing literature and a basic site inspection. As part of the desktop study, published literature and cartographic data, as well as archival data on heritage legislation, the history and archaeology of the area were studied. The desktop study was followed by field surveys. The field assessment was conducted according to generally accepted HIA practices and aimed at locating all possible heritage objects, sites, and features of cultural significance on the proposed mining right application. Initially, a drive-through was undertaken around the proposed mining right application site as a way of acquiring the archaeological impression of the general area. This was then followed by a walk down survey in the study area, with a handheld Global Positioning System (GPS) for recording the location/position of each possible site. The detailed photographic recording was also undertaken where relevant. The findings were then analysed in view of the proposed project in order to suggest further action. The result of this investigation is a report indicating the presence/absence of heritage resources and how to manage them in the context of the proposed mining development.

3.1 The Fieldwork surveys

The field survey was undertaken on the 10th of April 2022 by two archaeologists in the company of other specialists. The proposed mining right site was surveyed through tracks, access roads, and footpaths which cut across the mine site. The focus of the survey involved a pedestrian survey which was conducted across the proposed mining right site. The pedestrian survey focussed on parts of the project area where it seemed as if disturbances may have occurred in the past, for example, bald spots in the grass veld; stands of grass which are taller than the surrounding grass veld; the presence of exotic trees; evidence for building rubble, and ecological indicators such as invader weeds.

The literature survey suggests that prior to the 20th century modern agriculture and associated infrastructure; the general project area would have been a rewarding region to locate heritage resources related to Iron Age and historical sites (Bergh 1999). However, the situation today is completely different. The study area now lies on a modified landscape that has previously been cleared of vegetation but is now dominated by agriculture and mining activities.

3.2 Visibility and Constraints

The project site is accessible through mine roads making it easier to identify archaeological resources in their original places. In addition, due to the subterranean nature of cultural remains, this report should not be construed as a record of all archaeological and historic sites in the area.

3.3 Assumptions and Limitations

The investigation has been influenced by the unpredictability of buried archaeological remains (absence of evidence does not mean evidence of absence) and the difficulty in establishing intangible heritage values. It should be noted that archaeological deposits (including graves and traces of archaeological heritage) usually occur below the ground level. Should artefacts or skeletal material be revealed at the site during mining, such activities should be halted immediately, and a competent heritage practitioner, SAHRA must be notified in order for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations contained in this document do not exempt the applicant from complying with any national, provincial, and municipal legislation or other regulatory requirements, including any protection or management or general provision in terms of the NHRA. The author assumes no responsibility for compliance with conditions that may be required by SAHRA in terms of this report.

The field survey did not include any form of subsurface inspection beyond the inspection of burrows, road cut sections, and the sections exposed by erosion. The study team observed that the site might not have attracted sedentary human settlement although Orton & Webly (2013) identified a few scatters of lithic tools. Some assumptions were made as part of the study and therefore some limitations, uncertainties and gaps in information would apply. It should, however, be noted that these do not invalidate the findings of this study in any significant way:

- The proposed mining right site will be limited to a specific right of the site as detailed in the development layout (Figure 1).

- The mining team to provide link and access to the proposed site by using the existing access roads and there will be no mining beyond the demarcated site.
- No excavations or sampling were undertaken since a permit from heritage authorities is required to disturb a heritage resource. As such the results herein discussed are based on surficial observed indicators. However, these surface observations concentrated on exposed sections such as road cuts and clear farmland.
- This study did not include any ethnographic and oral historical studies, nor did it investigate the settlement history of the area.

3.4 Consultations

Public consultations are being conducted by the project EAP and issues raised by Interested and Affected parties will be presented during project specialist integration meetings. Issues relating to heritage will be forwarded to the heritage specialist. Integrated Specialist Services (Pty) Ltd team consulted residents who confirmed that there are no known graves at the sites.

4 CULTURE HISTORY BACKGROUND OF THE PROJECT AREA

Stone Age Archaeology

South Africa is one of the privileged countries in the world to have a very long and varied history of human occupation (Deacon and Deacon 1999). The Northern Cape is one of the regions in South Africa with the richest Stone Age scatters on the landscape, yet it remains poorly researched and understood (Lombard 2012). Stone Age archaeology is prevalent in the larger geographical area, but generally, the project area does not seem to have attracted many habitations. Perhaps the lack of large rock shelters, the domination of exposed environments and the lack of preferred stone raw materials for tools, dissuaded early man (ESA ~ 2.6 million to 250 000 years ago) from occupying this part of the area. Further to the northwest of this area, the ESA is very well represented at sites such as Kathu Pan 1, Kathu Townlands, and Bestwood 1 (Wilkins and Chazan 2012; Chazan *et al*. 2012; Walker *et al.* 2014) and Wonderwerk Cave (Thackeray *et al*. 1981). All the above sites produced well-made Acheulean hand axes and cleavers, as well as Fauresmith lithic materials that are transitional between the Acheulean (ESA) and the MSA.

The ESA is generally associated with the earlier Oldowan industry (marked by crude choppers and other unifacial core tools), followed by the still large but better fashioned hand axes and cleavers of the Acheulean techno-complex (Deacon and Deacon 1999). The Fauresmith Industry is characterized by a prepared core technology that produced both blades and points, making it transitional between the ESA and the MSA (~ 250 000 to 40-25 000 years ago) (Porat *et al*. 2010; Wilkins and Chazan 2012; Walter et al. 2014). Until recently, the Fauresmith Industry was poorly defined, being mostly identified based on the co-occurrence of Levallois points and hand axes (Beaumont and Vogel 2006: 224), and prepared cores, blades, and 'side-scrapers on flakes' (Beaumont 1990:79).

The MSA is better understood as a flake-technological stage characterized by faceted platforms, produced from prepared cores, as distinct from the core tool-based ESA technology (Barham and Mitchell 2008). More technological and behavioural changes than those witnessed in the MSA, occurred during the LSA (40-25 000, to recently, 100 years ago), which is also associated with Homo Sapiens (Barham and Mitchell 2008). For the first time, there is evidence of people's activities derived from materials other than stone tools (ostrich eggshell beads, ground bone arrowheads, small, bored stones and wood fragments) (Deacon and Deacon 1999). The LSA people are also credited with the production of rock art (engravings and paintings), which is an expression of their complex social and spiritual beliefs (Parkington *et al*. 2008). Not much is known about these rock shelters, save for the fact that they have LSA material that includes rock paintings (Morris 2010; van der Walt 2013: 18). In the area under study, MSA material mostly occurs on the same sites as ESA material, suggesting longer sequences of occupation that have allowed researchers to probe into the behavioural changes that influenced these technological developments (Porat *et al*. 2010; Walker *et al.* 2014). Thus, characteristic MSA has been reported at sites such as Kathu Pan 1 (Wilkins and Chazan 2012), and Wonderwerk Cave (Beaumont and Vogel 2006), but they also have been reported in isolated clusters (van Vollenhoven and Pelser 2012). At Wonderwerk Cave, the MSA component was associated with pieces of haematite and several incised stone slabs, most with curved parallel lines that add to the behavioural shifts that went beyond stone tools and ushered in the appreciation of art (Beaumont and Vogel 2006).

Later stone age

In terms of characterization, the lithic succession at Wonderwerk Cave serves as a benchmark for the Stone Age sequence of the Northern Cape (Beaumont and Vogel 2006; Kusel *et al*. 2009). The sequence comprises an uppermost LSA sequence that contains Ceramic LSA, Wilton and Oakhurst industries. Some researchers have named the earlier LSA industry of the region as the Oakhurst industry (some have labelled this local variant the Kuruman), characterized by rare, retouched artefacts, most of which are large scrapers that are rectangular with retouch on the side. Several Stone Age sites and scattered finds of Stone Age material were identified by Küsel et.al. (2009) and Archaetnos close to the town of Hotazel and adjacent to the Gamagara River in 2011. All the same, variants of the LSA industries were located at other sites such as Kathu Pan 1 (Porat *et al.* 2013) have been reported. At this site, ostrich eggshell fragments, beads and lithic artifacts attributed to Wilton and Albany industries were found. It was also important to note that, it is still possible to encounter isolated finds during construction and when this happens, the procedure (described in detail below) for reporting chance finds must be followed.

Other than the Wonder Cave, the Northern Cape Province is characterized by a general scarcity of cave sites. There is an abundance of inherently short-term open-air sites (Parson 2003). These assemblages, all of which are associated with ceramics, are described as belonging to either the Swartkop (hunters) or the Doornfontein Industry (Herders) (Beaumont & Morris 1990; Beaumont et al. 1995). Most of these open-air sites consist of a collection of stone artefacts and it is difficult to distinguish if the sites belonged to herders or hunter gatherers. Beaumont et al. (1995) argue that the Swartkop Industry is characterized by a formal component almost identical to that of the preceding local Wilton Complex, namely the Springbokoog. All Swartkop sites occur close to pans for example the Bundu pan southeast of the project area, streambeds, or other potential water sources, on low kopjes or in deflation hollows (Beaumont *et al.* 1995). In contrast, the contemporary Doomfontein Industry consists of mainly amorphous (shapeless) lithic artefacts, often manufactured on quartz and almost no formal tools (Beaumont *et al*. 1995). The implication is that the Wilton Complex gave direct rise to the Swartkop Industry approximately 2000 years ago. Swartkop assemblages are described as having the following elements in common: they are characterized by cryptocrystalline silicates, contain high frequencies of blade flakes, and backed blades and are associated with undecorated, grass tempered ceramics (Beaumont & Vogel 1989).

The raw material used for stone tool production in the LSA industries constitutes four basic types: chert, quartz, quartzite, and banded shale (Humphreys and Thackeray 1983). The chert includes siliceous types such as chert, agate, chalcedony, and jasper, which are essentially fine-grained raw materials. Quartz is equally fine-grained but tends to be very brittle. The flake implements of the MSA were replaced by the long, small blades of the Later Stone Age (LSA) from 20 000 years onwards. However, the traditional lifestyle did not change significantly in a very long time (Deacon and Deacon 1999). Assemblages provisionally assigned to the Doornfontein Industry, are associated with groups of people practising some form of herding during most of the last 2000 years (Beaumont *et al.* 1995: 247–8). Doornfontein assemblages are generally described as including predominantly shapeless lithic flakes, with a formal lithic component.

According to Morris & Beaumont (2004), the larger study area has a wealth of pre-colonial archaeological sites Famous sites in the region include the world renowned Wonderwerk Cave to the north of the study area. Closer to Kuruman two shelters on the northern and southern faces of GaMohaan (in the Kuruman Hills northwest of the town) contain Later Stone Age remains and rock paintings. Rock art is known to occur at Danielskuil to the northeast and on Carter Block (Morris 2008). Middle Stone Age material is on record around the study area where archaeological surveys have shown rocky outcrops and hills, drainage lines, riverbanks, and confluences to be prime localities for archaeological finds and specifically Stone Age sites, as these areas were utilized for settlement of base camps close to water and hunting ranges.

Morris (2005) noted that in the immediate area to the north of Postmasburg the Earlier Stone Age is represented by 11 known sites (Bruce, Kathu, Uitkoms, Sishen, Demaneng, Lylyveld and Mashwening); the Middle Stone Age by 5 sites (all in the vicinity of Kathu); and the Later Stone Age by 10 sites (one on King, one at Mashwening and eight at Kathu). Rock engravings have been identified from Sishen and Bruce (the Bruce site was salvaged and recorded by Fock & Fock 1984), as well as at Beeshoek (Fock & Fock 1984; Morris 1992; Beaumont 1998). Specularite sources are known on Demaneng and Lylyveld and were mined in Stone Age times at a site on Doornfontein to the south (Beaumont 1973; Beaumont & Boshier 1974) and at Tsantsabane to the east of Postmasburg (Beaumont 1973; Thackeray *et al.* 1983): numerous other speculative workings have also been recorded (Beaumont 1973).

It is important to note that Postmasburg has remarkable evidence of archaeological remains (Webley 2010). The possibility of archaeological findings in the study area has also been indicated by previous research in the greater Daniëlskuil-Postmasburg and Ghaap Plato areas. Webley (2010) noted that the possibility of scattered homesteads cannot be excluded around this area. A report by Webley (2010) indicates the existence of structures only demarcated by single rows of rocks, indicating the position of the house foundations., which testifies to early human activity. (Snyman 1983) Survey by Webley (2010) recorded dotted Stone Age artefact around dry pans and rivers as well as spot finds in the flat sandy areas. Most of these scatter were found where pebble layers were exposed. It is however important to note that no context and in situ preservation were identified in these sites and they were graded as of low heritage significance.

Several prehistoric specularite and haematite mines including underground workings were also recorded around Postmasburg, on the farms Paling M87. Open mining pits at Gloucester 13 and Mount Huxley, as well as open mining pits next to the town reservoir, were also recorded. An ancient specularite mine at Doornfontein (Doornfontein 1) north of Postmasburg has a maximum length of over 100 m and consists of four interlinked chambers (Beaumont & Boshier 1974). Excavations yielded mining tools including stone artefacts, various types of pottery, bone arrow heads, and hundreds of ostrich eggshell beads. The most famous mining site is Blinkklipkop (Gatkoppies). The first description of this site was given by P.B. Borchards, a member of the 1801 Truter and Somerville expedition to the Bechuana. Lichtenstein, in his Travels in Southern Africa, recounts a visit to the site in 1805, and William Burchell visited Blinkklipkop on June 18, 1812, as noted in his Travels in the Interior of Southern Africa. The Blinkklipkop and Doornfontein sites near provide evidence of LSA mining practices and the introduction in the region of domesticated ovicaprids and possibly cattle as well as pottery by 1200 BP.

Beaumont and Boshier (1974) excavated a prehistoric pigment (specularite) mine four (4) kilometres to the west of Bleskop at Jonas Vlakte on Doornfontein 446. This area appears to be particularly rich in specularite breccia and these deposits were mined in pre-European times. The Doornfontein site represents a number of chambers which have been dug into a hillside. Archaeological excavations resulted in the discovery of large numbers of stone artefacts comprising mainly stone choppers and hammerstones which had been used to mine the specularite. In addition, the archaeologists discovered pottery, decorated ostrich eggshell pieces, beads and bone implements as well as faunal (bone) remains which provide information on the diet of the pre-colonial miners (Beaumont & Boshier 1974: Figure 4). Radiocarbon dates place the mining activities 1200 years ago or 800 AD. Fragmentary human remains from the Blinkklipkop mine which is approximately 5km to the northeast of Postmasburg suggest that the early miners were of Khoisan physical type rather than representing the Iron Age settlement.

Rock art sites in the region, including rock engraving as well as paintings, are known from Wonderwerk Cave (paintings) and the Danielskuil Townlands (engravings). Non-representational rock art sites near Postmasburg include engravings from the farms Beeshoek and Klapin and paintings from Andriesfontein and Toto. Beaumont and Boshier (1974) also refer to some engraving sites at Paling which is located on Driehoekspan 435, as well as on Beeshoek to the west of Postmasburg. These roughly pecked engravings occur on shale outcrops.

Further to the north, Early Stone Age hand axes have been recorded at Kathu Pan. Beaumont has excavated numerous sites around the pan and he observed (Beaumont 1990) that a combination of geological conditions resulted in the preservation of a long record of human habitation in the Northern Cape.

Similarly, excavations at Bundu Pan near Marydale in the Northern Cape (Kiberd 2006) have also revealed a sequence including Early, Middle and Later Stone Age assemblages as well as preserved faunal remains. This suggests that the margins of pans need to be investigated for early human habitation. Webley *et al*. (2010) found a mix of Middle and Later Stone Age artefact scatters on fine-grained raw material were found around the margins of pans. Pelser's (2012) study for the proposed Boichoko Township Development on Portions 11 & 12 of Pens Fontein 449 recorded a scatter of stone tools within the proposed development area.

A number of open sites around Keimoes in the Northern Cape have been tested in recent years and they suggest two possible Later Stone Age sequences (Parsons 2008). However, the development of a chronological sequence is hampered by the lack of suitably stratified deposits. Morris & Beaumont (1991:119) have described a ceramic Later Stone Age for the site of Renosterkop, also near Keimoes.

Late Iron Age

The Tswana (Western Sotho) invaded the Northern Cape about 500 years ago. The later Hay District in which Postmasburg was located was only occupied in the early 1800s. Long before settling in this area the Tswana also undertook journeys to Blinkklipkop to mine for the cosmetic substance that they called sibilo. In 1813 the missionary

John Campbell came across a group of Bushmen near the mine and commented the following: “Blink Mountain is a kind of Mecca to the nations around, who are constantly making pilgrimages to it, to obtain fresh supplies of the blue shining powder and the red stone.” (Snyman 1983). Rock paintings in the area serve as evidence that the hunter gatherer Bushmen had inhabited Griqualand West for centuries. In the 1770s, the Korana (people of Nama ancestry) moved into the Postmasburg area and disrupted the Bushmen’s way of life. The Korana regularly visited a primitive mine in the Blinkklipkop, which today forms part of the town of Postmasburg, to exploit shimmering substances, namely hematite and specularite, which were mixed with fat and applied to the skin to give a sought-after shiny red appearance. With the later arrival of the Tswana, Korana, Griqua and Europeans the Bushmen gradually emigrated to the Kalahari, Botswana and Namibia. (Snyman 1983). It was during this period when the Griqua tribes coming from the south settled in the region in order to escape the encroachment of Afrikaner Trekboere who was active along the Orange River. They established the town of Klaarwater, renamed Griquatown in 1813. In the 1820s Andries Waterboer the Griqua leader was able to expel his enemies, the Bergenaars of the Langeberge, from Blinkklip, as the area was called at the time. This became a permanent outpost of the Griqua tribe. The remaining Tswana and Bushmen moved away, and some were assimilated by Waterboer’s people. By the 1830s the Blinkklip population had grown to the extent that missionary of the London Mission Society, John Baillie, was stationed there for a time. Nikolaas Waterboer succeeded his father in 1853, and after this, the tribe’s authority in the area started to wane. Waterboer and his tribe became British subjects in 1871 after the British annexed Griqualand West.

The area was settled since 1800 and served as a location of the Thlaping and Thlaro with evidence of stone tools, as well as glass beads, have been found in the Blinkklipkop (“Shiny Stone Hill”). The Tlhaping and Tlharo branches, which entered the Northern Cape from the north at the beginning of the 17th century, reached as far south as Majeng (Langeberg), Tsantsabane (Postmasburg) and Tlhake le Tlou (Danielskuil) by the beginning of the 18th century (Snyman 1986). A large Thlaping settlement was established at Nokaneng, about 40 km southwest of Olifantshoek, while the Tlharo largely occupied the Langeberg region between Ditlou (Olifantshoek) and Dibeng (Deben) (Maingard 1933). The farm Nokanna, situated about 35 km north of Witsand, equates with the former BaTlaping capital of Nokaneng, where Chief Mothibi was born in about 1775.

After clashes with the Koranna and Griqua people, who moved into the area after 1770, the Tlhaping and Tlharo temporarily abandoned Nokanna and the Langeberg in around 1790 to settle around Dithakong (Kuruman) only to return to the Langeberg at the beginning of the 19th century (Humphreys 1976). At the time of the 1801-1803 Borcherds and Somerville expedition, Dithakong was an important BaTlhaping capital. It was calculated that the number of huts there was at least not less than 1 500 and the number of occupants at somewhere between 8 000 and 25 000 (Maingard, 1933; Morris 1990).

Extensive stonewall enclosures are found on the adjacent hills and archaeological investigations during the 1980s have revealed that the ruins were built during the 15th century A.D. and possibly by sedentary Khoi groups. The area consists of primary and secondary enclosures and covers a total area of a square metre comprising hundreds of circles of varying sizes. With the annexation of the region south of the Molopo and north of Griqualand West by the British in 1885, the area became known as British Bechuanaland. Several reservations were established but following a revolt in 1895 known as the Langeberg Rebellion, the reservations were confiscated by the British colonial j

According to Snyman (1983); Breutz (1963) the discovery of diamonds further paved the way for white settlement in this district. De Jong (2010) noted that in 1867 a serious dispute over the ownership of the diamond fields ensued, involving the Transvaal and Orange Free State Boer republics, Griqua, Korana and Thlaping communities and the Cape colonial government. In October 1871 the diamond fields were proclaimed British territory under the name Griqualand West. In 1879 it was annexed to the Cape Colony. The incorporation of Griqualand West into the Cape Colony promoted colonial settlement in the area from the 1880s.

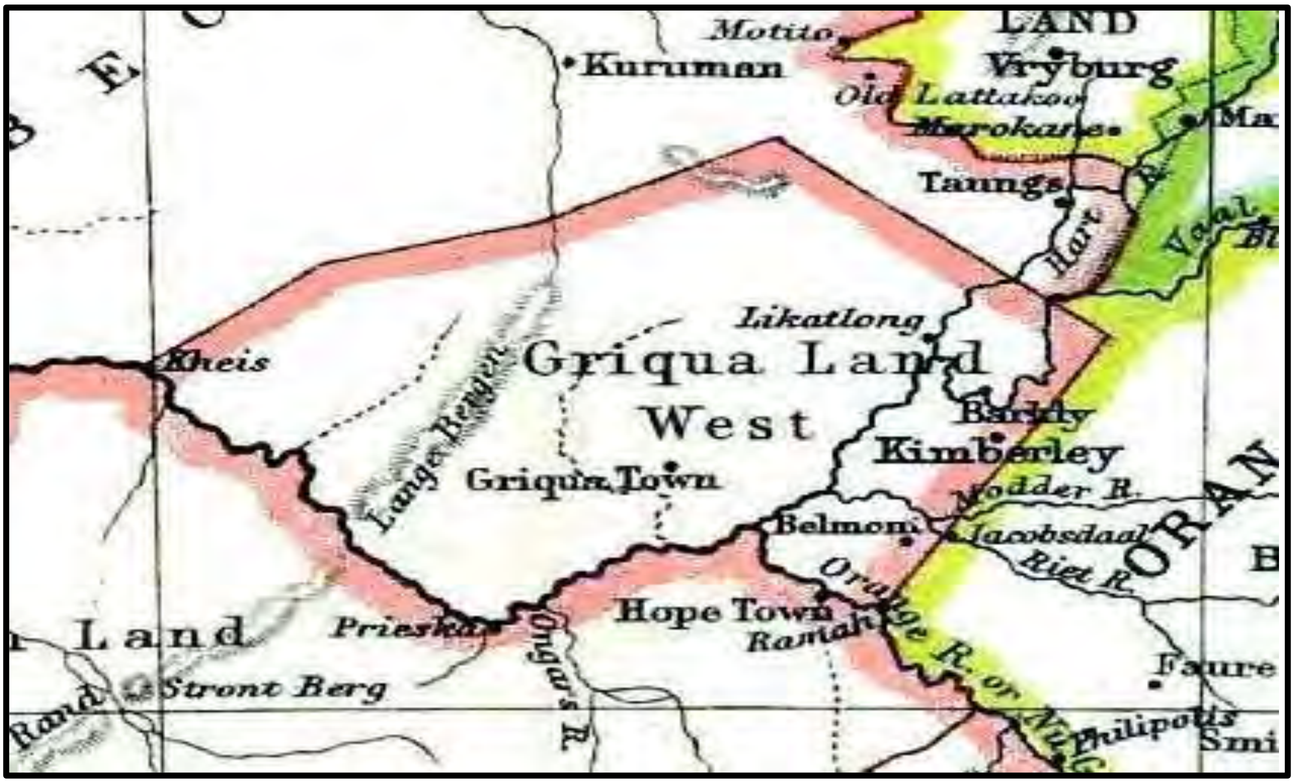

*Figure 8: Section of a map titled "Sketch Map of South Africa showing British Possessions". The map is dated July 1885. (*Kitto 2016*). The boundaries and position of Griqualand West are depicted in this figure. The approximate position of the present study area is shown.*

Government-owned land was surveyed and divided into farms, which were transferred to farmers. Surveyors were given the task of surveying and naming some of the many farms in this region. These farms were allocated to prospective farmers, but permanent settlement only started in the late 1920s and the first farmsteads were possibly built during this period (De Jong 2010). The reason why the settlement of Europeans in Postmasburg took long was that the country was so bare, waterless and stony that it was almost impossible to make a living there. Tribes that lived in the area occupied large parts of the country because it was so difficult to find water for their stock. It was only the later prosperity that came from mining that sparked agricultural development, leading to the sinking of thousands of boreholes and the construction of roads. (Breutz 1963)

Farms were surveyed by the British in the Griqualand district around 1870 and between 1876 and 1878. It was during this period that the first European owned farms were purchased in this area. There were still a number of Griqua landowners in the area as well. The Griqualand West Rebellion disrupted life in the region in 1878, causing some to move away. In 1880 the Griqualand West district was incorporated into the Cape Colony and brought under formal administration. As of the early 1880s, a much larger area surrounding Blinkklip was surveyed, and more white settlers moved into the area.

The Magistrate of the Hay District, J. J. Christie lobbied for the establishment of a town at Blinkklip. This was already the most populous part of the Hay district. The Griqua town of Blinkklip was established in 1882, originally a mission station which was later renamed Postmasburg in 1892 and became the centre of a magisterial district (Snyman 2000). Another town, Olifantshoek, was established in the 1880s. The establishment of Blinkklip led to the establishment of a Reformed Church five kilometres south of Blinkklip and this settlement started to gain prominence. By late 1884 the Reformed Church and its members were also campaigning for the establishment of the town, and on 30 November 1889, it was finally decided that the church would move to Blinkklip. The church was consecrated in Blinkklip on 28 February 1891, and a new Reformed Church building was completed in 1908. (Snyman 1983). It was only in 1891 that 82 town plots were surveyed around the existing police station at Blinkklip. In the same year members of the church petitioned the Commissioner of Crown Lands to rename this town Postmasburg, in memory of Professor Dirk Postma, a minister and founder of the Dutch Reformed Church in South Africa. On 14 April 1892, the Assistant Commissioner of Crown Lands reported as follows: "in view of the unanimous request of the inhabitants, instructions have been issued for the necessary arrangements to be made for the change of the name of the township from 'Blink Klip' to 'Postmasburg' (Snyman, 1983)

By June 1892 there were only three buildings in the town of Postmasburg: a police station, a church building and a small house belonging to a policeman. This soon changed, and by March 1893 the little settlement that was established around a church had a post office, two shops, a partially completed school building and twenty dwelling houses. The town's first town management council was elected in May of that year. (Snyman 1983) The manganese fields in the Postmasburg area were opened for prospecting in 1922, and this greatly boosted the development of the town and caused an influx of new residents. The economic depression of 1930 adversely affected mining in the area, but the town economy could still rely on the agricultural sector. Postmasburg became a municipality in 1936. (Snyman 1983: 12).

Intangible Heritage

As defined in terms of the UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage (2003) intangible heritage includes oral traditions, knowledge and practices concerning nature, traditional craftsmanship and rituals and festive events, as well as the instruments, objects, artefacts, and cultural spaces associated with a group(s) of people. Thus, intangible heritage is better defined and understood by the group of people that uphold it. In the present study area, very little intangible heritage is anticipated on the development footprint because most historical knowledge does not suggest a relationship with the study area per se, even though several other places in the general area do have intangible heritage.

5 RESULTS OF THE ARCHAEOLOGICAL/HERITAGE ASSESSMENT STUDY

The main cause of impacts on archaeological sites is direct, physical disturbance of the archaeological remains themselves and their contexts. It is important to note that the heritage and scientific potential of an archaeological site are highly dependent on its geological and spatial context. This means that even though, for example, a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from their original position. The severe impacts are likely to occur during clearance, indirect impacts may occur during the movement of heavy mining vehicles. Similarly, the clearing of access roads will impact material that lies buried in the surface sand. Since heritage sites, including archaeological sites, are non-renewable, they must be identified, and their significance assessed prior to mining. It is important to note, that due to the localised nature of archaeological resources, that individual archaeological sites could be missed during the survey, although the probability of this is very low within the proposed mining right sites. Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during the operation phase. The purpose of this study is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed mining right application by means of mitigation measures (see appended Chance Find Procedure). The study concludes that the impacts will be negligible since the sites have already been disturbed. The following section presents the results of the archaeological and heritage survey conducted within the proposed mining right application site.

Table 3: Summary of findings

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	Several buildings and mine structures were recorded during the survey. Due to the lack of information the ages of the buildings could not be established conclusively.
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists in the study area
Historical settlements and townscapes	None recorded on the study site
Landscapes and natural features of cultural significance	None
Archaeological sites	None recorded within the proposed mining site
Graves and burial grounds	None recorded within the proposed project site must be protected/
Movable objects	None
Overall comment	Although no burial site was recorded within the proposed mining site, there is potential to encounter unmarked graves.

Item	Description	Coordinates
KHB01	Dilapidated historic building	28° 9'43.00"S 23° 6'3.00"E
KHB02	Industrial structure	28° 9'36.00"S 23° 6'8.00"E
KHB03	Decommissioned railway line	28° 9'31.00"S 23° 6'10.00"E
KHB04	Remain of house foundations	28° 9'23.00"S 23° 6'7.00"E
KHB05	Partially destroyed buildings	28° 9'22.52"S 23° 6'4.42"E
KHB06	Industrial building blocks	28° 9'20.00"S 23° 6'3.00"E
KHB07	Linear dwellings and remains of foundations	28° 9'15.99"S 23° 6'4.88"E
KHB08	Dilapidated building	28° 9'15.88"S 23° 6'8.09"E
KHB09	Remnants of a house	28° 9'14.00"S 23° 6'10.00"E
KHB10	Mine compounds	28° 8'43.40"S 23° 6'18.81"E
KHB11	Remains of a loading bay	28° 8'43.76"S 23° 6'19.64"E
KHB12	Water reservoir	28° 8'51.17"S 23° 6'20.29"E
KHB13	Remains of a weigh bridge	28° 8'6.00"S 23° 6'17.00"E
KHB14	Partially destroyed brick dwelling	28° 8'30.00"S 23° 6'10.00"E
KHB15	Stone curns	28° 9'17.00"S 23° 6'28.00"E
KHB16	Partially demolished structure	28° 9'18.00"S 23° 6'29.00"E
KHB17	Clustered house foundations	28° 9'19.00"S 23° 6'33.00"E

Archaeological and Heritage Sites

The proposed mining right application site did not yield any confirmable archaeological sites or material. Based on the field study results and field observations, it is the considered opinion of the author that the receiving environment for the proposed mining right application site is low to medium potential to yield previously unidentified archaeological sites during mining.

Buildings and Structures older than 60 years

The study recorded more than 17 individual structures within the mining right site (see Plate 22 to 47). Most of the buildings and structures are associated with the previous mining activities within the area. Due to a lack of information and their state of conservation, their ages could not be conclusively confirmed. However, it is assumed that most of the historical buildings have been destroyed or collapsed due to natural decay and what remains are foundations which from a heritage perspective are not very significant. Although the buildings and structures are in a bad state of conservation, they are still protected in terms of Section 34 of the NHRA. It looks like most of the affected structures have been avoided and therefore the mining right application may be approved subject to ensuring that no historic building may be destroyed without a permit from PHRA. Further investigation and mitigation are required if a heritage building is earmarked for demolition or alteration.

Plate 21: Photo 21: View of the proposed mining right application site (Photograph © by Author 2022).

Plate 22: Photo 22: View of the proposed mining right application site (Photograph © by Author 2022).

Plate 23: Photo 23: View of the proposed mining right application site (Photograph © by Author 2022).

Plate 24: Photo 24: View of the proposed mining right application site (Photograph © by Author 2022

Plate 25: Photo 25: View of the proposed mining right application site (Photograph © by Author 2022

Plate 26: Photo 26: View of the proposed mining right application site (Photograph © by Author 2022

Plate 27: Photo 27: View of the proposed mining right application site (Photograph © by Author 2022

Plate 28: Photo 28: View of the proposed mining right application site (Photograph © by Author 2022

Plate 29: Photo 29: View of the proposed mining right application site (Photograph © by Author 2022

Plate 30: Photo 30: View of the proposed mining right application site (Photograph © by Author 2022

Plate 31: Photo 31: View of the proposed mining right application site (Photograph © by Author 2022

Plate 32: Photo 32: View of the proposed mining right application site (Photograph © by Author 2022

Plate 33: Photo 33: View of the proposed mining right application site (Photograph © by Author 2022

Plate 34: Photo 34: View of the proposed mining right application site (Photograph © by Author 2022

Plate 35: Photo 35: View of the proposed mining right application site (Photograph © by Author 2022

Plate 36: Photo 36: View of the proposed mining right application site (Photograph © by Author 2022

Plate 37: Photo 37: View of the proposed mining right application site (Photograph © by Author 2022

Plate 38: Photo 38: View of the proposed mining right application site (Photograph © by Author 2022

Plate 39: Photo 39: View of the proposed mining right application site (Photograph © by Author 2022

Plate 40: Photo 40: View of the proposed mining right application site (Photograph © by Author 2022

Plate 41: Photo 41: View of the proposed mining right application site (Photograph © by Author 2022

Plate 42: Photo 42: View of the proposed mining right application site (Photograph © by Author 2022

Plate 43: Photo 43: View of the proposed mining right application site (Photograph © by Author 2022

Plate 44: Photo 44: View of the proposed mining right application site (Photograph © by Author 2022

Plate 45: Photo 45: View of the proposed mining right application site (Photograph © by Author 2022

Plate 46: Photo 46: View of the proposed mining right application site (Photograph © by Author 2022

Plate 47: Photo 47: View of the proposed mining right application site (Photograph © by Author 2022

Burial grounds and graves

Human remains and burials are commonly found close to archaeological sites; they may be found in abandoned and neglected burial sites or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface. Archaeological and historical burials are usually identified when they are exposed through erosion and earth moving activities for infrastructure developments such as powerlines and roads. In some instances, packed stones or stones may indicate the presence of informal pre-colonial burials.

The field survey did not record any burial grounds or graves within the proposed mine site. However, a municipality cemetery is located near the development site. The cemetery is no longer active. The proposed development will not affect the site which is well fenced and secure.

It should be noted that burial grounds and gravesites are accorded the highest social significance threshold (See Appendix 3). They have both historical and social significance and are considered sacred. Wherever they exist or not, they may not be tampered with or interfered with during mining. The possibility of encountering human remains during subsurface earth moving works anywhere on the landscape is ever present. Although the possibility of encountering previously unidentified burial sites is low along with the proposed mining site, should such sites be identified during subsurface construction work, they are still protected by applicable legislation, and they should be protected (See Appendices 2 &3 for more details). In addition, any mitigation measures in respect of graves that may be located in the mine site must put into consideration the need to protect graves as evidence of previous settlement by African populations who were forcibly evicted due to racially discriminatory legislation and practices associated with the colonial and Apartheid regimes.

The study did not identify any graves or burial sites within the mining right application site. The possibility of encountering previously unidentified burial sites is low within the proposed mining right site, should such sites be identified during mining, they are still protected by applicable legislation, and should be protected (also see Appendixes for more details). In terms of Section 36 of the NHRA and the Human Tissue Act, the proposed mining right application may be approved without any further investigation and mitigation.

Public Monuments and Memorials

The survey did not identify any historical monuments and public memorials within the direct path of the proposed mining right application site.

Battle fields

There are no known battle fields within the proposed mining right application site.

Archaeo-Metallurgy, Prehistoric Mining and Mining Heritage

The study did not record any traces of archaeological or historical mining within the proposed mining right site.

Mitigation

Mitigation is required to protect historical buildings and structures within the mining right site. Based on the field observation existing buildings and structures were already avoided during the previous mining activities. In addition, most of these buildings and structures are in a poor state of conservation to warrant preservation in *situ.*

6 CUMULATIVE IMPACTS

Cumulative impacts are defined as impacts that result from incremental changes caused by other past, present, or reasonably foreseeable actions together with the project. Therefore, the assessment of cumulative impacts for the proposed mining is considered the total impact associated with the proposed project when combined with other past, present, and reasonably foreseeable future development projects. The impacts of the proposed mining were assessed by comparing the post-project situation to a pre-existing baseline. This section considers the cumulative impacts that would result from the combination of the proposed development.

This proposed mining combined with other proposed mining activities will effectively transform the landscape and will spoil the visual quality of the area along Road R325. The cumulative impact will negatively affect the landscape quality of the area which is ordinarily considered to be a source. The frequency of development proposals in the area has the potential to collectively change the character of the landscape (see the Kathu area as an example). The once isolated landscape will see volumes of people establishing low settlements or enlarging the existing ones. In the long run, the accumulative impact will be of high significance in terms of its potential to change the characteristics and quality of the landscape in the long run. The field survey focused on the potential of lithic tools and rock engravings that are known to occur in the project area.

7 ASSESSMENT OF SIGNIFICANCE

The significance of the impacts will be assessed considering the following descriptors:

Table 4: Criteria Used for Rating of Impacts

Nature of the impact (N)		
Positive	+	Impact will be beneficial to the environment (a benefit).
Negative	-	Impact will not be beneficial to the environment (a cost).
Neutral	0	Where a negative impact is offset by a positive impact, or mitigation measures, to have no overall effect.
`Magnitude(M)		
Minor	2	Negligible effects on biophysical or social functions/processes. Includes areas / environmental aspects which have already been altered significantly and have little to no conservation importance (negligible sensitivity*).
Low	4	Minimal effects on biophysical or social functions/processes. Includes areas / environmental aspects which have been largely modified, and/or have a low conservation importance (low sensitivity*).
Moderate	6	Notable effects on biophysical or social functions/processes. Includes areas / environmental aspects which have already been moderately modified and have a medium conservation importance (medium sensitivity*).
High	8	Considerable effects on biophysical or social functions/processes. Includes areas / environmental aspects which have been slightly modified and have high conservation importance (high sensitivity*).
Very high	10	Severe effects on biophysical or social functions/processes. Includes areas / environmental aspects which have not previously been impacted upon and are pristine, thus of very high conservation importance (very high sensitivity*).
Extent (E)		
Site only	1	Effect limited to the site and its immediate surroundings.
Local	2	Effect limited to within 3-5 km of the site.
Regional	3	Activity will have an impact on a regional scale.
National	4	Activity will have an impact on a national scale.
International	5	Activity will have an impact on an international scale.
Duration (D)		
Immediate	1	Effect occurs periodically throughout the life of the activity.
Short term	2	Effect lasts for a period 0 to 5 years.
Medium term	3	Effect continues for a period between 5 and 15 years.
Long term	4	Effect will cease after the operational life of the activity either because of a natural process or by human intervention.
Permanent	5	Where mitigation either by natural process or by human intervention will not occur in such a way or such a period that the impact can be considered transient.
Probability of occurrence (P)		

Improbable	1	Less than 30% chance of occurrence.
Low	2	Between 30 and 50% chance of occurrence.
Medium	3	Between 50 and 70% chance of occurrence.
High	4	Greater than 70% chance of occurrence.
Definite	5	Will occur, or where applicable has occurred, regardless of or despite any mitigation measures.

Once the impact criteria have been ranked for each impact, the significance of the impacts will be calculated using the following formula:

Significance Points (SP) = (Magnitude + Duration + Extent) x Probability

The significance of the ecological impact is therefore calculated by multiplying the severity rating with the probability rating. The maximum value that can be reached through this impact evaluation process is 100 SP (points). The significance for each impact is rated as High (SP≥60), Medium (SP = 31-60) and Low (SP<30) significance as shown below.

Table 5: Criteria for Rating of Classified Impacts

Significance of predicted NEGATIVE impacts		
Low	0-30	Where the impact will have a relatively small effect on the environment and will require minimal or no mitigation and as such have a limited influence on the decision
Medium	31-60	Where the impact can have an influence on the environment and should be mitigated and as such could have an influence on the decision unless it is mitigated.
High	61-100	Where the impact will definitely influence the environment and must be mitigated, where possible. This impact will influence the decision regardless of any possible mitigation.
Significance of predicted POSITIVE impacts		
Low	0-30	Where the impact will have a relatively small positive effect on the environment.
Medium	31-60	Where the positive impact will counteract an existing negative impact and result in an overall neutral effect on the environment.
High	61-100	Where the positive impact will improve the environment relative to baseline conditions.

Table 6: Operational Phase

Impacts and Mitigation measures relating to the proposed project during the Operational Phase														
Activity/Aspect	Impact /	Aspect	Nature	Magnitude	Extent	Duration	Probability	Mitrigation before mitigation	Mitigation measures	Magnitude	Extent	Duration	Probability	Mitigation after mitigation
Clearing and mining	Destruction of archaeological remains	Cultural heritage	-	4	1	2	2	14	• Use the chance to find a procedure to cater for accidental finds	4	1	2	2	14
	Disturbance of graves	Cultural heritage	-	4	1	2	4	28	• Use the chance to find a procedure to cater for accidental unmarked and buried grave finds	4	1	2	2	14
	Disturbance of buildings and structures older than 60 years old	Operational	-	6	1	2	4	36	• None required	4	1	2	2	14
Movement of equipment	Destruction of public monuments and plaques	Operational	-	2	1	1	1	4	• Mitigation is not required because there are no public monuments within the proposed mining right application site	2	1	1	4	4

Based on the results of the Impact Assessment Matrix the proposed mining site is viable from a heritage perspective.

8 STATEMENT OF SIGNIFICANCE

Aesthetic Value

The aesthetic values of the AIA Study Area and the overall project area are contained in the valley bushveld environment and landscape typical of this part of the Northern Cape Province. The visual and physical relationship between the AIA study area and the surrounding historical Cultural Landscape demonstrates the connection of place to the local and oral history stories of the African communities who populated this region going back into prehistory.

The proposed mining site will be situated within an environment and associated cultural landscape, which, although developed by existing settlements, remains representative of the original historical environment and cultural landscape of this part of the Northern Cape. The local communities consider the project area a cultural landscape linked to their ancestors and history. However, the proposed mining right application site will not alter this aesthetic value in any radical way since the mining holes will be limited in number and small.

Historic Value

The Indigenous historic values of the Site of Interest and overall study area are contained in the claim of possible historic homesteads being located in the affected area. The history of generations of the Sotho-Tswana clans is tied to this geographical region. Such history goes back to the pre-colonial period, through the colonial era, the colonial wars and subsequent colonial rule up to modern-day Northern Cape Province.

Scientific value

Past settlements and associated roads and other auxiliary infrastructure developments and disturbance within the HIA Study Area associated with the proposed mining right have resulted in a limited intact landscape with the potential to retain intact large scale or highly significant open archaeological site deposits.

Social Value

The project site falls within an extensive cultural landscape that is integrated with the wider inland. The overall area has social value for the local community, as is the case with any populated landscape. The literature review suggests that the social value of the overall project area is also demonstrated through local history which associates the area with the coming of European missionaries, explorers and colonialists and the African struggle against settler colonialism in the second half of the 1800s and at the end of the 1800s, the colonial wars of resistance, the century long struggle for democracy that followed colonial subjugation. Several generations of communities originate from the project area and continue to call it home. As such, they have ancestral ties to the area. The land also provides the canvas upon which daily socio-cultural activities are painted. All these factors are put together to confirm the social significance of the project area. However, this social significance is unlikely to be negatively impacted by the proposed mining right site especially given the fact that the development will add value to the human settlements and activities already taking place. Some sections of the development site are covered by thick bushes and vegetation retains social value as a source of important herbs and traditional medicines. As such, they must be considered significant social value sites

9 DISCUSSION

Several Phase 1 Heritage studies for various infrastructure developments and mining developments were conducted since 2006 in the general project area. Although these studies recorded sites of significance for example Morris (2010) Orton and Webley, (2013), Pelser (2011); Kaplan (2012) and Orton (2013), the recorded sites of varying significance. The archaeology of the Northern Cape is rich and varied, covering long spans of human history (Morris 2006). In the Northern Cape ESA assemblages, including the Fauresmith, tend to occur on the margins of seasonal rivers, semi-permanent water holes or pans (Pelser 2010) see Kusel *et al* (2009). The significance of sites so far recorded in the study compared to other sites indicate that they are of lesser importance because they are small scatters and confined pans and foothills of mountains (Morris 2010, Orton &Webley 2013). The region's remoteness of the Northern Cape may be a reason for the lack of archaeological research in the area. Probably because of its dryness, the area has been relatively marginal to human settlement for most of its history (Morris 2010, Pelser 2011). Some areas are richer than others, and not all sites are equally significant, and this is true for the current mining right application sites. The lack of confirmable archaeological sites recorded during the current survey is thought to be a result of two primary interrelated factors:

1. That proposed mining right application site is located within a heavily degraded mining area and has reduced sensitivity for the presence of high significance physical cultural site remains, be they archaeological, historical or burial sites, due to stamping and overgrazing by livestock.

2. Limited ground surface visibility on sections of the proposed mining right application sites may have impeded the detection of other physical cultural heritage site remains or archaeological signatures within the development site. This factor is exacerbated by the fact that the study was limited to a general survey without necessarily conducting any detailed inspection of specific locations that will be affected by the proposed mining right site.

The absence of confirmable and significant archaeological cultural heritage sites is not evidence that such sites do not exist in the proposed mining right application site. The significance of the sites of Interest (mining sites) is not limited to the presence or absence of physical archaeological sites. Based on the results of the field study the proposed mining right may be approved to proceed without any further investigation from a heritage perspective.

10 RECOMMENDATIONS

The study did not find any permanent barriers to the proposed mining rights application. It is the considered opinion of the author that the mining right application may be approved from a heritage resources management perspective if mitigation measures are implemented if and when required. The following recommendations are based on the results of the AIA/HIA research, cultural heritage background review, site inspection and assessment of significance.

- The proposed mining right application may be approved to proceed as planned under the observation that project work does not extend beyond the surveyed site.
- The recorded buildings and structures must not be destroyed without a permit from PHRA. They are protected in terms of Section 34 of the NHRA.
- Should any unmarked burials be exposed during mining, potential custodians must be trekked and consulted and relevant rescue/ relocation permits must be obtained from SAHRA and or the Department of Health before any grave relocation can take place. Furthermore, a professional archaeologist must be retained to oversee the relocation process in accordance with the National Heritage Resources Act 25 of 1999.
- Should chance archaeological materials or human burial remains be exposed during subsurface mining work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. The overriding objective, where remedial action is warranted, is to minimize disruption in construction scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations.
- Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no other significant cultural heritage resources barriers to the proposed mining right application. The Heritage authority may approve the proposed mining right to proceed as planned with special commendations to implement the recommendations herein made.
- The Site Manager must then make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area before informing ISS
- It is the responsibility of the applicant to protect the site from publicity (i.e., media) until a mutual agreement is reached.

- Noteworthy that any measures to cover up the suspected archaeological material or to collect any resources are illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by SAHRA
- The applicant is reminded that the unavailability of archaeological materials (e.g., stone tools and graves, etc) and fossils does not mean they do not occur, archaeological material might be hidden underground, and as such the client is reminded to take precautions during mining.
- The footprint impact of the proposed mining activities should be kept minimal to limit the possibility of encountering chance finds within the proposed development site.
- Overall, impacts on heritage resources are not considered to be significant for the project receiving environment. It is thus concluded that the project may be cleared to proceed as planned subject to the Heritage Authority ensuring that detailed heritage monitoring procedures are included in the project EMP for the mining phase, including chance archaeological finds mitigation procedure in the project EMP (See Appendix 1).
- The chance finds process will be implemented, when necessary, especially when archaeological materials and burials are encountered during subsurface mining activities.
- The findings of this report, with approval of the SAHRA, may be classified as accessible to any interested and affected parties within the limits of the laws.

11 CONCLUDING REMARKS

The literature review and field surveys confirmed that the project area is situated within a contemporary cultural landscape dotted with settlements with long local history. In terms of the archaeology and heritage in respect of the proposed mining right application site, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, remains and the applicant and contractors are advised to be diligent and observant during mining, should mining activities commence on the site. The procedure for reporting chance finds has been laid out (see Appendix 3). This report concludes that the proposed mining right sites may be approved by SAHRA to proceed as planned subject to recommendations herein made and a heritage monitoring plan is incorporated into the EMP (also see Appendices). The mitigation measures are informed by the results of the AIA/HIA study and principles of heritage management enshrined in the NHRA, Act 25 of 1999.

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APPENDIX 1: CHANCE FIND PROCEDURE FOR THE PROPOSED MINING RIGHT APPLICATION ON VARIOUS PORTION OF THE FARM KAPSTEWEL 436 WITHIN TSANTSABANE LOCAL MUNICIPALITY, ZF MGCAWU DISTRICT MUNICIPALITY, IN THE NORTHERN CAPE PROVINCE.

April 2022

ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
ECO	Environmental Control Officer
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

CHANCE FIND PROCEDURE

Introduction

An Archaeological Chance Find Procedure (CFP) is a tool for the protection of previously unidentified cultural heritage resources during construction and mining. The main purpose of a CFP is to raise awareness of all construction, mine workers and management on site regarding the potential for accidental discovery of cultural heritage resources and establish a procedure for the protection of these resources. Chance Finds are defined as potential cultural heritage (or paleontological) objects, features, or sites that are identified outside of or after Heritage Impact studies, normally as a result of mining monitoring. Chance Finds may be made by any member of the project team who may not necessarily be an archaeologist or even visitors. Appropriate application of a CFP on development projects has led to discovery of cultural heritage resources that were not identified during archaeological and heritage impact assessments. As such, it is considered to be a valuable instrument when properly implemented. For the CFP to be effective, the site manager must ensure that all personnel on the proposed mining development site understand the CFP and the importance of adhering to it if cultural heritage resources are encountered. In addition, training or induction on cultural heritage resources that might potentially be found on site should be provided. In short, the Chance find procedure details the necessary steps to be taken if any culturally significant artefacts are found during construction.

Definitions

In short, the term ‘heritage resource’ includes structures, archaeology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 37. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as this require the implementation of separate criteria for CFPs.

Background

The development site is subject to heritage survey and assessment at planning stage in accordance with the NHRA. These surveys are based on surface indications alone and it is therefore possible that sites or significant archaeological remains can be missed during surveys because they occur beneath the surface. These are often accidentally exposed during mining or any associated mining work and hence the need for a Chance Find Procedure to deal with accidental finds. In this case an extensive Archaeological Impact Assessment was completed by T. Mlilo (2022) on the proposed mining right application. The AIA/HIA conducted was very comprehensive covering the entire site.

Purpose

The purpose of this Chance Find Procedure is to ensure the protection of previously unrecorded heritage resources along the proposed project site. This Chance Find Procedure intends to provide the applicant and contractors with appropriate response in accordance with the NHRA and international best practice. The aim of this CFP is to avoid or reduce project risks that may occur as a result of accidental finds whilst considering international best practice. In addition, this document seeks to address the probability of archaeological remains finds and features becoming accidentally exposed during digging of foundations and movement of construction equipment. The proposed mining activities have the potential to cause severe impacts on significant tangible and intangible cultural heritage resources buried beneath the surface or concealed by tall grass cover. Integrated Specialist Services and Environmental Consultants developed this Chance Find Procedure to define the process which govern the management of Chance Finds during construction. This ensures that appropriate treatment of chance finds while also minimizing disruption of the construction schedule. It also enables compliance with the NHRA and all relevant regulations. Archaeological Chance Find Procedures are to promote preservation of archaeological remains while minimizing disruption of mining scheduling. It is recommended that due to the low to moderate archaeological potential of the project area, all site personnel and contractors be informed of the Archaeological Chance Find procedure and have access to a copy while on site. This document has been prepared to define the avoidance, minimization and mitigation measures necessary to ensure that negative impacts to known and unknown archaeological remains as a result of project activities and are prevented or where this is not possible, reduced to as low as reasonably practical during mining.

Thus, this Chance Finds Procedure covers the actions to be taken from the discovering of a heritage site or item to its investigation and assessment by a professional archaeologist or other appropriately qualified person to its rescue or salvage.

CHANCE FIND PROCEDURE

General

The following procedure is to be executed in the event that archaeological material is discovered:

- All clearance/mining activities in the vicinity of the accidental find/feature/site must cease immediately to avoid further damage to the find site.
- Briefly note the type of archaeological materials you think you have encountered, and their location, including, if possible, the depth below surface of the find

- Report your discovery to your supervisor or if they are unavailable, report to the project ECO who will provide further instructions.
- If the supervisor is not available, notify the Environmental Control Officer immediately. The Environmental Control Officer will then report the find to the Site Manager who will promptly notify the project archaeologist and SAHRA.
- Delineate the discovered find/ feature/ site and provide 30m buffer zone from all sides of the find.
- Record the find GPS location, if able.
- All remains are to be stabilised *in situ.*
- Secure the area to prevent any damage or loss of removable objects.
- Photograph the exposed materials, preferably with a scale (a yellow plastic field binder will suffice).
- The project archaeologist will undertake the inspection process in accordance with all project health and safety protocols under direction of the Health and Safety Officer.

- Finds rescue strategy: All investigation of archaeological soils will be undertaken by hand, all finds, remains and samples will be kept and submitted to a museum as required by the heritage legislation. If any artefacts need to be conserved, the relevant permit will be sought from the SAHRA.
- An on-site office and finds storage area will be provided, allowing storage of any artefacts or other archaeological material recovered during the monitoring process.
- In the case of human remains, in addition, to the above, the SAHRA Burial Ground Unit will be contacted and the guidelines for the treatment of human remains will be adhered to. If skeletal remains are identified, an archaeological will be available to examine the remains.
- The project archaeologist will complete a report on the findings as part of the permit application process.
- Once authorisation has been given by SAHRA, the Applicant will be informed when construction activities can resume.

Management of chance finds

Should the Heritage specialist conclude that the find is a heritage resource protected in terms of the NRHA (1999) Sections 34, 36, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), ISS will notify SAHRA and/or PHRA on behalf of the applicant. SAHRA/PHRA may require that a search and rescue exercise be conducted in terms of NHRA Section 38, this may include rescue excavations, for which ISS will submit a rescue permit application having fulfilled all requirements of the permit application process.

In the event that human remains are accidently exposed, SAHRA Burial Ground Unit or ISS Heritage Specialist must immediately be notified of the discovery in order to take the required further steps:

a. Heritage Specialist to inspect, evaluate and document the exposed burial or skeletal remains and determine further action in consultation with the SAPS and Traditional authorities:

b. Heritage specialist will investigate the age of the accidental exposure in order to determine whether the find is a burial older than 60 years under the jurisdiction of SAHRA or that the exposed burial is younger than 60 years under the jurisdiction of the Department of Health in terms of the Human Tissue Act.

c. The local SAPS will be notified to inspect the accidental exposure in order to determine where the site is a scene of crime or not.

d. Having inspected and evaluated the accidental exposure of human remains, the project Archaeologist will then track and consult the potential descendants or custodians of the affected burial.

e. The project archaeologist will consult with the traditional authorities, local municipality, and SAPS to seek endorsement for the rescue of the remains. Consultation must be done in terms of NHRA (1999) Regulations 39, 40, 42.

f. Having obtained consent from affected families and stakeholders, the project archaeologist will then compile a Rescue Permit application and submit to SAHRA Burial Ground and Graves Unit.

g. As soon as the project archaeologist receives the rescue permit from SAHRA he will in collaboration with the company/contractor arrange for the relocation in terms of logistics and appointing of an experienced undertaker to conduct the relocation process.

h. The rescue process will be done under the supervision of the archaeologist, the site representative and affected family members. Retrieval of the remains shall be undertaken in such a manner as to reveal the stratigraphic and spatial relationship of the human skeletal remains with other archaeological features in the excavation (e.g., grave goods, hearths, burial pits, etc.). A catalogue and bagging system shall be utilised that will allow ready reassembly and relational analysis of all elements in a laboratory. The remains will not be touched with the naked hand; all Contractor personnel working on the excavation must wear clean cotton or non-powdered latex gloves when handling remains in order to minimise contamination of the remains with modern human DNA. The project archaeologist will document the process from exhumation to reburial.

i. Having fulfilled the requirements of the rescue/burial permit, the project archaeologist will compile a mitigation report which details the whole process from discovery to relocation. The report will be submitted to SAHRA and to the company.

Note that the relocation process will be informed by SAHRA Regulations and the wishes of the descendants of the affected burial.

Appendix 2: Heritage Management Plan Input into the Proposed mining right application

Objective		• Protection of archaeological sites and land considered to be of cultural value. • Protection of known physical cultural property sites against vandalism, destruction and theft; and • The preservation and appropriate management of new archaeological finds should these be discovered during construction.						
No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility	Accountable	Contacted	Informed
Pre-Mining Phase								
1	Planning	Ensure all known sites of cultural, archaeological, and historical significance are demarcated on the site layout plan and marked as no-go areas.	Throughout Project	Weekly Inspection	Contractor [C] CECO	SM	ECO	EA EM PM
Mining Phase								
1	Emergency Response	Should any archaeological or physical cultural property heritage resources be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped until heritage authority has cleared the development to continue.	N/A	Throughout	C CECO	SM	ECO	EA EM PM
		Should any archaeological, cultural property heritage resources be exposed during excavation or be found on development site, a registered heritage specialist or PHRA official must be called to site for inspection.		Throughout	C CECO	SM	ECO	EA EM PM
		Under no circumstances may any archaeological, historical or any physical cultural property heritage material be destroyed or removed form site;		Throughout	C CECO	SM	ECO	EA EM PM
		Should remains and/or artefacts be discovered on the development site during earthworks, all work will cease in the area affected and the Contractor will immediately inform the Construction Manager who in turn will inform PHRA.		When necessary	C CECO	SM	ECO	EA EM PM
		Should any remains be found on site that is potentially human remains, the PHRA and South African Police Service should be contacted.		When necessary	C CECO	SM	ECO	EA EM PM
Rehabilitation Phase								
		Same as mining phase.						
Operational Phase								
		Same as mining phase.						

Appendix 3: Legal background in South Africa

Extracts relevant to this report from the National Heritage Resources Act No. 25 of 1999, (Sections 5, 36 and 47):

General principles for heritage resources management

5. (1) All authorities, bodies and persons performing functions and exercising powers in terms of this Act for the management of heritage resources must recognise the following principles:

(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;

(b) every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans;

(c) heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and

(d) heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

(2) To ensure that heritage resources are effectively managed—

(a) the skills and capacities of persons and communities involved in heritage resources management must be developed; and

(b) provision must be made for the ongoing education and training of existing and new heritage resources management workers.

(3) Laws, procedures and administrative practices must—

(a) be clear and generally available to those affected thereby;

(b) in addition to serving as regulatory measures, also provide guidance and information to those affected thereby; and

(c) give further content to the fundamental rights set out in the Constitution.

(4) Heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted and to participate in their management.

(5) Heritage resources contribute significantly to research, education and tourism and they must be developed and presented for these purposes in a way that ensures dignity and respect for cultural values.

(6) Policy, administrative practice and legislation must promote the integration of heritage resources conservation in urban and rural planning and social and economic development.

(7) The identification, assessment and management of the heritage resources of South Africa must—

(a) take account of all relevant cultural values and indigenous knowledge systems;

(b) take account of material or cultural heritage value and involve the least possible alteration or loss of it;

(c) promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;

(d) contribute to social and economic development;

(e) safeguard the options of present and future generations; and

(f) be fully researched, documented and recorded.

Burial grounds and graves

36. (1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) (a) No person may, without a permit issued by SAHRA or a provincial heritage resources authority—

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources

authority.

(5) SAHRA or a provincial heritage resources authority may not issue a permit for any activity under subsection (3)(b) unless it is satisfied that the applicant has, in accordance with regulations made by the responsible heritage resources authority—

(a) made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and

(b) reached agreements with such communities and individuals regarding the future of such grave or burial ground.

(6) Subject to the provision of any other law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority—

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

(7) (a) SAHRA must, over a period of five years from the commencement of this Act, submit to the Minister for his or her approval lists of graves and burial grounds of persons connected with the liberation struggle and who died in exile or as a result of the action of State security forces or agents provocateur and which, after a process of public consultation, it believes should be included among those protected under this section.

(b) The Minister must publish such lists as he or she approves in the Gazette.

(8) Subject to section 56(2), SAHRA has the power, with respect to the graves of victims of conflict outside the Republic, to perform any function of a provincial heritage resources authority in terms of this section.

(9) SAHRA must assist other State Departments in identifying graves in a foreign country of victims of conflict connected with the liberation struggle and, following negotiations with the next of kin, or relevant authorities, it may re-inter the remains of that person in a prominent place in the capital of the Republic.

General policy

47. (1) SAHRA and a provincial heritage resources authority—

(a) must, within three years after the commencement of this Act, adopt statements of general policy for the management of all heritage resources owned or controlled by it or vested in it; and
(b) may from time to time amend such statements so that they are adapted to changing circumstances or in accordance with increased knowledge; and
(c) must review any such statement within 10 years after its adoption.
(2) Each heritage resources authority must adopt for any place which is protected in terms of this Act and is owned or controlled by it or vested in it, a plan for the management of such place in accordance with the best environmental, heritage conservation, scientific and educational principles that can reasonably be applied taking into account the location, size and nature of the place and the resources of the authority concerned, and may from time to time review any such plan.
(3) A conservation management plan may at the discretion of the heritage resources authority concerned and for a period not exceeding 10 years, be operated either solely by the heritage resources authority or in conjunction with an environmental or tourism authority or under contractual arrangements, on such terms and conditions as the heritage resources authority may determine.
(4) Regulations by the heritage resources authority concerned must provide for a process whereby, prior to the adoption or amendment of any statement of general policy or any conservation management plan, the public and interested organisations are notified of the availability of a draft statement or plan for inspection, and comment is invited and considered by the heritage resources authority concerned.
(5) A heritage resources authority may not act in any manner inconsistent with any statement of general policy or conservation management plan.
(6) All current statements of general policy and conservation management plans adopted by a heritage resources authority must be available for public inspection on request.

NOVERO

AMBIENT NOISE BASELINE ASSESSMENT REPORT FOR MIDTRON MINERALS (PTY) LTD – KAPSTEWEL MANGANESE AND IRON ORE PROSPECTING PROJECT, NORTHERN CAPE PROVINCE

13 MAY 2022

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REPORT DETAILS

Client: Midtron Minerals Pty Ltd

Project Name: Baseline Environmental Noise and Impact Assessment

Project Location: Portions 2, 3, 5 and the remainder of Farm Kapstewel 346. Farm Kapstewel 346

Report Name: Environmental Noise Impact Assessment (Kapstewel Manganese and Iron Ore Project)

Monitoring Dates: 4 – 5 April 2022

Report Date: 13 May 2022

Prepared By: Novero (Pty) Ltd

Approved By: Nonhlanhla Mogakane

REVISION RECORD

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LIST OF ABBREVIATIONS

CBD	Central Business District
DMS	Dense Medium Separation Waste (DMS)
°C	Degrees Celsius
dBA	A-weighted decibels
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GN	Government Notice
IBAs	Important Bird and Biodiversity Areas
IFC	International Finance Corporation
Km/h	Kilometres per hour
L_{Aeq}	A-weighted, equivalent continuous sound level
LA90	A-weighted 90% statistical noise level
LAeq (T)	A-weighted equivalent sound pressure level, T is the time over which the noise is averaged
LAFmax	maximum A-weighted noise level
LAIeq (T)	Impulse corrected A-weighted equivalent sound pressure level
LReq,d	LAeq rated for impulsive sound, for the daytime (d)
LReq,n	LAeq rated for impulsive sound, for the night-time (n)
mbar	millibars
NEMA: AQA	National Environmental Management: Air Quality Act
NCRs	Noise Control Regulations

SANS	South African National Standard
TSF	Tailings Storage Facility
WRD	Waste Rock Dump

1. INTRODUCTION AND BACKGROUND

1.1. Project Details

Midtron Minerals (Pty) Ltd has appointed Nyamoki Consulting (Pty) Ltd (hereafter Nyamoki Consulting) as the Independent Environmental Assessment Practitioner to undertake the air quality and noise baseline assessment as a part of environmental authorisation for the Kapstewel Manganese and Iron Ore Prospecting Project.

Novero (Pty) Ltd (hereafter Novero) was subsequently appointed by Nyamoki Consulting Pty on behalf of Midtron Minerals Pty Ltd to undertake an air quality baseline assessment for the proposed open pit mine – Kapstewel Manganese and Iron Ore Prospecting Project and its associated infrastructure.

The mining right application includes portions 2, 3, 5 and the remainder of Farm Kapstewel 346. Farm Kapstewel 346 is situated in the Tsantsabane Local Municipality, within the ZF Mgcawu District Municipality in the north-eastern part of the Northern Cape Province. Kapstewel is located some 20 km north of Postmasburg along the Regional Route R325 that connects N8 in Griekwastad and ends at N14 near Sishen, 24 km southwest of Kathu.

1.2. Scope of Work

The purpose of this investigation is to determine baseline environmental noise conditions, identify sensitive receptors and prepare a specialist baseline assessment report for the Mining Right Application.

The following tasks, typical of an environmental noise baseline assessment, are included in the scope of work:

- A review of surrounding activities to identify noise sources;
- A study of regulatory requirements and thresholds against which compliance needs to be assessed
- A study of the environment in the vicinity of the proposed development; including:
    - The identification of potential Noise Sensitive Receptors (NSRs);
    - Monitoring at pre- identified Noise Receptors
    - Analysis of results and Recommendations thereof

According to the SANS 10103: 2008 (6th Edition), daytime is defined as 06h00 to 22h00 and night-time as 22h00 to 06h00, therefore, the baseline monitoring exercise took place in line with these requirements.

1.3. Background: Mine Operations

There are 6 mining areas identified, namely A, B, C, D, E and F. Genet Manganese will mine ROM immediately after granting and execution of the mining right. Where present vegetated soil overlying the planned mining areas is to be stripped prior to mining and stockpiled on dedicated dumps next to each mining area which will be used for rehabilitation purposes at a later stage. The ore will be loaded onto the dump trucks from the open excavations by excavator and hauled to the crushing and screening plant. Blasting is required when extreme hard materials are to be mined out of the pits. Mining will be done by the conventional opencast mining method. It is designed based on the nature of the ore bodies in the mine, which proposes that each mining area be treated as a separate pit. Mining will be done on three ore bodies most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

The mining process will include drilling, blasting, loading, hauling and quality control. Three working shifts for the whole 24 hours are expected to be arranged to reach the final target.

Drilling: The Mine will utilize an RC drill for prospecting resources as well as blasting. A typical drilling pattern is a 4 m x 4 m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody.

Blasting: The explosives provided by service providers are placed down the holes using trucks designed for such purposes. The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted.

Loading: Genet Manganese will utilise excavators and FELs to load the minerals onto the dump trucks and ADTs. Wastes and RoM will be loaded separately onto different trucks and hauled to designated areas.

Hauling: Minerals will be hauled to either mobile plants or at a later stage to fixed plants. The waste materials will be hauled to the designated dumps or hauled to mined-out areas for backfilling purposes.

Quality control: The chemical quality of the final products is partly controlled by supplying the plant with a suitable mixture of run-of-mine ore. Samples are taken at regular intervals from the manganese ore that has been crushed and screened and chemically analysed at the onsite laboratory to ensure that the final product contains the correct silica, potassium oxide, phosphorus, and sulphur and alumina content. A comprehensive record shall be kept of the sample analyses. The manganese ore that has been processed in the crushing and screening plant will be put through the magnetic separating plant to ensure that the final product's grade adheres to the customer specifications.

1.4. Environmental Noise and the Environment

Noise is defined as unwanted or harmful outdoor sound regarded as a pervasive environmental pollutant that leads to annoyance and can be perceived as stressful (European Environment Agency, 2015) It is normally created by human activity, such as noise emitted from transport, (road traffic, rail traffic, air traffic) and industrial activities, etc. Most epidemiological studies have been carried out with respect to the health effects of occupational and environmental noise with respect to road and air traffic noise. Studies suggest a higher risk of cardiovascular diseases, including high blood pressure and ischemic heart diseases in subjects persistently exposed to high levels of noise at the workplace or transportation noise outside their dwellings. Different expert groups have evaluated the evidence of the association. For instance, road traffic noise levels at the facades of houses exceeding 65 dBA during daytime and 55 dBA during the night were found to be detrimental to cardiovascular health. Based on meta-analyses, exposureresponse relationships and regression, coefficients have been derived that can be used for a quantitative risk assessment and burden of disease calculations in public health (Babisch, 2011). According to De Vos and Van Beek (2011), it is estimated that a total of 2 billion citizens all over the world are subject to environmental – road traffic – noise levels of over 55 dB L_{den}, which are considered potentially harmful to their health. Furthermore, studies by Stansfeld and Clark (2011) show that environmental noise exposure can lead to mental health effects resulting in psychiatric hospital admissions. Under most circumstances, intolerable environmental noise can cause irritation and frustration to people and animals.

According to Kight et al (2011), the scope and magnitude of anthropogenic noise pollution are often much greater than those of natural noise and are predicted to have an array of deleterious effects on both human beings and animals (e.g., wildlife, birds, etc.) through affecting the acoustic stimuli on animal physiology, development, neural function and genetic effects. Artificial noise in the environment can alter the organism's ability to detect and analyse its auditory scene and has the potential to cause a detrimental impact on both the life and survival of some animal species. It has been prominent that by altering the fine-tuned balance between predator and prey detection, evasion and interfering with the use of sounds in communication, particularly with regards to animal reproduction and navigation. Noise can have a detrimental effect on animals and aggregate their risk of death. Hearing impairment and rapid increase in pulse rate are some of the ill effects of sound pollution on animals. High intensity sound induces fear, which can force certain animal species to abandon their habitat.

Studies have found that some birds have to be compelled to sing at higher frequencies, bats and owls can have difficulty finding prey, terrestrial insectivores lose habitat by avoiding areas with roads and construction and frogs can struggle to find mates with increased noise levels around their habitats. Furthermore, the animal population's evolutionary trail can be altered by sapping resources commonly devoted to various activities resulting in profound genetic and evolutionary consequences, numerous species experiencing hearing impairment and the reduction of usable habitat, which in the case of endangered species contributes to extinction.

1.5. Environmental Noise Propagation

Several factors affect noise levels and measurements can vary significantly for the same noise source. The most important factors affecting noise propagation are:

- Type of source (point or line)
- The type of source and its sound power (LW)
- The distance between the source and the receiver
- Atmospheric conditions (wind speed and direction, temperature, and humidity, etc.)
- Obstacles such as barriers or buildings between the source and receiver
- Ground absorption; and
- Reflections

1.6. Environmental Noise Indices

The following indices are used when assessing environmental noise by measurement or calculation (ISO, 2016):

- $L_{Aeq\ (T)}$ – The A-weighted equivalent continuous sound pressure level during a stated time interval starting at t1 and ending at t2, expressed in decibels (dB), at a given point in space. Where T indicates the time over which the noise is averaged (calculated or measured). The International Finance Corporation (IFC) provides guidance with respect to LAeq (1 hour), the A indicates weighted equivalent sound pressure level, averaged over 1 hour.
- $L_{AIeq\ (T)}$ – The impulse corrected A-weighted equivalent sound pressure level, where T indicates the time over which the noise is averaged (calculated or measured). The sampling of LAIeq (T) is prescribed in the SABS, SANS 10103 of 2008 (6th Edition).
- $L_{Req,d}$ – The LAeq rated for impulsive sound (LAIeq) and tonality in accordance with SABS, SANS 10103 of 2008 (6th Edition) for the daytime (d) period between 06:00 to 22:00.
- $L_{Req,n}$ – The LAeq is rated for impulsive sound (LAIeq) and tonality in accordance with SABS, SANS 10103 of 2008 (6th Edition) for the night-time (n) between 22:00 to 06:00.
- L_{A90} – The A-weighted 90% statistical noise level, is defined as the noise level that is exceeded during 90% of the measurement period. It is a useful descriptor which indicates what the LAeq could have been in the absence of noisy single events and is considered representative of background noise levels.
- L_{AFmax} – The maximum A-weighted noise level measured with the fast time weighting. It is the highest level of noise that occurred during a sampling period.

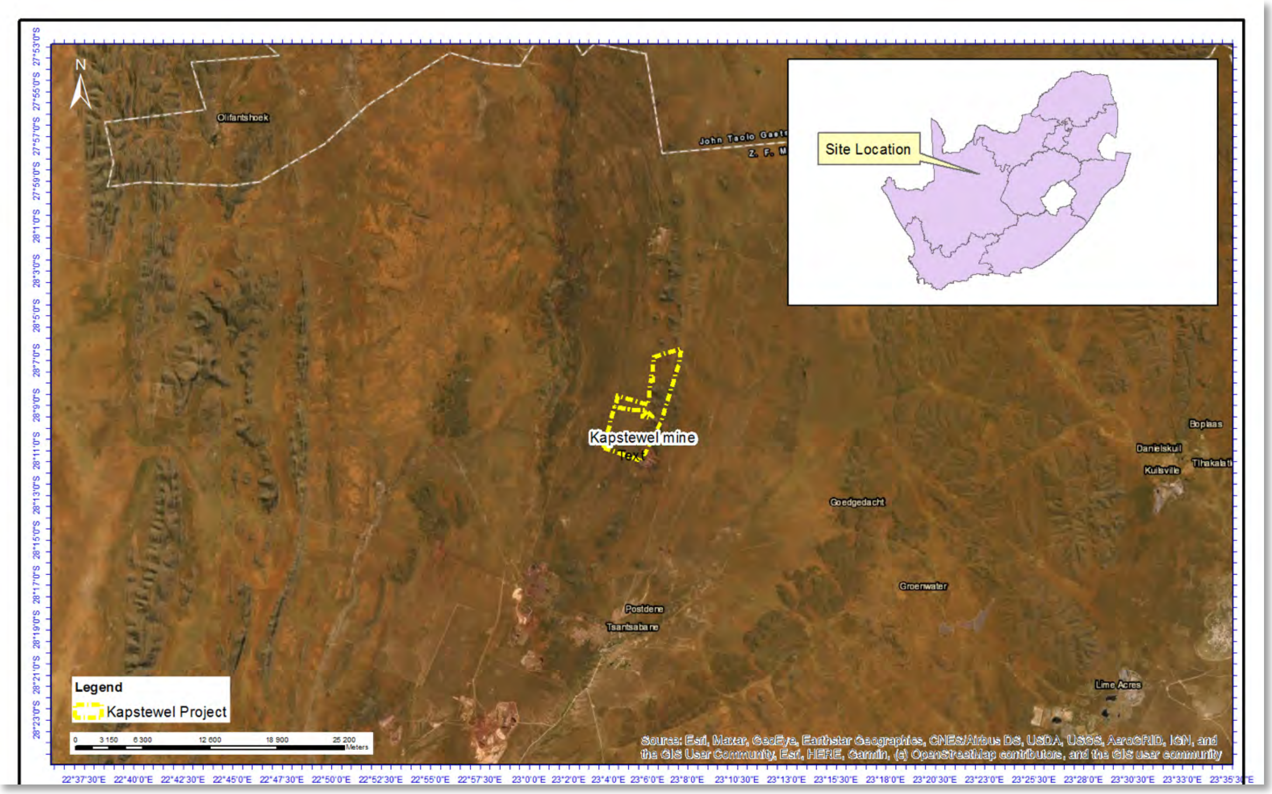
2. PROJECT LOCALITY

The Kapstewel Manganese and Iron Ore Prospecting Project t is located approximately 550 km southwest of Johannesburg, and approximately 19 km to the north of Postmasburg in the Northern Cape Province (**Error! Reference source not found.**). This area is characterised by flat terrain and a range of hills that will be mined for manganese and iron ore.

Farm Kapstewel 436 is situated within the Tsantsabane Local Municipality.

The application for mining rights seeks the extraction of manganese and iron ore for 30 years over the:

- Portion 2 (Remaining Extent), Portion 3 (Remaining Extent), Portion 5 and Remaining Extent of the Farm Kapstewel 436;
- Area measuring 2,766.63 ha.



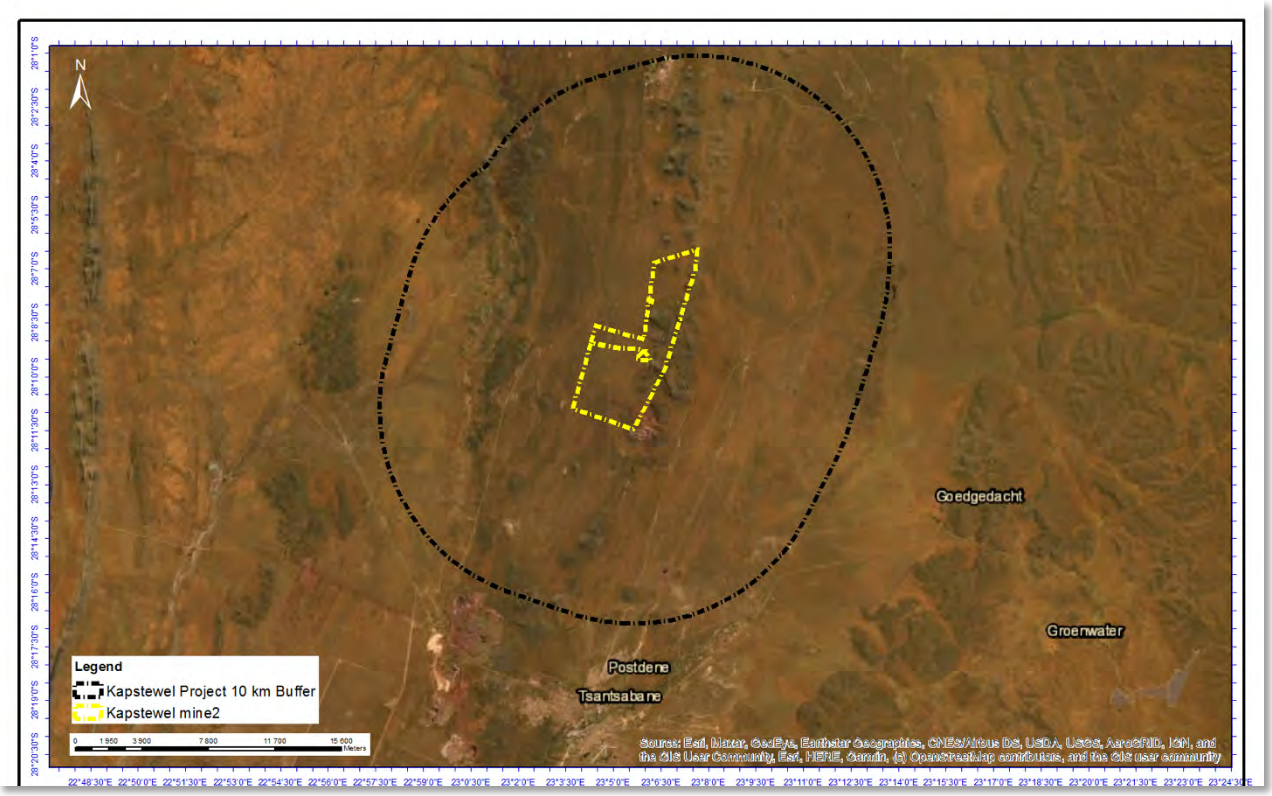


Figure 1 Geographical Location Map

The Farm Kapstewel 436 was surveyed between 24 and 27 March 2022 to ascertain the overall state of biodiversity. According to the South African National Biodiversity

Institute (SANBI) the proposed site is classified as an Ecological Support Area, this implies that the proposed site plays a role in meeting biodiversity targets for ecosystems, species and ecological processes as identified in a systematic biodiversity plan. The sites were found to incorporate endemic tree species that will need to be considered during the planning and construction phase of the proposed activities. They also provide ecosystem services for both fauna and flora onsite. The table below provides details of the identified potential noise sensitive receptor points surrounding the mine, which are likely to be impacted by the noise from the mine operations.

Table 1 Details of the Noise Sensitive Receptor Points and Distances from Operations

Receptor ID	**GPS Coordinates**		**Distance from operations (central point)/km**	**Elevation**
NSR01	28^{0} 09'12,81"S	23^{0} 05' 59,43" E	2,11	1455m
NSR02	28^{0} 09'16.53"S	23^{0} 06'19.17"E	1,65	1468
NSR03	28^{0} 08'44.42"S	23^{0} 06' 03.65" E	2,67	1462
NSR04	28^{0} 08'16.85"S	23^{0} 06' 57.51"E	3,84	1511
NSR05	28^{0} 11'49.52"S	23^{0} 05' 31.94" E	3,26	1413
NSR06	28^{0} 10'50.07"S	23^{0} 05'38.88"E	1,76	1423
NSR07	28^{0} 10'22.06"S	23^{0} 07'29.35"E	1,86	1438
Central Point	28^{0} 10'18.66"S	23^{0} 6'19.95"E	0	1447

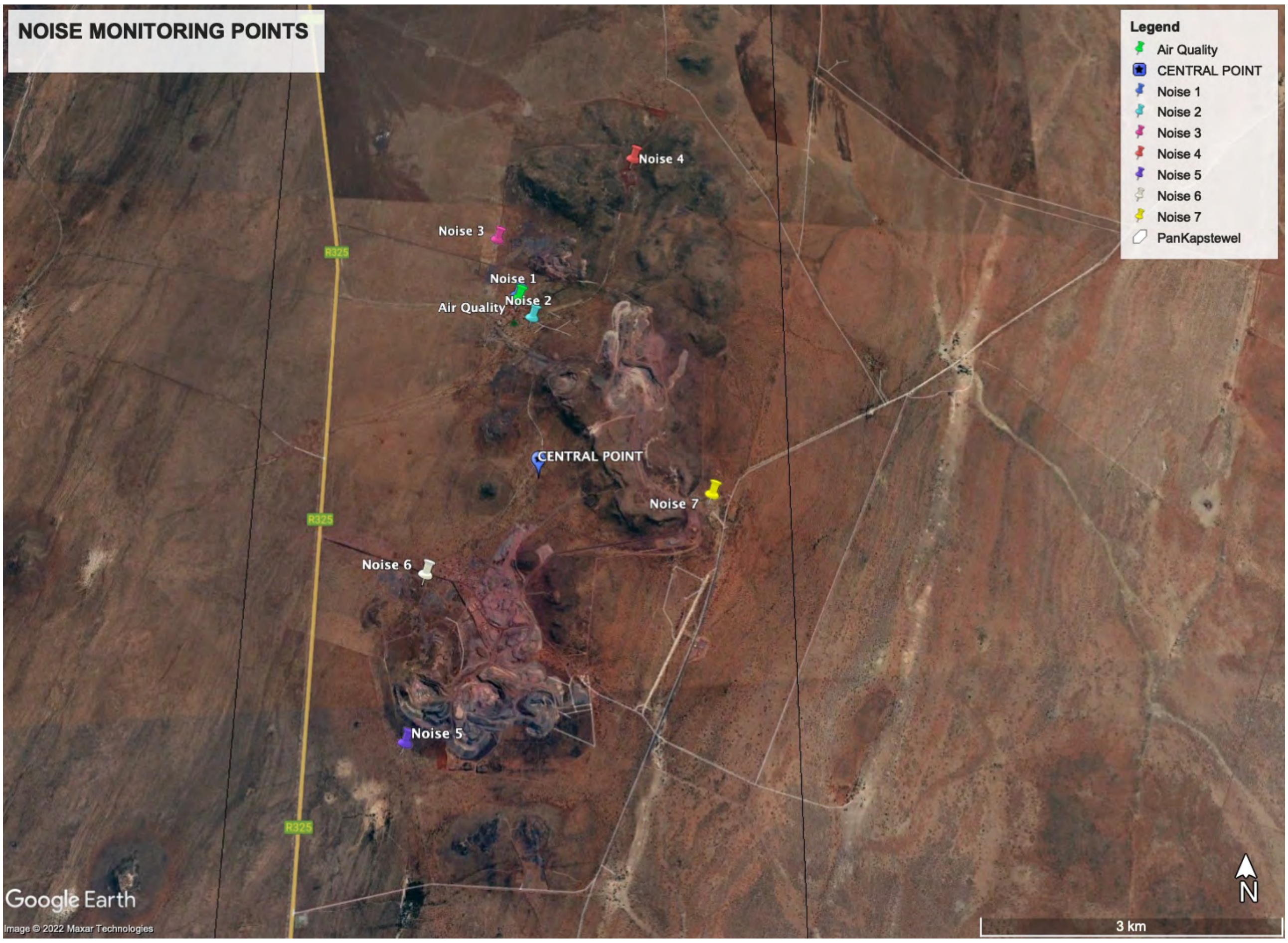


Figure 2 Noise Sensitive Receptor Points

3. ENVIRONMENTAL NOISE MONITORING

3.1 Legal Requirements

The South African legislation and guidelines as well as industry standards, were used as a reference for the study. The section below provides an overview of the standards, legislation and guidelines used during the monitoring and preparation of this report.

3.1.1 Constitution of the Republic of South Africa, 1996 ("The Constitution")

Section 24 of the Constitution states that everyone is entitled to an environment that is not harmful to his or her well-being. In the context of noise, a determination of a level of noise that is harmful to well-being must be made. "Noise pollution" is specifically included in Part B of Schedule 5 of the Constitution, which means that noise pollution control is a local authority competence, provided that the local authority concerned can carry out this function.

3.1.2 National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) [NEMA: AQA]

Section 34 of the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) makes provision for prescribing standards for control of noise either in general or by specified machinery or activities or in specified places or areas; or for determining a definition of noise and the maximum levels of noise. Fortunately, South African law, through the Environment Conservation Act 73 of 1989 and municipal by-laws, protects citizens that are exposed to intolerable noise pollution.

3.1.3 Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections. 24(5)(a) and (h) and 44 of the national environmental: The Management Act, 1998, when applying for environmental authorisation.

These protocols were published in March 2020 to provide instructions in terms of specialist assessments and minimum report requirements for noise impacts when applying for environmental authorisation.

3.1.4 National Noise Control Regulations, 1992 (GN R154 of 1992)

The primary law and legally enforceable on the external noise in South Africa is the Noise Control Regulations (NCRs), GN R154, promulgated in 1992 under Section 25 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989). The NCRs were revised under Government Notice Number R.55 of 14 January 1994 to make it obligatory for all authorities to comply with these regulations. Subsequently, in terms of Schedule 5 of the Constitution of the Republic of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Only three provinces, namely Gauteng, Western Cape, and Free State, have devolved responsibility to administer these regulations, with some of the municipalities implementing noise control by-laws.

3.2 South African Noise Standards

The requirements for assessment methods, measurement and rating of environmental noise are to be carried out in accordance with the following SANS Standards:

- South African National Standard (SANS) Code of Practice, SANS 10103:2008, outlines the measurement and rating of environmental noise with respect to annoyance and speech communication.
- South African National Standard (SANS) Code of Practice, SANS10328:2008, which outlines methods for environmental noise impact assessments.

The SANS 10103:2008 provides a guideline on how environmental noise measurements are to be taken and analysed. Table 2 below outlines the rating levels recommended for different districts. The ambient noise above these levels would be annoying to the community.

Table 2 Ambient Noise Rating Levels for Outdoor Use

Type of District	**Equivalent Continuous Rating Level ($L_{Req,T}$) for Outdoor Noise**	
	Daytime $L_{Req,d}$[(a)] (dBA)	**Night-time $L_{Req,n}$[(b)] (dBA)**
Rural districts	45	35
Suburban districts with little road traffic	50	40
Urban districts	55	45
Urban districts with one or more of the following: business premises; main roads	60	50
Central business districts	65	55
Industrial districts	70	60

Notes:

(a) $L_{Req,d}$ – the L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the daytime period, i.e., 06h00 to 22h00.

(b) $L_{Req,n}$ – the L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the night-time, i.e., 22h00 to 06h00.

In addition, the following standards were also taken into consideration:

i. SANS 656 – Sound Level Meters.
ii. SANS 658 – Integrating averaging sound level meters.
iii. SANS 10328 – Methods of Measuring Environmental Noise.

3.3 International Finance Corporation (IFC) Guidelines

The Environmental Noise Management guidelines under the General Environmental, Health, and Safety (EHS) Guidelines, outlined in Table 3 below apply to noise generated beyond the property boundaries of a development that conforms to the *Equator Principles*. The guideline states that noise prevention and mitigation measures should be applied mainly at the source, where predicted or measured noise impacts from project facilities/operations exceed the applicable noise level guideline at the most sensitive point of reception. It further states that noise impacts should not exceed levels presented in Table 3 below or result in a maximum increase above background levels of 3 dBA at the nearest receptor location off-site (IFC, 2007). The IFC noise level guidelines for residential, institutional, and educational receptors are in line with the SANS 10103 standard which was used for the noise assessment presented in this report.

Table 3 IFC Noise Level Guidelines

Area	Daytime L_{Aeq}(dBA)	Night-time L_{Aeq}(dBA)
Industrial Receptors	70	70
Residential, Institutional and Educational Receptors	55	45

3.4 World Health Organisation (WHO) Environmental Noise Guidelines for the European Region *(applicable to other global regions)*

Noise is globally recognised as an important public health issue, that poses negative impacts on human health and well-being; and this is a growing concern worldwide. Environmental noise is an important public health issue, highlighted among the top environmental risks to health. It has negative impacts on human health and well-being and is a growing concern among the public and policymakers. The growing understanding of these health impacts of exposure to environmental noise guided the development of these guidelines. The primary purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources such as transportation (road traffic, railway, and aircraft) noise, wind turbine noise and leisure noise. They provide robust and evidence based public health advice essential to drive policy action that will protect communities from the adverse effects of noise. Although developed for the European region, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience, in terms of their health implications (WHO, 2016).

These guidelines are the first of their kind globally and provide recommendations for protecting human health from exposure to environmental noise originating from various sources. Given the growing recognition of the problem and the rapid advances in research on the health impacts of noise, these guidelines offer strong public health advice and serve as a solid basis for future updates. They were developed based on the growing understanding of the health impacts of exposure to environmental noise, and provide robust public health advice, which is essential to drive policy action that will protect communities from the adverse effects of noise. The process of developing the guidelines followed a rigorous methodology; their recommendations are based on systematic reviews of evidence that consider more health outcomes of noise exposure than ever before. Importantly, these guidelines contribute to the 2030 Agenda for Sustainable Development and support the vision of creating resilient communities and supportive environments, through their possible influence on urban, transport and energy policies (WHO, 2016).

4. ECOLOGICAL ASPECTS

According to Fishpool and Evans, (2001), South Africa contains more than 840 avian species, encompassing approximately 7% of the world's avifauna, mainly due to South Africa's high levels of habitat diversity. Various sites within the country have been identified as important for maintaining viable populations of endemic, range restricted, and threatened species. There is a programme within the international sphere of Birdlife that focuses on conservation initiatives. The Important Bird Areas Programme identifies works to conserve a network of sites critical for the long term survival of bird species that are threatened globally, of which one of them is the demarcation of IBAs within different areas. The primary aim of the

Important Bird and Biodiversity Areas (IBAs) program is to ensure the long-term conservation of important avifaunal habitats. They also provide essential benefits to people, such as food, materials, water, climate regulation, flood attenuation, as well as opportunities for recreation and spiritual fulfilment. By conserving IBAs, all the ecosystem goods and services they provide are preserved, which means in effect that a meaningful component of the South African economy (such as water management and agriculture) is supported (Marnewick et al., 2015a). A total of 105 bird species were confirmed during an ecological assessment, including those in the Red Data List.

Many avifaunal species are adaptable as they are habitat generalists and can, therefore, accommodate a certain degree of habitat degradation and transformation (Harrison et al., 1997). Other species are extremely habitat specific and rely on certain habitat units for breeding, hunting, or foraging and roosting. It is the survival of these species that become threatened as they cannot adapt to changes to the habitat. Habitat-specific species are sensitive to environmental change, with the destruction of habitat being the leading cause of species decline worldwide (Barnes, 2000).

Birds are generally regarded as good ecological indicators because their presence or absence tends to represent conditions pertaining to the proper functioning of an ecosystem. Bird communities and ecological conditions are directly linked to land cover. As the land cover of an area changes, so do the types of birds in that area (The Bird Community Index, 2007). Land cover is directly linked to habitats within the study area. The diversity of these habitats should give rise to many different species.
According to the South African Bird Atlas Project (SABAP2), almost 300 species of birds have been identified in the Sekhukhuneland area; the majority of these birds are comprised of Bushveld, Grassland and Mountainous species. All birds that could be present within the vicinity of the study area are listed in the table below.

Table 4 Avifauna

Scientific Name	**Common Name**	**IUCN Status**
Geronticus calvus	Southern Bald Ibis	VU
Sagittarius serpentarius	Secretary bird	NT
Gyps coprotheres	Cape Vulture	VU

Scientific Name	Common Name	IUCN Status
Stephanoaetus coronatus	African Crowned Eagle	NT
Circus ranivorus	African Marsh-Harrier	VU
Circus maurus	Black Harrier	NT
Falco biarmicus	Lanner Falcon	LC
Alcedo semitorquata	Half Collared Kingfisher	CR
Bugeranus carunculatus	Wattled Crane	VU
Anthropoides paradiseus	Blue Crane	VU
Balearica regulorum	Grey Crowned Crane	VU
Eupodotis senegalensis	White-bellied Korhaan	VU

A few avifaunal species were spotted onsite during the site visit. The proposed mining operations may generate noise pollution which serves as a deterrent to birds.

Figure 3 Picture of the African Crowned Eagle (Google pictures)

Reptiles

The study site has a number of venomous snakes such as Cape Cobra, Black Mamba and a number of other venomous snakes. All these have a high chance of occurring in the study area, based on habitat requirements and are most likely to occur in rocky habitats, either on rocky outcrops or in rocky, well wooded valleys.

Figure 4 Snake Poster observed on site (extract from biodiversity report)

Mammals

According to the desktop study conducted, the species listed in Table 5 were identified as being possible to occur within the study area or the immediate vicinity of the proposed filing station area. It must be noted that some of these species are very sensitive to habitat and in some instances; the likeliness for them to occur is minimal. There are nine Red List mammal species that have a HIGH chance of occurring in the study area. Cattle and other domestic animals graze on the property.

Table 5 Mammals

Common name	Recorded on site
Spotted necked otter	None

Greater dwarf shrew	None
Pangolin	None
Rock dormouse	None
Lesser grey-brown musk	None
African weasel	None
Brown hyena	None
Honey badger	None
Southern hedgehog	None

The site is also used for grazing Sheep and Goats. None of the sensitive mammals which were expected was spotted on site except for droppings of smaller mammals (Figure 5). The presence of evidence of disturbance on site, and the seasonality issues may explain why all the sensitive mammals were not seen during the site visit. Some of the expected animals are nocturnal, and thus may only be seen at night.

Figure 5 Mammal droppings observed on site

Invertebrates

Butterflies are a good indication of the habitats available in a specific region (Woodhall 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope or endemic species (specific habitat requirements with populations concentrated in a small area) which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch and therefore identify. A list of butterflies that are likely to be observed on the study site and the surrounding areas are summarised in the table below.

Table 6 Invertebrates

Scientific Name	Common Name
Melanitis leda Helena	Evening Brown
Acraea anemosa	Broad-bordered Acraea
Acreae neobule	Wandering Acraea
Danaus Chrysippus	African Monarch butterfly
Junonia hierta cebrene	Yellow Pansy butterfly
Danays chrysippus	Southern Milkweed
Charaxes jasius	Koppie Emperor
Cyclyrius pirithous	Common Blue
Hyalites esebria	Dusky Acrea butterfly
Phalantha aethiopica	Poplar Leopard
Alaena amazoula	Yellow Zulu
Catacroptera cloanthe	Pirate butterfly
Charaxes achaemenses	Bushveld Emperor
Pinacopteryx eriphia	Zebra White butterfly
Eurema brigitta	Broad-bordered yellow
Vanessa cardui	Painted Lady
Papilio demodocus	Citrus Swallowtail butterfly

5. APPROACH AND METHODOLOGY

5.1. Instrumentation

The instrumentation used during the monitoring exercise were:

i. The Sound Level Meter
ii. Windshield
iii. Survey Forms
iv. Mobile Device for camera purposes

5.2. Methodology

Ambient noise measurements according to the SANS Code of Practice 10103:2008 were carried out at 7 receptor points. These receptor points were selected for the following reasons: easily definable and with easy future access during monitoring which will be conducted in future and at different distances from the source point for representative coverage. These points were selected for baseline monitoring purposes for the proposed mining activities. A route plan taking into consideration the number of points travel time and daytime as well as night-time periods was developed to maximise efficiency during the monitoring exercise and ensure timeous completion of all monitoring point sampling. The information was collected in the form of a survey where all the information required was listed for each point. Information such as time, temperature and pressure are recorded.

Measurements were taken during the daytime (06h00-22h00) and night-time (22h00 – 06h00) periods, as stipulated in the SANS 10103. The methodology used during the survey met the requirements of the SANS 10103 (2008) summarised below:

i. The noise samples were collected for an average of ten (10) minutes
ii. The sound level meter was positioned at approximately 1.4m above ground, and not within proximity of reflecting surfaces.
iii. The sound level meter was set to A-weighting ($L_{Aeq,\ T}$).

6. MONITORING RESULTS

The total ambient noise levels resulting from noise emissions of site operations were assessed in terms of the guidelines provided by SANS 10103. The guideline used was for rural district rating levels as the mine is situated in a rural setting.

6.1. Measured ambient noise levels

The results of the noise survey are illustrated in the table below where the Leq is the average noise level for the specific measuring point over some time, the Lmax is the maximum noise level and the Lmin is the minimum noise level registered during the noise survey for the specific area in dBA.

Table 7 Measured ambient noise levels

	Daytime	Night-time

Measuring Point	Leq-dBA	Lmax(Fast) dBA	Lmin(Fast) dBA	Leq-dBA	Lmax(Fast) dBA	Lmin(Fast) dBA
NSR01	68,2	77,8	21	34,1	68,4	19,9
NSR02	36,7	73,5	22,6	40,5	90,9	21,4
NSR03	36,2	61,2	22,5	33,4	75	19
NSR04	58,5	77,6	32	87,9	100	28,9
NSR05	50,3	79,9	18,8	40,1	77,7	22
NSR06	55,9	73,2	30,5	38,6	81,1	30,5
NSR07	42,6	80,9	22,8	46,9	85,8	22,8

Meteorological Data

Meteorological data plays an important role in the conveyance of sound waves and speed. This data was collected to perform analysis based on parameters such as wind speed and direction, relative humidity, and temperature. These parameters may affect noise measurements depending on their magnitudes and wind velocity. For instance, sound passes through hot air faster than through cold air when it is less dense. The attenuation of sound in the air is also affected by relative humidity. Dry air absorbs far more acoustic energy than moist air. Therefore, the higher the humidity, the lower the absorption, and this explains why noise travels faster and further at night as opposed to during the day.

Wind speed increases with altitude, which will bend the path of sound to ''focus'' it on the downwind side and make a ''shadow'' on the upwind side of the source. The noise survey was conducted downwind because at short distances, up to 50 m, the wind has a minor influence on the measured sound level. For longer, the wind effect becomes appreciably greater. Furthermore, downwind measurement is preferred because the deviation is smaller, and the result is also conservative.

Temperature gradients create effects similar to those of wind gradients, except that they are uniform in all directions from the source. The temperature may increase with an increase with altitude (temperature inversion).'' focusing'' sound on the ground surface. This is the reason sound travels closer when it is warmer and further when temperatures are lower. Sound reflected by the ground interferes with the directly propagated sound. The effect of the ground is different for acoustically hard (e.g., concrete or water), soft (e.g., grass, trees, or vegetation) and mixed surfaces. Precipitation can affect ground attenuation. Snow, for example, can give considerable attenuation and can also cause high, positive temperature gradients. Regulations often advise against measuring under such conditions.

Atmospheric Attenuation

The reduction of noise as it passes through the air is dependent on many factors including:

- Distance from source
- Frequency content of the noise
- Ambient temperature
- Relative humidity
- Ambient pressure

Tables 8 and 9 below provide an outline of daytime and night-time meteorological parameters that were measured at all the monitoring points.

Table 8 Daytime Meteorological Data

Monitoring Point	Temperature (°C)	UV	Wind Speed Km/h	Wind Direction	Pressure (mbar)
NSR01	23	Fair	12	N	1050
NSR02	34	High	12	W	1035
NSR03	31	Moderate	12	W	1000
NSR04	31	Moderate	12	E	1100
NSR05	34	High	12	W	1050
NSR06	34	High	12	SW	1020
NSR07	34	High	12	SW	1025

Table 9 Night-time Meteorological Data

Monitoring Point	Temperature (°C)	UV	Wind Speed Km/h	Wind Direction	Pressure (mbar)

NSR01	16	Low	12	NW	1025
NSR02	17	Low	12	NW	1020
NSR03	16	Low	12	SE	1010
NSR04	16	Low	12	SE	1000
NSR05	16	Low	12	SE	1025
NSR06	16	Low	12	SE	1050
NSR07	17	Low	12	SE	1015

6.2. Measured Ambient Noise Monitoring Results

The assessment methods for measurement and rating of environmental noise were carried out in accordance with SANS 10103:2008, which provides a guideline on how environmental noise measurements are to be taken and analysed. The standard outlines the rating levels recommended for different districts. The rural district was utilised for this assessment of the noise monitoring, mainly because the receptor points are located within a rural undeveloped area. Rural district thresholds are outlined below. It is imperative to note that the mine itself may be categorised within the industrial district as it is an activity of that nature. However, due to its location, the mine will be measured against the rural districts' thresholds *(of 45dBA and 35dBA for daytime and night-time respectively)* as outlined in Table 6 below.

Table 10 Thresholds for various districts

Type of District	**Equivalent Continuous Rating Level ($L_{Req,T}$) for Outdoor Noise**	
	Daytime $L_{Req,d}$ (a) (dBA)	**Night-time $L_{Req,n}$ (b) (dBA)**
Rural districts	45	35
Suburban districts with little road traffic	50	40
Industrial districts	70	60

6.2.1. Day and Night-time Monitoring Results

The section provides the results of day-time noise levels measured at all the monitoring points on the day (4-5 April 2022) of the assessment. The results are presented in tabular (*presented in Tables 11 and 12, with threshold exceedances, highlighted using red text)* and graphical *(presented in Figures 6 and 7, with threshold exceedances shown by red bars)* formats.

Table 11 Daytime Monitoring Results

Monitoring Point	Guideline Limit LAeq,T	Monitored Result LAeq,T
NSR01	45	68,2
NSR02	45	36,7
NSR03	45	36,2
NSR04	45	58,5
NSR05	45	50,3
NSR06	45	55,9
NSR07	45	42,6

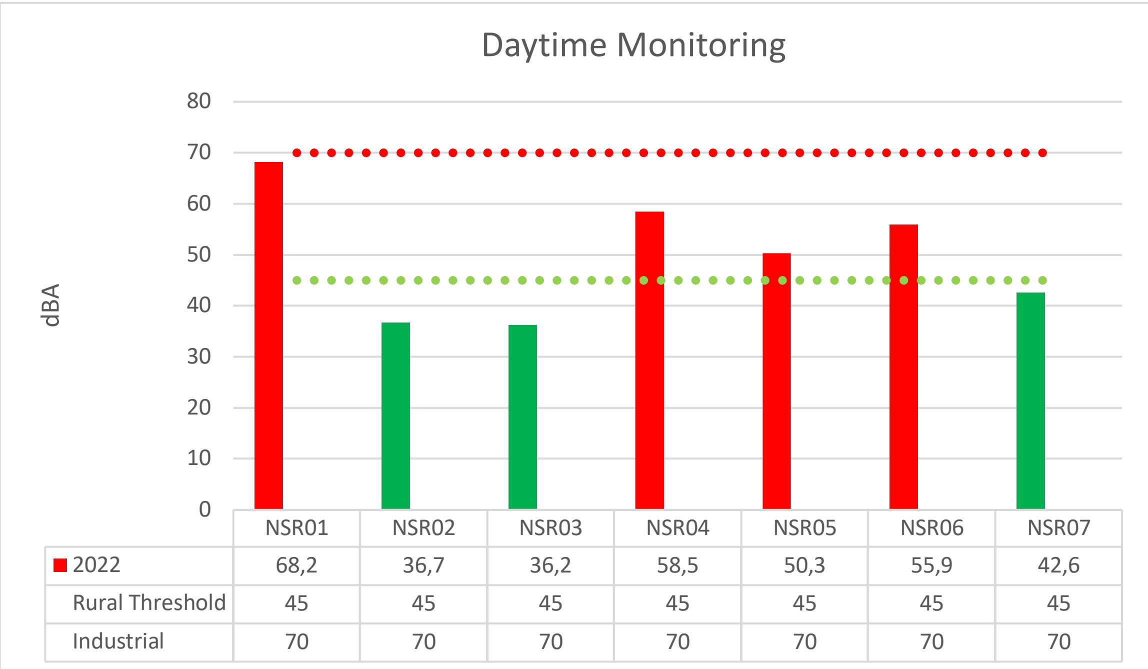
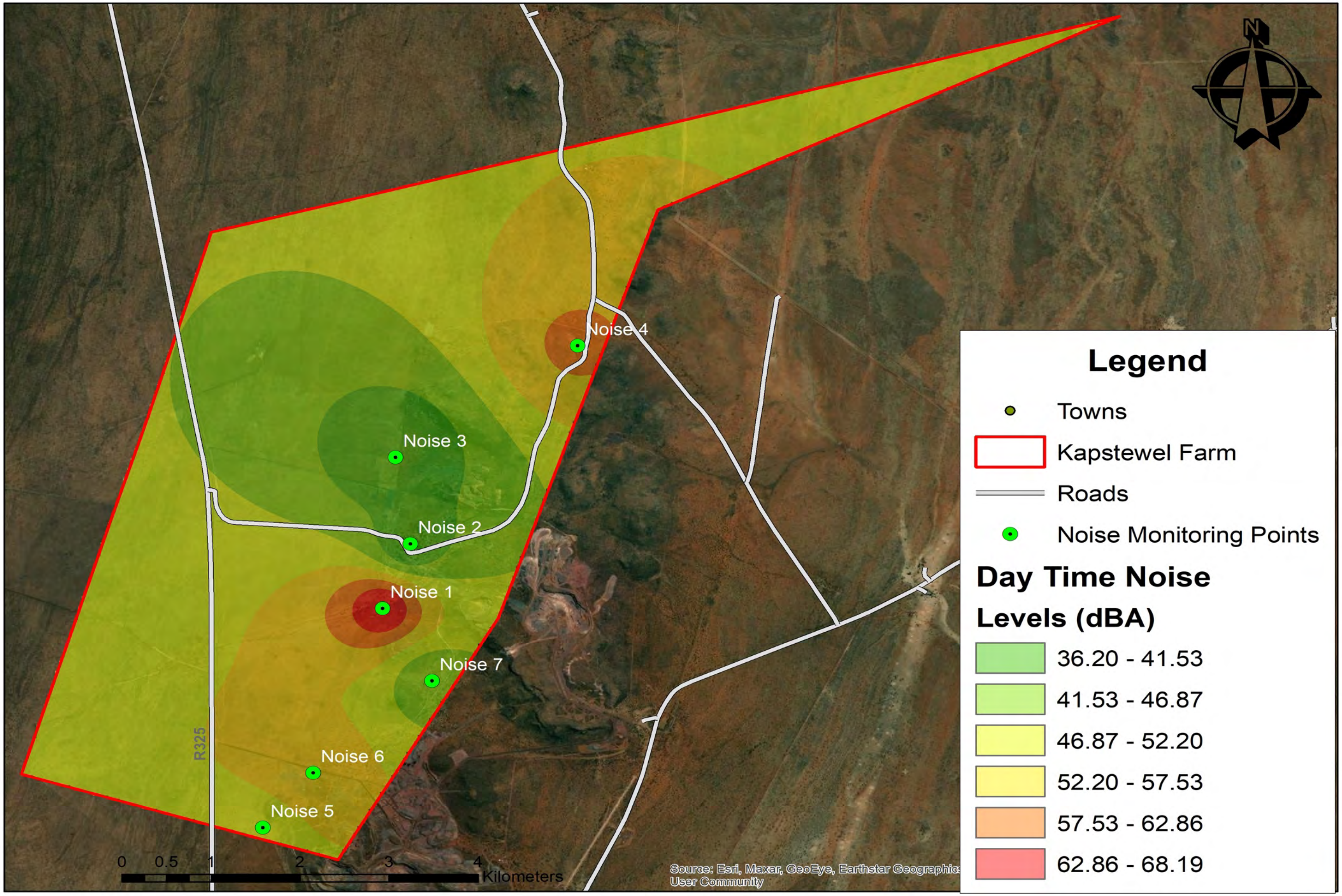


Figure 6 Daytime Monitoring Results



N
Noise 4
Noise 3
Noise 2
Noise 1
Noise 7
Noise 6
Noise 5
R325
0 0.5 1 2 3 4
Kilometers
Source: Esri, Maxar, GeoEye, Earthstar Geographics
User Community
Legend
Towns
Kapstewel Farm
Roads
Noise Monitoring Points
Day Time Noise Levels (dBA)
36.20 - 41.53
41.53 - 46.87
46.87 - 52.20
52.20 - 57.53
57.53 - 62.86
62.86 - 68.19

Table 12 Night-time Monitoring Results

Monitoring Point	Guideline Limit LAeq,T	Monitored Result LAeq,T
NSR01	35	34,1
NSR02	35	40,5
NSR03	35	33,4
NSR04	35	87,9
NSR05	35	40,1
NSR06	35	38,6
NSR07	35	46,9

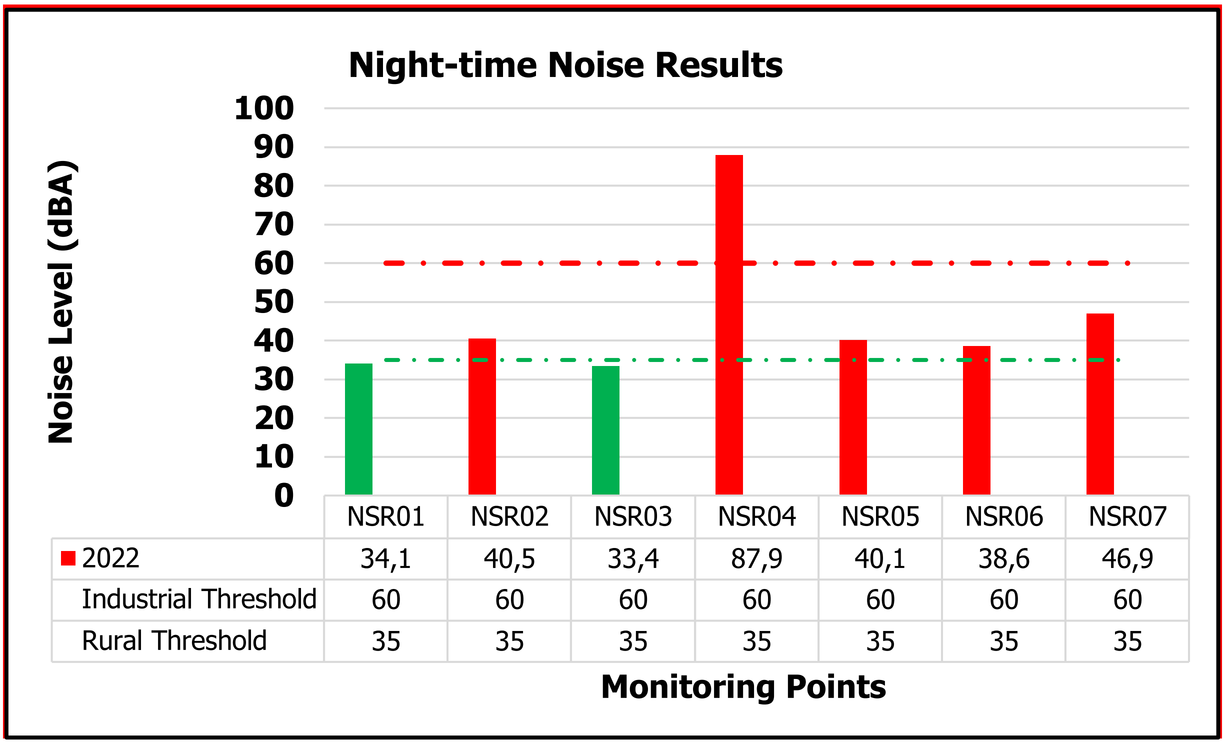
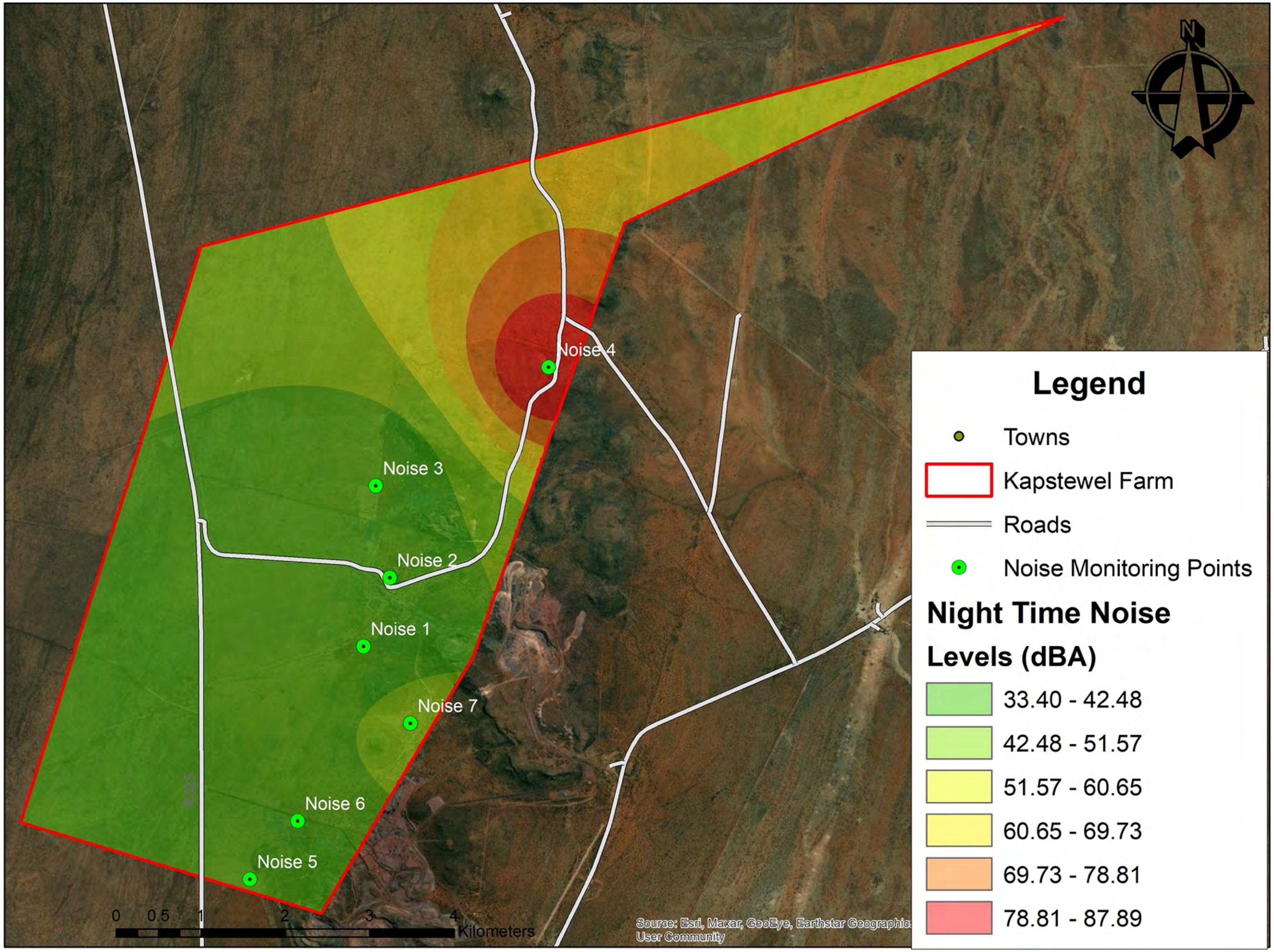


Figure 7 Night-time Monitoring Results



Noise 4
Noise 3
Noise 2
Noise 1
Noise 7
Noise 6
Noise 5
0 0.5 1 2 3 4
Kilometers
N
Source: Esri, Maxar, GeoEye, Earthstar Geographics
User Community
Legend
Towns
Kapstewel Farm
Roads
Noise Monitoring Points
Night Time Noise Levels (dBA)
33.40 - 42.48
42.48 - 51.57
51.57 - 60.65
60.65 - 69.73
69.73 - 78.81
78.81 - 87.89

6.3. Discussion of Results

Sound is defined as any pressure variation that can be detected by the human ear. The number of pressure variations per second is called the frequency of sound and is measured in hertz (Hz). In terms of sound pressure levels, audible sound ranges from the threshold of hearing at 0 dB to the threshold of pain at 130 dB and over. An increase of 6 dB represents a doubling of the sound pressure, an increase of about 8-10 dB is required before the sound subjectively appears to be significantly louder. Similarly, the smallest perceptible change is about 1 Db. Noise levels are most critical during evenings, weekends, and warm seasons when windows are open and there are outdoor activities, mainly because that is considered a time for rest and relaxation. The noise may be masked by traffic noise and other activities during weekdays, but in the evenings and on weekends the same noise can be offensive. Audible pure tones heard frequently can cause even low-level, low frequency noise to be intolerable.

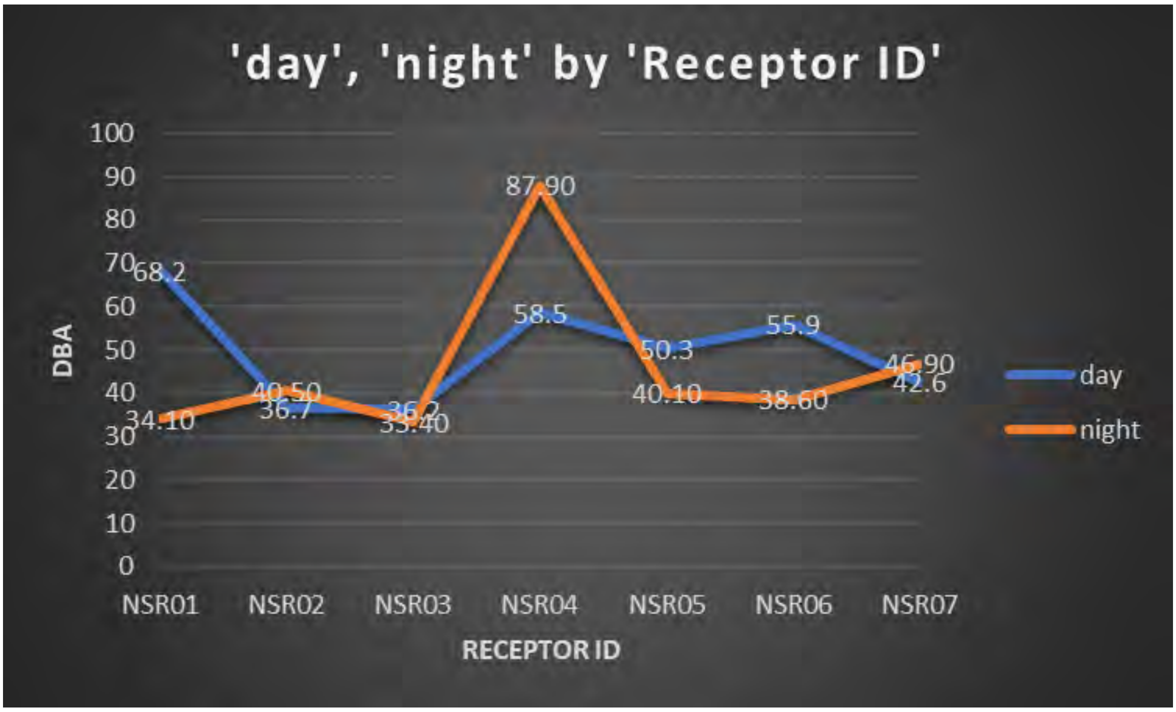


Figure 8 Results for both day and night

For the daytime noise Level recorded on the day, 42,9% were within the guideline limit of 45dbA for rural areas. Points NSR02, NSR03 and NSR07 are found to be compliant against these thresholds, however, if measured against industrial limits, 100% compliance was achieved for daytime.

For the night-time noise monitoring, 71,4% of the points were above the guideline limit of 35dbA. A total of only two points were compliant, namely, NSR01 and NSR03. NSR04 experienced a very high impact from the ongoing activities on site, resulting in a very high ambient noise reading. An 85,7% compliance rate against the industrial thresholds was obtained, with NSR04 exceeding the threshold by a significant 27,9dBA.

As mentioned in the section **ECOLOGICAL ASPECTS**, multiple faunae were found on site, including birds, frogs, guinea fowls, snakes and butterflies., Animals encountered include cows, wild dogs, etc.

Although the area was not delineated as an important bird area, it is evident that the area generally has a variety of avian populations throughout the entire monitoring footprint. Noise affects the way in which birds communicate. This results in birds having to compete and emit a louder and higher frequency, which in turn results in higher energy consumption for communication purposes. Furthermore, birds that are territorial use sound to protect/defend their territories, whereby the birds emit a louder and higher frequency noise in order to protect their territory and improve communication. An increase in noise will affect this aspect of their wellbeing. Cows, on the other hand, are often exposed to high noise frequencies as most have cowbells around their necks. This will not have a major effect on their reactivity to noise, however, cows without cowbells would experience a slightly different reaction. The basic physiologic processes underlying the detection and sensation of sound are essentially identical between humans, dogs, cattle, and mice (Front. Vet. Sci., 2017). Considering that cows can hear sounds between 23 Hz and 35 kHz, with the highest sensitivity at 8 kHz, and are able to detect sounds at −11 dB, i.e., amplitudes the human ear cannot detect, the continuous exposure to bells during the pasturing season might impair the cows' hearing capacity.

7. IMPACT ASSESSMENT

The impact assessment is undertaken to meet the requirements of Appendix 3 of the EIA Regulations. Appendix 3 states that an environmental assessment report must include the assessment of each identified potentially significant impact and risk, including:

i. Cumulative impacts
ii. Nature, significance and consequence of the impacts and risks
iii. The extent and duration of impacts and risks probability of impact and risk occurring
iv. Degree to which the impact and risk can be reversed
v. Degree to which the impact and risk may cause irreplaceable loss of resources
vi. Degree to which impact and risk can be mitigated.

The risk rating in this section has been developed to meet the requirements of the EIA regulations outlined above. Rating of significant impacts allows for identifying high impacts that need to be managed during the construction and operational phases of the project. Significance is determined by a three-phase process as outlined below in the project. Significance is determined by a three-phase process as outlined below

Table 13 Significance Rating

Rating		Description
7	Severe	Impact most substantive, no mitigation possible
6	Very High	Impact substantive, mitigation difficult/expensive
5	High	Impact substantive, mitigation possible and easier to implement
4	Moderate-High	Impact real, mitigation difficult/expensive
3	Moderate-low	Impact real, mitigation easy, cost-effective and/or quick to implement
2	Low	Impact negligible, with mitigation
1	Very Low	Impact negligible, no mitigation required
0	No Impact	There is no impact at all - not even a very low impact on a party or system.

Table 14 Spatial Rating Scale

Rating		Description
7	National	The maximum extent of any impact
6	Provincial	The spatial scale is moderate within the bounds of impacts possible and will be felt at a provincial scale
5	District	The spatial scale is moderate within the bounds of impacts possible and will be felt at a district scale
4	Local	The impact will affect an area up to 5 km from the proposed route corridor.
3	Adjacent	The impact will affect the development footprint and 5oom buffer around the development footprint
2	Development footprint	Impact occurring within the development footprint
1	Isolated Sites	The impact will affect an area no bigger than the servitude

Table 15 Temporal Scale

Rating		Description
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is greater.
3	Medium term	The environmental impact identified will operate for the duration of the life of the line.
4	Long term	The environmental impact identified will operate beyond the life of the operation.
5	Permanent	The environmental impact will be permanent.

Table 16 Probability Rating Scale

Rating	Description
1	Practically impossible
2	Unlikely
3	Likely
4	Very Likely
5	It’s going to happen / has occurred

Table 17 Degree of the certainty rating scale

Rating	Description
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% are sure of a particular fact or the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likeli-hood of an impact occurring.
Can't know	The consultant believes an assessment is not possi-ble even with additional research.

For potential impacts to be described in a quantitative manner in addition to the qualitative description, a rating scale of between 1 and 7 is used for each of the assessment criteria. Thus, the total value of impact is described by the equation below:

Impact Risk = ((Significance + Spatial + Temporal)/3) * (Probability/5)

Table 18 Impact Risk Rating

Rating	Impact class	Description
6.1 - 7.0	7	SEVERE
5.1 - 6.0	6	VERY HIGH
4.1 - 5.0	5	HIGH
3.1 - 4.0	4	MODERATE-HIGH
2.1 - 3.0	3	MODERATE-LOW
1.1 - 2.0	2	LOW
0.1 - 1.0	1	VERY LOW

This section describes the impact assessment methodology that was used in evaluating all identified noise impacts that may arise due to the proposed mining establishment. In order to evaluate the significance of an identified impact, the study considered two factors viz. (1) impact consequence - defined as the severity, spatial extent and duration of the impact, and

(2) likelihood of impact occurrence - defined as the frequency of the activity/aspect causing the impact and the frequency with which the impact occurs.

The first step in the impact assessment methodology was the characterisation of the noise and the identification of impacts that may occur within the receptor environment during the construction and operational phases of the development. This was accomplished by constructing a noise profile of the environment. The monitoring exercise provided baseline noise characteristics of the potentially affected environment and facilitated the tracking of changes that could potentially occur due to the proposed development. Any change to the baseline noise characteristics of the environment was deemed an impact and was methodically evaluated.

The second step involved evaluating the significance of the identified changes to the baseline noise environment. A numerical rating system was used to assess the significance of all identified impacts. The system was based on the impact consequence and likelihood of impact occurrence. In evaluating the impact consequence of identified noise changes, the study considered 3 criteria i.e. the severity, spatial scope, and duration of the change. A weighting was assigned to each impact consequence criterion, with the maximum weight that can be assigned being 5

In evaluating the likelihood of impact occurrence, the study considered two criteria i.e. frequency of the activity/aspect causing the impact and the frequency with which the impact occurs. A weighting was assigned to each likelihood of impact occurrence criterion, with the maximum weight that can be assigned being 5 The significance of the impact/change was then determined by multiplying the weights of the impact consequence and likelihood of impact occurrence as follows;

$$Significance = impactConsequence \times like\text{h}oodofimpactoccurence$$
$$= (severity + spatialscope + duration) \times (Frequencyofactivity + frequencyofimpact)$$

The significance of the impact was then read off a significance rating matrix table as depicted in Table 10. The matrix provided a rating on a scale of 1 to 150, with any rating between (1 – 25) considered low significance, (26 – 39) medium-low, (40 – 75) medium-high, and (76 – 150) high significance.

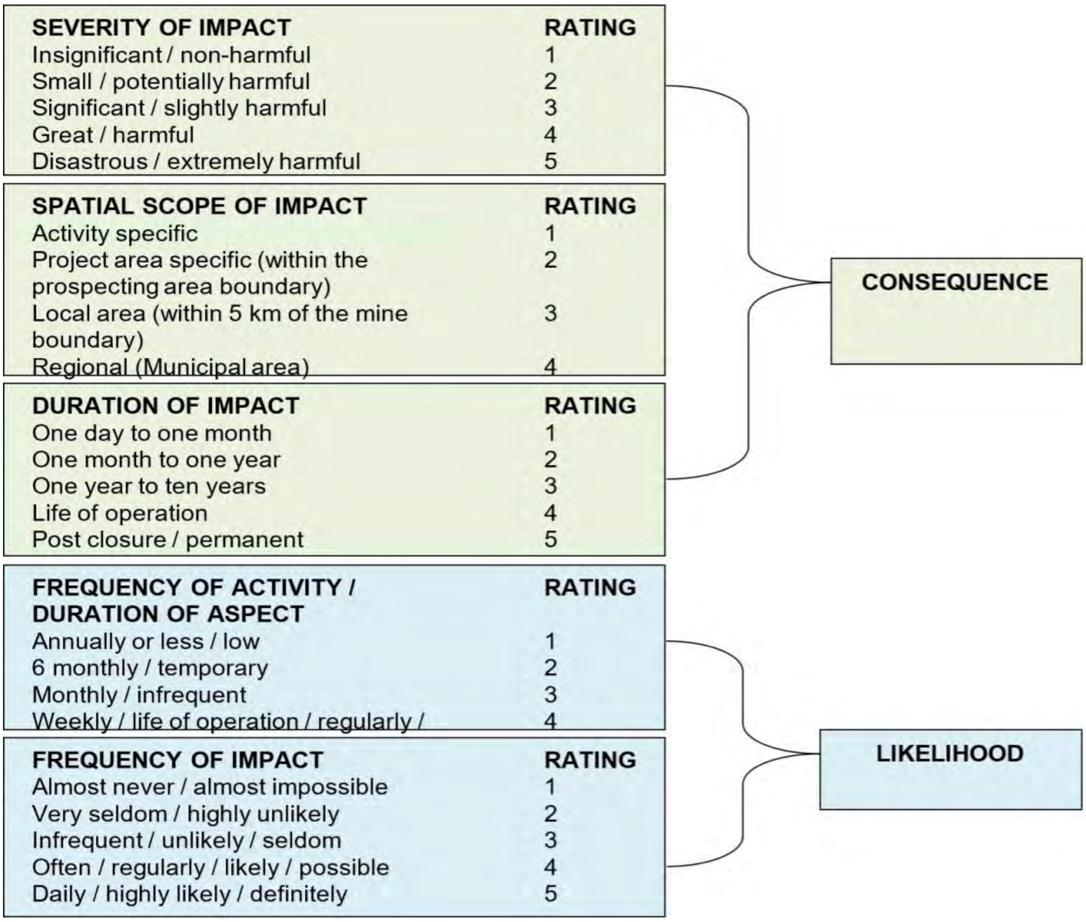


Figure 9 Criteria for assessing noise impacts

-

Consequence

Likelihood

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	20	30	40	50	60	70	80	90	100	110	120	1	140	150

	High	76 to 150	Improve current management
	Medium High	40 to 75	Maintain current management
	Medium Low	26 to 39	
	Low	1 to 25	No management required

SIGNIFICANCE = CONSEQUENCE x LIKELIHOOD

Figure 10 Significance rating matrix

Types of Noise

Continuous Noise

Continuous noise is produced by machinery that operates without interruption. Measuring for just a few minutes with hand-held equipment is sufficient to determine the noise level.

Impulsive Noise

The noise from impacts or explosions, e. g from a pile driver, punch press or gunshot, is called impulsive noise. It is brief and abrupt, and its startling effect causes greater annoyance than would be expected from a simple measurement of sound pressure level.

Tones in noise

Annoying tones are created in two ways: Machinery with rotating parts such as motors, gearboxes, fans and pumps often create tones. Repeated impacts cause vibration that, transmitted through surfaces into the air, can be heard as tones. Tones can be identified subjectively by listening or objectively using frequency analysis.

Low Frequency Noise

Low frequency noise has significant acoustic energy in the frequency range of 8 to 100 Hz. Noise kind is typical for power plants and, since the noise is hard to muffle and spreads easily in all directions, it can be heard for miles. Low frequency noise is more annoying than would be expected from A-weighed sound pressure level.

Evaluation of ambient noise changes/Impacts

There is current activity and therefore the site currently contributes to the ambient noise levels of the district. The existing site ambient noise levels were measured for 10 minutes at each point, during the day and night cycles. It would be acceptable to expect an allowance of up to 70dBA / 60dBA for daytime/ night time activity respectively in the industrial zoned area according to SANS10103:2008 despite the relatively low measured ambient noise levels against the industrial thresholds.

The main activities during construction are summarised as follows:

- Site clearing and grubbing
- Construction of site facilities and plants

- Storage & handling infrastructure and utility construction

The main noise producing activities and equipment to be used include piling of ore, hydraulic excavators, compactors, cranes, mobile site generators, grinders, air compressors, jack hammers, and construction vehicles including articulated dump trucks and concrete premix trucks etc.

Construction phase

Table 19 Construction Phase _ Noise Assessment

Nature: Causing unwanted disturbance to surrounding areas		
	Without Mitigation	With Mitigation
Severity of Impact	Extremely harmful (5)	Small/potentially harmful (2)
Spatial Scope of Impact	Local area (within 5km of ROI) (3)	Project Area (2)
Duration of Impact	One year to ten years (3)	One year to ten years (3)
Frequency of Activity	Temporary (2)	Temporary (2)
Frequency of Impact	Highly likely (5)	Highly Likely (5)
Significance	High (80)	Medium-high (40)
<u>Mitigation measures:</u> 1. Minimise noise pollution and ensure compliance in terms of controlled area noise thresholds (if any). 2. All activities must be conducted in accordance with municipal by-laws. 3. Working activities during construction must be confined to the following working hours: Monday to Friday, 07h00 to 17h00 Saturday, 07h00 to 15h00 No work on Sundays and public holidays 4. High Noise areas must be demarcated		

Operational Phase

Table 20 Operational Phase _ Noise Assessment

Nature: Noise pollution due to cumulative impacts associated with the development		
	Without Mitigation	With Mitigation
Severity of Impact	Extremely harmful (5)	Significant (3)
Spatial Scope of Impact	Local Area (Within 5 km of ROI) (3)	Project Area Specific (2)
Duration of Impact	Permanent (5)	Permanent (5)
Frequency of Activity	Life of Operation (4)	Life of operation (4)
Frequency of Impact	Highly Likely(4)	Infrequent (3)
Significance	High (104)	Medium-high (60)
Mitigation: 1. All equipment in different units should be designed/operated in such a way that the noise level shall not exceed 85 dBA. 2. Quarterly monitoring of work zone noise and outside area should be conducted to determine any noise impacts(all receptor points identified and if a residential dwelling will be established for miners during operation) 3. Controls such as silencers on engine powered equipment and enclosures around generators (if available on site) can be used to reduce the noise impact during operations		

Should the prevailing ambient noise level be caused to increase due to the introduction of a new noise source/s, the expected community response is given as follows as a function of the excess ambient noise level (ΔL Req, T)

Table 21 Comparison for assessing community/group response (SANS 10103:2008)

Excess (ΔL Req, T) (dBA)	**Estimated community or group response**	
	Category	**Description**
0 to 10	Little	Sporadic complaints
5 to 15	Medium	Widespread complaints
10 to 20	Strong	Threats of community or group action
>15	Very Strong	Vigorous community or group action

NOISE REDUCTION

When aiming to reduce the effects of environmental noise on people, you must consider the following aspects:

- Noise sources
- Transmission path
- Types of homes in which people live

The most common source of environmental noise is road traffic. Outdoor noise levels usually decrease with increasing distance from the source because of the geometrical spreading of the noise.

The source

Noise abatement methods can be used to reduce continuous noise from the mine as far as practically feasible. Road surfaces can be improved to give lower noise output. Porous asphalt and the newer ‵′thin noise-reduced surfaces ‵′ have shown reductions of 2 – 6 dB (A).

Transmission Path

The obvious method of reducing noise is to move people as far away as possible from the sources of environmental noise. However, this is often impractical, so additional attenuation in the form of noise barriers can be applied.

The barrier height and the position of the source and /or receiver relative to it are crucial to the amount of noise reduction that can be achieved. Effective barriers with heights ranging from 1.5 m.

In addition, the frequency spectrum of the noise source will affect the achievable reduction. Law frequencies, compared to the high performance of barriers can be improved by applying sound absorbing material, avoiding parallel, reflective surfaces and shaping or angling barriers to avoid multiple reflections.

8. CONCLUSION AND RECOMMENDATIONS

All of the receptor points were below the industrial thresholds as observed on the noise depiction maps, except for NSR04 (Night time monitoring).

The following recommendations should, therefore, be explored;

I. Monitoring should be done every quarter to determine the impact of the expansion operations on receptor areas during different seasons (for at least a year after operations begin and during construction). This is to determine the impact the project may have on surrounding environments. The baseline results will be used to compare for cumulative noise analysis. Noise differs from season to season; therefore a better understanding of the noise profile may take time to attain.

II. Noise barriers are and will be naturally established on the site (difference in elevations, hills, valleys and even waste rock dumps), and these normally slow down noise emanating from operations, alternatively, source controls can be explored, such as silencers on engine powered equipment and enclosures around generators and other noise intensive machines, for the protection of the employees on and around the site.

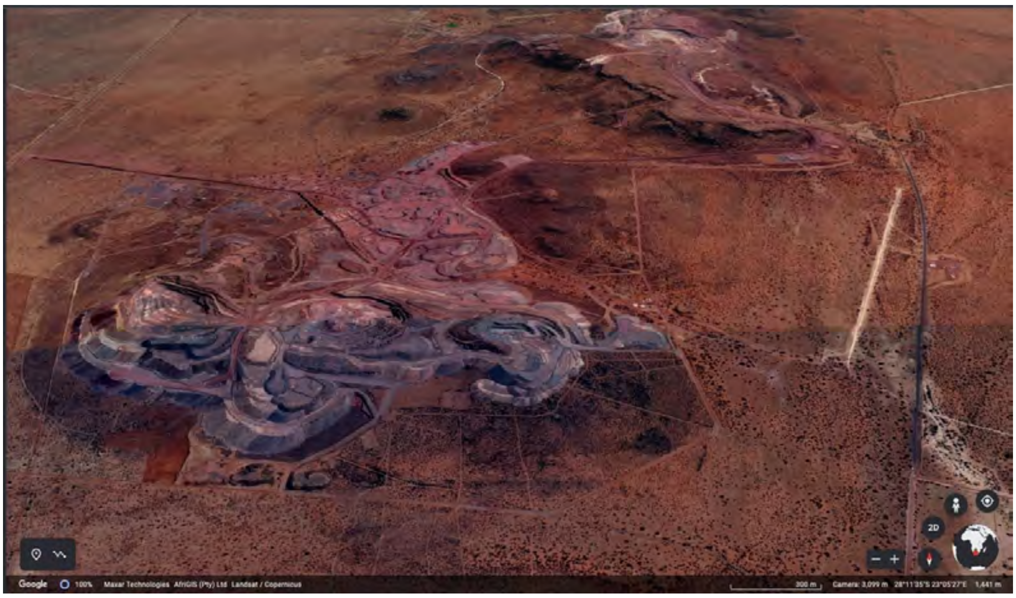


Figure 11 3D View of the site

III. Specific focus on the ecosystems found on and adjacent to the site should be ensured and noted. The mine to implement best practices to reduce and monitor noise impacts on sensitive receptors.

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Midtron Minerals (Pty) Ltd - Kapstewel Manganese and Iron Ore Mining Right Application Project

Tsantsabane Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province

Farm: Remaining Extent of Portion 2, Remaining Extent of Portion 3, Portion 5 and Remaining Extent Kapstewel 436

Fourie, H. Dr heidicindy@yahoo.com

012 942 0110/079 940 6048

Palaeontological Impact Assessment: Desktop Study

Facilitated by: Nyamoki Consulting (Pty) Ltd

1850 Berg Avenue, Doreg AH,

Akasia, 0182

Tel: 076 327 1827

2022/06/07

Ref: N/A

Regisaurus (ESI)

Executive Summary

Outline of the development project: Nyamoki Consulting (Pty) Ltd has facilitated the appointment of Dr H. Fourie, a palaeontologist, to undertake a Palaeontological Impact Assessment (PIA), Desktop Study of the proposed Kapstewel Manganese and Iron Ore Mining Right Application Project in the Tsantsabane Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province on Farm: Remaining Extent, Remaining Extent of Portion 2, Remaining Extent of Portion 3, and Portion 5 Kapstewel 436.

The applicant, Midtron Minerals (Pty) Ltd. will be mining by conventional opencast mining method. It is designed based on the nature of the orebodies in the mine, which proposes that each mining area be treated as a separate pit. Mining will be done on three ore bodies most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

Alternative 1: A polygon area outlined in red with the town of Postmasburg 20 km. to the south, the train station of Palingpan is to the west, Manganore to the south, the R325 Road cuts through the property in a north south direction, and the R385 Road is in the west. The approximate size of the site is 2 766,63 hectares.

Legal requirements: -

The National Heritage Resources Act (Act No. 25 of 1999) (NHRA) requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. The Republic of South Africa (RSA) has a remarkably rich fossil record that stretches back in time for some 3.5 billion years and must be protected for its scientific value. Fossil heritage of national and international significance is found within all provinces of the RSA. South Africa's unique and non-renewable palaeontological heritage is protected in terms of the National Heritage Resources Act. According to this act, palaeontological resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

The main aim of the assessment process is to document resources in the development area and identify both the negative and positive impacts that the development brings to the receiving environment. The PIA therefore identifies palaeontological resources in the area to be developed and makes recommendations for protection or mitigation of these resources.

"palaeontological" means any fossilised remains or fossil trace of animals or plants which lived in the geological

past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or traces.

For this study, resources such as geological maps, scientific literature, institutional fossil collections, satellite images, aerial maps and topographical maps were used. It provides an assessment of the

observed or inferred palaeontological heritage within the study area, with recommendations (if any) for further specialist palaeontological input where this is considered necessary.

A Palaeontological Impact Assessment is generally warranted where rock units of LOW to VERY HIGH palaeontological sensitivity are concerned, levels of bedrock exposure within the study area are adequate; large scale projects with high potential heritage impact are planned; and where the distribution and nature of fossil remains in the proposed area is unknown. The specialist will inform whether further monitoring and mitigation are necessary.

Types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (Act No.25 of 1999):
(i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.
This report adheres to the guidelines of Section 38 (1) of the National Heritage Resources Act (Act No. 25 of 1999).
Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; (b) the construction of a bridge or similar structure exceeding 50 m in length; (c) any development or other activity which will change the character of a site (see Section 38); (d) the re-zoning of a site exceeding 10 000 m² in extent; (e) or any other category of development provided for in regulations by SAHRA or a PHRA authority.

This report aims (1c) to provide comment and recommendations on the potential impacts that the proposed development could have on the fossil heritage of the area and to state if any mitigation or conservation measures are necessary.

Outline of the geology and the palaeontology:

The geology was obtained from map 1:100 000, Geology of the Republic of South Africa (Visser 1984) and the 1:250 000 geological map of Postmasburg 2822 (Moen 1977).

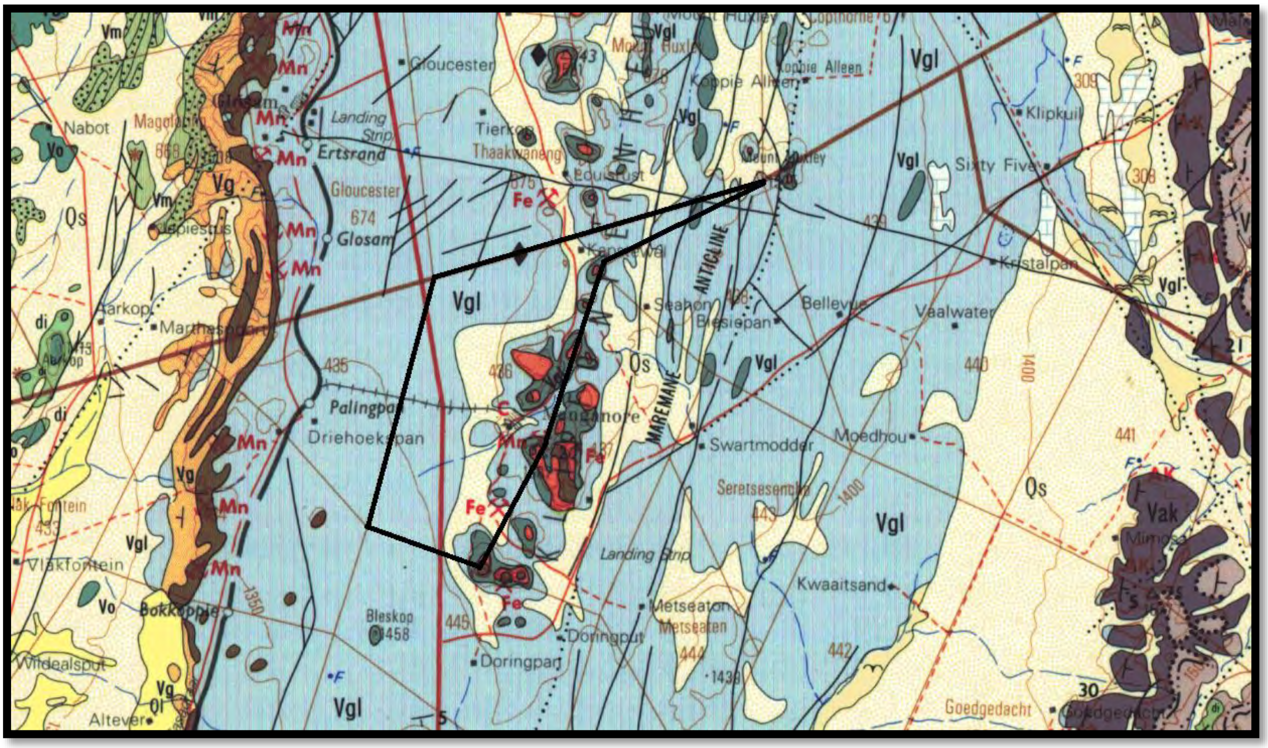

Figure: The geology of the development area.

Legend to Figure and short explanation.

Qs – Red to flesh-coloured wind-blown sand; sand dune (light beige). Quaternary.
Vgl – Chert and chert breccia (blue), dolomitic limestone (puckered limestone) with subordinate coarsely crystalline dolomite, chert and lenses of limestone (light blue). Lime Acres, Ghaap Group, Campbell Subgroup, Transvaal Supergroup. Banded ironstone (red). Vaalian.
---f--- – (black) Fault.
……. – Undifferentiated linear structure.
♦ - Diamond pipe.
↔ - Maremane Anticline.
□ – Approximate position of Mining Right Application (in black on figure).

Mining Activities in study area on Figure above

Fe – Iron ore Mn - Manganese.

Summary of findings: The Palaeontological Impact Assessment: Desktop Study was undertaken in June 2022 in winter in dry and cold conditions (Appendix 6 of Act, 1(d)) during the official Level 1 lockdown of the Covid-19 virus, as this is a desktop study, the season has no influence on the outcome. The following is reported:

The development is taking place on sedimentary sequences, which are underlain by Transvaal, Rooiberg and Griqualand-West geology.

Over areas totalling fully 40% of Southern Africa the ‘hard rocks’, from the oldest to the Quaternary, are concealed by normally unconformable deposits – principally sand, gravel, sandstone, and limestone. Inland deposits are much more extensive than marine deposits and are terrestrial and usually unfossiliferous. Some of these deposits date back well into the Tertiary, whereas others are still accumulating. Owing to the all-to-often lack of fossils and of rocks suitable for radiometric or palaeomagnetic dating, no clear-cut dividing line between the Tertiary and Quaternary successions could be established (Kent 1980). The alluvium sands were deposited by a river system and reworked by wind action (Snyman 1996). A thick cover of Kalahari reddish sand blankets most outcrops and is dominated by the typical Kalahari thornveld (Norman and Whitfield 2006).

Groenewald and Groenewald (2014) placed the Ghaap Plateau as a Group in the Transvaal Supergroup with the Campbell Group as a Subgroup. The Ghaap Plateau was deposited as a thick layer of carbonaceous sediments in extensive shallow basins. It consists of carbonates, siliclastics and iron formations. The age is Late Archaean, Early Proterozoic (Johnson 2006). Stromatolites are present in the upper member. Stromatolites occur in the dolomite of the Ghaap Plateau Formation. The Ghaap Plateau Formation is followed by the Asbestos Hills Formation (Sheet 2722 info). The Ghaap Plateau dolomites correlate with the Chuniespoort Group dolomites (McCarthy and Rubidge 2005). Johnson (2006) refers to the area round Kuruman and Postmasburg as the Griqualand basin as part of the Transvaal Supergroup. Johnson (2006) divided the Ghaap Group into the Schmidtsdrift, Campbell Rand, Asbestos Hills and Koegas Subgroups. The age is placed as 2642 ± 3 Ma.to 2222 ± 13 Ma. The Campbell Rand Subgroup has two formations, the Nauga and Klein Naute with the Kliphuis, Kuruman and Daniëlskuil Formations part of the Asbestos Hills Subgroup. The Lime Acres Member, Campbell Rand Subgroup lies on top of the Kogelbeen Formation containing important limestone resources (Eriksson *et al.* 2006).

Palaeontology - Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, the palaeontological sensitivity can generally be LOW to VERY HIGH, and here in the development MODERATE for the Transvaal Supergroup and HIGH for the Quaternary (SG 2.2 SAHRA APMHOB, 2012) (Almond and Pether 2009).

‘Algal microfossils’ have been reported from shales and are probably of diagenetic origin (Eriksson 1999), these may be present here. Stromatolites are significant indicators of palaeoenvironments and provide evidence of algal growth between 2640 and 2432 million years ago. These fossils are rarely found in shales and are allocated a HIGH palaeontological sensitivity as they are important indicators of palaeo-environmental conditions (Groenewald and Groenewald 2014). Stromatolites may be plentiful in dolomites, but good examples should always be preserved.

<u>Recommendation</u>:

The impact of the mining on the fossil heritage is HIGH and MODERATE. A Phase 1 Palaeontological Impact Assessment: Field Study is recommended if fossils are found during excavating, trenching, drilling, clearing or blasting (according to SAHRA protocol).

The Project includes one locality Alternative (see Figure 1):

Alternative 1: A polygon area outlined in red with the town of Postmasburg is 20 km. to the south, the train station of Palingpan is to the west, Manganore to the south; the R325 Road cuts through the property in a north south direction, and the R385 Road is in the west. The approximate size of the site is 2 766,63 hectares.

Concerns/threats to be added to the EMPr (1k,l,m):

1. The overburden and inter-burden must always be surveyed for fossils. Special care must be taken during the clearing, digging, drilling, and excavating of foundations, trenches, channels and footings and removal of overburden not to intrude fossiliferous layers.
2. Threats are earth moving equipment/machinery (front end loaders, excavators, graders, dozers) during construction, the sealing-in, disturbance, damage or destruction of the fossils by development, vehicle traffic, mining, and human disturbance.

The recommendations are (1g):

1. Mitigation is needed if fossils are found, permission needed from SAHRA.
2. No consultation with parties was necessary.
3. The development may go ahead with caution, but the ECO must survey the mining for fossils after drilling, trenching material must be scrutinised as well in line with the legally binding Environmental Management Programme (EMPr) this must be updated to include the involvement of a palaeontologist/ archaeozoologist when necessary.
4. The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during mining activities. The protocol is to immediately cease all mining activities if a fossil is unearthed, construct a 30 m no-go barrier, and contact SAHRA for further investigation.

Stakeholders: Developer – Midtron Minerals (Pty) Ltd.
Environmental – Nyamoki Consulting (Pty) Ltd. 1850 Berg Avenue, Doreg AH, Akasia, 0182.
Tel: 076 327 1827.
Landowners – M. and S.W. Victor, AUTUMN SKIES RESOURCES & LOGISTICS (PROPRIETARY) LIMITED, and Sincerity Resources SA.

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1. Background information on the project

1.1. Report

This report is part of the environmental impact assessment process under the National Environmental Management Act, as amended (Act No. 107 of 1998) (NEMA) and includes Appendix 6 (GN R38282 of 4 December 2014) of the Environmental Impact Assessment Regulations (see Appendix 1 bold in text). It is also in compliance with SG 2.2 SAHRA APMHOB Guidelines, 2012. Minimum standards for palaeontological components of Heritage Impact Assessment Reports, Pp 1-15 (2).

1.2. Outline of development

This report discusses and aims to provide the developer with information regarding the location of palaeontological material that will be impacted by the development. Depending on the presence or absence of fossils in the pre-construction phase it is necessary for the developer to apply for the relevant permit from the South African Heritage Resources Agency (SAHRA / PHRA).

Mining will be done by the conventional opencast mining method. It is designed based on the nature of the orebodies in the mine, which proposes that each mining area be treated as a separate pit. Mining will be done on three ore bodies most of the time. Access to the opencast mining areas will be provided by a number of haul roads to the crushing, screening and magnetic separation plants for the minerals.

The mining process will include drilling, blasting, loading, hauling and quality control. Three working shifts for the whole 24 hours are expected to be arranged to reach the final target. The Mine will utilize an RC drill for prospecting resources as well as blasting. A typical drilling pattern is a 4m x 4m grid, and the depth of the hole will be determined by the thickness of the overburden and orebody. The explosives provided by service providers are placed down the holes using trucks designed for such purposes. The quantities of explosives are determined by the purposes of the blasting and the nature of the materials to be blasted. Local benefits of the proposed development include benefits to the local economy.

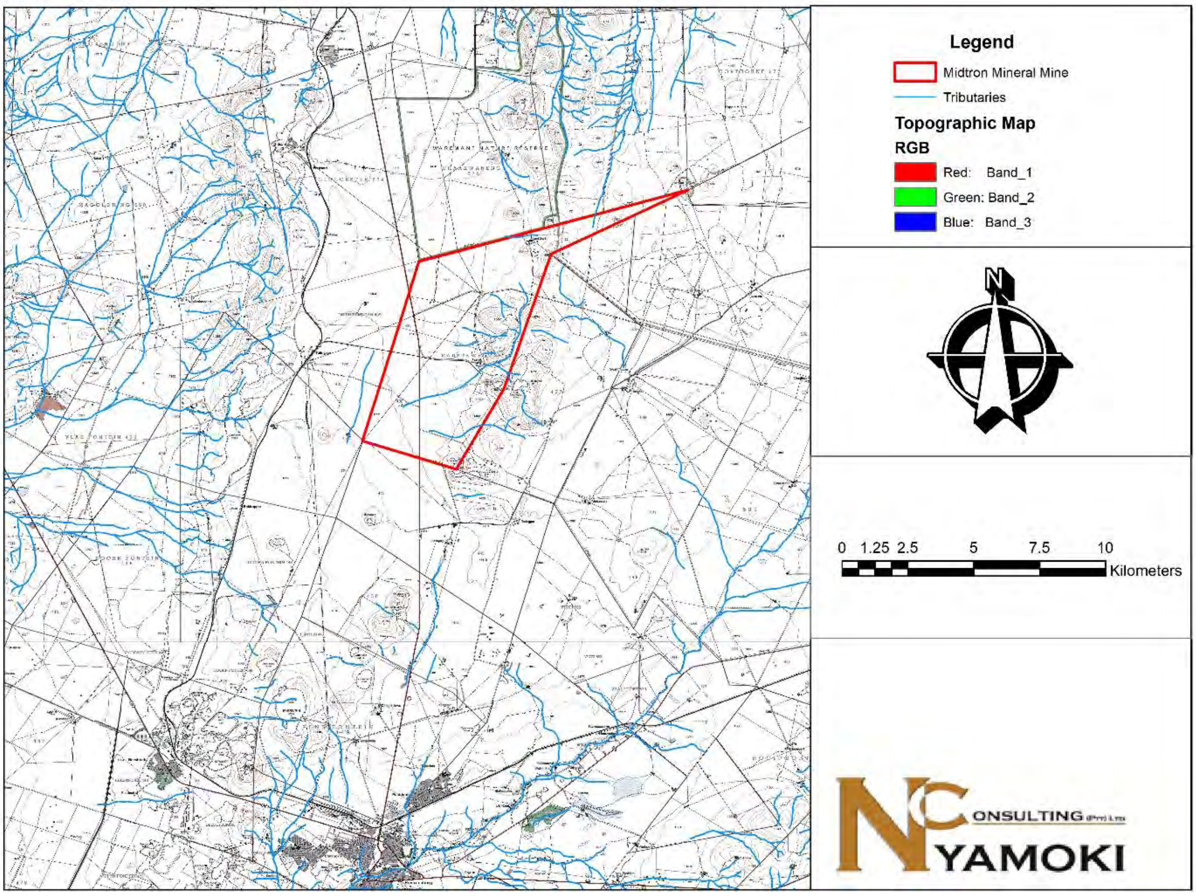

Figure 1a: Topographic figure showing location (Nyamoki).

The following infrastructure is anticipated:

- Static jaw crushing, cone crushing and screening plant Magnetic separating plant
- Second stage cone crushing plant
- Weighbridges (x3)
- Diesel tanks (3* 23000L)
- Water dams (2* 250m3)
- Wash bay
- Workshop (20m*100m)
- Gensets (2*300kVA, 2*500kVA)
- Feeder bay and substation (3MVA)
- Offices
- Storerooms Laboratory
- Ablution facilities
- Security control point

The Project includes one locality Alternatives (see Figures 1 and 2):

Alternative 1: A polygon area outlined in red with the town of Postmasburg 20 km. to the south, the train station of Palingpan is to the west, Manganore to the south, the R325 Road cuts through the property in a north south direction, and the R385 Road is in the west. The approximate size of the site is 2 766,63 hectares.

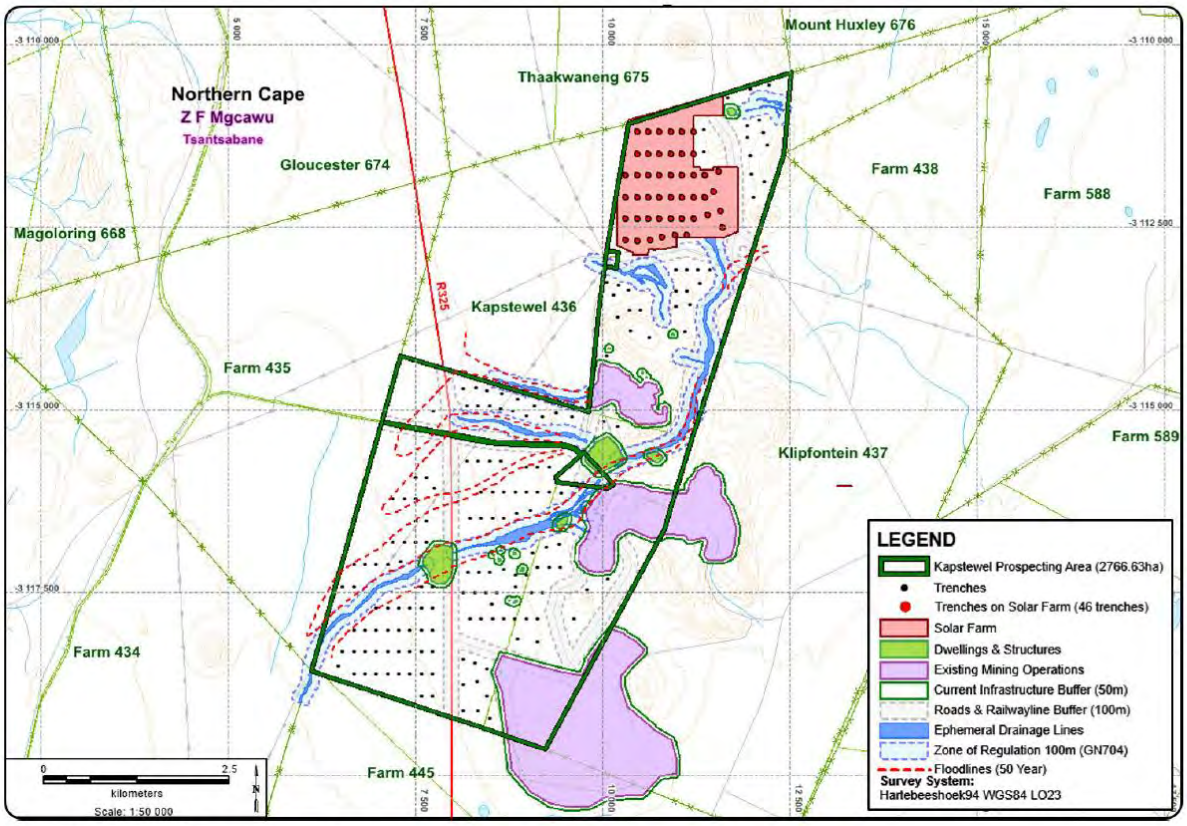

Figure 5: Prospecting areas in relation to dwellings, structure, 100 m buffer and floodline

Figure 2: Mining Right Application areas in relation to infrastructure (Nyamoki).

<u>Rezoning/ and or subdivision of land:</u> N/a.
<u>Name of Developer and Consultant:</u> Midtron Minerals (Pty) Ltd. and Nyamoki Consulting (Pty) Ltd.
<u>Terms of reference:</u> Dr H. Fourie is a palaeontologist commissioned to do a palaeontological impact assessment to ascertain if any palaeontological sensitive material is present in the development area. This study will advise on the impact on fossil heritage mitigation or conservation necessary, if any.
<u>*Short Curriculum vitae (1ai,ii):*</u> Dr Fourie obtained a Ph.D from the Bernard Price Institute for Palaeontological Research (now ESI), University of the Witwatersrand. Her undergraduate degree is in Geology and Zoology. She specialises in vertebrate morphology and function concentrating on the Therapsid Therocephalia. For the past 15 years she carried out field work in the Eastern Cape, Limpopo, Mpumalanga, Gauteng, Free State and Kwazulu Natal Provinces. Dr Fourie has been employed at the Ditsong: National Museum of Natural History in Pretoria (formerly Transvaal Museum) for 26 years.
<u>Legislative requirements:</u> South African Heritage Resources Agency (SAHRA) for issue of permits if necessary. National Heritage Resources Act (Act No. 25 of 1999). An electronic copy of this report must be supplied to SAHRA.

2. Description of property or affected environment

2.1. Location and depth:

The Proposed Kapstewel Manganese and Iron Ore Mining Right Application Project in the Tsantsabane Local Municipality, ZF Mgcawu District Municipality, Northern Cape Province will be situated on Farm: Remaining Extent, Remaining Extent of Portion 2, Remaining Extent of Portion 3, and Portion 5 Kapstewel 436.

Depth is determined by the related infrastructure, such as the foundations to be developed and the thickness of the formation. Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to determine due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot. Geological maps do not provide depth or superficial cover, it only provides mappable surface outcrops.

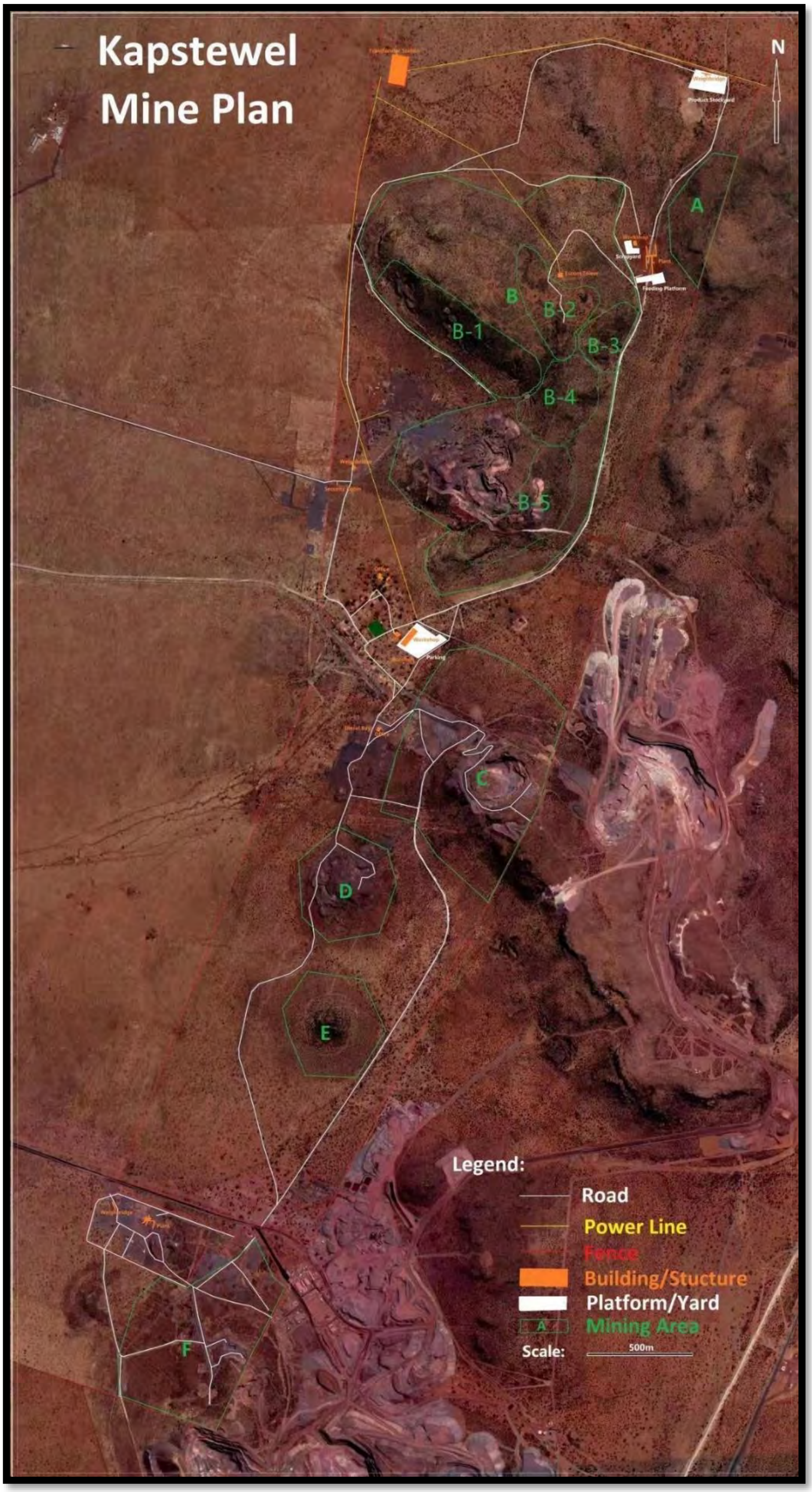

Figure 3: Google Earth location map (Nyamoki).

3. Description of the Geological Setting

3.1. Description of the rock units:

Over areas totalling fully 40% of Southern Africa the ‘hard rocks’, from the oldest to the Quaternary, are concealed by normally unconformable deposits – principally sand, gravel, sandstone, and limestone. Inland deposits are much more extensive than marine deposits and are terrestrial and usually unfossiliferous. Some of these deposits date back well into the Tertiary, whereas others are still accumulating. Owing to the all-to-often lack of fossils and of rocks suitable for radiometric or palaeomagnetic dating, no clear-cut dividing line between the Tertiary and Quaternary successions could be established (Kent 1980). The alluvium sands were deposited by a river system and reworked by wind action (Snyman 1996). A thick cover of Kalahari reddish sand blankets most outcrops and is dominated by the typical Kalahari thornveld (Norman and Whitfield 2006).

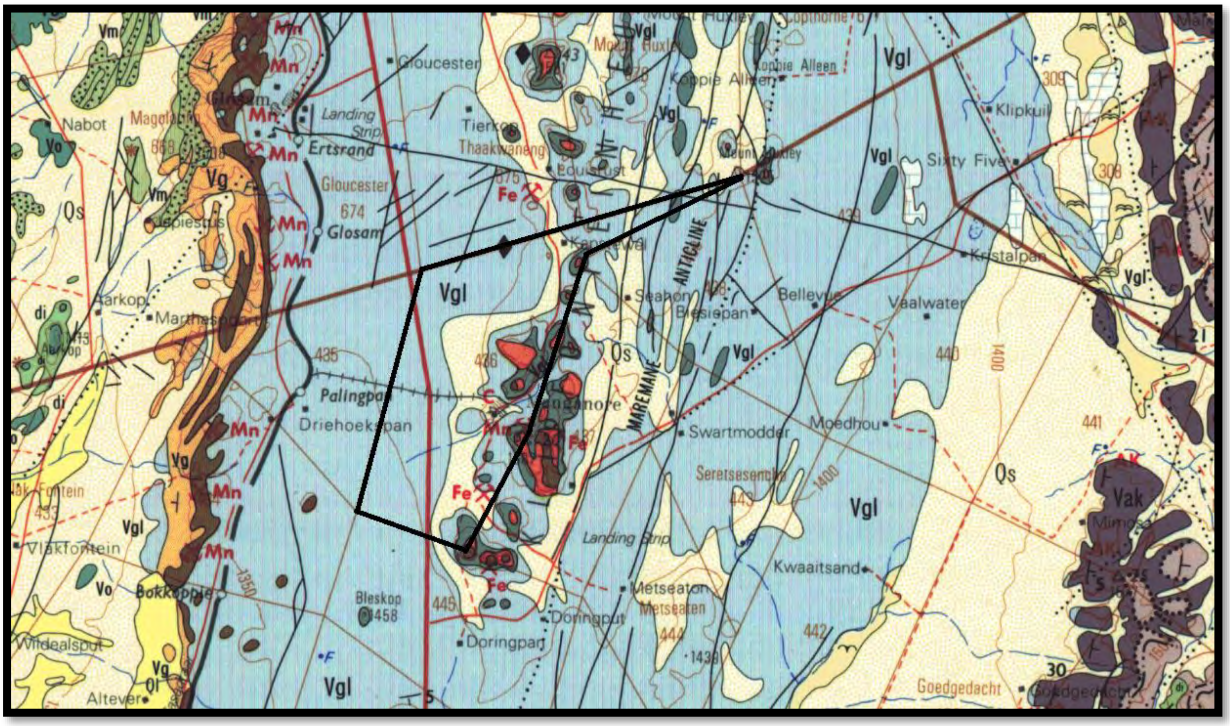

Figure 4: Geology of the area (Moen 1977) (1h).

__Legend to Figure and short explanation.__

Qs – Red to flesh-coloured wind-blown sand; sand dune (light beige). Quaternary.
Vgl – Chert and chert breccia (blue), dolomitic limestone (puckered limestone) with subordinate coarsely crystalline dolomite, chert and lenses of limestone (light blue). Lime Acres, Ghaap Group, Campbell Subgroup, Transvaal Supergroup. Banded ironstone (red). Vaalian.
---f--- – (black) Fault.
……. – Undifferentiated linear structure.

♦ - Diamond pipe.
↔ - Maremane Anticline.
□ – Approximate position of Mining Right Application right (in black on figure).

<u>Mining Activities in study area on Figure above</u>

Fe – Iron ore   Mn - Manganese
The mining past and present has an influence on this development.

The Griqualand West Basin consists mainly of sediments of chemical origin together with lavas and subordinate clastic sediments. The basal unit, the Vryburg Formation lies unconformably on the granite and rocks of the Ventersdorp Supergroup. It is followed by the Campbell Group which consists of the Schmidtsdrif Formation and the upper Ghaap Plateau Formation (Visser 1989). There are also two formations in the Griquatown Group, namely, the Asbestos Hills and Koegas Formations. The Gamagara Formation follows and is located on the Maremane Anticline, it is overlain by the Makganyene Formation. The Cox Group consists of the lower Ongeluk Formation and the upper Voëlwater Formation. It attains a maximum thickness of 4500 m (Kent 1980, Snyman 1996). Almond and Pether (2009) referred to this as the Griqualand Basin within the Transvaal Supergroup.

Groenewald and Groenewald (2014) placed the Ghaap Plateau as a Group in the Transvaal Supergroup with the Campbell Group as a Subgroup. The Ghaap Plateau was deposited as a thick layer of carbonaceous sediments in extensive shallow basins. It consists of carbonates, siliclastics and iron formations. The age is Late Archaean, Early Proterozoic. The Schmidtsdrif Formation forms the lower part of the Campbell Group and is divided into three members. The members are each approximately 10 m thick (Sheet info 2722). Now known as the Boomplaas and Clearwater Formations (Johnson 2006). Stromatolites are present in the upper member. Stromatolites occur in the dolomite of the Ghaap Plateau Formation. The Ghaap Plateau Formation is followed by the Asbestos Hills Formation (Sheet 2722 info). The Ghaap Plateau dolomites correlate with the Chuniespoort Group dolomites (McCarthy and Rubidge 2005). Johnson (2006) refers to the area round Kuruman and Postmasburg as the Griqualand basin as part of the Transvaal Supergroup. Johnson (2006) divided the Ghaap Group into the Schmidtsdrift, Campbell Rand, Asbestos Hills and Koegas Subgroups. The age is placed as 2642 ± 3 Ma.to 2222 ± 13 Ma. The Campbell Rand Subgroup has two formations, the Nauga and Klein Naute with the Kliphuis, Kuruman and Daniëlskuil Formations part of the Asbestos Hills Subgroup. The Lime Acres Member, Campbell Rand Subgroup lies on top of the Kogelbeen Formation containing important limestone resources (Eriksson *et al.* 2006)

Asbestos is present as blue asbestos in the Asbestos Hill Formation, together with the Gamagara Formation it is mined at Sishen (Snyman 1996). This formation forms the hills in the south and the Kuruman Hill in the north (Visser 1989). Limestone occurs as lenses in the upper portion of the Ghaap Plateau. Manganised silica breccia (the manganese marker) is at the top of the Ghaap Plateau Formation (Sheet 2722 info). Manganese is also found in the Otazel and Gamagara Formations, it is the world's largest manganese resource.

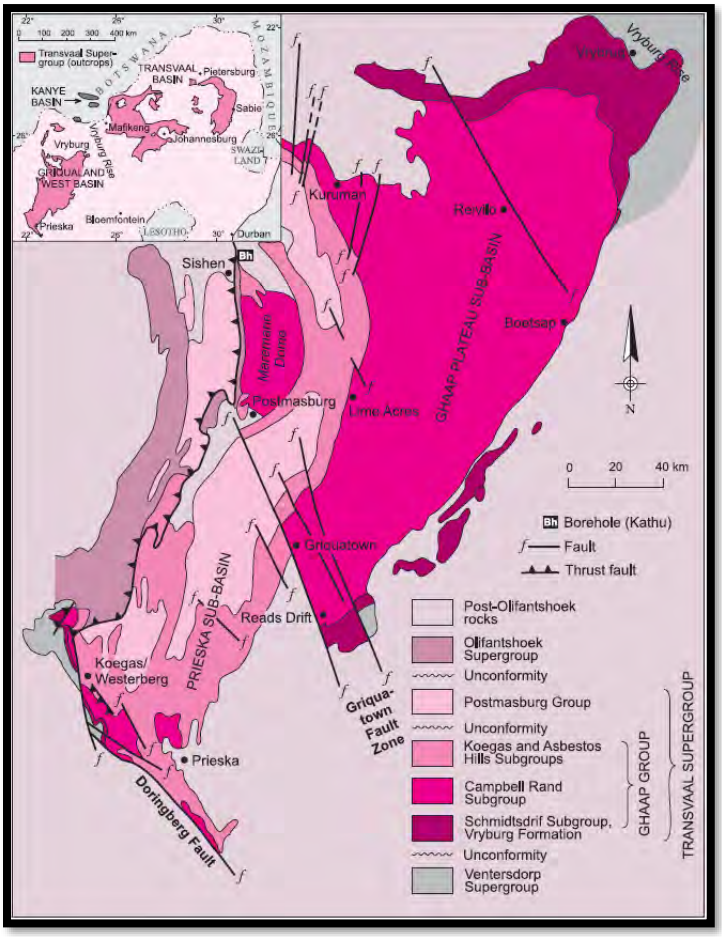

Figure 5: Figure to show general geology of the Transvaal Supergroup in the Postmasburg area (Johnson 2006).

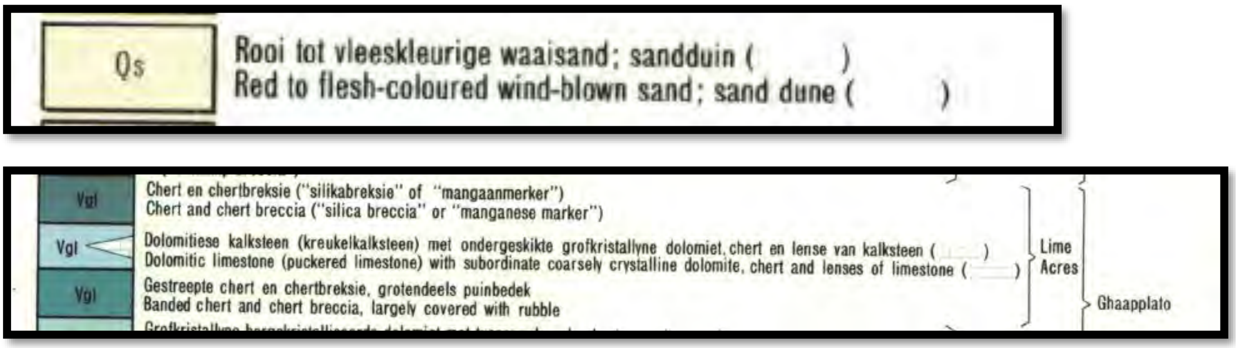

Figure 6: Lithology (Moen 1977).

4. Background to Palaeontology of the area

Summary: When rock units of moderate to very high palaeontological sensitivity are present within the development footprint, a desktop and or field scoping (survey) study by a professional palaeontologist is usually warranted. The main purpose of a field scoping (survey) study would be to identify any areas within the development footprint where specialist palaeontological mitigation during the construction phase may be required (SG 2.2 SAHRA AMPHOB, 2012).

'Algal microfossils' have been reported from shales and are probably of diagenetic origin (Eriksson 1999), these may be present here. Stromatolites are significant indicators of palaeoenvironments and provide evidence of algal growth between 2640 and 2432 million years ago. Significant fossil remains of Cenozoic aged terrestrial organisms have been recorded from the sedimentary rocks of the Kalahari Group. These fossils are rarely found and are allocated a HIGH palaeontological sensitivity as they are important indicators of palaeo-environmental conditions (Groenewald and Groenewald 2014).

The Quaternary Formation to Holocene may contain fossils. A very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size (Groenewald and Groenewald 2014).

Figure 7: Example of a Stromatolite (Photograph: E. Butler).

The more recent Phanerozoic deposits (Cenozoic) are of importance in the study of life during the last 300 million years. Large areas in the western part of the Northern Cape Province are underlain by Cenozoic (Tertiary, Quaternary) deposits of the Kalahari Group.

Table 1: Taken from Palaeotechnical Report (Almond and Pether 2009) (1cA, 1cB).

15. FLUVIAL, LACUSTRINE & TERRESTRIAL DEPOSITS (most too small to be indicated on small scale geological maps) **including *eg* Kwaggaskop Fm** **(Q)**	Fluvial, pan, lake and terrestrial sediments, including diatomite (diatom deposits), pedocretes, tufa, cave deposits Late Cretaceous to Holocene *c.* 65 Ma → 0 Ma	Bones and teeth of mammals (*eg* proboscideans, rhinos, bovids, horses, micromammals), reptiles, fish, freshwater molluscs, petrified wood, trace fossils (*eg* termitaria), rhizoliths, diatom floras	• Scattered records, many poorly studied (*eg* from ancient drainage systems) • Include equivalents of famous Arrisdrift Miocene fauna from S. Namibia • Threatened by alluvial diamond mining (*eg* Gariep, Vaal river gravels) • Orange River Man (100-50 Ka, *H. heidelbergensis*)

2. TRANSVAAL SUPERGROUP **2c. Postmasburg Group (Vmk, Vo)** **2b. Ghaap Group (Vsc, Vvs, Vca, Va, Vk)** **2a. Vryburg Fm (Vv)**	Dominantly shallow marine carbonate metasediments (low grade), deeper water BIF (ironstones, chert), subordinate siliclastic sediments, volcanics, tillites L. Archaean / E. Proterozoic (Vaalian) *c.* 2.6-2.2 Ga	Shallow marine and lacustrine stromatolites in carbonates organic-walled microfossils (*eg* cyanobacteria) in siliciclastics / cherts / carbonates Controversial records of 2.2 Ga "trace fossils"	• Classic Early Proterozoic stromatolitic successions (Ghaap & Postmasburg Groups of Griqualand West Basin) • Early continental shelf environments (margins of Kaapvaal Craton)

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity is generally LOW to VERY HIGH.

Table 2: Criteria used (Fossil Heritage Layer Browser/SAHRA):

Rock Unit	Significance/vulnerability	Recommended Action
Quaternary	High	Desktop study is required, field assessment likely
Transvaal Supergroup	Moderate	Desktop study required

Databases and collections: Ditsong: National Museum of Natural History.
Impact: HIGH for the quaternary, MODERATE for the Transvaal Supergroup. There are significant fossil resources that may be impacted by the development and if destroyed are no longer available for scientific research or other public good. The screening tool indicates the area as Very High, but the Palaeotech Report indicates it as MODERATE.

The Project includes one locality Option (Figure 1) (1f,j) with the above palaeontological sensitivitivities. Alternative 1: A polygon area outlined in red with the town of Postmasburg 20 km. to the south, the train station of Palingpan is to the west, Manganore to the south, the R325 Road cuts through the property in a north south direction, and the R385 Road is in the west. The approximate size of the site is 2 766,63 hectares.

All the land involved in the development was assessed (ni,nii) and none of the property is unsuitable for development (see Recommendation B).

5. Description of the Methodology (1e)

The palaeontological impact assessment: desktop study was undertaken in June 2022. A Phase 1: Field Study will entail a walkthrough of the affected portion with photographs (in 20 mega pixels) taken of the site with a digital camera (Canon PowerShot SX620HS). A Global Positioning System (GPS (Garmin eTrex 10) can be used to record the outcrops. A literature survey is included and the study relied on literature, geological maps, Google Maps and Google Earth images.

SAHRA document 7/6/9/2/1 (SAHRA 2012) requires track records/logs from archaeologists not palaeontologists as palaeontologists concentrate on outcrops which may be recorded with a GPS. Isolated occurrences of rocks usually do not constitute an outcrop. Fossils can occur in dongas, as nodules, in fresh rock exposures, and in riverbeds. Finding fossils require the experience and technical knowledge of the professional palaeontologist, but that does not mean that an amateur can't find fossils. The geology of the region is used to predict what type of fossil and zone will be found in any particular region. Archaeozoologists concentrate on more recent fossils in the quaternary and tertiary deposits.

Assumptions and Limitations 1(i):-

The accuracy and reliability of the report may be limited by the following constraints:

1. Most development areas have never been surveyed by a palaeontologist or geophysicist.
2. Variable accuracy of geological maps and associated information.
3. Poor locality information on sheet explanations for geological maps.
4. Lack of published data.
5. Lack of rocky outcrops.
6. Inaccessibility of site.
7. Insufficient data from developer and exact lay-out plan for all structures.

A Phase 1 Palaeontological Impact Assessment: Field Study will include:

1. Recommendations for the future of the site.
2. Background information on the project.
3. Description of the property of affected environment with details of the study area.
4. Description of the geological setting and field observations.
5. Background to palaeontology of the area.
6. Field Rating.
7. Stating of Significance (Heritage Value).

A Phase 2 Palaeontological Impact Assessment: Mitigation will include:

1. Recommendations for the future of the site.
2. Description of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.

5. A detailed site plan.
6. Possible declaration as a heritage site or Site Management Plan.

The National Heritage Resources Act No. 25 of 1999 further prescribes:

Act No. 25 of 1999. National Heritage Resources Act, 1999.
National Estate: 3 (2) (f) archaeological and palaeontological sites,
(i)(1) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens,
Heritage assessment criteria and grading: (a) Grade 1: Heritage resources with qualities so exceptional that they are of special national significance;
(b) Grade 11: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and (c) Grade 111: Other heritage resources worthy of conservation.
SAHRA is responsible for the identification and management of Grade 1 heritage resources.
Provincial Heritage Resources Authority (PHRA) identifies and manages Grade 11 heritage resources.
Local authorities identify and manage Grade 111 heritage resources.

No person may damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a provincially protected place or object without a permit issued by a heritage resources authority or local authority responsible for the provincial protection.
Archaeology, palaeontology and meteorites: Section 35.
(2) Subject to the provisions of subsection (8) (a), all archaeological objects, palaeontological material and meteorites are the property of the State.
(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or excavation, recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before a Phase 2 may be implemented.

The Mitigation is done in order to rescue representative fossil material from the study area to allow and record the nature of each locality and establish its age before it is destroyed and to make samples accessible for future research. It also interprets the evidence recovered to allow for education of the public and promotion of palaeontological heritage.

Should further fossil material be discovered during the course of the development (*e. g.* during bedrock excavations), this must be safeguarded, where feasible *in situ,* and reported to a palaeontologist or to the Heritage Resources authority. In situations where the area is considered palaeontologically sensitive (*e. g.* Karoo Supergroup Formations, ancient marine deposits in the interior or along the coast) the palaeontologist might need to monitor all newly excavated bedrock. The developer needs to give the palaeontologist sufficient time to assess and document the finds and, if necessary, to rescue a representative sample.

When a Phase 2 palaeontological impact study is recommended, permission for the development to proceed can be given only once the heritage resources authority has received and approved a Phase 2 report and is satisfied that (a) the palaeontological resources under threat have been adequately recorded and sampled, and (b) adequate development on fossil heritage, including, where necessary, *in situ* conservation of heritage of high significance. Careful planning, including early consultation with a palaeontologist and heritage management authorities, can minimise the impact of palaeontological surveys on development projects by selecting options that cause the least amount of inconvenience and delay.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

6. Description of significant fossil occurrences

Details of the location and distribution of all significant fossil sites or key fossiliferous rock units are often difficult to determine due to thick topsoil, subsoil, overburden and alluvium. Depth of the overburden may vary a lot.

'Algal microfossils' have been reported from shales and are probably of diagenetic origin (Eriksson 1999), these are present here. Stromatolites are significant indicators of palaeoenvironments and provide evidence of algal growth between 2640 and 2432 million years ago. Significant fossil remains of Cenozoic aged terrestrial organisms have been recorded from the sedimentary rocks of the Kalahari Group. These fossils are rarely found and are allocated a HIGH palaeontological sensitivity as they are important indicators of palaeo-environmental conditions (Groenewald and Groenewald 2014).

Figure 8: Thin section of a stromatolite (De Zanche and Mietto 1977).

The Quaternary Formation may contain fossils. A very wide range of possible fossil remains, though these are often sparse, such as: mammalian bones and teeth, tortoise remains, ostrich eggshells, non-marine mollusc shells, ostracods, diatoms, and other micro fossil groups, trace fossils (e.g. calcretised termitaria, rhizoliths, burrows, vertebrate tracks), freshwater stromatolites, plant material such as peats, foliage, wood, pollens, within calc tufa. Stromatolite structures range from a centimetre to several tens of metres in size (Groenewald and Groenewald 2014).

The threats are:

- Earth moving equipment/machinery (front end loaders, excavators, graders, dozers) during construction and operational.
- The sealing-in or destruction of fossils by development, vehicle traffic, clearing, mining right, mining, and human disturbance. See Description of the Geological Setting (F) above.

7. Recommendation (1o,p,q)

a. There is no objection (see Recommendation B) to the development, it may be necessary to request a Phase 1: Palaeontological Impact Assessment: Field Study if fossils are found during excavating, clearing, trenching or drilling. The palaeontological sensitivity is HIGH and MODERATE and fossils (stromatolites) may be present.
b. This project may benefit the economy, the growth of the community and social development in general.
c. Preferred choice: Only one locality Alternative is presented and possible.
d. Care must be taken during the grading of roads, digging of foundations and removing topsoil, subsoil and overburden (see Executive Summary) or blasting of bedrock. The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting SAHRA must be notified. All drilling activities must be stopped, a 30 m no-go barrier constructed and a palaeontologist should be called in to determine proper mitigation measures.
e. No consultation with parties was necessary (1o,p,q).
f. This report must be submitted to SAHRA together with the HIA.

Sampling and collecting:

Wherefore, a permit is needed from the South African Heritage Resources Agency (SAHRA / PHRA).

a. Objections: Cautious. See heritage value and recommendation.
b. Conditions of development: See Recommendation.
c. Areas that may need a permit: Yes.
d. Permits for mitigation: Needed from SAHRA/PHRA if fossils are found.

8. Conclusions

a. All the land involved in the development was assessed and none of the property is unsuitable for development (see Recommendation B).
b. All information needed for the Palaeontological Impact Assessment Study was provided by the Consultant. All technical information was provided by Nyamoki Consulting.
c. Areas that would involve mitigation and may need a permit from the South African Heritage Resources Agency are discussed.
d. The following should be conserved: if any palaeontological material is exposed during digging, excavating, or drilling, SAHRA must be notified. All development activities must be stopped, a 30 m no-go barrier constructed, and a palaeontologist should be called in to determine proper mitigation measures, for example, shallow caves.
e. Condition in which development may proceed: It is further suggested that a Section 37(2) agreement of the Occupational, Health and Safety Act 85 of 1993 is signed with the relevant contractors to protect the environment (fossils) and adjacent areas as well as for safety and security reasons.

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10. Declaration (Disclaimer) (1b)

I, Heidi Fourie, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed development project for which I was appointed to do a palaeontological assessment. There are no circumstances that compromise the objectivity of me performing such work.

I accept no liability, and the client, by receiving this document, indemnifies me against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with services rendered, directly or indirectly by the use of the information contained in this document.

It may be possible that the Desktop Study may have missed palaeontological resources in the project area as the presence of outcrops are not known or visible due to vegetation while others may lie below the overburden of earth and may only be found once development commences.

This report may not be altered in any way and any parts drawn from this report must make reference to this report.

<u>POPI Act 2013 Statement</u>

It provides that everyone has the right to privacy and includes a right to protection against the unlawful collection, retention dissemination and use of personal information contained in this document and pertains to the phone and contact details, signature and contents.

As per the Declaration Section none of the information may be shared without the permission of the author.

Heidi Fourie
2022/06/07

Appendix 1:

Table 3: Listing points in Appendix 6 of the Act and position in Report (in bold).

Section in Report	Point in Act	Requirement
B	1(c)	Scope and purpose of report
B	1(d)	Duration, date and season
B	1(g)	Areas to be avoided
D	1(ai)	Specialist who prepared report
D	1(aii)	Expertise of the specialist
F Figure 3	1(h)	Map
F	1(ni)	Authorisation
F	1(nii)	Avoidance, management, mitigation and closure plan
G Table 1	1(cA)	Quality and age of base data
G Table 2	1(cB)	Existing and cumulative impacts
G	1(f)	Details or activities of assessment
G	1(j)	Description of findings
H	1(e)	Description of methodology
H	1(i)	Assumptions
J	1(o)	Consultation
J	1(p)	Copies of comments during consultation
J	1(q)	Information requested by authority
Declaration	1(b)	Independent declaration
Appendix 2	1(k)	Mitigation included in EMPr
Appendix 2	1(l)	Conditions included in EMPr
Appendix 2	1(m)	Monitoring included in EMPr
D	2	Protocol or minimum standard

Appendix 2: Management Plan and Protocol for Chance Finds (1k,l,m).

This section covers the recommended protocol for a Phase 2 Mitigation process as well as for reports where the Palaeontological Sensitivity is LOW; this process guides the palaeontologist / palaeobotanist on site and should not be attempted by the layman / developer. As part of the Environmental Authorisation conditions, an Environmental Control Officer (ECO) will be appointed to oversee the construction activities in line with the legally binding Environmental Management Programme (EMPr) so that when a fossil is unearthed they can notify the relevant department and specialist to further investigate. Therefore, the EMPr must be updated to include the involvement of a palaeontologist during the digging and excavation (ground breaking) phase of the development.

The EMPr already covers the conservation of heritage and palaeontological material that may be exposed during construction activities.

- When a fossil is found the area must be fenced-off with a 30 m barrier and the construction workers must be informed that this is a no-go area.
- If fossils have already been found they must be kept in a safe place for further inspection.
- The ECO should familiarise him- or herself with the formations and its fossils. A site visit after blasting, drilling, clearing or excavating is recommended and the keeping of a photographic record when feasible.
- Most museums and universities have good examples of fossils.
- The developer must survey the areas affected by the development and indicate on plan where the construction / development / mining will take place. Trenches have to be dug to ascertain how deep the sediments are above the bedrock (can be a few hundred metres). This will give an indication of the depth of the topsoil, subsoil, and overburden, if need be trenches should be dug deeper to expose the interburden.

Mitigation will involve recording, rescue and judicious sampling of the fossil material present in the layers sandwiched between the geological / coal layers. It must include information on number of taxa, fossil abundance, preservational style, and taphonomy. This can only be done during mining or excavations. In order for this to happen, in case of coal mining operations, the process will have to be closely scrutinised by a professional palaeontologist / palaeobotanist to ensure that only the coal layers are mined and the interlayers (siltstone and mudstone) are surveyed for fossils or representative sampling of fossils are taking place.

The palaeontological impact assessment process presents an opportunity for identification, access and possibly salvage of fossils and add to the few good plant localities. Mitigation can provide valuable onsite research that can benefit both the community and the palaeontological fraternity.

A Phase 2 study is very often the last opportunity we will ever have to record the fossil heritage within the development area. Fossils excavated will be stored at a National Repository.

A Phase 2 Palaeontological Impact Assessment: Mitigation will include (SAHRA) -

1. Recommendations for the future of the site.

2. Description and purpose of work done (including number of people and their responsibilities).
3. A written assessment of the work done, fossils excavated, not removed or collected and observed.
4. Conclusion reached regarding the fossil material.
5. A detailed site plan and map.
6. Possible declaration as a heritage site or Site Management Plan.
7. Stakeholders.
8. Detailed report including the Desktop and Phase 1 study information.
9. Annual interim or progress Phase 2 permit reports as well as the final report.
10. Methodology used.

Three types of permits are available; Mitigation, Destruction and Interpretation. The specialist will apply for the permit at the beginning of the process (SAHRA 2012).

The Palaeontological Society of South Africa (PSSA) does not have guidelines on excavating or collecting, but the following is suggested:

1. The developer needs to clearly stake or peg-out (survey) the areas affected by the mining/ construction/ development operations and dig representative trenches and if possible supply geological borehole data.
2. When clearing topsoil, subsoil or overburden and hard rock (outcrop) is found, the contractor needs to stop all work.
3. A Palaeobotanist / palaeontologist (contact SAHRIS for list) must then inspect the affected areas and trenches for fossiliferous outcrops / layers. The contractor / developer may be asked to move structures and put the development on hold.
4. If the palaeontologist / palaeobotanist is satisfied that no fossils will be destroyed or have removed the fossils, development and removing of the topsoil can continue.
5. After this process the same palaeontologist / palaeobotanist will have to inspect and offer advice through the Phase 2 Mitigation Process. Bedrock excavations for footings may expose, damage or destroy previously buried fossil material and must be inspected.
6. When permission for the development is granted, the next layer can be removed, if this is part of a fossiliferous layer, then with the removal of each layer of sediment, the palaeontologist / palaeobotanist must do an investigation (a minimum of once a week).
7. At this stage the palaeontologist / palaeobotanist in consultation with the developer / mining company must ensure that a further working protocol and schedule is in place. Onsite training should take place, followed by an annual visit by the palaeontologist / palaeobotanist.

Fossil excavation, if necessary, during Phase 2:

1. Photography of fossil / fossil layer and surrounding strata.
2. Once a fossil has been identified as such, the task of extraction begins.
3. It usually entails the taking of a GPS reading and recording lithostratigraphic, biostratigraphic, date, collector and locality information.
4. Use Paraloid (B-72) as an adhesive and protective glue, parts of the fossil can be kept together (not necessarily applicable to plant fossils).

5. Slowly chipping away of matrix surrounding the fossil using a geological pick, brushes and chisels.
6. Once the full extent of the fossil / fossils is visible, it can be covered with a plaster jacket (not necessarily applicable to plant fossils).
7. Chipping away sides to loosen underside.
8. Splitting of the rock containing palaeobotanical material should reveal any fossils sandwiched between the layers.

SAHRA Documents:
Guidelines to Palaeontological Permitting Policy.
Minimum Standards: Palaeontological Component of Heritage Impact Assessment reports.
Guidelines for Field Reports.
Palaeotechnical Reports for all the Provinces.

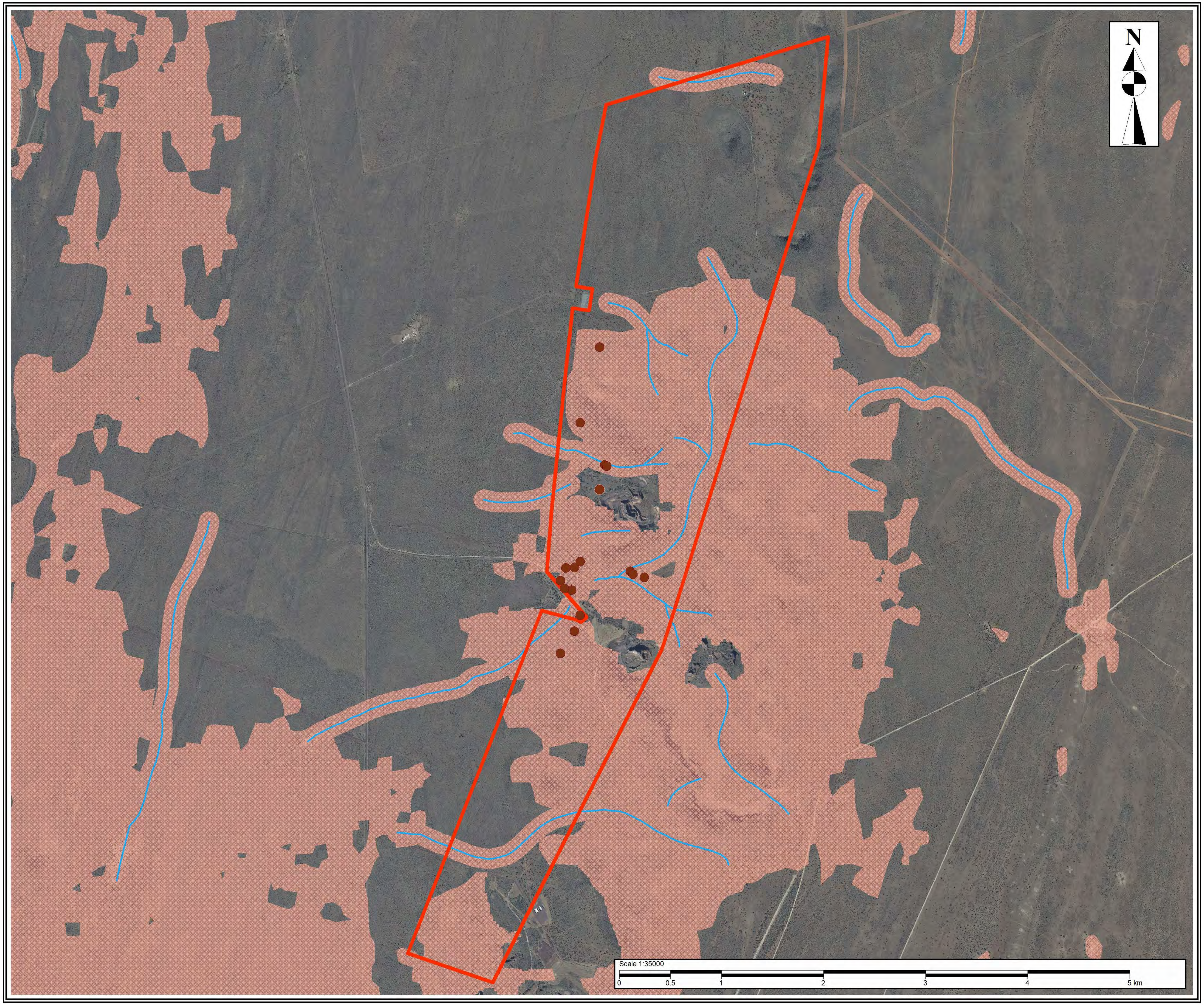
Appendix 3: Impact Statement

The development footprint is situated on a geological layer with a high palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact. The extent of the impact only extends in the region of the development activity footprint and may include transport routes. The expected duration of the impact is assessed as potentially permanent. The intensity/magnitude of the impact is moderate as it may continue in a modified way. The probability of the impact occurring will be high.

In the absence of mitigation procedures (should fossil material be present within the affected area) the damage or destruction of any palaeontological materials will be permanent. The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner. With Mitigation the impact will be low and the cumulative impact is low. Impacts on palaeontological heritage during the construction and preconstruction phase could potentially occur but are regarded as having a moderate possibility. The significance of the impact occurring will be S = (2+5+8)4
60 Medium (30-60). After Mitigation it may be low.

The development footprint is situated on a geological layer with a moderate palaeontological sensitivity. The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact. The extent of the impact only extends in the region of the development activity footprint and may include transport routes. The expected duration of the impact is assessed as potentially permanent. The intensity/magnitude of the impact is moderate as it may continue in a modified way. The probability of the impact occurring is probable.
Mitigation procedures (should fossil material be present within the affected area) may be necessary if fossils are found. The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner. The cumulative impact is low. Impacts on palaeontological heritage during the mining phase may potentially occur. The significance of the impact occurring will be S = (2+5+8)3
45 Medium (30-60). After Mitigation it may be low.

Appendix 7: Project Composite Map



Application for a Mining Right in Respect of Iron and Manganese Ore for Midtron Minerals (Pty) Ltd

Cadastral

Legend

Rivers and Drainage Lines

Red Flag Areas

Mining Right Area Boundary

Historical Findings

Locality

Map by:

NDi

GEOLOGICAL CONSULTING SERVICES

PTY (LTD)

Coordinate System: WGS 84