Application for a Prospecting Right and Associated Environmental Authorisation on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41, situated in the Thembelihle Local Municipality, Northern Cape Province.

Draft EIA/EMPr Report

DMR Reference Number: NC30/5/1/1/2/12655 PR

Report Prepared for

Samara Mining (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 the Prospecting Activities) on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41, situated in Thembelihle Local Municipality, Northern Cape Province.*
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Executive Summary

Introduction

Samara Mining (Pty) Ltd has applied for a prospecting right on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41, situated in Thembelihle Local Municipality, Northern Cape Province. The project will require a Section 102 Environmental Management Programme (EMPr) amendment application and associated applications for a Prospecting Right, Environmental Authorisation (EA) from the Department of Mineral Resources (DMR) Northern Cape Regional Office.

The proposed prospecting triggers activities that are contained on the 2014 Environmental Impact Assessment Regulations (Government Notice 983, Government Notice 984 and Government Notice 985 of 4th of December 2014) and thus a Scoping and Environmental Impact Assessment Process is required. Furthermore, as the project occurs within a regulated area of a watercourse and involves abstraction of water, it triggers activities that are listed under Section 21 (a), (c) and (i) of the National Water Act (Act No. 36 of 1998). As such an Integrated Water Use Licence (WULA) application process will also be required.

Remainder of Farm Slypsteen and portion of Portion 3 of Slypsteen located 30km south of Douglas and Remainder of Farm Lot 271 located 30km north of Hopetown in the Northern Cape Province.

Who is conducting the EIA?

Ndi Geological Consulting Services (Pty) Ltd has been appointed by Samara Mining (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to conduct the Environmental Impact Assessment for the proposed prospecting activities.

The reports and documentation for the integrated EA application process will be compiled and finalised for submission to the DMR for the EA 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?

Prior to the commencement of the development, 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 specialist investigations, reporting and further stakeholder involvement. Currently the process is 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 proposed Samara prospecting project which will be located on two farms as described include:

- *Prospecting area;*
- *Ablution facilities with a footprint of no more than 16m^2;*
- *Access roads, including a haul road running from the pit to the processing plant area;*
- *Chemical storage area of about <0.001 ha to be used as a chemical storage facility;*
- *Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from;*
- *Vehicle parking area covering approximately <0.01 hectares:*

- *Topsoil stockpile covering an area of about <0.5 hectares;*
- *A slimes dam of about <0.1 hectares and*
- *Fences of about 100m^2 will be erected.*
- *Vegetation clearance <20ha*

Motivation for the Proposed Project

In 2017, was the 150th anniversary of the discovery of diamonds in South Africa. That is probably not strictly true, as diamonds might have been discovered earlier by people who never put them to commercial use. But the discovery of the first diamond on the banks of the Orange River near Hopetown in 1867 sparked off the development of mining in the country. It also sparked off a great many other things, including the establishment of the first stock exchange in Africa in nearby Kimberley in 1881. Other by-products of the discovery of diamonds were two universities, those of the Witwatersrand and Pretoria, which had their origins in a school of mines set up in Kimberley in 1896.

Mining accounts for 11% of gross fixed capital formation, but also for almost a quarter of all foreign direct investment in South Africa. The industry accounts for only 0.3% of corporate taxpayers, but they were responsible for almost 7% of tax assessed in 2014. Although mining employs almost half a million people, this is less than 3% of the country's workforce. However, some of these relatively low figures understate the sector's contribution to the economy. For example, mining currently accounts for a third of all merchandise exports. The mining sector is the backbone of the economy. The industry spends almost as much on the purchase of goods and services from other sectors of the economy as it generates in output.

South African diamonds adorn the heads of British monarchs when they are crowned. Mining quickly extended beyond diamonds to gold, coal, platinum, and other minerals. It opened the interior of the country. Longer and longer railways had to be built. Eskom, Iscor, and Sasol were established. Factories were built to supply the needs of the mining industry and of the new towns to which it gave rise as more and more people moved off the land. A vast array of service industries had also to be set up to service the mines, the people who worked in them, and everyone else in the towns.

Alternatives Considered

The alternatives considered were as follows:

- *Location: The location of the proposed project components is constrained to the location of the existing mineral resource. As such, no property alternatives were considered for the location of the prospecting area.*
- *Type of Activity: An alternative to the type of activity would be to leave the current state of environment and not add to the disturbance to the aquatic environment.*
- *Design or Layout of the Activity: Specialist studies conducted did not identify any fatal flaws or no go areas, for this reason no alternatives were considered.*
- *The Technology to be used in the Activity: No technology alternative was investigated as the proposed technology has been trusted for many years.*
- *The Operation Aspects of the Activity: No operation alternative was investigated as the proposed method has for many years been proven to be successful.*

The assessment also included the "no-go "option. All the identified alternatives were assessed in detail in the specialist studies and impact assessment phase.

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.

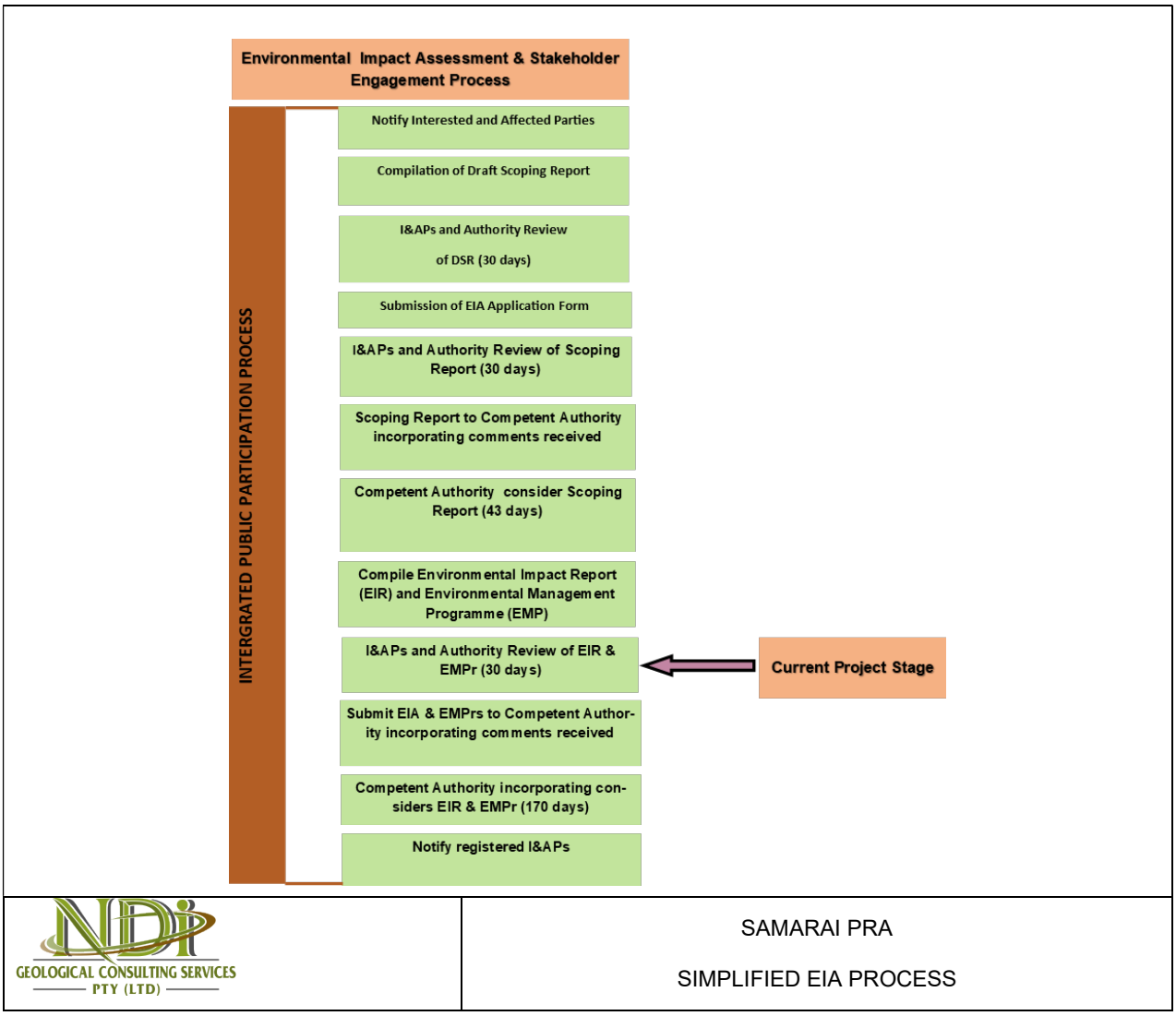

Figure ES-1: Illustration of the EIA process to be followed.

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 to discuss the scoping report and plan of study; and*
- *Compilation of the Comments and Responses Report (CRR).*

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 CRR.*

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 this report.

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

Aspect	***Description***
Socio-Economic Profile	*The proposed project is located within the Northern Cape Province, under the jurisdiction of Thembelihle Local Municipality which in turn falls under the Pixley Ka Seme District Municipality.* *The Pixley Ka Seme District Municipality area is the eastern-most district Municipality within the Northern Cape, and borders on the Western Cape, Eastern Cape and Free State provinces.* *There are 8 category B municipalities within the municipal area, viz. Emthanjeni, Kareeberg, Renosterberg, Siyancuma, Siyathemba, Thembelihle, Ubuntu and Umsobomvu. The following main towns in these category B municipalities represent an even spread throughout the district as central places and agricultural service centers: Douglas, Prieska, Carnarvon, Victoria West, Colesberg, Hopetown and De Aar. De Aar is the 'largest' of these towns. The closest major city to these towns is Bloemfontein in the Free State province.* *Thembelihle Municipality is located on the banks of the Orange River. The Municipality was formed through the amalgamation of three towns, that is, Hopetown, Strydenburg and Orania. The outcome of the dispute regarding Orania has not yet been decided upon and the uncertainty still exists as to where Orania is demarcated. N12 cuts through this municipal area and is a major boost to the economies of Hopetown and Strydenburg.* *The employment status of the available workforce/economically active group in the Pixley ka Seme municipal area indicates that the overall results regarding the employment status of the workforce / potential economically active group in the municipal area have improved from the 2001 figure of 63,1% employed and 36,9% unemployed. In 2011, the number of unemployed individuals was almost 8% below what it was in 2001. However, any unemployment rate, irrespective of how large, has serious repercussions for the ability of the residents to pay for their daily needs and for municipal services. Owing to the high numbers of unemployed persons, other main sources of income are pension/welfare payment.*
Topography	*The study area is on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41 and situated on the Upper Orange Water Management Area (WMA). The proposed mining area is located at the upper top of the quaternary catchment D33H just at the boundary with quaternary catchment D33K.* *The catchment is characterised generally by a flat topography with the lowest point along the Orange River. As of the study site, the topography increases from the Orange River East to West with the highest point at 1107 m above the sea level. The two main non-perennial tributaries of the Orange River start in this high topographic area flowing down the slope towards into the Orange River.*

Aspect	*Description*
Climate	*The climatic condition of the study area is a local steppe climate. The average maximum temperatures for the region range from 16.7°C in August to 32°C in January while the average minimum temperatures range from 0°C in June to 18°C in August. The area lies within a summer/autumn rainfall area, with predominantly dry winters. The average rainfall of the quaternary catchment is 331 mm (Middleton and Bailey, 2012). The region receives the lowest rainfall in June and July, and the highest in February and March. Evaporation data was sourced for WR2012 which provided monthly Class S-Pan for the period 1934 - 2001.*
Geology	*In the proposed study area, alluvial diamonds are found in gravel deposits associated with the ancient Orange-Vaal River drainage system which is known to be the primary secondary source of alluvial diamond deposits in the Northern Cape Province and along the west coast of Namaqualand in South Africa. Litholologies such as andesite to basaltic andesite constitute the Allanridge Formation which is a member of the Platberg Group of the Venterdorp Supergroup in the Northern Cape Province. This rock formation concludes the succession of the Ventersdorp Supergroup which is characterized by mafic lava flows. The Ventersdorp Supergroup is a Neoarchean bimodal volcanic sequence on the Kaapvaal Craton of Southern Africa.* *In the Barkly West District, the Ventersdorp Supergroup is only represented by a basal unit of quartzite overlain by a thick sequence of andesitic lavas interbedded with minor agglomerate. The former is regarded as the equivalent of the Bothaville Formation while the latter is regarded as the equivalent of the Allanridge Formation (SACS, 1980). The succession has a minimum thickness of 1000 m. Based on a U/Pb study on zircons, the Ventersdorp Supergroup has been dated at about 2,7 Ga (Armstrong et al., 1990).* *The andesitic lavas forming most of the roches moutonnees and striated pavements in the area show the development of amygdales of quartz, chalcedony, carnelian, agate, jasper, calcite, epidote, chlorite, and pyrite. The andesites are green to dark-grey fine-grained microcrystal fine rocks which are usually altered by chloritisation, epidotisation, uralisation, saussuritisation and calcitisation. Porphyritic and non-porphyritic zones are present, while pillow lavas are found in a few places. The Ventersdorp rocks exhibit displacement faulting which trend extensive jointing and variable in a NNW, NNE, and NE directions. Except for outcrops close to or in the riverbed, these rocks are covered by a variable thickness of reddish sandy loam or even tufa. Visser et al., (1976) suggested that the accumulations of andesite took place in broad basins largely under subareal conditions and interpreted them as plateau lavas. The onset of deposition of the Ventersdorp volcanics has been constrained by dates of 2714 ±16 and 2709 ±8 Ma determined for samples from the Klipriviersberg Group, near the base of the supergroup, and of porphyry from the overlying Makwassie Formation of the Platberg Group (Armstrong et al., 1991) respectively.*
Biodiversity	***Vegetation*** *According to the SANBI database the site is located within the SVk 5 Vaalbos Rocky Shrubland and the Kimberley Thornveld (SVk 4) vegetation types.* ***The SVk 5 Vaalbos Rocky Shrubland*** *is distributed across the Northern Cape and Free State Provinces. It Extends along solitary hills and scattered ridges east of the confluence of the Orange and Vaal Rivers, mainly in the Kimberley and Herbert Districts and west of*

Aspect	*Description*
	a line bounded by the western Free State towns of Luckhoff, Petrusburg, Dealesville, Bultfontein and Hertzogville. Altitude 1 000 to 1 400 m. *The SVk 5 Vaalbos Rocky Shrubland is characterized by Slopes and elevated hills and ridges within plains of mainly SVk 4 Kimberley Thornveld, also in the vicinity of NKu 3 Northern Upper Karoo. Evergreen shrub communities dominated by Tarchonanthus camphoratus, Olea europaea subsp. africana, Euclea crispa, Diospyros lycioides, Rhus burchellii and Buddleja saligna. Sheltered, cool sites include trees such as R. lancea, Celtis africana and Ziziphus mucronata. On the footslopes of the dolerite hills, where calcrete-rich soils occur, shrubs and small trees of Acacia tortilis and Z. mucronata can be dominant.* The Kimberley Thornveld (SVk 4) *is found in the North-West, Free State and Northern Cape Provinces. Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkly West Districts. Also includes pediment areas in the Herbert and Jacobsdal Districts. It thrives in altitude ranging 1 050–1 400 m.* *It is characterized by Plains often slightly irregular with well-developed tree layer with Acacia erioloba, A. tortilis, A. karroo and Boscia albitrunca and well-developed shrub layer with occasional dense stands of Tarchonanthus camphoratus and A. mellifera. Grass layer open with much uncovered soil.* ***Critical biodiversity areas*** *According to the 2016 Northern Cape Critical Biodiversity Areas, Portion of Slypsteen 41 falls within a Critical Biodiversity Area 2 and Ecological Support Area (ESA2) (Figure 3, vegetation map). ESAs are areas that are important for maintaining the ecological processes on which Critical Biodiversity Areas (CBAs) depend. This category has also been split into ESA1 and ESA2 based on land cover. ESA1s are in a largely natural state, and are important for supporting CBAs, while ESA2s are no longer intact but potentially retain significant importance from an ecological process perspective (e.g., agricultural land maintaining landscape connectivity).*
Heritage Resources	*In terms of archaeology and heritage in respect of the proposed Prospecting Right Application and associated Environmental Authorisation and Waste Management Licence for diamonds (alluvial and general) mining, 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 the prospecting of the land site. The procedure for reporting chance finds has clearly been laid out. This study concludes that the proposed prospecting may be approved by SAHRA to proceed as planned subject to recommendations herein made and heritage monitoring plan being incorporated into the construction EMPr (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.*
Palaeontology	*The study site is situated in an area of varying palaeosensitivity – from low, to medium to high. Rare fossils such as root casts, burrows, termitaria, ostrich eggshells, mollusc shells and isolated bones may be found in the surface calcretes that occur in the study area. These calcretes are considered to have a high palaeosensitivity. There is high probability of finding marine fossils and track fossils in the Dwyka rocks in the study area. The Dwyka sedimentary rocks are considered to have a moderate palaeosensitivity. The ECO should take responsibility for supervising the development and should follow the Chance Find Procedure if a significant fossil discovery is made.*

Aspect	*Description*
Wetlands	*The ecological significance of the tributaries should be viewed in the context of the overall level of functionality of the Orange River, which is thought to be medium, and in the context of the hydrological 'connectivity' of the river, which has resulted from significant historical modification and thus transformation of the ecosystem. It is important to note that the Orange River catchment plays a major role in supporting agriculture, industry, and mining. Historically, the river played an important role in the South African diamond rush, with the first diamonds in the country being discovered in alluvial deposits on the Orange. Today, several commercial diamond mines operate along the final stretch of the Orange River and around its mouth.* *It must also be remembered that wetlands are protected under the National Water Act, and that the Act does not discriminate between degraded and non-degraded wetlands in terms of their importance. It is therefore recommended that extra caution be taken when prospecting. All alien invasive vegetation along the riverbanks must be removed and eradicated from the property boundary.*
Surface Floodline	*The proposed activity which is for alluvial diamond prospecting activity takes place along the flood plains of the water course. Appropriate baseline information including rainfall data, depth-duration-frequency design rainfall estimates, evaporation data as well as both regional and local hydrological characteristics have been considered for the proposed mining project site. The HEC-RAS model was applied to provide an indication of what areas would be inundated by the respective flood flows for 1:50 and 100-year events. The results complied Government Notice 704 (Government Gazette 20118 of June 1999). As such, the buffers have been included to ensure that where the flood line is less than 100 metres away from the watercourse, then a minimum watercourse buffer distance of 100 metres is maintained with respect to location of slime dams and stockpile dump site infrastructure areas.*

Anticipated Impacts

Risks and potential impacts were categorised according to the type of activity undertaken and the relation to each environmental variable. Findings from specialist studies were incorporated into this 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 construction and operation.*
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 Species of Conservation Concern (SCC).*

Element of Environment	*Potential Impact Descriptions*
Wetland and aquatic ecology	*Possible loss, sedimentation and contamination of wetland seeps.*
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, operation, 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 in 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 professional judgement of the EAP team through appraisals on the project description, listed activities and the 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.

Key Positive Impacts After Mitigation

The main positive impacts identified for the project relate to socio-economic impacts that the proposed operation of Samara prospecting project will have. The proposed project will result in the creation of more jobs should it move to the next stage, which is mining. 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 project is expected to have a positive socio-economic benefit through employment of locals. Recruitment of labour will be guided by Samara Mining (Pty) Ltd.'s recruitment policies which are expected to promote the employment of local labour by the applicant as well as by any appointed contractors. Samara Mining (Pty) Ltd will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise.

Key Negative Impacts After Mitigation

The assessment found that there are several negative impacts that are expected because of the proposed prospecting project. The most significant impacts identified were on groundwater and surface water resources, including the loss of wetlands and their associated functions.

The wetland assessment found the wetlands on site is located within 500m of the Orange River, the river is regarded as a National Freshwater Priority Area by the SANBI. It can be classified in terms of its hydrogeomorphic characteristics, as a river (FEPA) that receives both surface and subsurface water input, the delineated river displays a gradient of wetness across its width. Hydrophyte's species and terrestrial species dominate the drier portion of the riverbanks, while obligated hydrophytes occur in the wetter areas.

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.

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 prospecting area.

Wetland Impacts: The specialist study shows that there is a wetland located on the site, therefore, there is potential for impacts on this wetland located on the property. Indiscriminate movement into and access to wetlands areas will result in:

- *Loss of habitat and wetland ecological structure because of site clearance activities and uncontrolled wetland degradation;*
- *Impact on the wetlands systems because of changes to the sociocultural service provisions*
- *Impact on the hydrological functioning of the wetland systems;*
- *Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources; and*
- *Soil compaction and levelling because of construction activities and vehicle movement leading to loss of wetland 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 because of bulk earthworks, operation of heavy machinery, and material movement.*
- *Increase in carbon emissions and ambient air pollutants (NO2 and SO2) because of movement of vehicles and operation of machinery/equipment.*

Visual Impacts due to:

- *Visual intrusion because of the movement of machinery and the erection of contractor camps;*
- *Scaring of the landscape because of the clearance of vegetation and preparation of the project areas; and*
- *Indirect visual impact due to dust generation because 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. The environment of Samara Mining project area is rural, sparsely populated and with activities limited to the prospecting activities will therefore result in an increase in ambient noise levels because of the prospecting activities. However, given that there are current mining activities taking place on site.

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 bulk sampling areas will result in loss of land capability and result in a permanent change in land use 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 on site. 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 because of the cleaning and topsoil stripping of the construction footprint;*
- *As a result of construction activities, the land use will have altered from grazing and agriculture to that of construction for mining activities;*
- *Handling and storage of building materials and different kinds of waste leading to soil sterilisation.*

Heritage Impacts: In terms of archaeology and heritage in respect of the prospecting right application, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, remains and the developer and contractors are advised to be diligent and observant during the construction of the land site. The procedure for reporting chance finds has been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the prospecting right application cannot be approved.

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 prospecting area as well as the latent

water influx will need to be managed 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	SIGNIFICANCE if mitigated
• Site Establishment and construction of infrastructure: • *Prospecting area;* • *Ablution facilities with a footprint of no more than 16m²;* • *Access roads, including a haul road running from the pit to the processing plant area;* • *Chemical storage area of about <0.001ha to be used as a chemical storage facility;* • *Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from;* • *Vehicle parking area covering approximately <0.01 hectares;* • *Topsoil stockpile covering an area of about <0.5 hectares;* • *A slimes dam of about <0.1 hectares;* • *Fences of about 100m² will be erected and* • Vegetation clearance <20ha	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 Implement and observe speed limits	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 because of construction activities, erosion, poaching and faunal species trapping	Fauna	Construction, operation and decommissioning	Medium-High (-)	Relocation of affected faunal species of conservation importance. Minimisation of project footprint areas Rehabilitation of affected areas	Medium-Low (-)
	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources	Wetlands and Aquatic Ecosystems	Construction, operation and decommissioning	Medium-High (-)	Development and implementation of a 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 50m buffer around wetlands	Medium-Low (-)
	Soil compaction and levelling because of construction activities and vehicle movement leading to loss of wetland and riparian habitat	Wetlands and 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 wetland and riparian areas and the 50m buffer around wetlands	Medium-Low (-)
	The use of vehicles and machinery 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 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	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 because of vegetation clearance 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 (-)
	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 (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Removal of local geology because of prospecting activities	Geology	Construction	Medium-High (-)	Minimisation of project footprint areas	Low (-)
	Emissions of Green House Gases because 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 (-)
Bulk sampling 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 Open and honest communication with surrounding communities	Low (-)
	Monitoring borehole on the border of the prospecting 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 (-)	Monitoring of pits for ingress	Medium-High (-)
	The rainfall water within the designated dirty water area of the prospecting 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	Surface Water	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 because of continual wetland disturbance and uncontrolled wetland degradation.	Wetlands and aquatic ecology	Operation	Medium-High (-)	Control of access to wetland areas and within the 500 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 wetlands systems because of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and wetland disturbance	Wetlands and aquatic ecology	Operation	Medium-High (-)		Low (-)
	Impact on the hydrological functioning of the wetland systems because of reduced wetland footprints and uncontrolled disturbance	Wetlands and aquatic ecology	Operation	Medium-High (-)		Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Impacts on the hydrological functioning of the wetland because of prospecting	Wetlands and aquatic ecology	Operation	Medium-High (-)		Medium-Low (-)
	Possible increase in dust generation, PM10 and PM2.5 because 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, land use and land capability	Operation	Medium-High (-)	Minimisation of project footprint areas	Low (-)
	Soil contamination because of operational activities can be because of several activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from vehicles).	Soil, land use 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 prospecting of the prospecting 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 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	Low (-)
Closure and rehabilitation of mine and infrastructure sites Removal of equipment and infrastructure • *prospecting area;* • *Ablution facilities with a footprint of no more than 16m^2;* • *Access roads, including a haul road running from the pit to the processing plant area;* • *Chemical storage area of about <0.001 ha to be used as a chemical storage facility;* • *Office site with a footprint of*	Loss of employment Reduced regional economic development. Reduced diamond 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.	Low (-)
	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	Groundwater	Decommissioning and closure	High (-)	Monitoring of groundwater levels	Medium-Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
approximately <0.01 ha for storage of stationary and for the field staff to work from; • *Vehicle parking area covering approximately <0.01 hectares:* • *Topsoil stockpile covering an area of about <0.5 hectares;* • *Vegetation clearance <20ha;* • *A slimes dam of about <0.1 hectares and* • *Fences of about 100m^2 will be erected*	permanently lowered groundwater					
	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 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	Medium-Low (-)
	Dust and Soil Erosion	Soils, Land use and Land Capability	Decommissioning and closure	Medium-High (-)	Implementation 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	Medium-High (-)	Control and management of alien invasive vegetation Monitoring of rehabilitated areas to ensure successful rehabilitation.	Low (-)
	Increase in erosion because of disturbance leading to loss of floral habitat	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 floral habitat	Biodiversity	Decommissioning and closure	Medium-High (-)		Medium-Low (-)
	Ongoing prospecting development and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	Biodiversity	Decommissioning and closure	Medium-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 (-)		Low (-)
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	Biodiversity	Decommissioning and closure	**High (-)**		Medium-Low (-)
	Ongoing prospecting 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 (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	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 prospecting 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 (-)

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.

Samara Mining (Pty) Ltd 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 Samara Mining (Pty) Ltd.

Conclusion and Recommendation

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed Samara prospecting 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 with 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 wetland habitat and ecoservices for the creation of the prospecting areas and construction of infrastructure;*
- *Reduction in catchment yields as dirty water runoff within the mine will be contained in the PCDs;*
- *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 because 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 and low significance, including:

- *Ensuring the layout of the prospecting infrastructure does not impact on the wetlands and regulated 500 m buffer without approval from the DWS;*
- *Ensuring the layout of the prospecting infrastructure does not impact on the heritage resources;*
- *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 grazing, and crop farming 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 wetlands located outside the footprints of the prospecting areas and infrastructure, the prospecting 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 to address adverse impacts immediately. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DEA should monitor activities during the construction, operational and closure phases of the proposed prospecting activities.

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 Samara prospecting project fulfils the process requirements of the NEMA and the NEM: WA. The EAP recommends that an EA be issued by the DMR and that the construction and operation of the project 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 by the DMR.

YOUR COMMENT ON THE EIA/EMPr REPORT

This Draft EIA/EMPr Report will be available for comment for a period of 30 days from 21 July 2021 to 20 August 2021. 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&APs are requested to provide comments and information on the following aspects of the proposed project:

1. Information on how I&APs 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

20 August 2021

Please submit comments to the EAP:

Ndivhudzannyi Mofokeng
Ndi Geological Consulting Services (Pty) Ltd
38 Ophelia Street
Kimberley, 8301
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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 Samara Mining (Pty) Ltd. The opinions in this Report are provided in response to a specific request from Samara Mining (Pty) Ltd 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
MSA:	Middle Stone Age
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
PHRA:	Provincial Heritage Resources Agency
PoS:	Plan of Study
PPE:	Personal Protective Equipment
PRA	Prospecting Right Application
PVC:	Polyvinyl chloride
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
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 PROSPECTING ACTIVITIES ON LOT 271 AND REMAINDER AND PORTION OF PORTION 3 OF THE FARM SLYPSTEEN 41 IN THE THEMBELIHLE 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	Samara Mining (Pty) Ltd
TEL NO	064 522 3506
FAX NO:	
POSTAL ADDRESS	P O Box 11124, Hadison Park, Kimberley, Northern Cape, 8306
PHYSICAL ADDRESS	
FILE REFERENCE NUMBER SAMRAD	NC 30/5/1/1/2/12655 PR

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 prospecting "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 considered 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 SCOPING PROCESS
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

Samara Mining (Pty) Ltd has applied to the Department of Mineral Resources, for a Prospecting Right application (with bulk sampling) to prospect for alluvial Diamonds on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41.

Farm Lot 271 is located about 30km SSE of Douglas while Remainder and Portion of Portion 3 of the Farm Slypsteen 41 is located about 32km NNW of Hopetown.

The prospecting activities will require a Section 102 Environmental Management Programme (EMPr) amendment application and associated applications for a Prospecting Right, Environmental Authorisation and Waste Management Licence from the Department of Mineral Resources (DMR) Northern Cape Regional Office. An Integrated Water Use Licence (IWUL) will also be required from the Department of Water and Sanitation (DWS).

Samara Mining (Pty) Ltd has appointed Ndi Geological Consulting Services (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) to conduct the Prospecting Right Application (PRA)/EA process for the project.

The reports and documentation for the integrated EA/WULA application process will be compiled and finalised for submission to the DMR 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 proposed prospecting triggers activities contained in the 2014 Environmental Impact Assessment Regulations (Government Notice 983, Government Notice 984 and Government Notice 985 of 4 December 2014) and thus a Scoping and Environmental Impact Assessment Process is required. Further, as the project occurs within a regulated area of a watercourse and involves abstraction of water, it triggers activities that are listed under Section 21 (a), (c) and (i) of the National Water Act (Act No. 36 of 1998). As such an Integrated Water Use Licence Application process will also be undertaken.

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 to make a sound decision on the proposed development and set conditions that must be adhered to.

2.1 Environmental Authorisation 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 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 regarding 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, 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.

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

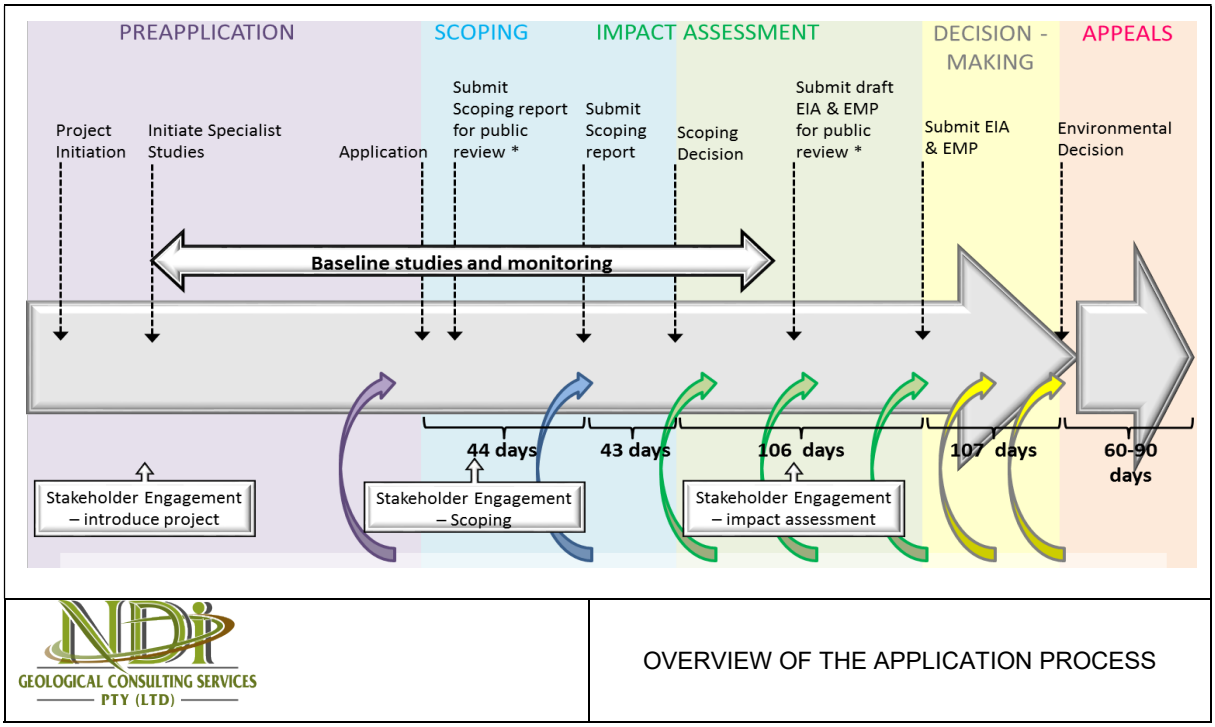

Figure 2-1: Overview the Environmental Impact Assessment Process

2.2 Report Index in Relation to the NEMA Regulations

There are minimal requirements and issues that need to be addressed in the EIA that are stipulated in Regulation 2, Appendix 3 of GNR 982 published in terms of NEMA. 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.	
Appendix 3 (b)	The location of the activity, including – The 21digit 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 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.	
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.	
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.	
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.	
Appendix 3 (g)	A motivation for the preferred development footprint within the approved site.	
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;	
	Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	A summary of the issues raised by interested and affected parties, and an indication of the way the issues were incorporated, or the reasons for not including them;	
	The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	
	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.	
	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	
	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 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;	
	If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;	
	A concluding statement indicating the preferred alternative development location within the approved site.	
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;	
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.	
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.	
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.	
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 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.	
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.	
Appendix 3 (p)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	
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.	
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.	
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.	
Appendix 3 (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	
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.	
Appendix 3(v)	Any specific information that may be required by the competent authority.	
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 Samara Mining (Pty) Ltd 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

Ndivhudzannyi Mofokeng has a BSc (Hons) Earth Sciences in Mining and Environmental Geology.

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

3.2.2 Summary of EAPs experience

Ndivhudzannyi holds BSc (Hons) Earth Sciences in Mining and Environmental Geology. She has close to 10 years' experience in the exploration and open cast work in the mining industry. She has proven leadership skills from supervising exploration rigs (Reverse Circulation and percussion drilling). She has proven working experience in field exploration and mapping, borehole logging, borehole sampling, sample preparation for laboratory analysis, handling of GPS, supervisory duties within the field, geological report and progress report writing, including Prospecting Work Programmes and Environmental Management Plans, handling the Department of Mineral Resources (DMR) documents in general. Ndivhudzannyi has as a solid technical background in GIS ArcView software (GSSA Prof Reg), Rockworks, Turbo-Cad and Turbo-Sketch, and Global Mapper 9 Application.

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 project is located on the Orange River on boundary to the Farms Lot 271 (Remainder No.39), Remainder and portion of Portion 3 of the Farm Slypsteen 41. The properties are in the Thembelihle Local Municipality, Northern Cape Province. The footprint of the area is approximately 2 240.03 ha. The description of the affected properties is provided in Table 4-1 and a map showing the affected property is provided in Table 4-1.

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

Farm Name:	Farm Lot 271 (Remainder Farm 39), Remainder of the Farm Slypsteen 41 and a Portion of Portion 3 Slypsteen 41
Application area (Ha)	2 240.03 hectares
Magisterial district:	Pixley Ka Seme District Municipality
Distance and direction from nearest town	Remainder of Farm Slypsteen 41 and portion of Portion 3 of Slypsteen located 30km SSE of Douglas and Remainder of Farm Lot 271 located 32km NNW of Hopetown in the Northern Cape Province
21-digit Surveyor General Code for each farm portion	C03300000000004100000 C03300000000004100003 C03300000000003900000

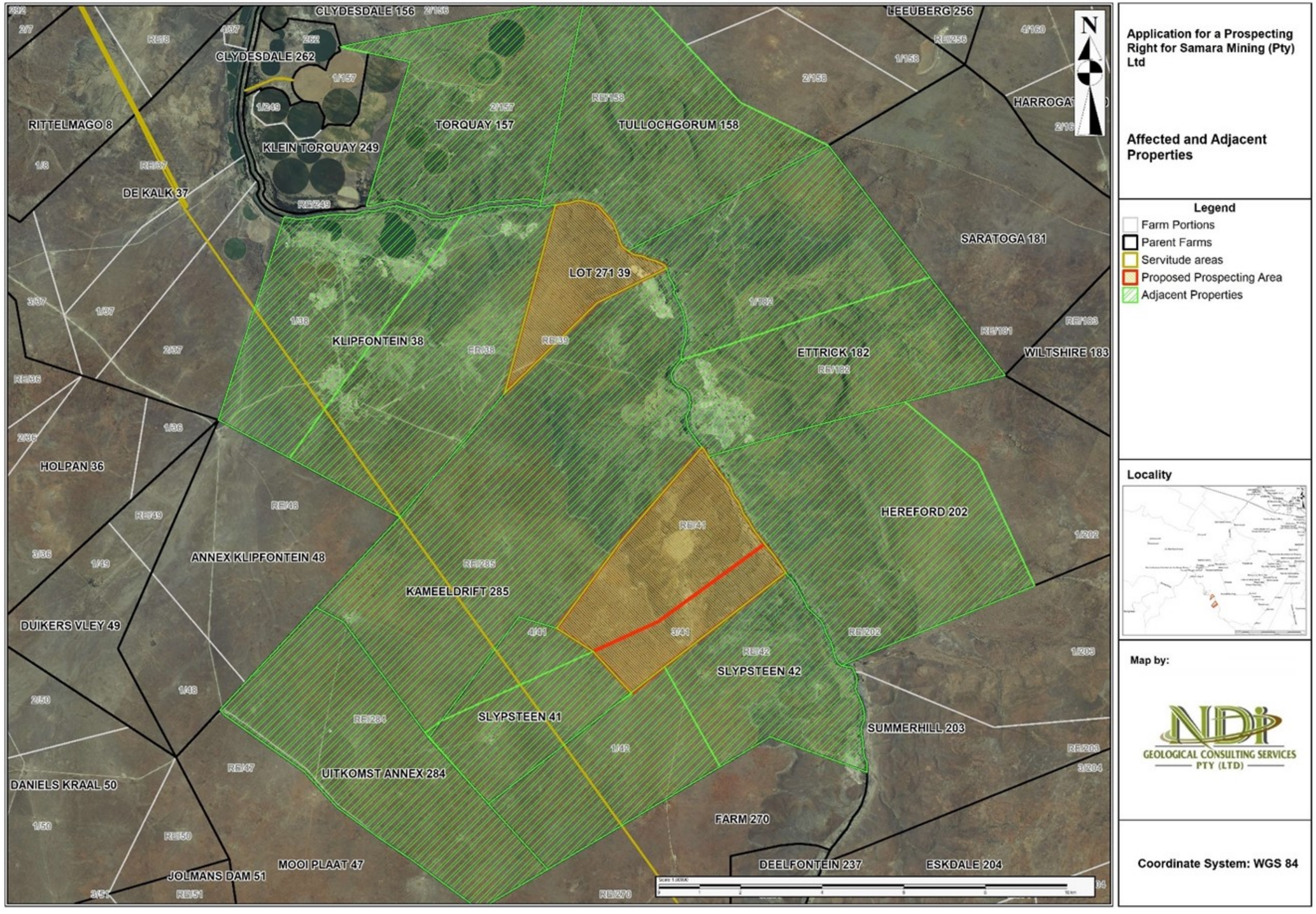

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Figure 4-1: Cadastral Map

4.2 Locality map

The Remainder of Farm Slypsteen 41 and portion of Portion 3 of Slypsteen located 32km south-southeast of Douglas and Remainder of Farm Lot 271 located 32km north-northwest of Hopetown in the Northern Cape, South Africa(Figure 4-2).

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

Figure 4-2: Locality Map

5 Project description

5.1 Basic Overview of the Prospecting Method

Prospecting method to be employed will entail both invasive and non-invasive activities. The activities will be undertaken in a phased approach, in which Phase 1 will be desktop studies and geological mapping while Phase 2 will consist of bulk sampling. No drilling has been planned for this operation. The final location of the bulk sampling pits will be determined on completion of Phase 1. The plan is to excavate four (4) pits, the size of each pit will be 50m x 5m x 4m. The four pits will be excavated using an excavator and Front-End Loader. Products will be loaded from the Pit to the articulated dumper trucks (ADT's) to the closest or nearest processing plant. Waste from the processed product will be used for rehabilitation and back filling purpose. In completion of the prospecting process, the applicant will then decide whether to continue with the application of the mining right with the DMR or not.

The required infrastructure will include:

- Ablution facilities with a footprint of no more than 16m^2;
- Topsoil stockpile of <0.5 ha will be used as a final cover over the trenches to ensure vegetation re-grow and back filling method - truck and shovel.
- Access roads, including a haul road running from the pit to the processing plant area not exceeding 0.1 ha;
- Chemical storage area of about <0.001 ha to be used as a chemical storage facility;
- A fence of about 100m^2 in size will be erected around the mining area for safety reasons. This will prevent animals from falling into the pits;
- Office site with a footprint of approximately <0.001 ha for storage of stationary and for the field staff to work from;
- Vehicle parking area covering <0.01 hectare be provided for vehicles and the other machinery used during prospecting as parking space;
- Waste rock dump (clusters, rubble, rocks) will be back filled into the trenches and followed by gravel and finer materials left from the Rotary Pan separation and sorting process.

Figure 5-1 shows the proposed layout of location of prospecting activities whereas Figure 5-2 shows the basic processing flowsheet.

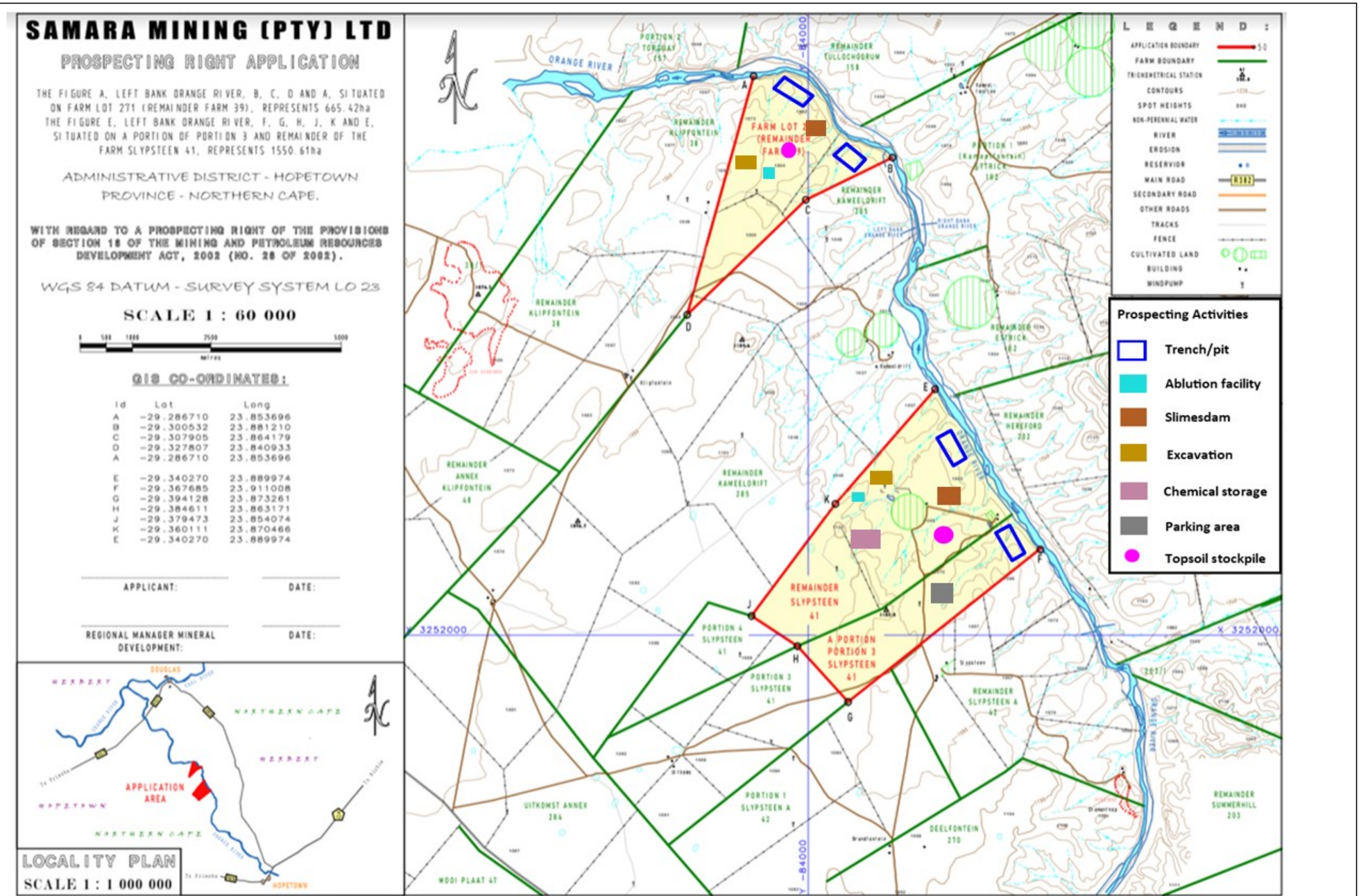

Figure 5-1: Proposed layout of location of prospecting activities

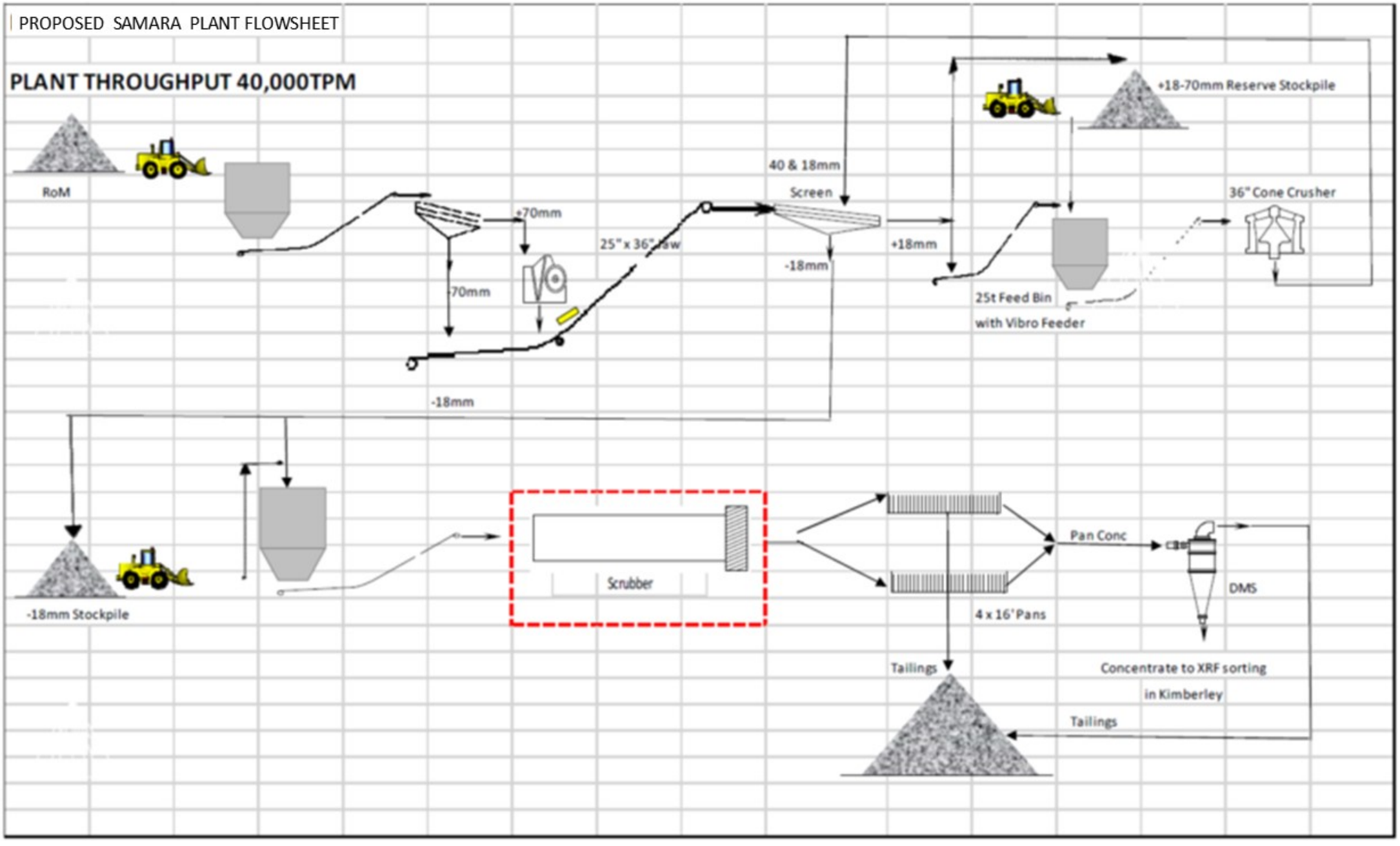

Figure 5-2: A basic plant process flow diagram.

5.2 Infrastructure Required

5.2.1 Access Roads

There are various main and minor roads passing over the proposed project area. Some of these roads will be used to access the proposed prospecting project area. Where sites cannot be accessed via existing roads, a temporary access road (tracks) will be established.

5.2.2 Power

Diesel powered vehicles and machinery will be used for the proposed project.

5.2.3 Chemical Storage Site

During the bulk sampling activities, limited quantities of chemicals, diesel fuel, oil and lubricants will be stored on site. The only dangerous good that will be stored in any significant amount will be the diesel fuel. No more than 30 m^3 will be stored above ground in diesel storage tanks.

5.2.4 Water Supply

It is anticipated that water will be brought onto site and trucked to the identified sampling sites. Water bowsers will be deployed to the sites as and when required.

5.2.5 Ablution Facilities

Sewage waste will be generated from the campsite and bulk sampling sites. Portable chemical toilets will be used for the management of sewage waste generated on site.

5.2.6 Fencing

Fencing will be erected around the prospecting areas.

5.2.7 Plant Site

Two 18 feet rotary pan processing plants which can process a minimum of 45 tph and a maximum of 50 tph each, will be required.

5.2.8 Slimes Dam

It is expected that the design of the slimes dam will be based on the use of bedrock and strapping to ensure filtration of water for recycling. An engineer will be appointed to design the proposed slimes dam and the design drawings and design report will be submitted to the DMR with the EIA/EMPr Report.

5.2.9 Vehicle Parking Area

Space of not more than 0.01 ha will be required as parking areas for vehicles and machinery to be used. The parking areas will be made impervious to protect groundwater resources from possible hydrocarbon leakages.

5.2.10 Temporary Site Office Area

A temporary site office to be used by site personnel will be erected.

Figure 5-3: Location of the proposed Samara prospecting project showing the road network

5.3 Listed and specified activities

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 (Figure 5-4).

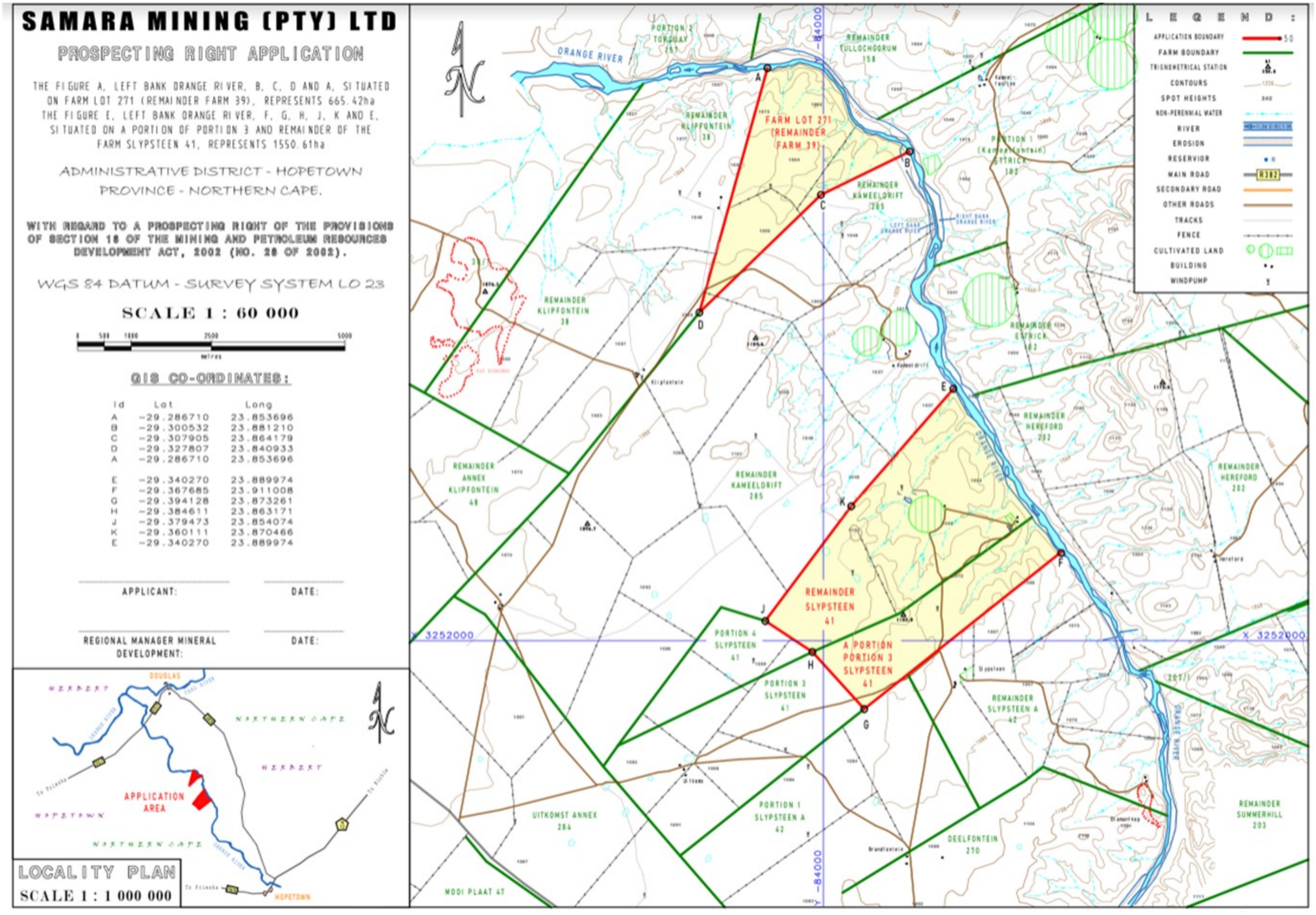

Figure 5-4: Prospecting Right Application Area

Due to the Integrated Environmental Process which the proposed Samara PRA Project will follow, all relevant activities which require authorisation in terms of NEMA and NEM: WA have been included in Table 5-1.

Table 5-1: Applicable Activities

Name of activity	Aerial extent of the activity in Ha or m²	Listed activity	Applicable listing notice	Waste Management Authorisation
Mining Area	<1 ha out of 2 240.03ha	X	GNR 984 (15, 17)	
Ablution facility	<16m^2	X	GNR 983 (25)	
Topsoil Stockpile	<0.5ha	X	GNR 983 (27)	
Access roads	<0.1ha	X	GNR 983 (24, 27)	
Chemical storage	<0.001ha	X	GNR 983 (14) GNR 984 (4)	
Fencing	100 m^2	X	GNR 983 (27)	
Office site	<0.01ha	X	GNR 983 (27)	
Vehicle parking area	<0.01ha	X	GNR 983 (27)	
Vegetation clearance	<20ha	X		

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 Environmental rights must be protected, and this will be done by ensuring that environmental impacts are avoided. Where this is not possible, minimal disturbance caused by prospecting activities should be mitigated.	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 to be undertaken will be aligned to the associated stakeholder consultation process which will be followed, and all I&APs will be given an opportunity to register as an I&APs and be provided an opportunity to review and comment on reports submitted to the competent authorities for decision making.	N/A
Minerals and Petroleum Resources Development Act 28 of 2002	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 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	Department of Mineral Resources, Northern Cape Province

Legislation	Description and Relevance	Authority
	Application for Prospecting Right in terms of section 27 of the MPRDA 28 of 2002 has been submitted.	
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 This application relates to NEMA and its associated regulations, and these will be applied.	
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 applicable listed activities that will be triggered by the project is provided in Table 5-1. A scoping process for this application has been completed.	
Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805)	Section 13 of this report addresses environmental impacts that will be generated throughout the duration of the prospecting right period. These have been assessed as part of the application for the proposed project.	
Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004	This proposed project triggers activities and for that reason an Environmental Assessment is required.	
Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.		

Legislation	Description and Relevance	Authority
DEA Integrated Environmental Management Guideline Series, Guideline 7: Public Participation in the Environmental Impact Assessment Process, 2012 (Government Gazette 807)	As an integral part of the Scoping/EIA Process, public participation is being conducted for the proposed project as stipulated in Chapter 6 of the NEMA.	
National Water Act, 1998 (Act 36 of 1998)	The project will require a Section 21 (a, c & i, e, g, and j) IWUL. The application involves bulk sampling, which requires the use of a large amount of water compared to drilling. A Water Use License will require for this application and a meeting with the DWS will be arranged to discuss the application.	Department of Water and Sanitation (DWS), Northern Cape
National Environmental Management Waste Act (Act No. 36 of 1998)	Not applicable to this project	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. Samara will endeavour to minimise pollution of the air which is also supported by the development of the EMPr which considers the principles of the NEM: AQA,	Department of Environmental Affairs and Thembelihle 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 permit has been issued to Samara from the Department of Agriculture, Forestry and Fisheries (DAFF) which authorises the removal and transplantation of trees for activities associated with the various mining areas and infrastructure. No protected trees will be removed without authorisation from DAFF. Samara Mining will apply for the removal and/or relocation of any protected trees that are affected by the project.	Department of Agriculture, Forestry and Fisheries (DAFF)
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.	Northern Cape

Legislation	Description and Relevance	Authority
	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. Samara Mining will apply for the removal and/or relocation of any protected trees that are affected by the project.	Department of Nature Conservation (DENC)
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. Continuing the dual pattern found with the other natural systems the Municipality reveals two distinct vegetation regions, the Vaalbos Rocky Shrubland and the Kimberley Thornveld.	Department of Environmental Affairs
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. All personnel on site including employees, contractors, sub-contractors and visiting personnel will need to 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. The procedure for reporting chance finds has been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the prospecting right application cannot be approved.	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

7 Motivation

7.1 Mining benefits

2017 was the 150th anniversary of the discovery of diamonds in South Africa. That is probably not strictly true, as diamonds might have been discovered earlier by people who never put them to commercial use. But the discovery of the first diamond on the banks of the Orange River near Hopetown in 1867 sparked off the development of mining in the country. It also sparked off a great many other things, including the establishment of the first stock exchange in Africa in nearby Kimberley in 1881. Other by-products of the discovery of diamonds were two universities, those of the Witwatersrand and Pretoria, which had their origins in a school of mines set up in Kimberley in 1896.

Mining accounts for 11% of gross fixed capital formation, but also for almost a quarter of all foreign direct investment in South Africa. The industry accounts for only 0.3% of corporate taxpayers, but they were responsible for almost 7% of tax assessed in 2014. Although mining employs almost half a million people, this is less than 3% of the country's workforce. As we shall see later in this paper, however, some of these relatively low figures understate the sector's contribution to the economy. For example, mining currently accounts for a third of all merchandise exports. The mining sector is the backbone of the economy. The industry spends almost as much on the purchase of goods and services from other sectors of the economy as it generates in output.

South African diamonds adorn the heads of British monarchs when they are crowned. Mining quickly extended beyond diamonds to gold, coal, platinum, and other minerals. It opened the interior of the country. Longer and longer railways had to be built. Eskom, Iscor, and Sasol were established. Factories were built to supply the needs of the mining industry and of the new towns to which it gave rise as more and more people moved off the land. A vast array of service industries had also to be set up to service the mines, the people who worked in them, and everyone else in the towns.

7.2 Environmental responsibility

In their own nature, prospecting projects have negative environmental impacts, the severity of which depends on the scope of work. These impacts of this project have been included in Section 13 of this report.

Impacts will be investigated in detail during the impact assessment phase of the project. This is where possible, measures to mitigate the impacts of the project will be identified and will be 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.

Samara Mining will be able to keep track of the impacts of the project on the environment and where required, to take remedial action through the environmental monitoring programme included in the EMPr.

7.3 No-go option

The no go option will mean that prospecting activities will not be conducted. This will result in no disturbance of the aquatic or any other environment. Life will carry on as usual and no mitigation measures will need to be applied.

In their nature prospecting activities do not create a lot of jobs as compared to mining, nonetheless for mining to take place prospecting need to have been undertaken to quantify the mineral deposit and to determine the feasibility to extract it. By not implementing this project, it means an opportunity to create jobs will have been lost, the local economic opportunities and revenue which could potentially have benefited 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: socio-economic initiatives within the surrounding communities that are associated with mine developments 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 diamonds internationally will be lost.

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 must be considered 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).

Alternatives can be considered feasible if they 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 location of the proposed project has been chosen based on its potential for diamond mineralisation, which is supported by literature review and desktop study, as well as its availability for prospecting licence application. For that reason, no other property alternatives were considered.

8.2 Type of Activity

An alternative to the type of activity would be to leave the area in its current state and not disturb the aquatic environment. The current land use of the area of the properties is farming and if no prospecting activities are carried out, farming will continue as usual.

The land use alternatives have been investigated in more detail in Section 14 of this report and the specialist studies report attached as Appendix 6.

8.3 Design or Layout of the Activity

Design and layout of the prospecting activities has always been used and has proven to work for many years. For this reason, no design or layout alternative was investigated.

No fatal flaws were identified during the specialist studies. The impact assessment has been included in Section 13 of this report.

8.4 The Technology to be used in the Activity.

Technology to be used will be that of the likes of excavators, Front End Loader, ADTs, water trucks, 4-wheel drive. It is for this reason that no technology alternative was investigated.

8.5 The Operation Aspects of the Activity

The operations activity will involve bulk sampling of four pits. The process will involve the removal of diamonds from gravel material alongside the Orange River. The first step will be to remove vegetation followed by the topsoil which will be stockpiled for rehabilitation purposes of the mined-out areas.

Excavators will be used to remove the diamondiferous gravels and all materials larger material will be screened out. The material remaining from screening will be deslimed and all the material less 0.5 mm diameter will be pumped into the tailings dam. The larger diamondiferous gravels of will be treated in a Dense Medium Separator (DMS) using an 18 feet rotary pan processing plant. The ADTs will be used to haul material to and from the stockpile area. Water trucks will spray the haul roads to minimise dust production.

8.6 The Option of Not Implementing the activity

This option will result in lost information that would have been collected should prospecting activities have been carried out. This information forms the basis with which mining can take place.

By not implementing this project a chance to create jobs will not be created, the local economic opportunities and revenue 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: socio-economic initiatives within the surrounding communities (refer Section 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 diamonds internationally will be lost.

9 Public Participation Process

The objectives of stakeholder engagement for the different phases of the application are as follows;

Scoping

The objectives of the stakeholder engagement during scoping phase are to provide sufficient and accessible information to stakeholders in an objective manner to enable them to raise issues of concern and suggestions for enhanced benefits and to verify that their issues have been recorded. The stakeholders can also provide input into the Terms of Reference (ToR) for specialist studies, impact assessment and management planning and contribute relevant local and traditional knowledge to the environmental assessment;

Impact assessment

The objectives of the stakeholder engagement during the impact assessment phase are to verify that their issues have been considered in the EIA and to further comment on the findings of the environmental assessment; and

Decision-making phase

Following the outcome of the decision-making process by authorities, stakeholders will be informed of the outcome and how and by when the decision can be appealed.

The stakeholder engagement process is conducted in terms of NEMA, which provides clear guidelines for stakeholder engagement during an EIA. Chapter 1 of the NEMA 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) 982, promulgated on 8 December 2014, specify the minimum requirements for stakeholder engagement in an EIA process conducted under the NEMA. In 2017, the Minister of Environmental Affairs published, in terms of Section 24J of the NEMA, Public Participation Guidelines which guide the Public Participation Process (PPP) to give effect to Section (2)(4)(f), (o) and 24 (1A) (C) of the NEMA.

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

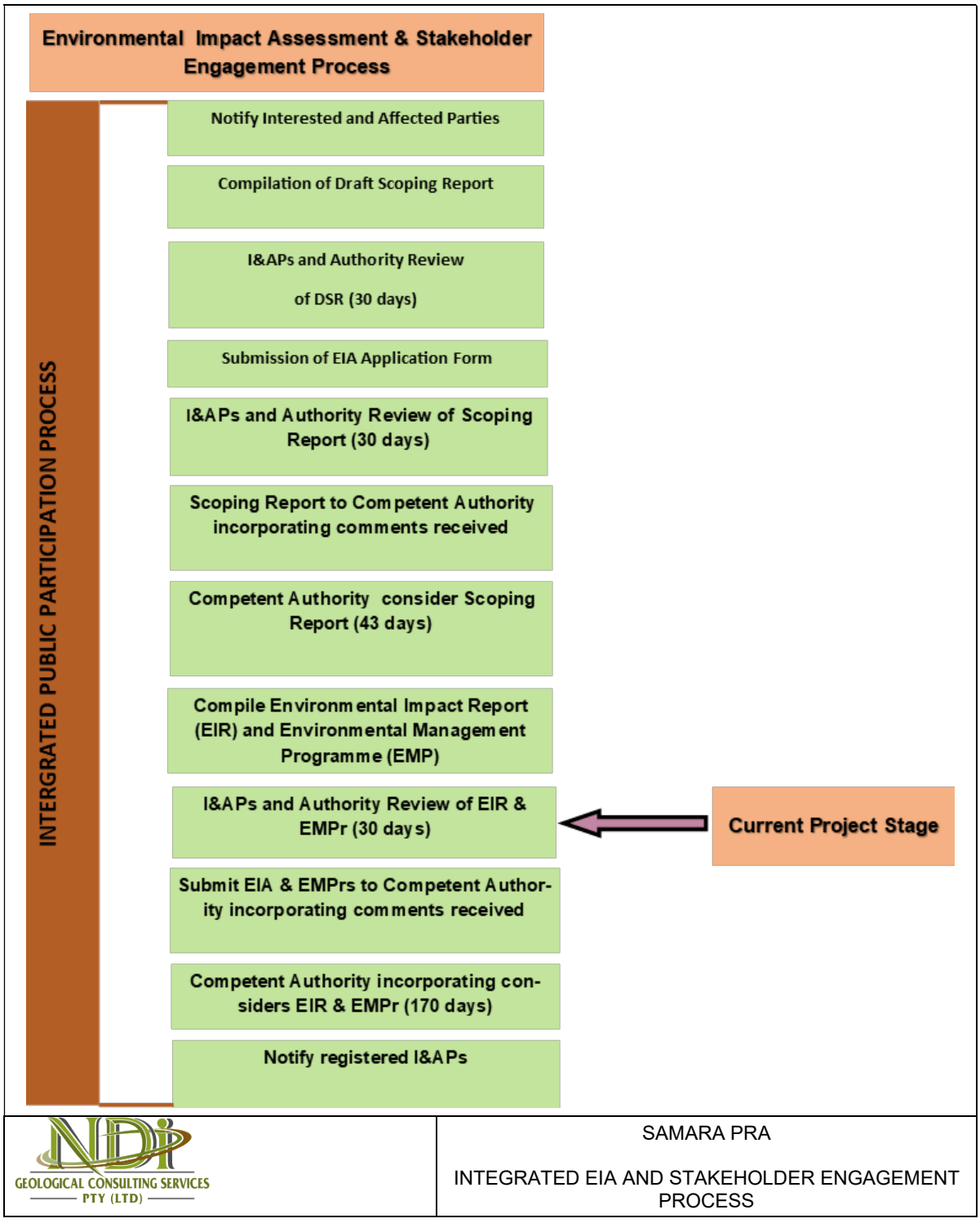

Figure 9-1: Integrated EIA and Stakeholder Engagement Process

The current stakeholder engagement process incorporates all the above-mentioned guidelines. A decision on the success or failure of the application will be made by the competent authority, who in this case is the DMR. There are other authorities who form part of the commenting authorities on the application. These authorities include national departments, local municipalities and service providing parastatals.

9.1 Scoping Phase

9.1.1 Stakeholder Identification Interested and Affected Parties

The process identifies Interested and Affected Parties (I&APs) through responses to the advertisements, site notices and written notification to I&APs associated with the project.

I&APs' register will be maintained for the duration of the project where the details of stakeholders are captured and automatically updated upon communication to the EAP. Their comments will also be registered. Please refer to Appendix 5 for a copy of the I&APs register.

A map of the affected and adjacent farm properties is provided in Figure 9-2.

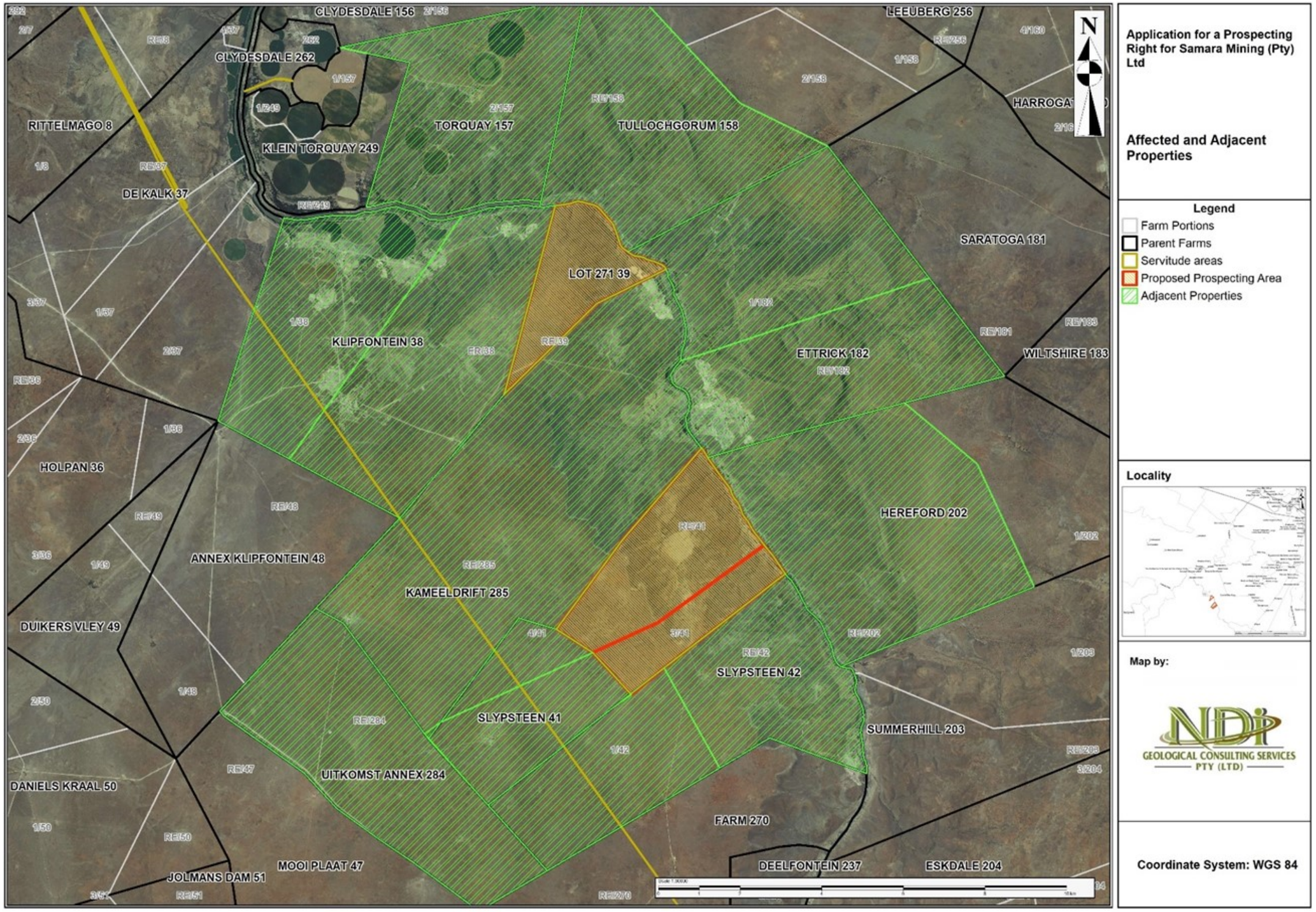

Figure 9-2: Affected and Adjacent Properties

9.1.2 Notification and Registration of the I&APs

The announcement phase of the project provided stakeholders with an opportunity to register and participate as I&APs. Stakeholders were informed about the Samara Mining's intention to the required EA and water use authorisation processes following a prospecting right application.

9.1.3 Distribution of Notification Letters

Stakeholders were sent letters that were informing them of the proposed project.

9.1.4 Site Notice Placements

Site notices notifying stakeholders and I&APs of the proposed activity were placed at conspicuous places in the project area. Areas of placement were mostly determined according to the number of potential I&APs that may pass by.

9.1.5 Newspaper Advertisements

Newspaper advertisements were also used to notify stakeholders about the proposed projects. The advertisements further provided the stakeholders with the opportunity to participate in the EIA process.

9.1.6 Notification of the Availability of the Draft Scoping Report

The availability of the DSR was announced by means of SMS, letters 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.

9.1.7 Stakeholder commenting period.

The stakeholders, competent and commenting authorities were provided with a 30-day commenting period to comment on the Draft Scoping report.

All comments raised by I&APs were recorded and included in the Final Scoping Report that was submitted to the DMR for decision making. The comments received were also collated into the Comments and Responses Register (CRR). The CRR will be updated with additional comments that will be received during the current impact assessment phase.

9.2 Impact Assessment Phase

9.2.1 Notification Letter

Notification letters informing registered I&APs of the public comments period for the Draft EIA and details of the public meeting was distributed to I&APs via email and SMS.

9.2.2 Newspaper Advertisements

Stakeholders were notified about the proposed projects using newspaper advertisements. An advertisement was placed in the DFA News on 16 July 2021 and another one was placed in the Noordkaap newspaper on 21 July 2021. The advertisement further provided the stakeholders with the opportunity to participate in the EIA process.

9.2.3 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. The 30-day review period will begin from the 21st of July 2021 to the 20th of July 2021.

9.3 Summary of Issues Raised by I&APs

A summary of the comments received from the stakeholders and responses provided by the EAP will be provided in Table 9-1 and incorporated into the final report.

Table 9-1: Summary of the Issues Raised by the I&APs

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
AFFECTED PARTIES					
Landowner/s	X				
	X				
Lawful occupier/s of the land	X				
Landowners or lawful occupiers on adjacent properties	X				
Municipal councillor	X				
Municipality	X				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA	X				
Communities	X				
Dept. Land Affairs	X				

Interested and Affected Parties		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Consultation Status
Traditional Leaders	X				
Dept. Environmental Affairs	X				
Other Competent Authorities affected	X				
OTHER AFFECTED PARTIES	X				
INTERESTED PARTIES	X				

9.4 Notification of authority decision

After reviewing the application, the competent authority will decide on the EIA / EMPr, which will be communicated with the registered stakeholders in writing (mail, email, fax and SMS) by the EAP. This will also include 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 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. More detail on certain aspects of this environment have been included in the EIA since the specialist investigations have been completed and once inputs from I&APs have been considered during the public participation process. For each environmental aspect discussed below, proposed environmental issues/impacts have been highlighted qualitatively where applicable. The EIA will explore these issues on a quantitative level.

10.1 Regional Setting

The proposed project is located within the Northern Cape Province, under the jurisdiction of Thembelihle Local Municipality (TLM). The TLM falls under the Pixley ka Seme District Municipality (as a category C Municipality) which covers an area of 103 410km², which is also 27,7% of the total area that constitutes the Northern Cape province.

This district municipal area is the eastern-most district Municipality within the Northern Cape, and borders on the Western Cape, Eastern Cape and Free State provinces. Figure 10-1 indicates the location of the Municipality in the province.

There are 8 category B municipalities within the municipal are, viz. Emthanjeni, Kareeberg, Renosterberg, Siyancuma, Siyathemba, Thembelihle, Ubuntu and Umsobomvu. The following main towns in these category B municipalities represent an even spread throughout the district as central places and agricultural service centers: Douglas, Prieska, Carnarvon, Victoria West, Colesberg, Hopetown and De Aar. De Aar is the ‘largest’ of these towns. The closest major city to these towns is Bloemfontein in the Free State province.

Thembelihle Municipality is located on the banks of the Orange River. The Municipality was formed through the amalgamation of three towns, that is, Hopetown, Strydenburg and Orania. The outcome of the dispute regarding Orania has not yet been decided upon and the uncertainty still exists as to where Orania is demarcated. N12 cuts through this municipal area and is a major boost to the economies of Hopetown and Strydenburg.

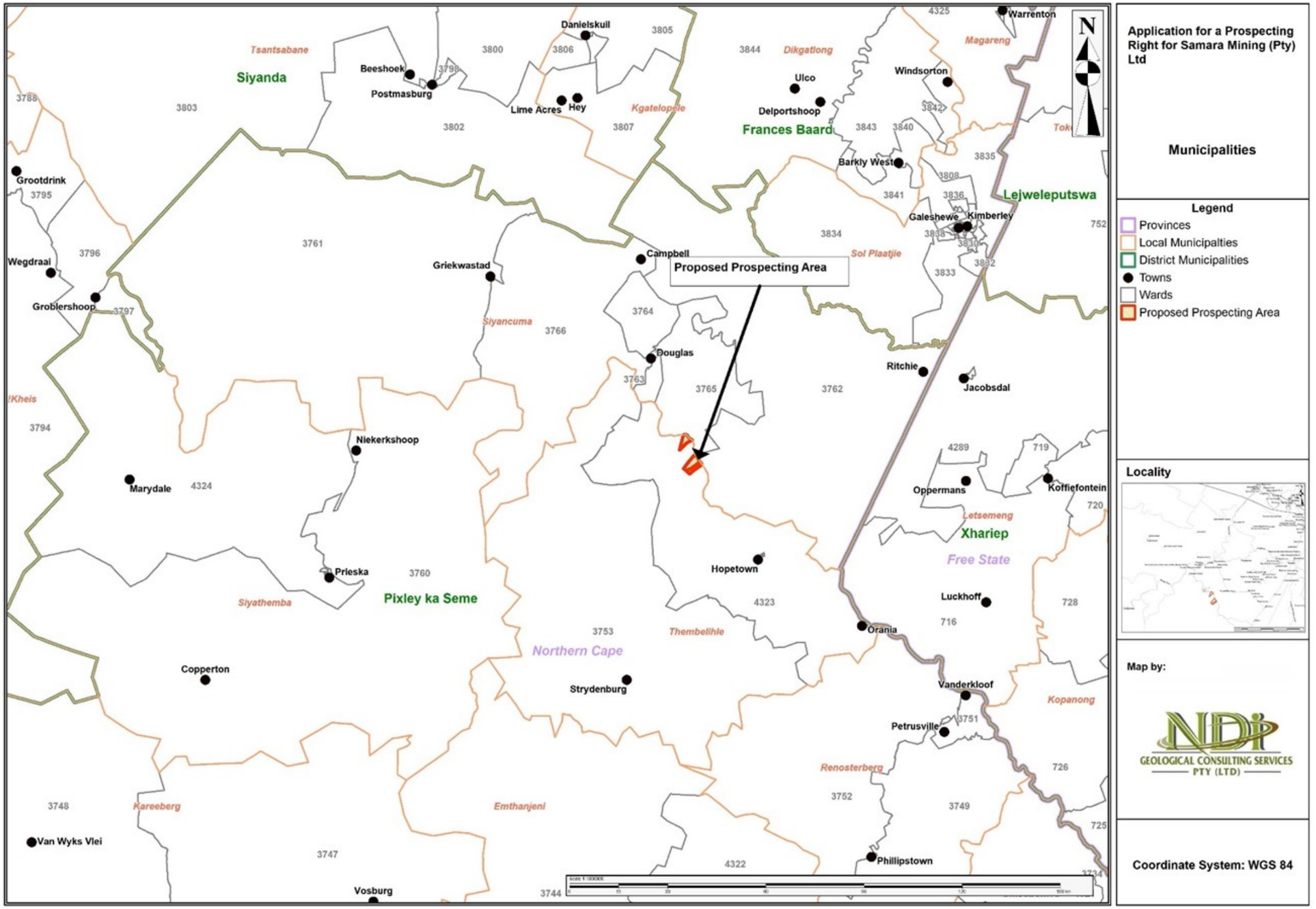

Figure 10-1: Location of the Project Area within the Northern Cape Province

10.1.1 Demographic profile

Table 10-1 indicates both an increase in the population size and the number of households between 2001 and 2011, but a decrease in the average household size over the same period. The increase in the population size from 2001 to 2011 was preceded by a period with a negative growth rate, i.e., fewer persons in the municipal area in 2001 than in 1996 — hence, the negative growth rate. Note that, together, the Black-African and Coloured groupings constitute more than 90% of the total population.

Table 10-1: Demographic profile in the Pixley Ka Seme District Municipality

Indicator¤		2001¤	
Population¤		166·547¤	
Population·growth·rate¤		-1,27%·(1996-2001)¤	1,12%
Households¤		41·707¤	
People·per·household¤		3,9¤	
Gender·breakdown¤	Males¤	79·927·(48.6%)¤	92·(
	Females¤	84·687·(51.4%)¤	92·:
Age·breakdown¤	0---14¤	32,6%¤	
	15---64¤	61,5%¤	
	65+¤	5,9%¤	
	Black·African¤	27,2%¤	

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10.1.2 Economic profile

The economy in the Pixley ka Seme municipal area is characterised by the following:

- ≈ High levels of poverty and low levels of education;
- ≈ It is a small to medium-town sub-region with a low level of development despite the strategic location in terms of the national transport corridors;
- ≈ Sparsely populated towns with several larger towns serving as “agricultural service centres”; spread evenly throughout the district as central places;
- ≈ High rate of unemployment, poverty, and social grant dependence;
- ≈ Prone to significant environmental changes owing to long-term structural changes (such as climate change, energy crises and other shifts);
- ≈ Geographic similarity in economic sectors, growth factors and settlement patterns;

- ≈ Economies of scale not easily achieved owing to the relatively small size of towns;
- ≈ A diverse road network with national, trunk, main and divisional roads of varying quality;
- ≈ Potential and impact of renewable energy resource generation; and
- ≈ Potential and impact of radio telescope initiatives, e.g., Square Kilometre Array radio telescope project.

Employment status

The employment status of the available workforce/economically active group in the Pixley ka Seme municipal area is listed in Table 10-2. It indicates that the overall results regarding the employment status of the workforce / potential economically active group in the municipal area have improved from the 2001 figure of 63,1% employed and 36,9% unemployed. In 2011, the number of unemployed individuals was almost 8% below what it was in 2001. However, any unemployment rate, irrespective of how large, has serious repercussions for the ability of the residents to pay for their daily needs and for municipal services. Owing to the high numbers of unemployed persons, other main sources of income are pension/welfare payments:

Table 10-2: Employment status

Employment Status	2001	%2001	2011	%2011
Employed	36 921	63.1	43 664	71.7
Unemployed	21 632	36.9	17 203	28.3
Not economically active	101 886	42.5	116 201	47.6

Economic sector contributor

The economic activities in the Northern Cape Province are dominated by mining, agriculture, manufacturing and construction, contributing to the provincial GDP, i.e., 22%, 7%, 3% and 2% respectively. Note that the Northern Cape only contributed about a share of 2% to the national GDP in 2014 and which contribution fluctuated around that mark since 2004. Between 2011 and 2014, the annual growth in the agriculture and mining sectors was about 4,2% and 5,2%, respectively. The economic activities in the Pixley ka Seme municipal area are dominated by agriculture, social and personal services, financial services, tourism and transport and lately, retail and construction activities emanating from the establishment of the Square Kilometre Array project. Table 10-3 includes four economic sectors in the province (seen from a municipal perspective) that have comparative advantages in relation to the South African economy (in descending order):

Table 10-3: Economic sector contributor

Description	Targeted within Pixley ka Seme District Municipality
Mining	High priority
Agriculture	High priority
Manufacturing	High priority
Wholesale, retail and motor trade; catering and accommodation	High priority

In this context, it is important to note the impact the establishment of the Square Kilometre Array project in the western segment of the municipal area, already had and will continue to have on the economic and socio-economic elements of the area and its population.

Household Income

The monthly household income of all the households residing in the Pixley ka Seme municipal area is listed in the table below. Almost 11 % of all households within the municipal area have no income, whilst another 3,4% of households earn between R0 and R4800 per annum. In the context of housing delivery, these people as well as another 50% of all households will be beneficiaries of the 'give-away' housing programmes, i.e., the RDP and BNG programmes with ownership as the tenure type, and the CRU programme with rental as tenure type. In total, almost 61% of all households in the municipal area will qualify for these housing options owing to a monthly household income of less than R3500. Another segment of the population, viz. 24,8% earns below 'R15 000' per month, and for this group it would not be possible to qualify for a (commercial) home loan. These people would then rely of housing subsidies (to gain ownership of a house) or social housing (to rent a dwelling). It is accepted that, on average, South African households have an annual income of R138 168, viz. a monthly income of R11 514. Hence, more than 90% of the households living in the Pixley ka Seme municipal area have a monthly income below the average for a South African household.

10.2 Climatic Conditions

The climatic condition of the study area is a local steppe climate. The average maximum temperatures for the region range from 16.7°C in August to 32°C in January while the average minimum temperatures range from 0°C in June to 18°C in August. The area lies within a summer/autumn rainfall area, with predominantly dry winters. The average rainfall of the quaternary catchment is 331 mm (Middleton and Bailey, 2012). The region receives the lowest rainfall in June and July, and the highest in February and March. Evaporation data was sourced for WR2012 which provided monthly Class S-Pan for the period 1934 - 2001. This station is located north of the site as illustrated in Table 10-4 provides a summary of the monthly evaporation distribution (Class S-Pan) at this station.

Table 10-4: Monthly evaporation distribution

Month	Evaporation (mm)
January	327.60
February	272.80
March	255.10
April	185.60
May	124.80
June	92.00
July	92.20
August	129.10
September	177.50
October	240.30
November	280.80
December	319.90
Total	**2497.70**

10.3 Topography and Drainage

The study area is on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41 and situated on the Upper Orange Water Management Area (WMA). The proposed mining area is located at the upper top of the quaternary catchment D33H just at the boundary with quaternary catchment D33K.

The catchment is characterised generally by a flat topography with the lowest point along the Orange River. As of the study site, the topography increases from the Orange River East to West with the highest point at 1107 m above the sea level as indicated in Figure 10-2. The two main non-perennial tributaries of the Orange River start in this high topographic area flowing down the slope towards into the Orange River.

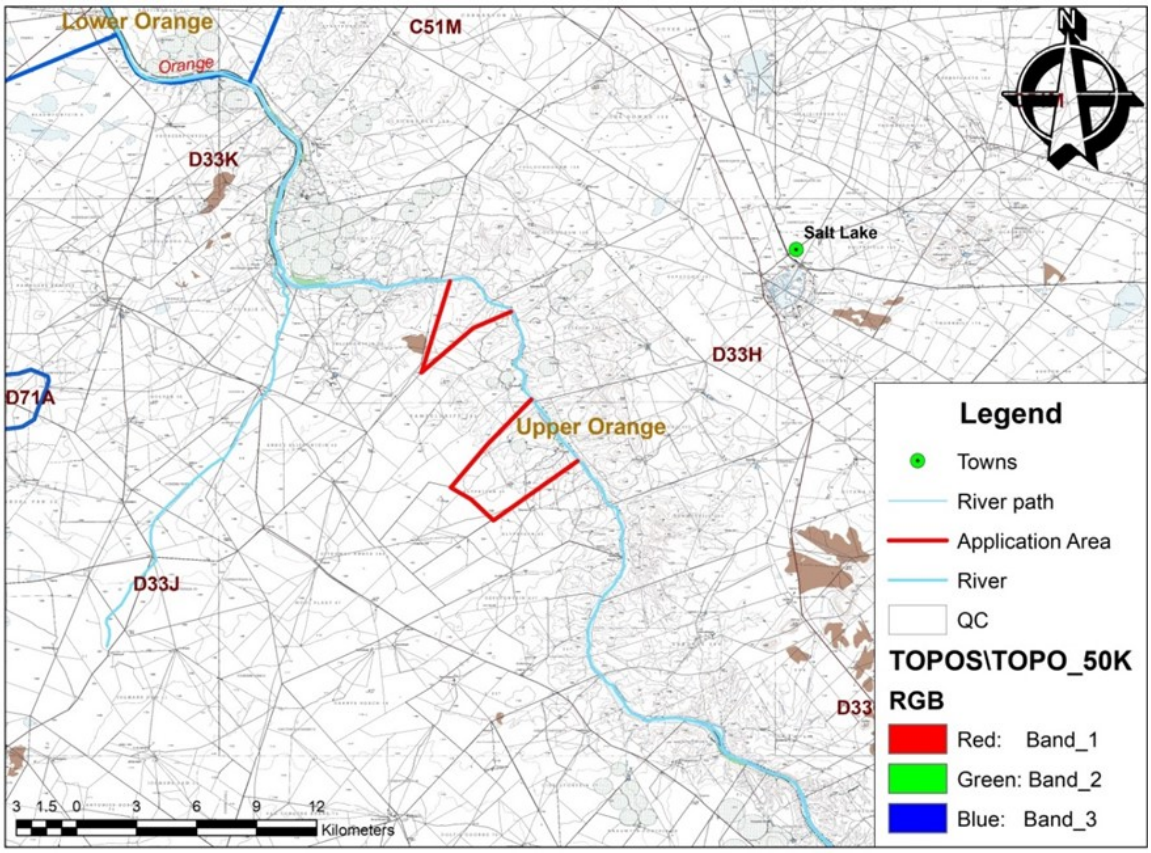


Figure 10-2: Topography

10.4 Geology

10.4.1 Regional Geology

In the proposed study area, alluvial diamonds are found in gravel deposits associated with the ancient Orange-Vaal River drainage system which is known to be the primary secondary source of alluvial diamond deposits in the Northern Cape Province and along the west coast of Namaqualand in South Africa. Litholologies such as andesite to basaltic andesite constitute the Allanridge Formation which is a member of the Platberg Group of the Venterdorp Supergroup in the Northern Cape Province. This rock formation concludes the succession of the Ventersdorp Supergroup which is characterized by mafic lava flows. The Ventersdorp Supergroup is a Neoarchean bimodal volcanic sequence on the Kaapvaal Craton of Southern Africa.

In the Barkly West District, the Ventersdorp Supergroup is only represented by a basal unit of quartzite overlain by a thick sequence of andesitic lavas interbedded with minor agglomerate. The former is regarded as the equivalent of the Bothaville Formation while the latter is regarded as the

equivalent of the Allanridge Formation (SACS, 1980). The succession has a minimum thickness of 1000 m. Based on a U/Pb study on zircons, the Ventersdorp Supergroup has been dated at about 2,7 Ga (Armstrong et al., 1990).

The andesitic lavas forming most of the roches moutonnees and striated pavements in the area show the development of amygdales of quartz, chalcedony, carnelian, agate, jasper, calcite, epidote, chlorite, and pyrite. The andesites are green to dark-grey fine-grained microcrystal fine rocks which are usually altered by chloritisation, epidotisation, uralisation, saussuritisation and calcitisation. Porphyritic and non- porphyritic zones are present, while pillow lavas are found in a few places. The Ventersdorp rocks exhibit displacement faulting which trend extensive jointing and variable in a NNW, NNE, and NE directions. Except for outcrops close to or in the riverbed, these rocks are covered by a variable thickness of reddish sandy loam or even tufa. Visser et al., (1976) suggested that the accumulations of andesite took place in broad basins largely under subareal conditions and interpreted them as plateau lavas. The onset of deposition of the Ventersdorp volcanics has been constrained by dates of 2714 ±16 and 2709 ±8 Ma determined for samples from the Klipriviersberg Group, near the base of the supergroup, and of porphyry from the overlying Makwassie Formation of the Platberg Group (Armstrong et al., 1991) respectively.

10.4.2 Local Geology

In the study area, the Allanridge Formation of the Ventersdorp Supergroup outcrops on the northern side of the Farm Lot 39 and the north-eastern side of the Farm Slypsteen 41(Figure 10-4). This formation comprises of Vaalian-aged dark green amygdaloidal basaltic lava, light green porphyritic lava and pyroclastic rocks (Van der Westhuizen et al., 2009).

The Allanridge Formation is unconformably overlain by the Carboniferous-aged sediments of the Dwyka Group of the Karoo Supergroup at both study sites. The Dwyka Group comprises thinly bedded mudstones and claystones, stratified conglomerates, pebbly sandstones, and diamictites. The diamictites in this formation are very clast-rich with very few massive diamictites found. The clasts were sourced from eroded material from the much older basement rocks and comprise numerous different rock types. These include quartzites, vein quartz, banded ironstone, dolomite, gneiss, granite, and amygdaloidal lavas. It is currently accepted that the northern facies of the Dwyka Group represent valley-fill deposits, proglacial outwash fans, and subglacial till deposits left by continental glaciers retreating towards the south of the early Karoo Basin. Glacial pavements where striation marks are left on the surface of basement rocks are known from this formation in numerous localities (Von Brunn & Visser, 1999; Johnson et al., 2009).

These alluvial diamond deposits between Hopetown, Douglas and Prieska in the Northern Cape are representative of unique repositories or sinks of high-quality gem diamonds. The area along the application area is covered by calcified pandune, calcrete and quaternary age sand deposits.

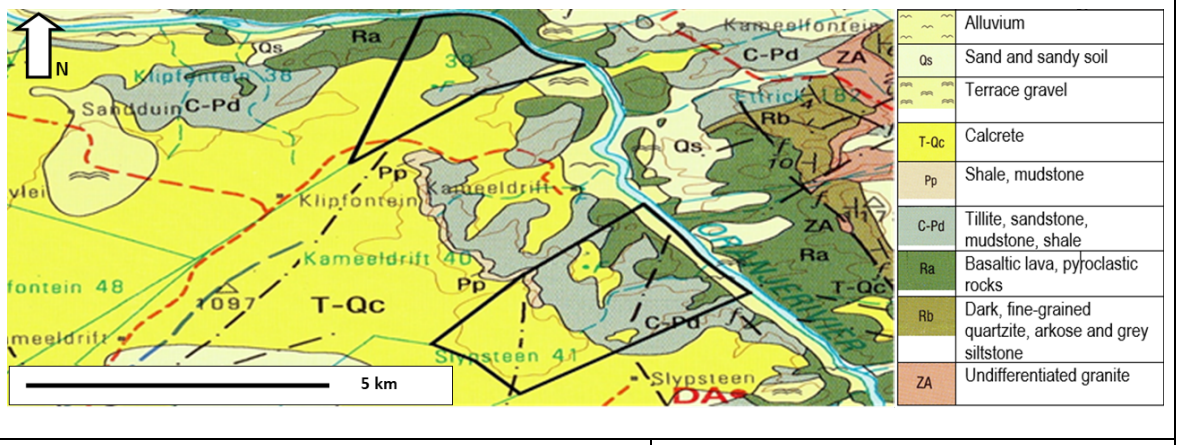


Figure 10-3: Locality Specific Geological Map (Council for Geoscience, 1995)

10.4.3 Current Land Use

The current land use on the affected properties is farming. It is expected that due to the low rainfall and high temperatures and evapotranspiration, the agriculture potential of the area is low (as shown in Figure 10-4)

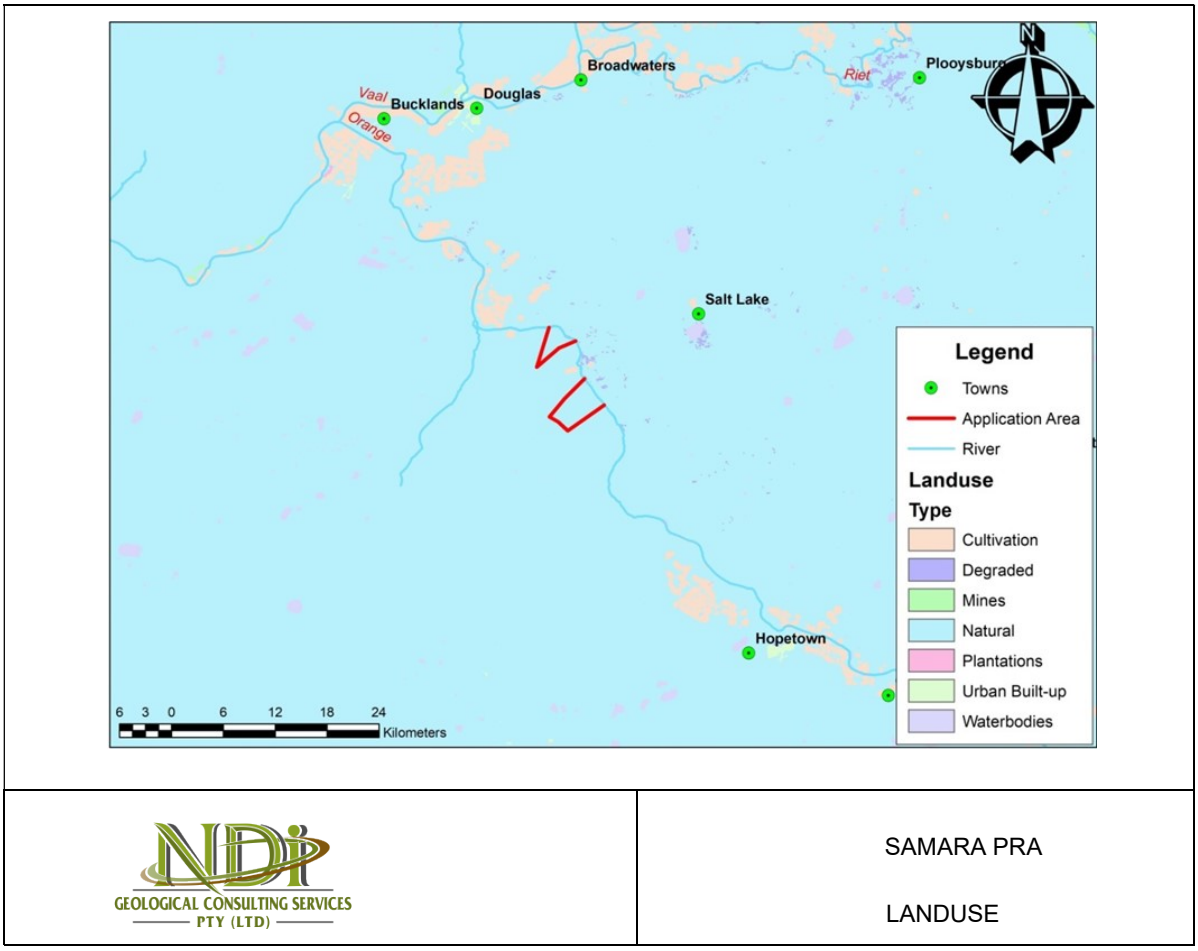


Figure 10-4: Proposed Study Area Land use

10.5 Heritage Resources

The main cause of impacts to 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 is 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 and prospecting processes; indirect impacts may occur during movement of prospecting vehicles. The excavation prospecting will result in the relocation or destruction of all existing surface heritage material. 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, it is important that they are identified, and their significance assessed prior to construction. It is important to note, that due to the localized 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 prospecting site.

Further, archaeological sites and unmarked graves may be buried beneath the surface and may only be exposed during prospecting. The purpose of the AIA is to assess the sensitivity of the area in terms of archaeology and to avoid or reduce the potential impacts of the proposed prospecting by means of mitigation measures (see appended Chance Find Procedure). The study concludes that the impacts will be negligible since the site has previously been cleared and mined. Table 10-5 provides a summary of the heritage resources assessment.

Table 10-5: Summary of results of the field survey

Heritage resource	Status/Findings
Buildings, structures, places and equipment of cultural significance	None located on site
Areas to which oral traditions are attached or which are associated with intangible heritage	None exists on the area
Historical settlements and townscapes	None survives in the proposed site
Landscapes and natural features of cultural significance	None
Archaeological and palaeontological sites	None located
Graves and burial grounds	None
Movable objects	None
Overall comment	The surveyed area has no confirmable archaeological resources on the surface, but sub-surface chance finds are still possible.

10.5.1 Archaeological Site

No archaeological and heritage sites were recorded during the field survey on the proposed prospecting site. Based on the field study results and field observations, the receiving environment for the proposed prospecting is low to medium potential to yield previously unidentified archaeological sites during subsurface excavations and work associated with the proposed prospecting. The literature review also revealed that no Stone Age sites are shown on a map contained in a historical atlas of this area. This, however, should rather be seen as a lack of research in the area and not as an indication that such features do not occur.

10.5.2 Buildings and Structures

The survey did not record any buildings and structures which are older than 60 years old within the proposed site. The proposed prospecting does not trigger Section 34 of the NHRA which protects buildings, and structures older than 60 years.

10.5.3 Burial grounds and graves

The field survey did not identify any graves within the proposed prospecting site. It should be noted that burial grounds and grave sites are accorded the highest social significance threshold. They have both historical and social significance and are considered sacred. Also, graves are important in providing evidence for communities seeking land restitution. Wherever they exist or not, they may not be tampered with or interfered with during any development without a permit from SAHRA. It should be borne in mind that 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 within the proposed prospecting site, should such sites be identified during subsurface construction work, they are still protected by applicable legislation, and they should be protected.

10.5.4 Public Monuments and monuments

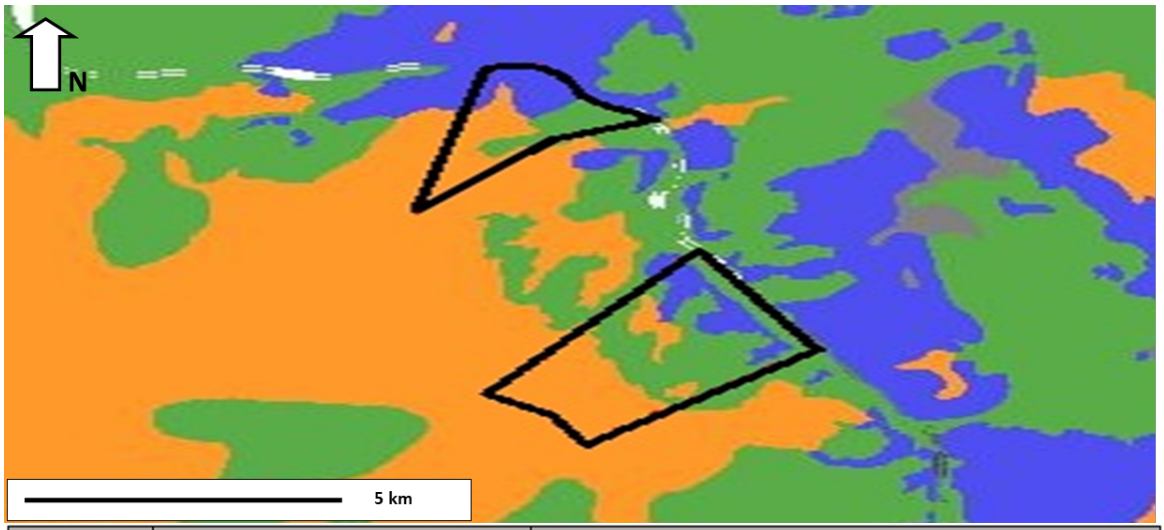
There are no public memorials and monuments within the prospecting right application site.

10.5.5 Battle fields

No known battles or skirmishes associated with colonial wars, Anglo-Boer war, and the struggle against apartheid were fought within the proposed prospecting site.

10.6 Palaeontology

Although the area covered by the Allanridge Formation is classified as having a Low Palaeontological Sensitivity (Figure 10-5), it consists of igneous rocks and is therefore devoid of fossils and is of no palaeontological concern. The Dwyka Group sediments that cover the Allanridge Formation in the north and north-western parts of the study site is considered to have a Moderate Palaeontological Sensitivity. The Dwyka Group rocks may contain fossils of marine invertebrates and fish as well as trace fossils made by arthropods and fish especially in the Douglas area (Almond & Pether, 2008). The fossil record of the surface calcrete is sparse, occurs sporadically and is low in diversity and is classified as having a High Palaeontological Sensitivity. The fossils that have been discovered in this formation include root casts, burrows, termitaria, ostrich eggshells, mollusc shells and isolated bones (Almond & Pether 2008).



Colour	Palaeontological Significance	Action
ORANGE	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely.
GREEN	MODERATE	Desktop study is required.
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required.

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SAMARA PRA

PALAEONTOLOGICAL SIGNIFICANCE

Figure 10-5: Palaeontological significance map

10.7 Biodiversity

10.7.1 Vegetation

According to the SANBI database the site is located within the SVk 5 Vaalbos Rocky Shrubland and the Kimberley Thornveld (SVk 4) vegetation types. **The SVk 5 Vaalbos Rocky Shrubland** is distributed across the Northern Cape and Free State Provinces. It extends along solitary hills and scattered ridges east of the confluence of the Orange and Vaal Rivers, mainly in the Kimberley and Herbert Districts and west of a line bounded by the western Free State towns of Luckhoff, Petrusburg, Dealesville, Bultfontein and Hertzogville. Altitude 1 000 to 1 400 m (Figure 10-6).

The SVk 5 Vaalbos Rocky Shrubland is characterized by Slopes and elevated hills and ridges within plains of mainly SVk 4 Kimberley Thornveld, also in the vicinity of NKu 3 Northern Upper Karoo. Evergreen shrub communities dominated by *Tarchonanthus camphoratus*, *Olea europaea* subsp. *africana, Euclea crispa*, *Diospyros lycioides*, *Rhus burchellii* and *Buddleja saligna*. Sheltered, cool sites include trees such as *R. lancea*, *Celtis africana* and *Ziziphus mucronata*. On the footslopes of the dolerite hills, where calcrete-rich soils occur, shrubs and small trees of *Acacia tortilis* and *Z. mucronata* can be dominant.

The Kimberley Thornveld (SVk 4) is found in the North-West, Free State and Northern Cape Provinces. Most of the Kimberley, Hartswater, Bloemhof and Hoopstad Districts as well as substantial parts of the Warrenton, Christiana, Taung, Boshof and to some extent the Barkly West Districts. Also includes pediment areas in the Herbert and Jacobsdal Districts. It thrives in altitude ranging 1 050–1 400 m.

It is characterized by Plains often slightly irregular with well-developed tree layer with *Acacia erioloba, A. tortilis, A. karroo* and *Boscia albitrunca* and well-developed shrub layer with occasional dense stands of *Tarchonanthus camphoratus* and *A. mellifera.* Grass layer open with much uncovered soil.

Regional sensitivity

(i) SVk 5 Vaalbos Rocky Shrubland

The Vaalbos Rocky Shrubland (SVk 5) is classified as **Least threatened.** According to Mucina and Rutherford the conservation for this vegetation type is set at **16%,** with nearly **2%** being statutorily conserved at the Vaalbos National Park. Only about 2% already transformed.

(ii) SVk 4 Kimberley Thornveld

The SVk 4 Kimberley Thornveld is classified as **Least threatened**. A Target 16% has been set for conservation, with Only 2% statutorily conserved in Vaalbos National Park as well as in Sandveld, Bloemhof Dam and S.A. Lombard Nature Reserves. Some 18% already transformed, mostly by cultivation. Erosion is very low. Area is mostly used for cattle farming or game ranching. Overgrazing leads to encroachment of *Acacia mellifera* subsp*, detinens*.

10.7.2 Critical biodiversity areas

According to the 2016 Northern Cape Critical Biodiversity Areas, Portion of Slypsteen 41 falls within a Critical Biodiversity Area 2 and Ecological Support Area (ESA2) (Figure 10-6, biodiversity map). ESAs are areas that are important for maintaining the ecological processes on which Critical Biodiversity Areas (CBAs) depend. This category has also been split into ESA1 and ESA2 based on land cover. ESA1s are in a largely natural state, and are important for supporting CBAs, while ESA2s are no longer intact but potentially retain significant importance from an ecological process perspective (e.g., agricultural land maintaining landscape connectivity).

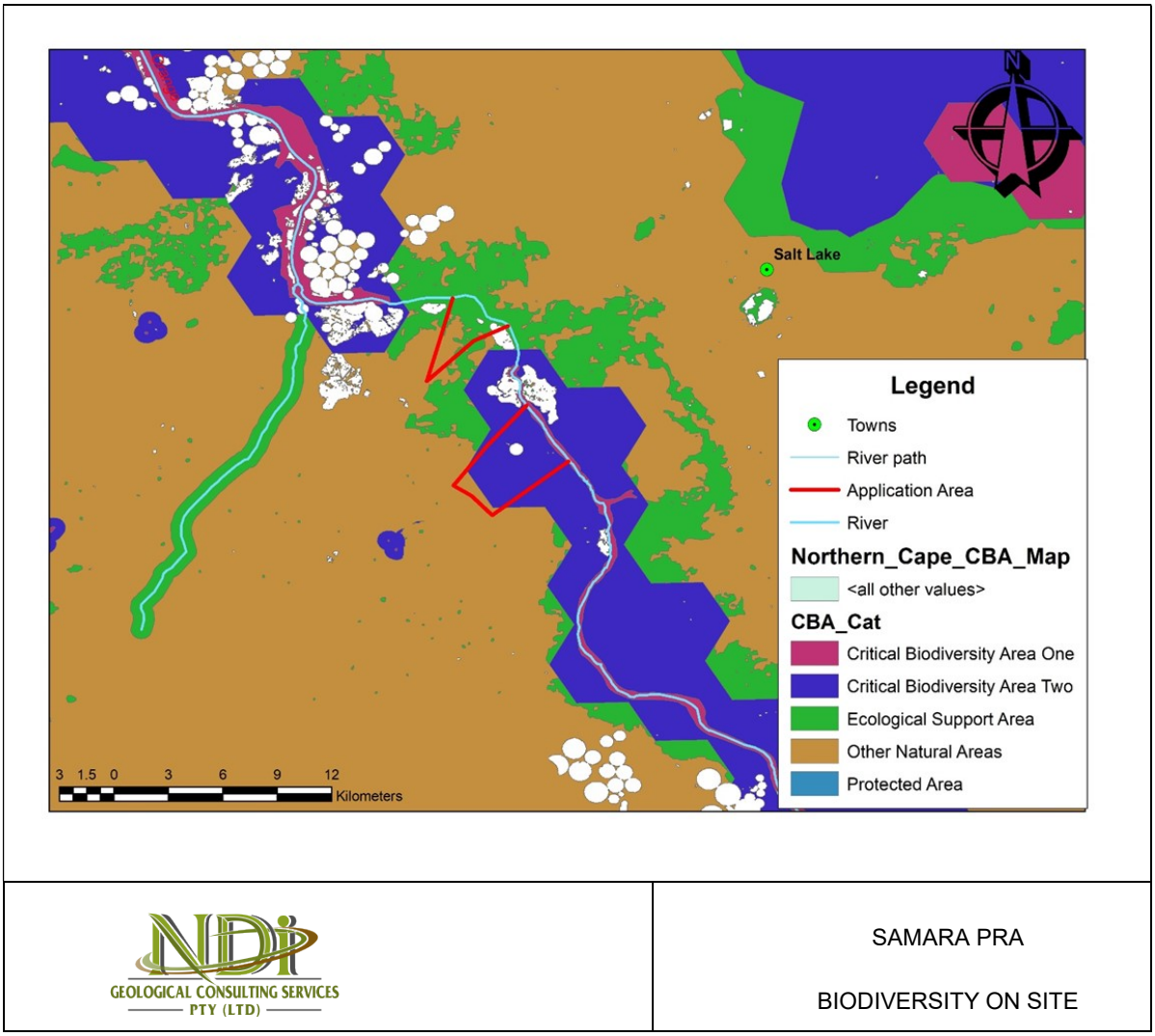


Figure 10-6: Overview of biodiversity on site

The proposed project area is in an area that is regarded as ecologically intact, moderate in plant species diversity with many endemic species. The area has evidence of disturbance from mining operations (Figure 10-7 to Figure 10-10). The prospecting will take place along the impacted areas onsite, and thus the disturbance will be limited to the disturbed areas (low lying areas of the site). Prospecting is going to take place in an already disturbed area and alluvial diamonds are found in such terraces, and not further into the bush. Vegetation has already been disturbed, and thus no new disturbance will be caused by the proposed prospecting activities.

Field investigations findings

The site has baboons, Kudus, Cattle and Springboks. None of the sensitive mammals which were expected were spotted on site except for droppings of larger mammals such as cattle. The presence of historic mining disturbance 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. Due to disturbance of the soil and removal of vegetation, it is likely that alien plants may establish on site.

Figure 10-7: Proposed prospecting area with little vegetation.

Figure 10-8: Disturbed land in the application area

Figure 10-9: The overall topography of the proposed study area

Figure 10-10: Stockpiles from mining activities

10.8 Areas of Conservation Importance

10.8.1 Wetlands

The proposed project is located within 500m of the Orange River (Figure 10-11), the river is regarded as a National Freshwater Priority Area by the SANBI. It can be classified in terms of its hydro-geomorphic characteristics, as a river (FEPA) that receives both surface and subsurface water input, the delineated river displays a gradient of wetness across its width. In addition, the sites areas traversed by several tributaries that feed into the Orange River. Hydrophyte's species and terrestrial species dominate the drier portion of the riverbanks, while obligated hydrophytes occur in the wetter areas.

The river is surrounded by the Kimberly Thornveld vegetation type and the Vaalbos Rocky Shrubland, the latter is characterised by Slopes and elevated hills and ridges within plains of mainly SVk 4 Kimberley Thornveld, also in the vicinity of NKu 3 Northern Upper Karoo. Evergreen shrub communities dominated by *Tarchonanthus camphoratus, Olea europaea subsp. africana, Euclea crispa, Diospyros lycioides*, *Rhus burchellii* and *Buddleja saligna*. Sheltered, cool sites include trees such as R. lancea, Celtis africana and Ziziphus mucronata. On the footslopes of the dolerite hills, where calcrete-rich soils occur, shrubs and small trees of *Acacia tortilis and Z. mucronata* can be dominant.

The Kimberly Thornveld Plains often slightly irregular with well-developed tree layer with *Acacia erioloba, A. tortilis, A. karroo and Boscia albitrunca and* well-developed shrub layer with occasional dense stands *of Tarchonanthus camphoratus and A. mellifera.* Grass layer open with much uncovered soil. The vegetation of the central wet to moist portion of the valley bottom wetland (permanently wet area) is dominated by a homogeneous stand of the obligate hydrophytes.

Figure 10-11: General representation of the Orange River on site.

Field survey

The site is still ecologically intact with minor disturbances in the low-lying areas where prospecting is expected to take place, which include permanent and reversible damage to the area within the site. Historic impacts include the mining operations. The result has been very high vegetation surface areas with high biodiversity sensitivity cover or topsoil in many areas. As a result, the identification of typical wetland indicators in the form of hydrophytes and hydromorphic soils were restricted on the site.

The areas around the river on the study site have signs of human disturbance, with the overall site being ecologically intact. Sedimentation has been taking place. Consequently, topsoil with signs of wetness and organic material are present in along the riverbanks. See Figure 10-12 for signs of human disturbance.

Figure 10-12: Signs of human disturbance onsite

10.9 Surface Floodline

10.9.1 Design Storm

Design storm estimates for station no. 0256453_W for return periods of 24 hours and storm durations were determined by Design Rainfall Estimation Software for South Africa developed by the University of Natal in 2002 as part of a WRC project K5/1060 (Smithers and Schulze, 2002). These are presented in Table 3. This method uses a Regional L-Moment Algorithm (RLMA) in conjunction with a Scale Invariance approach to providing site specific estimates of design rainfall (depth, duration, and frequency), based on surrounding station records (Table 10-6).

Table 10-6: Design rainfall

Return Period (yrs)	Rainfall Depth (mm)
2	39.7
5	56.1
10	67.8
20	79.4
50	95.4
100	108.0
200	121.2

The commonly used “return period,” or Recurrence Interval (RI), requires further explanation. In hydrological terms, the more accurate term is Probability of Exceedance (PE). The PE denotes the statistical probability of a certain flood magnitude being exceeded. By contrast, the RI suggests a flood that recurs with certain regularity. Table 4 below shows the correlation between these terms. As can be seen, the 1-year RI flood has a PE of 100%, which means that there is a 100% probability in any given year that a flood with that magnitude will occur. Similarly, there is only a 1% probability that the 100-year RI flood will be exceeded in any given year.

10.9.2 Mean Annual Rainfall (MAR

The MAR of catchment C92B has been reducing over a time. This reduction is evident as indicated in Water Resource (WR) studies from 1990 to 2012 and the reduction is from 5 Mm³ in WR90, 4.75 Mm³ in WR2005 and 4.11 Mm³ in WR2012. For this project, WR2012 quaternary runoff data (Middleton and Bailey, 2012) was downscaled to obtain representative site runoff. The Mean Annual Runoff (MAR) was calculated using the method: This was calculated using the simple equation; Site runoff = (site area *quaternary catchment runoff) / quaternary catchment area.

Table 10-7 indicates the calculated MAR of the study site using the method above. The resulting MAR values are tabulated below. Table 10-8 shows the percentages of MAR from the site boundary that make up the quaternary catchment and the reduction in the catchment’s MAR post development. As the figures are small, the area will not have a large potential stream flow reduction impact on the runoff of the immediate and general areas. This means that the runoff of the Quaternary Catchment into which the proposed development sites falls will not be significantly decreased by the proposed development.

Table 10-7: Baseline MAR

Quaternary Catchment C92B Area (KM²)	Baseline Quaternary Catchment C92B MAR (Mm³)	Samara Project Site Area (KM²)	Samara Project Site MAR (Mm³)
889	4.11	15.11	0.69

Table 10-8: Anticipated Post Development Reduction in MAR

Quaternary Catchment C92B Area (KM²)	Post Development MAR C92B MAR (Mm³)	Samara Study Site MAR (Mm³)	% Of Reduction in MAR
889	3.42	0.69	16%

10.9.3 Peak Runoff Flow and Volume

Flood peaks flows were determined using the Rational Method. This method was first introduced by the Irish engineer Mulvaney back in the mid-nineteenth century. It is today probably still the most utilised and suited for calculation of peaks flows for small catchments of an area less than 15 km². This method continues to be used because of its simplicity.

The runoff coefficient (C) used for all delineated catchments for the 1:100-year flood was 0.41 and 0.37 for the 1: 50 flood (Chow et al., 1988). The value was selected based on that the catchments are undeveloped with flat slopes. The additional inputs into the rational method and results used as boundary conditions in flood line delineation using HEC-RAS are given in Table 10-9.

Table 10-9: Flood Peak runoff flow and volumes using the Rational method.

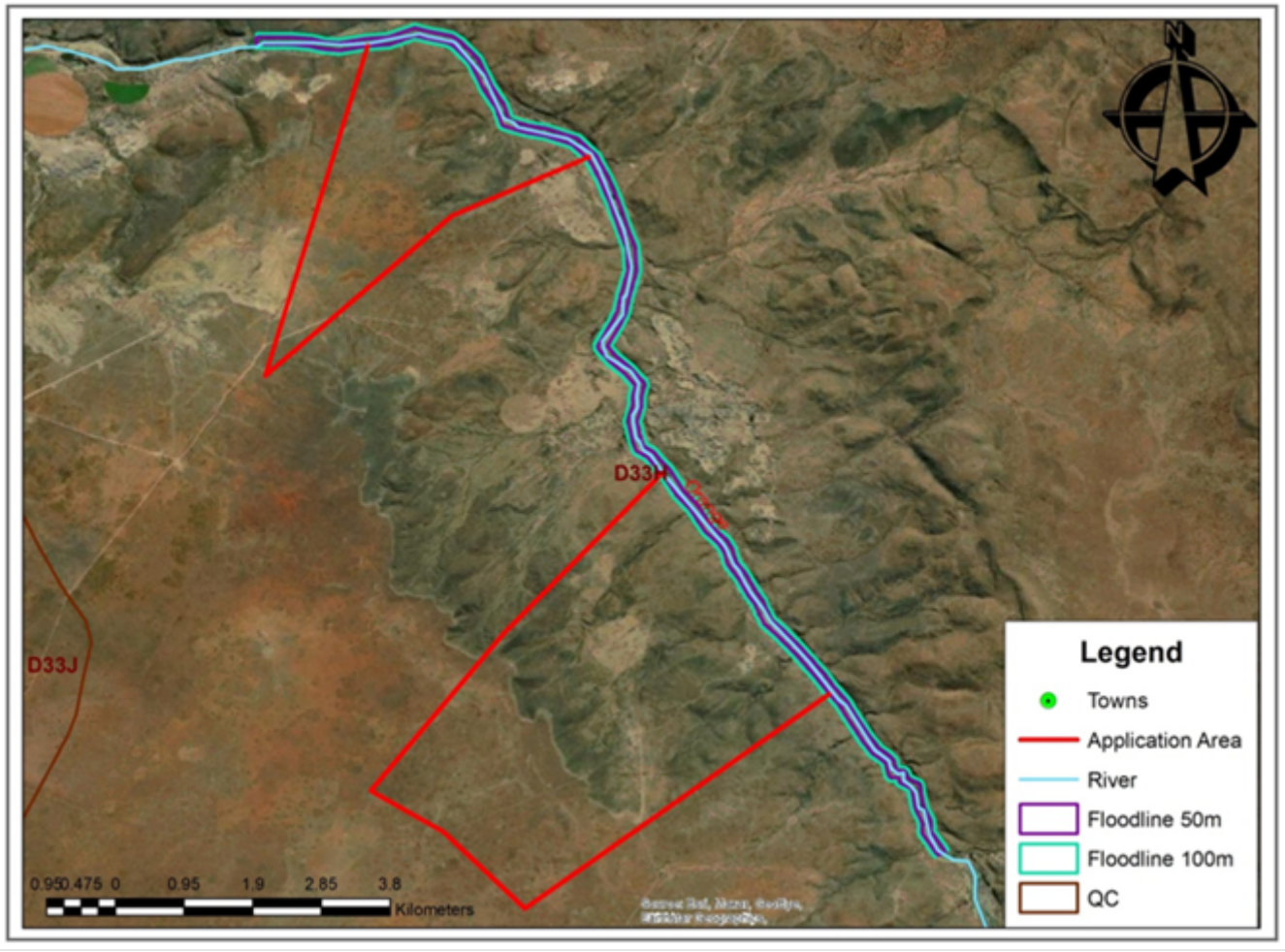
Sub-catchments	A	B
Intensity (I) 1:50	95.4 mm	95.4 mm
Intensity (I) 1:100	120 mm	120 mm
Area (km²)	3.3	2.7
Flood Peak 1:50 (m³/s)	1.3	1
Flood Peak 1:100 (m³/s)	2	1.5

10.9.4 Flood Line Delineation

Flood lines for the delineated catchments were analysed to evaluate risks associated with potential flooding of infrastructure and to facilitate the protection of natural resources. For this study, flood lines were determined using the HEC-RAS model to indicate areas within the site where infrastructure associated with the proposed prospecting activities should not be built.

HEC-RAS is a hydraulic programme designed to perform one-dimensional hydraulic calculations for a range of applications, from a single watercourse to a full network of natural or constructed channels. The software is used worldwide and has consequently been thoroughly tested through numerous case studies. The flood lines were determined 1:50 and 1:100 flood peaks. Results of the flood delineation using HEC-RAS are given in Figure 10-12.

A condition of the site not being less than 100 m of the watercourse was tested by putting a 100 m buffer around the delineated rivers in Esri's ArcMap.



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FLOODLINES

Figure 10-13: Floodlines

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.
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.
Wetland and aquatic ecology	Possible loss, sedimentation and contamination of wetland seeps
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

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.

12.1 Methodology

This process describes how the significance, probability, and duration of the identified impacts that were identified through the consultation process will be determined to decide the extent to which the initial site layout needs revision.

12.1.1 Criteria of assigning significance to potential impacts.

The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure (Table 12-1).

Nature of impact

This is an appraisal of the type of effect the activity would have on the affected environmental component. Its description should include what is being affected, and how. The impact may be positive or negative.

Extent

The physical and spatial size of the impact. This is classified as follows:

Local

The impacted area extends only as far as the activity, e.g., a footprint.

Site

The impact could affect the whole, or a measurable portion of the property.

Regional

The impact could affect the area including the neighbouring farms, transport routes, and the adjoining towns.

Cumulative

The impact could have a cumulative effect on the surrounding land uses.

Duration

The lifetime of the impact which is measured in the context of the lifetime of the proposed phase (i.e., construction or operation.

Short term

The impact will either disappear with mitigation or will be mitigated through natural process in a short time.

Medium term

The impact will last up to the end of the mining period, whereafter it will be entirely negated.

Long term

The impact will continue or last for the entire operational life of the mine but will be mitigated by direct human action or by natural processes thereafter.

Permanent

Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

Intensity

This describes how destructive, or benign, the impact is. Does it destroy the impacted environment, alter functioning, or slightly alter it. These are rated as:

Low

This alters the affected environment in such a way that the natural processes or functions are not affected.

Medium

The affected environment is altered, but function and process continue, although in a modified way.

High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

Probability

This describes the likelihood of the impacts occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

Improbable

The possibility of the impact occurring is very low, due either to the circumstances, design, or experience.

Probable

There is a possibility that the impact will occur to the extent that provisions must be made, therefore.

Highly probable

It is most likely that the impacts will occur at some or other stage of the development.

Definite

The impact will take place regardless of any preventative plans, and mitigation measures or contingency plans will have to be implemented to contain the impact.

Determination of significance

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

No significance

The impact is not likely to be substantial and does not require any mitigatory action.

Low

The impact is of little importance but may require limited mitigation.

Medium

The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

High

The impact is of great importance. Failure to mitigate, with the objective to reduce the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

Table 12-1: Criteria for Assessing Significance of Impacts

INTENSITY OF IMPACT	RATING
Insignificant: impact is of a very low magnitude	1
Low: impact is of low magnitude	2
Medium: impact is of medium magnitude	3
High: impact is of high magnitude	4
Very high: impact is of highest order possible	5

EXTENT OF THE IMPACT	RATING
Limited: impact affects the project site	1
Small: impact extends to the boundaries of the mining area	2
Medium: impact extends to neighbouring properties	3
Large: impact affects the surrounding communities	4
Very Large: The impact extends beyond the neighbouring communities	5

DURATION OF THE IMPACT	RATING
Very short-term: impact lasts for a very short time (less than a month)	1
Short-term: impact lasts for a short time (months but less than a year)	2
Medium-term: impact lasts for the for more than a year but less than the life of operation	3
Long-term: impact occurs over the operational life of the proposed extension.	4
Residual: impact is permanent (remains after mine closure)	5

PROBABILITY	RATING
Highly Improbable: Likelihood of the impact arising is estimated to be negligible; <5%. 1	1
Improbable: Likelihood of the impact arising is estimated to be 5-35%. 2	2
Possible: Likelihood of the impact arising is estimated to be 35-65% 3	3
Probable: Likelihood of the impact arising is estimated to be 65-95%. 4	4
Highly Probable: Likelihood of the impact arising is estimated to be > 95%. 5	5

PROBABILITY	SEVERITY				
	1	2	3	4	5
1	L	L	L	L-M	L-M
2	L	L-M	M	M	M-H
3	L	M	M	M-H	H
4	L-M	M	M-H	H	H
5	L-M	M-H	H	H	H

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, operations 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 Northern Cape 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;
- Construction and ground preparation for the planned prospecting 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;
- back filling of trenches associated with the project;
- Preparation of prospecting activities associated with the project; and
- Vegetation clearing of the construction footprint.

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 because 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 because of the extension of the mining area, loss of livestock farming land cultivated land, impacting on potential crop yield;
- Positive impact on local economy due to economic opportunities 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, 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

Earth moving machinery and construction vehicles usage 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, 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 because of spillages and uncontrolled release.

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 unnamed tributary 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 because 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 prospecting area.

Some level of sedimentation is expected to occur in the unnamed tributaries 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 proposed prospecting 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 for SCC because 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 resulting from site clearance, anthropogenic activity, and possible uncontrolled fires;
- Impact on floral SCC resulting from clearing, anthropogenic activity, and uncontrolled fires;
- Potential spreading of alien invasive species resulting from 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 because of site clearing, alien invasive species, erosion, and general construction activities;
- Loss of faunal diversity and ecological integrity because 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 resulting from 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 Wetland and Aquatic Environmental Impacts

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

- Loss of habitat and wetland ecological structure resulting from site clearance activities and uncontrolled wetland degradation;
- Impact on the wetlands systems resulting from changes to the sociocultural service provisions though site clearance, waste management and wetland disturbance;
- Potential poor planning, resulting in the placement of the linear infrastructure within wetland habitat, leading to altered habitat (fragmentation);
- Impact on the hydrological functioning of the wetland systems;
- Soil compaction and levelling resulting from construction activities and vehicle movement leading to loss of wetland and riparian habitat; and
- Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland 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 $PM_{2.5}$ resulting from bulk earthworks, operation of heavy machinery, and material movement; and
- Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) because of movement of vehicles and operation of machinery/equipment.

13.1.7 Visual Impacts

The following impacts on the visual character resulting from the proposed prospecting activities are envisaged during the pre-construction and construction phases:

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

13.1.8 Noise Impacts

Prospecting requires the use of vehicles and machinery during the pre-construction and construction phases. This may generate noise in the immediate vicinity and in addition, the assembling of mine related equipment and/or structures during the construction phase will inherently generate a degree of noise emissions.

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 a measurable deterioration. This impact is permanent but will be localised within the site boundary. This impact is possible and will have moderate significance with or without implementation of mitigation measures as it is impossible to re-create original soil profile distribution.

Soil chemical pollution because of potential oil and fuel spillages from vehicles is 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 because of the heavy vehicles commuting on the existing roads as well as any new haul roads constructed 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 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 a, it is anticipated that the significance of this impact can be reduced to moderate. In areas of permanent changes such as road upgrades, 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 found that terms of archaeology and heritage in respect of the prospecting right application, there are no obvious ‘Fatal Flaws’ or ‘No-Go’ areas. However, the potential for chance finds, remains and the developer and contractors are advised to be diligent and observant during the construction of the land site. The procedure for reporting chance finds has been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the prospecting right application cannot be approved.

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 resulting from 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 have potential to impact on the climate in the area due to emissions of Green House Gases (GHGs).

13.1.16 Cumulative Impacts

The following cumulative impacts are envisaged because of the proposed prospecting project:

- Increased generation of dust, PM_{10} and $PM_{2.5}$ within the local area; and
- Reduced land availability for livestock grazing and agricultural use.

Table 13-1: Potential Impacts and mitigation measures associated with the pre-construction and construction phase of the proposed Samara prospecting project.

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 (-)	Bulk Sampling	Protect social - economic environment of local land users.	• Where possible, site 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 resulting from the prospecting activities, loss of cultivated and grazing land	4	2	5	3	2	**55**	Medium High (-)	Bulk Sampling	Minimise loss of agricultural land and crop yields.	• Timeous communication with farm leaser on the prospecting 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 farmer'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	3	3	2	2	1	**24**	Low (-)	Bulk Sampling	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 prospecting 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	3	3	3	2	2	**36**	Medium Low (-)
Indirect	Positive impact on local economy due to economic opportunities for local and regional business	2	4	2	1	1	**16**	Low (-)	Bulk Sampling	Improve on local economy through utilisation of local resources.	• Develop a register of local business; • Open communication channel with the local community around Samara Mining regarding opportunities to register on the Samara Mining suppliers list to manage expectations; • 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	3	4	2	2	2	**36**	Medium Low (-)

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Indirect	Negative impact due to the occurrence of additional trucks on the roads, and the incidence of construction workers on site	3	3	2	3	2	**40**	Medium High (-)	Bulk Sampling	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 Samara Mining standards and requirements, Samara Mining 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 Samara Mining 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 (-)	Bulk Sampling	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 Samara Mining 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 Samara Mining standards and requirements, Samara Mining 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 (-)	Bulk Sampling	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 continue as per 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; • 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 because of spillages and uncontrolled release	2	2	2	3	3	**36**	Medium Low (-)	Bulk Sampling			Pre-Construction and Construction Phase	1	2	2	2	2	**20**	Low (-) **d**
Indirect	Monitoring boreholes located on Bulk Sampling area may be a conduit of flow to the groundwater unless sealed	3	3	4	3	3	**60**	Medium High (-)	Bulk Sampling		• Grouting and capping of boreholes located within the footprint of construction camps be required prior to construction activities.	Pre-Construction and Construction Phase	1	2	2	2	3	**25**	Low (-) **d**
Surface Water Impacts																			

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Direct	Contaminated dirty water runoff to surrounding areas resulting in the impact on local surface water quality	3	3	4	3	3	**60**	Medium High (-)	Bulk Sampling	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 Construction Phase	1	2	2	2	3	**25**	Low (-) **d**
Direct	Increase in turbidity of the local water streams because of runoff of cleared areas	2	3	2	4	2	**42**	Medium High (-)	Bulk Sampling	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 to minimize undue erosion; • Erosion can also be limited by ensuring that site 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 prospecting 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; • 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 monthly.	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 (-)	Bulk Sampling	Protection of Surface water	• Adequate protection measures at river crossings will be included in the infrastructure designs.	Pre-Construction and Construction Phase	1	2	1	1	1	**8**	Low (-)
Direct	Increase of erosion potential during construction activities associated with the Bulk Sampling	1	2	4	3	2	**35**	Medium Low (-)	Bulk Sampling	Prevention of sedimentation because of erosion.	• Adequate storm water management should be considered in the detailed design of the proposed infrastructure to minimize undue erosion; • Ensure erosion protection measures are adequately implemented and monitored; • Erosion can also be limited by ensuring that site vehicles and human movement is limited to project specific dedicated access ways.	Pre-Construction and Construction Phase	1	2	2	2	1	**15**	Low (-)
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 (-)	Bulk Sampling	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 (-)	Bulk Sampling		• Waste will be disposed of in accordance with 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 (-)

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Biodiversity Impacts																			
Direct	Potential spreading of alien invasive species because of floral disturbance	3	2	4	4	4	**72**	Medium High (-)	Bulk Sampling	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 (-)	Bulk Sampling	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 wetland or other natural habitats.	Pre-Construction and Construction Phase	2	1	2	2	2	**20**	Low (-)
Direct	Impact of faunal species of conservational concern due to habitat loss and collision with construction vehicles	2	3	4	3	3	**54**	Medium High (-)	Bulk Sampling	Protection of species of Conservational Concern.	• 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 (-)
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 (-)	Bulk Sampling	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; • 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 (-)

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Indirect	Loss of faunal divert and ecological integrity because of construction activities, erosion, poaching and faunal specie trapping	3	2	3	3	3	**48**	Medium High (-)	Bulk Sampling	Reduce impacts on faunal ecological integrity through curbing erosion and poaching.	• Edge effects of construction and operational activities need to be actively managed 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 wetland 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 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 (-)	Bulk Sampling	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 (-)
Wetland and Aquatic Impacts																			

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Indirect	Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources	3	3	2	3	2	**40**	Medium High (-)	Bulk Sampling	Reduce impact of sedimentation on wetland and riparian resources.	• Restrict construction to the drier winter months, if possible, to avoid increased water inputs and sedimentation within the wetland; • Adequate storm water management must be incorporated into the design of the proposed development throughout all phases 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 because of construction activities and vehicle movement leading to loss of wetland and riparian habitat	4	3	3	4	3	**70**	Medium High (-)	Bulk Sampling	Minimise impact on wetland and riparian habitat	• No construction of infrastructure may take place within riparian and wetland 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 wetland 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 wetland areas or their associated buffer zones; • It must be ensured that contractor laydown areas are located outside of wetland and riparian areas and associated 100 m buffer zones and excluded from clearing activities 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 because of bulk earthworks, operation of heavy machinery, and material movement.	2	2	2	2	2	**24**	Low (-)	Bulk Sampling	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 because 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 (-)

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Direct	Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) because of movement of vehicles and operation of machinery/equipment.	3	3	2	2	2	**32**	Medium Low (-)	Bulk Sampling		• 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 (-)
Visual Impacts																			
Direct	Scaring of the landscape because of the clearance of vegetation and preparation of the Bulk Sampling.	2	2	2	2	2	**24**	Low (-)	Bulk Sampling	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 daily; • Litter and dust management measures should be always in place; • The sites should be always kept neat and tidy; • On site construction activities will be limited to be undertaken between 6am and 6pm.	Pre-Construction and Construction Phase	1	1	1	1	1	**6**	Low (-)
Direct	Indirect visual impact due to dust generation because of the movement of vehicles and materials, to and from the site area.	1	2	2	3	3	**30**	Medium Low (-)	Bulk Sampling			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 (-)	Bulk Sampling	Minimise the emission of noise pollution during construction and prospecting activities.	• Hauling vehicles with low noise levels to be used and must be always maintained in a good order; • 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; • 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 because of the mining activities.	2	2	2	3	3	**36**	Medium Low (-)	Bulk Sampling		• The roll over prospecting method must include the construction of a noise barrier on the current prospecting 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																			

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Direct	Chemical pollution of soils because of vehicle hydrocarbon spillages and compaction.	2	2	2	3	3	**36**	Medium Low (-)	Bulk Sampling	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; • 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 (-)
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 (-)	Bulk Sampling	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 pit 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 because of the cleaning and topsoil stripping of the construction footprint.	3	2	3	2	3	**40**	Medium High (-)	Bulk Sampling		• The existing pre-construction prospecting 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) 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	As a result of construction activities, the land use will have altered from grazing and agriculture to that of construction for mining activities	2	2	3	2	3	**35**	Medium Low (-)	Bulk Sampling	Minimise loss of agricultural land.		Life of Operation	2	2	2	2	2	**24**	Low (-)
Direct	Handling and storage of building materials and different kinds of waste leading to soil sterilisation.	2	2	2	2	2	**24**	Low (-)	Bulk Sampling	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 costs and if it occurs, should be cleaned up immediately.	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		
Direct	Permanent loss of land capability and land use.	3	3	2	2	2	**32**	Medium Low (-)	Bulk Sampling	Minimise loss of land capability and enhance rehabilitation.	• Land capability and land use will be lost because 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 (-)

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		
Heritage Impacts																			
Direct	The proposed project has the potential to impact on sites of archaeological importance.	4	1	1	4	4	**48**	Medium High (-)	Bulk Sampling	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; • 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 prospecting 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.	Pre-Construction and Construction Phase	2	1	1	1	1	**8**	Low (-)
Palaeontology Impacts																			
Direct	Sealing-in or destruction of the fossils during earth moving activity	4	3	3	2	2	**40**	Medium High (-)	Bulk Sampling	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 because of bush clearing and construction vehicles on site.	3	3	2	2	2	**32**	Medium Low (-)	Bulk Sampling	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 bulk sampling	3	2	3	3	3	**48**	Medium High (-)	Bulk Sampling	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; • Optimally exploit this resource in terms of tonnage of rock mined and cost	Life of Operation	1	2	2	2	2	**20**	Low (-)
Climate Impacts																			
Direct	Emissions of Green House Gases because of the use of plant, heavy moving machinery, generators etc.	2	3	2	3	3	**42**	Medium High (-)	Bulk Sampling	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, PM10 and PM2.5 within the local area	2	3	2	3	2	**35**	Medium Low (-)	Bulk Sampling	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			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	Reduced land availability for agricultural use	2	3	2	3	2	**35**	Medium Low (-)	Bulk Sampling	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 (-)	Bulk Sampling				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:

- Excavation of the diamond ore;
- Operation of the processing plant;
- Water and stormwater management;
- Maintenance of infrastructure;
- Maintenance of topsoil stockpiles;
- Machinery movement during prospecting activities;
- Transportation of ore; and

The following impacts are envisaged during the operational phase.

13.2.1 Socio – Economic Impacts

The following socio – economic impacts are envisaged because of the operational phase of the proposed project:

- Negative impact because 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;
- Positive impact because of operation and associated activities, providing a potential for local employment opportunities; increasing access to financial capital for workers; and

13.2.2 Groundwater Impacts

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

- Lowered groundwater levels due to dewatering of the pit void;
- Process water seepage from the potential contaminant source zones affecting local groundwater quality: Process water is also likely to seep from the PCDs and tailings dam into the local groundwater and subsequently decrease the water quality in the local area.
- prospecting impacting on water quality because of groundwater inflows into the workings which needs to be pumped out for mine safety and the resultant dewatering (water level decrease) of the groundwater system in the immediate vicinity of the working;
- 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
- Contaminated Groundwater Impacting Local Receptors: During operation, 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.

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 and Plant Area: The rainfall water within the designated dirty water areas of the pits and Plant Area 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.
- The 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 remains of moderate significance both pre- and post-mitigation. It is recommended that regular dust suppression be conducted as far as possible using water from the pollution control dams thereby keeping the PCDs as close to empty as possible to allow for accommodation of the design storm.
- 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.
- Operation of the buildings and workshop areas: Changes to the hydrology within the catchment may also occur due to the rainfall and storm water within the buildings and workshop areas will result in increased peak flows due to the impervious nature of the ground being introduced. The effluent generated within the workshop areas should be controlled and managed using localised sumps at various areas. The potential for contamination of surface water due to releases of dirty water (runoff and return water) will be due to high concentration because of pollutant build up. Spillages and accidental discharges from these areas also have the potential to impact on the unnamed tributaries via cumulative waste load build-up and subsequent wash off during storm events (via runoff) but the impacts will be very localised to the areas due to proximity limitations of the first flush event. The impact is of moderate significance but can be mitigated and reversed through a combination of on-site clean-up using spill kits and assimilation/natural recovery in the watercourse or drainage areas.
- Improper site management may result in runoff from latrines and domestic waste which could pollute surface water resources;
- 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 because of incorrect waste management practises and pollution.

Some level of sedimentation is expected to occur in the unnamed tributaries pre-development 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.

13.2.4 Biodiversity Impacts

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

- Destruction of potential floral habitats because of continual disturbance of soil, leading to altered floral habitats, erosion and sedimentation;

- Impact on floral diversity because of possible uncontrolled fires;
- Potential spreading of alien invasive species because 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 because of poaching and faunal species trapping;
- Impact of faunal species of conservational concern due to habitat loss and collision with vehicles transporting material; 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 Wetland and Aquatic Environmental 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 wetlands and aquatic ecosystems:

- Loss of habitat and wetland ecological structure because of continual wetland disturbance and uncontrolled wetland degradation;
- Impact on water quality and availability as a result in ineffective dirty water separation, and dirty water entering the wetland;
- Impact on the wetlands systems because of changes to the sociocultural service provisions through continued uncontrolled vegetation clearance, waste management and wetland disturbance; and
- Impact on the hydrological functioning of the wetland systems because of reduced wetland 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 $PM_{2.5}$ because of stockpiling material, use of heavy machinery, and material movement;
- Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) resulting from movement of vehicles and operation of machinery/equipment.

13.2.7 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 prospecting activities, including removal of diamonds and potentially increasing the height of the stockpile and dumps;

- Additional vehicular activities impacting on the rural character of the region and leading to visual exposure of receptors further from the Samara project area to diamond prospecting activities;
- Generation of dust leading to visual intrusion, visual exposure of receptors 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.

13.2.8 Noise Impacts

The following noise impact is envisaged because of the pre-construction 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 because of the prospecting activities. The assembling of mine related equipment and/or structures during the operational phase will inherently generate a degree of noise emissions.

13.2.9 Soils, Land Use and Land Capability Impacts

The operation of the Samara prospecting 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 prospecting activities has potential for contamination should it not be managed properly, which may render the land not usable after back filling 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 because of operational activities can be because of several activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).

13.2.10 Traffic Impacts

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

13.2.11 Heritage Impacts

In terms of archaeology and heritage in respect of the prospecting right application, there are no obvious ‘Fatal Flaws’ or ‘No-Go’ areas. However, the potential for chance finds, remains and the developer and contractors are advised to be diligent and observant during the construction of the land site. The procedure for reporting chance finds has been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the prospecting right application cannot be approved.:

- 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.

13.2.12 Palaeontology Impacts

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

13.2.13 Topography Impacts

As a result of operational phase activities, the following impacts are envisaged because 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 bulk sampling of the Samara prospecting project area will ultimately alter the topography.

13.2.14 Geology Impacts

Extraction of the diamond resources will result in the removal of local geology.

13.2.15 Climate Impacts

As a result of the operational activities, emissions of Green House Gases may occur because of the use of plant, heavy moving machinery, generators etc.

13.2.16 Cumulative Impacts

The following cumulative impacts are envisaged because of the proposed operation of the Samara prospecting project:

- Increased generation of dust, PM_{10} and $PM_{2.5}$ within the local area;
- Increased loss of indigenous vegetation and loss of soil resources; and
- Reduced land availability for livestock grazing and agricultural use.

Table 13-2: Potential Impacts and mitigation measures associated with the operational phase of the proposed Samara prospecting project.

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 because of bulk sampling as there will be additional trucks on the roads, impacting on local communities' health and safety	3	3	4	2	1	**30**	Medium Low (-)	Bulk Sampling	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 Samara Mining standards and requirements, Samara Mining 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 Samara Mining 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 (-)	Bulk Sampling	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; • 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 Samara Mining employees and neighbouring landowners and inhabitants about local recruitment strategies and policies, and give regular updates; Monitor the surrounding area for informal settlement and develop a strategy to deal with informal settling; • Ensure that all contractors and their employees attend inception training, addressing Samara Mining standards and requirements, Samara Mining 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 because of operation and associated activities, providing a potential for local employment opportunities; increasing access to financial capital for workers	3	3	4	1	1	**20**	Low (-)	Bulk Sampling	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 employment and procurement policy; • Communication with locals regarding job opportunities and skills requirements to manage expectations.	Life of Operation	3	3	4	2	1	**30**	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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
Direct	Negative impact because of manmade features dissecting the landscape which will impact on the rural and agricultural sense of place.	2	3	4	2	1	**27**	Medium Low (-)	Bulk Sampling	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 because of hydrocarbon spillages from machinery.	2	2	2	3	3	**36**	Medium Low (-)	Bulk Sampling	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 because of spillages and uncontrolled release.	2	2	2	3	3	**36**	Medium Low (-)	Bulk Sampling			Life of Operation	1	2	2	2	2	**20**	Low (-)
Indirect	Monitoring borehole on the border of the Bulk Sampling area may be a conduit of flow to the groundwater unless sealed.	3	3	4	3	3	**60**	Medium High (-)	Bulk Sampling		• 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 the wetland.	2	1	1	1	1	**8**	Low (-)	Bulk Sampling	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 (-)**	Bulk Sampling	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 Bulk Sampling 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 (-)	Bulk Sampling	Recue 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 volume of contaminated water that needs to be managed within the footprint	2	2	3	3	3	**42**	Medium High (-)	Bulk Sampling	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 (-)
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 (-)	Bulk Sampling	Prevent water pollution because of pump failure	• Maintenance of infrastructure must be undertaken in a regular basis	Life of Operation	1	2	2	2	2	**20**	Low (-)

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		Consequence			Likelihood (Probability)		Significance (Degree to which impact may	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
Direct	Runoff from calcrete stockpiles yielding acidic water which may impact on water quality.	2	3	3	2	2	**32**	Medium Low (-)	Bulk Sampling	Prevent water pollution due to runoff from calcrete stockpiles.	• Stockpiles should not stay for a long period before it is discarded to the rehabilitation site	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 (-)	Bulk Sampling	Prevent water pollution because 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; • 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 (-)
Indirect	Impacts on surface water resources quality because of incorrect waste management practises and pollution.	2	3	3	2	2	**32**	Medium Low (-)	Bulk Sampling	Prevent water pollution because of waste management practises.		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 (-)	Bulk Sampling	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 because 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 (-)	Bulk Sampling	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 because of alien species proliferation, poaching, and collision of vehicles with animals	3	3	2	2	2	**32**	Medium Low (-)	Bulk Sampling	Minimise the loss of faunal diversity because 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 (-)	Bulk Sampling	Protection of indigenous vegetation.	• All soils compacted because 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 (-)
Indirect	Discharge and contamination from operational facilities may pollute receiving environment, impacting on faunal diversity	2	2	2	2	2	**24**	Low (-)	Bulk Sampling	Ensure adequate planning to prevent habitat destruction.	• Edge effects of operational activities need to be actively managed 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 (-)
Wetland and Aquatic Impacts																			
Direct	Loss of habitat and wetland ecological structure because of continual wetland disturbance and uncontrolled wetland degradation.	2	3	3	3	3	**48**	Medium High (-)	Bulk Sampling	Protection of Wetland Habitat and wetland 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 wetland and riparian areas and associated 100 m buffer zones and excluded from clearing activities to minimise	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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
											• 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 wetland features is 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 wetland areas along the linear development should be avoided to retain soil stability provided by the grass root structures.								
Direct	Impact on the wetlands systems because of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and wetland disturbance	2	3	3	3	3	**48**	Medium High (-)	Bulk Sampling	Minimise change and effectiveness of wetland service provision	• As much vegetation growth as possible should be promoted within the wetland features 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 wetland 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, wetland 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 wetland features and ensure establishment of indigenous species within areas previously dominated by alien vegetation; • Maintain the REC for each of the wetland features, as stated within the wetland report during the life of the development.	Life of Operation	2	2	2	2	2	**24**	Low (-)
Indirect	Impact on the hydrological functioning of the wetland systems because of reduce wetland footprints and uncontrolled disturbance during maintenance activities	2	3	3	3	2	**40**	Medium High (-)	Bulk Sampling	Conserve the hydrological function of the surrounding wetlands.	• Flow continuity and connectivity of the freshwater features must be reinstated post- construction activities; • Regular monitoring of water quality must be implemented to ensure the impacts of runoff and decant of water into wetland resources is prevented or minimised; • Adequate storm water management must be incorporated into the design of the proposed development throughout all phases 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 wetland because of the Bulk Sampling	4	3	3	4	3	**70**	Medium High (-)	Bulk Sampling	Minimise impact on wetland and riparian habitat	• Dirty water must be recycled back into the mining system; • All wetland 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																			

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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
Direct	Possible increase in dust generation, PM10 and PM2.5 because of stockpiling material, use of heavy machinery, and material movement.	3	3	2	4	4	**64**	Medium High (-)	Bulk Sampling	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 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 on site or if possible, at sensitive receptors near the site; • 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) because of movement of vehicles and operation of machinery/equipment.	3	3	2	2	2	**32**	Medium Low (-)	Bulk Sampling		• 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 (-)
Visual Impacts																			
Direct	Scaring of the landscape because of the clearance of vegetation and preparation of the Bulk Sampling.	2	2	2	2	2	**24**	Low (-)	Bulk Sampling		• It is recommended that stockpiles be vegetated with indigenous vegetation 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 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, 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; • 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	Life of Operation	1	1	1	1	1	**6**	Low (-)
Direct	Indirect visual impact due to dust generation because of the movement of vehicles and materials, to and from the site area.	1	2	2	3	3	**30**	Medium Low (-)	Bulk Sampling			Life of Operation	1	1	1	2	2	**12**	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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
											• 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 (BLM, 2013); 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 (-)	Bulk Sampling	Minimise the emission of noise pollution during construction and prospecting activities.	• Hauling vehicles with low noise levels to be used and must be always maintained in a good order; • 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; • 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 because of the prospecting activities.	2	2	2	3	3	**36**	**Medium Low (-)**	Bulk Sampling	Reduce noise emissions during operation.	• The roll over mining method must include the construction of a noise barrier on the northwest side of each current Pit 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	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 (-)	Bulk Sampling	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; • 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 because of the cleaning and topsoil stripping of the construction footprint.	2	3	2	2	2	**28**	**Medium Low (-)**	Bulk Sampling		• The existing pre-construction layout and design must aim to minimise the area to be occupied by project 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) 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)	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 prospecting activities	2	3	3	2	2	**32**	**Medium Low (-)**	Bulk Sampling	Minimise loss of agricultural land.		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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
											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;								
Direct	Soil contamination because of operational activities can be because of several activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	3	2	3	3	2	**40**	Medium High (-)	Bulk Sampling	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 Pits are all hazards faced by stockpiles. This should be avoided at all costs 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 (-)	Bulk Sampling	Conserve heritage artefacts and buildings.	• Monitor and control the prospecting 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 (-)	Bulk Sampling	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 (-)	Bulk Sampling	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 excavation of the Bulk Sampling area will ultimately alter the topography.	3	3	4	3	3	**60**	Medium High (-)	Bulk Sampling			Life of Operation	3	3	4	2	1	**30**	Medium Low (-)
Geology Impacts																			

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	Significance Rating					Consequence			Likelihood (Probability)		Significance (Degree to which	Significance Rating
Direct	Removal of local geology because of prospecting	2	2	3	2	2	**28**	Medium Low (-)	Bulk Sampling	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; • Optimally exploit this resource in terms of tonnage of rock mined and cost as provided for in the prospecting plan.	Life of Operation	1	2	2	2	2	**20**	Low (-)
Climate Impacts																			
Direct	Emissions of Green House Gases because of the use of plant, heavy moving machinery, generators etc.	2	2	3	2	2	**28**	Medium Low (-)	Bulk Sampling	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, PM10 and PM2.5 within the local area	2	3	2	3	2	**35**	Medium Low (-)	Bulk Sampling	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 (-)	Bulk Sampling	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 (-)	Bulk Sampling				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 prospecting related infrastructure. The potential impacts associated with demolition activities are like 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 project will entail the demolition and removal of most 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 13-3, can be applied during the closure/rehabilitation phase in terms of the demolition of the project related infrastructure:

Table 13-3: 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) to approximate the pre-mining aspect and contours. The previous infrastructure footprint area must be ripped several times 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 the Soil Conservation Plan is 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. If vegetation has not re-established, and erosion gullies have developed, remedial action should be taken.
Biodiversity	● All soils compacted because 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. ● Post closure groundwater management will need to be very

Environmental Aspect	Additional Mitigation Measures
	carefully managed to ensure that no impact on the wetland 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; ● All mined areas should be flooded as soon as possible to bar oxygen from reacting with remaining pyrite; ● 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 excavated areas is recommended so that recovery of water in those areas can be monitored; ● Intercepting decant by a downstream trench is an option to investigate; ● Treating of decanting pit water to acceptable water quality levels can be achieved by the installation of a treatment plant.
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, Samara Mining (Pty) Ltd 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/project closure.

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

Table 13-4: 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							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																			
Surface water																			
Direct	Debris blocking watercourses if road continues to be used by the community.	1	2	4	4	3	49	Medium-High (-)	Bulk Sampling Decommissioning and Closure	To avoid blockage of watercourse	• Community needs to remove litter & debris to prevent blocking.	Duration of the decommissioning/ rehabilitation phase	1	2	2	2	3	25	Low (-)
Direct	Impeding flow while under demolition	3	2	2	1	3	28	Medium-Low (-)	Bulk Sampling Decommissioning and Closure		• Demolish infrastructure as far as possible in the dry season	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 (-)	Bulk Sampling 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 (-)			• 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/project 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	4	3	5	5	3	88	**High (-)**	Bulk Sampling Decommissioning and Closure	To avoid or minimise the lowering of groundwater	• Regularly monitor water levels in boreholes near the active excavation area. • Regularly update and validate groundwater numerical model to ensure that the drawdown zone does not extend beyond managed/monitored areas. • 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.	Duration of the decommissioning/ rehabilitation phase	3	2	1	2	4	36	Medium-Low (-)
Direct	Potential Decant of Acid Mine Water: Following mine closure and subsequent recovery (rebounding) of the local groundwater, the mine void space will fill with water. If the local groundwater pressure were to rise above local topography, then decant points could form and the decant water is likely to be of poor quality.	2	2	1	1	4	25	Medium-Low (-)	Bulk Sampling Decommissioning and Closure	To minimise groundwater contamination	• Regularly monitor water levels and water quality in boreholes near the active excavated area. • Regularly update and validate groundwater numerical model to ensure that the water level rebound is as predicted and that the potential for decant has not altered. • If potential for decant increases then actively respond with pump and treat measures, as required.	Duration of the decommissioning/ rehabilitation phase	1	2	1	2	4	24	Low (-)
Direct	Post-closure the contamination plumes are expected to take many years to return to the natural water quality of the area.	2	2	1	2	4	30	Medium-Low (-)	Bulk Sampling Decommissioning and Closure		• Implement frequent (preferably with loggers) monitoring of water levels and water quality in boreholes local to the active excavated area. • Ensure receptors (private boreholes and riverbeds) are regularly monitored. • Source alternative water sources to provide to the	Duration of the decommissioning/ rehabilitation	2	2	1	1	4	25	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		
											sensitive receptors (users), should groundwater quality, or yield, be shown to be negatively affected by the project. • 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								
Wetlands																			
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 (-)	Bulk Sampling 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 relevant contractors leave the site; • Post-closure monitoring of the wetlands is recommended to be undertaken.	Duration of the decommissioning/ rehabilitation phase	2	1	2	1	2	15	Low (-)
Visual																			
Indirect	Removal of infrastructure and general decommissioning and closure activities leading to visual intrusion on sensitive receptors.	3	2	3	3	3	48	Medium-High (-)	Bulk Sampling 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 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																			

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	Soil Compaction	2	3	3	3	2	40	Medium-High (-)	Bulk Sampling 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 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 (-)	Bulk Sampling 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 development. • The footprint of the proposed prospecting 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;	Duration of the decommissioning/ rehabilitation	2	1	2	1	2	15	Low (-)
Indirect	Soil Degradation	2	3	2	5	3	56	Medium-High (-)	Bulk Sampling 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; • Stockpile's 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 regarding 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 to achieve a free draining landscape that is as close as possible the pre-mining/prospecting land capability rating.	Duration of the decommissioning/ rehabilitation	3	1	3	3	2	35	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			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		
Residual	Soil Contamination n	4	3	3	2	3	**50**	Medium-Low (-)	Bulk Sampling 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																			
Direct	Loss of floral SCC	4	2	5	2	3	55	Medium-High (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 because of disturbance leading to loss of floral habitat	3	2	3	4	3	56	Medium-High (-)	Bulk Sampling 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 (-)**	Bulk Sampling 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 prospecting and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	4	3	5	5	3	88	**High (-)**	Bulk Sampling 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 (-)**	Bulk Sampling 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	2	2	2	1	18	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		
Residual-post closure	Ineffective rehabilitation may lead to permanent transformation of floral habitat	4	3	3	4	4	80	High (-)	Bulk Sampling 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 prospecting and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	3	3	4	4	4	80	High (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling 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 (-)	Bulk Sampling Decommissioning and Closure	Species composition should be like 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 (-)	Bulk Sampling Decommissioning and Closure	Faunal habitat should be rehabilitated to a similar state prior to prospecting/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 (-)	Bulk Sampling 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 (-)
Cumulative	Ongoing prospecting and ineffective rehabilitation leading to cumulative loss of faunal habitat and diversity in the region	3	3	5	3	3	66	Medium-High (-)	Bulk Sampling 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 (-)

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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		
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 (-)	Bulk Sampling 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 (-)	Bulk Sampling Decommissioning and Closure	To ensure effective rehabilitation	• Faunal habitat is to be reinstated to a similar state as to that of conditions prior to prospecting 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 (-)	Bulk Sampling Decommissioning and Closure	Recovery of habitat structure	• Ensure habitat structure is like that of prior to prospecting activities	Post-closure	3	2	3	2	2	32	Medium-Low (-)
Waste Management																			
Direct	Potential water and soil pollution because of inappropriate waste management practices	2	3	2	2	2	28	Medium-Low (-)	Bulk Sampling 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 (-)

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

Refer to Section 13 for the mitigation measures that could be applied to reduce the level of risk that will be posed by the proposed prospecting 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 Section 13 of this report.

15 Motivation where no alternatives were considered.

The diamond mineralisation potential was identified on the proposed prospecting right area. Specialist studies conducted did not identify any ‘no go’ areas. The activity and technology to be used has also for years been proven to work. Hence no alternative option was investigated.

16 Statement motivating the preferred site.

The diamond mineralisation potential was identified on the proposed prospecting right area. Specialist studies conducted did not identify any ‘no go’ areas. The activity and technology to be used has also for years been proven to work. Hence no alternative option was investigated.

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 construction of infrastructure: • *Prospecting area;* • *Ablution facilities with a footprint of no more than 16m^2;* • *Access roads, including a haul road running from the pit to the processing plant area;* • *Chemical storage area of about <0.001 ha to be used as a chemical storage facility;* • *Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from;* • *Vehicle parking area covering approximately <0.01 hectares:* • *Topsoil stockpile covering an area of about <0.5 hectares;* • *Vegetation clearance <20ha;* • *A slimes dam of about <0.1 hectares and* • *Fences of about 100m^2 will be erected*	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 (-)
	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 because 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 (-)	Development and implementation of a 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 because of construction activities and vehicle movement leading to loss of wetland and riparian habitat	Wetlands and 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 wetland and riparian 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 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	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 because 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 (-)
	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	Geology	Construction	Medium-High (-)	Minimisation of project footprint areas	Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	a result prospecting					
	Emissions of Green House Gases because 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 (-)
Bulk sampling 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 Open and honest communication with surrounding communities	Low (-)
	Monitoring borehole on the border of the prospecting 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 prospecting 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 because of continual wetland disturbance and uncontrolled wetland degradation.	Wetlands and aquatic ecology	Operation	Medium-High (-)	Control of access to wetland areas and within the 500 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 wetlands systems because of changes to the sociocultural service provisions through uncontrolled vegetation clearance, waste management and wetland disturbance	Wetlands and aquatic ecology	Operation	Medium-High (-)		Low (-)
	Impact on the hydrological functioning of the wetland systems because of reduce wetland footprints and uncontrolled disturbance during maintenance activities	Wetlands and aquatic ecology	Operation	Medium-High (-)		Low (-)
	Impacts on the hydrological functioning of the wetland	Wetlands and aquatic ecology	Operation	Medium-High (-)		Medium-Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	because of Bulk Sampling					
	Possible increase in dust generation, PM10 and PM2.5 because 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 bulk sampling 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, land use and land capability	Operation	Medium-High (-)	Minimisation of project footprint areas	Low (-)
	Soil contamination because of operational activities can be because of several activities (i.e., hazardous substance storage, incidental hydrocarbon leakages from construction vehicles).	Soil, land use 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 bulk sampling of the prospecting 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 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	Low (-)
Closure and rehabilitation of site and infrastructure sites Removal of equipment and infrastructure • *prospecting area;* • *Ablution facilities with a footprint of no more than 16m²;* • *Access roads, including a haul road running from the pit to the processing plant area;* • *Chemical storage area of about <0.001 ha to be used as a chemical storage facility;* • *Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work*	Loss of employment Reduced regional economic development. Reduced diamond 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.	Low (-)
	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/project 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-Low (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
from; • *Vehicle parking area covering approximately <0.01 hectares:* • *Topsoil stockpile covering an area of about <0.5 hectares;* • *Vegetation clearance <20ha;* • *A slimes dam of about <0.1 hectares and* • *Fences of about 100m2 will be erected*	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 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	Medium-Low (-)
	Dust and Soil Erosion	Soils, Land use and Land Capability	Decommissioning and closure	Medium-High (-)	Implementation 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	Medium-High (-)	Control and management of alien invasive vegetation Monitoring of rehabilitated areas to ensure successful rehabilitation.	Low (-)
	Increase in erosion because of disturbance leading to loss of floral habitat	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 floral habitat	Biodiversity	Decommissioning and closure	Medium-High (-)		Medium-Low (-)
	Ongoing prospecting and ineffective rehabilitation leading to cumulative loss of natural vegetation in the region	Biodiversity	Decommissioning and closure	Medium-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 (-)		Low (-)
	Ineffective rehabilitation may lead to permanent transformation of floral habitat	Biodiversity	Decommissioning and closure	**High (-)**		Medium-Low (-)
	Ongoing prospecting 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 (-)

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	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 prospecting 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

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	• When selecting alternatives, it recommended to select sites have been impacted, if possible, to minimise the footprint of the project. The pristine sites should be used as a last resort. This will help conserve the remaining vegetation, and thus maintain ecosystem services. • Some of the sensitive species that can occur onsite may be affected by the proposed development (such as *Euphorbia spinea* and *Galenia africana*). These species are protected within South Africa under the National Forest Act (Act 84 of 1998) and therefore application for permits to remove them should be acquired from the relevant authority prior to commencement of the proposed development. • If any of the plant Species of Special Concern such as the Marula tree are identified during clearing of vegetation for the prospecting area, they should be recorded with a GPS and reported so that a relocation strategy can be employed by a suitably qualified botanical specialist. Given that plant SSC are present in large numbers on site, it is highly likely that some of these species will be encountered. No plant SSC should be destroyed because of the proposed activity. • A laminated brochure can be developed with photos and given to operators on site, all SSC can be marked with biodegradable tape and permits applied for. Large plants are to be replaced by three young plants, medium plants by two plants and small plants by similar size plants. A database should be set up to include the following: species, number of individuals, GPS co-ordinates, size, height, and whether they area multistemmed. • Fauna and Flora monitoring is recommended. The following should be adhered to for the monitoring programme: ▪ Monitoring must take place annually. ▪ Monitoring must be completed by qualified specialists; ▪ Adaptive management must be applied; ▪ Monitoring during the wet season is essential; and ▪ Findings must be compared to previous years. Considering the season which the field has been conducted, it is therefore, recommended that more data be gathered during the summer season. .		Sections 13, 19, 23, 26, 35, 37 and 40
Heritage Impact Assessment	1. From a heritage perspective supported by the findings of this study, the proposed prospecting is feasible if appropriate measures are taken to deal with the recorded burial site. 2. The footprint impact of the proposed prospecting and associated infrastructure should be kept to a minimum to limit the possibility of encountering chance finds. 3. Prospecting teams must be inducted on the possibility of encountering archaeological resources that may be accidentally exposed during subsurface clearance before the commencement of work on the site to ensure appropriate mitigation measures and that course of action is afforded to any chance finds. 4. Should chance archaeological materials or human remains be exposed during subsurface construction 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	X	Sections 13, 19, 23, 26, 35, 37 and 40

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.
	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. 5. Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMP, there are no significant cultural heritage resources barriers to the proposed mine. SAHRA may approve the alluvia diamond proposed Prospecting Right Application and associated Environmental Authorisation and Waste Management Licence for diamonds (alluvial and general) mining to proceed as planned with special commendations to implement the recommendations herein made.		
Palaeontological Impact Assessment	If a significant fossil find is made in the surface calcrete or Dwyka rocks during construction and mining, the ECO should take the following steps: **PROCEDURE FOR CHANCE PALAEONTOLOGICAL FINDS** Extracted and adapted from the National Heritage Resources Act, 1999 Regulations Reg No. 6820, GN: 548. The following procedure must be considered if previously unknown fossils or fossil sites are exposed or found during the life of the project: 1. Surface excavations should continuously be monitored by the ECO and any fossil material be unearthed the excavation must be halted. 2. If fossiliferous material has been disturbed during the excavation process it should be put aside to prevent it from being destroyed. 3. The ECO then must take a GPS reading of the site and take digital pictures of the fossil material and the site from which it came. 4. The ECO then should contact a palaeontologist and supply the palaeontologist with the information (locality and pictures) so that the palaeontologist can assess the importance of the find and make recommendations. 5. If the palaeontologist is convinced that this is a major find an inspection of the site must be scheduled as soon as possible to minimise delays to the development. From the photographs and/or the site visit the palaeontologist will make one of the following recommendations: a. The material is of no value so development can proceed, or: b. Fossil material is of some interest and a representative sample should be collected and put aside for further study and to be incorporated into a recognised fossil repository after a permit was obtained from SAHRA for the removal of the fossils, after which the development may proceed, or: c. The fossils are scientifically important, and the palaeontologist must obtain a SAHRA permit to excavate the fossils and take them to a recognised fossil repository, after which the development may proceed. 7. If any fossils are found then a schedule of monitoring will be set up between the developer and palaeontologist in case of further discoveries.		
Surface Floodline	Because of the average climate characterized by average evaporation rates for the site slightly exceeding the average rainfall, stream flow at the site is non-perennial, however perennial regionally. As such, there may be excess stream flows in wet season that would need to be appropriately managed.	X	Sections 13, 19, 23, 26, 35, 37 and 40

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.
	This baseline study therefore indicates that the proposed prospecting activities may not have significant impact on the hydrology of the study area and the entire quaternary catchment D33H. However, caution should be exercised to ensure that the river courses are protected.		
Wetlands Delineation	● Limit all activities within the demarcated areas. ● Include environmental awareness aspects into the site induction program to ensure all construction staff are aware of the location and importance of wetland habitats. ● Establish emergency response measures and a clearly defined chain of communication to rapidly deal with any unforeseen impacts to wetlands, e.g., spills. ● No stockpiling of material may take place within the wetland/watercourse areas and temporary construction camps and infrastructure should also be located outside the wetland footprint. ● Regular cleaning up of the wetland areas should be undertaken to remove litter. ● Design and implement a construction stormwater management plan that aims to minimise the concentration of flow and increase in flow velocity, as well as minimising sediment transport off site. ● Where practically possible, the major earthworks should be undertaken during the dry season (roughly from April to August) to limit erosion due to rainfall runoff. ● Store and handle potentially polluting substances and waste in designated, bunded facilities. ● Waste should be regularly removed from the construction site by suitably equipped and qualified operators and disposed of in approved facilities. ● Locate temporary waste and hazardous substance storage facilities a minimum of 100m from any wetland edge. ● Keep enough spill clean-up materials on site.	X	Sections 13, 19, 23, 26, 35, 37 and 40

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 are 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 proposed operation of Samara prospecting project will have. The proposed project will result in the creation of more jobs should it move to the next stage, which is mining. 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 project is expected to have a positive socio-economic benefit through employment of locals. Recruitment of labour will be guided by Samara Mining (Pty) Ltd.'s recruitment policies which are expected to promote the employment of local labour by the applicant as well as by any appointed contractors. Samara Mining (Pty) Ltd will ensure that a transparent process of employment will be followed to limit opportunities for conflict that may arise.

19.1.2 Key Negative Impacts After Mitigation

The assessment found that there are several negative impacts that are expected because of the proposed prospecting project. The most significant impacts identified were on groundwater and surface water resources, including the loss of wetlands and their associated functions.

The wetland assessment found the wetlands on site is located within 500m of the Orange River, the river is regarded as a National Freshwater Priority Area by the SANBI. It can be classified in terms of its hydrogeomorphic characteristics, as a river (FEPA) that receives both surface and subsurface water input, the delineated river displays a gradient of wetness across its width. Hydrophyte's species and terrestrial species dominate the drier portion of the riverbanks, while obligated hydrophytes occur in the wetter areas.

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.

- 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.
- Wetland Impacts: The specialist study shows that there is a wetland located on the site, therefore, there is potential for impacts on this wetland located on the property. Indiscriminate movement into and access to wetlands areas will result in:
    - Loss of habitat and wetland ecological structure because of site clearance activities and uncontrolled wetland degradation;
    - Impact on the wetlands systems because of changes to the sociocultural service provisions
    - Impact on the hydrological functioning of the wetland systems;
    - Increased runoff due to topsoil removal and vegetation clearance leading to possible erosion and sedimentation of wetland and riparian resources; and
    - Soil compaction and levelling because of construction activities and vehicle movement leading to loss of wetland 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 $PM_{2.5}$ because of bulk earthworks, operation of heavy machinery, and material movement.
    - Increase in carbon emissions and ambient air pollutants (NO_2 and SO_2) because of movement of vehicles and operation of machinery/equipment.
- Visual Impacts due to:
    - Visual intrusion because of the movement of machinery and the erection of contractor camps;
    - Scaring of the landscape because of the clearance of vegetation and preparation of the project areas; and
    - Indirect visual impact due to dust generation because 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. The environment of Samara project area is rural, sparsely populated and with activities limited to the prospecting activities will therefore result in an increase in ambient noise levels as a result of the prospecting activities.
- 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 bulk sampling areas will result in loss of land capability and result in a permanent change in land use 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 on site. 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;
- As a result of construction activities, the land use will have altered from grazing and agriculture to that of construction for prospecting activities;
- Handling and storage of building materials and different kinds of waste leading to soil sterilisation.

- Heritage Impacts: In terms of archaeology and heritage in respect of the prospecting right application, there are no obvious 'Fatal Flaws' or 'No-Go' areas. However, the potential for chance finds, remains and the developer and contractors are advised to be diligent and observant during the construction of the land site. The procedure for reporting chance finds has been laid out and if this report is adopted by SAHRA, then there are no archaeological reasons why the prospecting right application cannot be approved.
- 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 prospecting 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

The specialist studies and impact assessment by the EAP's team did not identify any 'Fatal Flaws' or 'No-Go' areas for the proposed project. As such it was not necessary to revise the layout plan for the proposed Samara prospecting project. The site map provided in Figure 19-1 is not final. On completion of phase1 of the prospecting activities, final bulk sampling locations will then be identified, and the site map will be updated.

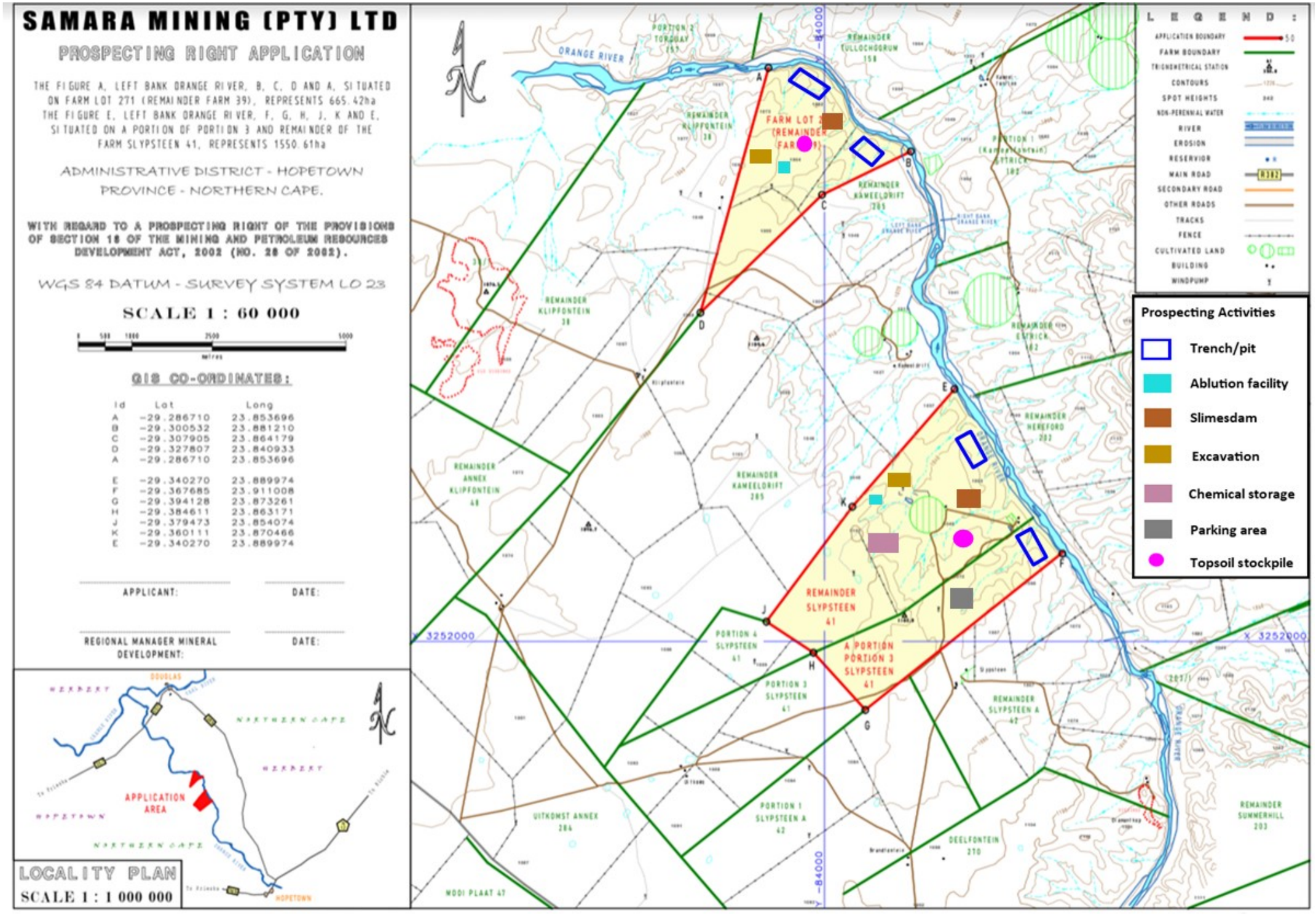

Figure 19-1: Final Site Map

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 13 and the main impacts are provided in Section 19.1. 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 many 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 wetland 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. 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 wetlands) which may also impact aquatic biota may also occur due to the proposed prospecting activities. The implementation of mitigation measures such as commencing rehabilitation activities in tandem with or immediately following construction will however reduce the duration and 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 prospecting activities, should they yield positive results, will result in the development of a mine which 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 growth in the local and regional economy. Moderate negative social impacts are expected due to the impacts the proposed Bulk Sampling will have on agricultural activities (livestock and crop farming) and game farming in the area and surroundings.

19.3.2 Operational Phase

Most of the impacts identified for the operational phase are associated with the bulk sampling which will result in the perforation of rock and groundwater reserves leading to severe hydrological and geomorphological impacts. With the implementation of mitigation measures and proper blast designs these impacts can be reduced to be of minor negative significance.

The erection 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 PCDs 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 because 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.

Like 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 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 project. 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 prospecting activities will have on the environment.

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-prospecting 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 prospecting operations cease as a dependency on the project 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; several 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.

21 Final Proposed alternatives

21.1 Preferred Option

The preferred option entails bulk sampling pits and the following associated infrastructure:

- Ablution facilities with a footprint of no more than 16m^2;
- Access roads, including a haul road running from the pit to the processing plant area;
- Chemical storage area of about <0.001 ha to be used as a chemical storage facility;
- Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from;
- Vehicle parking area covering about <0.01 hectare be provided for vehicles and the other machinery used during prospecting as parking space;
- Topsoil stockpile covering an area of about <0.5 hectares;
- Vegetation clearance <20ha;
- A slimes dam of about <0.1 hectares and
- Fences of about 100m^2 will be erected.

21.2 Alternative Option

The diamond mineralisation potential was identified on the proposed prospecting right area. Specialist studies conducted did not identify any 'Fatal Flaws' or 'No-Go' areas. The activity and technology to be used has also for years been proven to be effective. Hence no alternative option was investigated.

22 Aspects for inclusion as conditions of Authorisation

The studies and impact assessment have been based on the PWP, scoping report 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.

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 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 wetlands and/or within 100 m of watercourses without approval from the DWS.
- A geohydrology model must be developed for the project to indicate the extent of the possible impacts the project will have on the groundwater quality and levels.
- 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;
- A Stormwater Management Plan must be developed and adhered to;
- The EMPr must be enforced throughout the life of the project; and
- Environmental audits reports must be submitted to the DMR monthly 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.

23 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 reviewed and used to explain the environmental profile is accurate.

The public involvement process has been sufficiently effective in identifying the critical issues needing to be addressed in the EIA / EMPr 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 and Scoping Phases 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 Samara Mining (Pty) Ltd 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. It is expected that Samara Mining (Pty) Ltd 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 following assumptions and limitation apply to the different specialist studies that were conducted for the proposed project.

23.1 Biodiversity

According to the South African National Biodiversity Institute (SANBI) the proposed site is classified as a Critical Biodiversity Area 2 and 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 proposed site has suffered minor veld transformation because of historic mining activities; however, it is still in a good ecological state. These sites were found to incorporate protected 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.

23.2 Heritage Resources

The study was shaped 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 accidental exposed at the site during mining, such activities should be halted immediately, and a competent heritage practitioner, SAHRA or PHRA must be notified for an investigation and evaluation of the find(s) to take place (see NHRA (Act No. 25 of 1999), Section 36 (6). Recommendations of the study 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.

23.3 Wetland Delineation

The ecological significance of the tributaries should be viewed in the context of the overall level of functionality of the Orange River, which is thought to be medium, and in the context of the hydrological 'connectivity' of the river, which has resulted from significant historical modification and thus transformation of the ecosystem. It is important to note that the Orange River catchment plays a major role in supporting agriculture, industry, and mining. Historically, the river played an important role in the South African diamond rush, with the first diamonds in the country being discovered in alluvial deposits on the Orange. Today, several commercial diamond mines operate along the final stretch of the Orange River and around its mouth.

It must also be remembered that wetlands are protected under the National Water Act, and that the Act does not discriminate between degraded and non-degraded wetlands in terms of their importance. It is therefore recommended that extra caution be taken when prospecting. All alien invasive vegetation along the riverbanks must be removed and eradicated from the property boundary.

23.4 Groundwater Study

None

23.5 Surface Floodline

Appropriate baseline information including rainfall data, depth-duration-frequency design rainfall estimates, evaporation data as well as both regional and local hydrological characteristics have been considered for the proposed mining project site. The HEC-RAS model was applied to provide an indication of what areas would be inundated by the respective flood flows for 1:50 and 100-year events. The results complied Government Notice 704 (Government Gazette 20118 of June 1999). As such, the buffers have been included to ensure that where the flood line is less than 100 metres away from the watercourse, then a minimum watercourse buffer distance of 100 metres is maintained with respect to location of slime dams and stockpile dump site infrastructure areas. The site's MAR contribution to the quaternary catchment was 16% pre-development and this was expected to decrease during the mining phase.

23.6 Palaeontology

Construction and mining in fossiliferous areas may be mitigated in exceptional cases but there is a protocol to be followed. If a significant fossil find is made in the surface calcrete or Dwyka rocks

during construction and mining, the ECO should take the steps that are recommended for chance palaeontological find. The recommendations encourage monitoring of surface excavations, assessment of found palaeontological finds by a palaeontologist and if removal of fossil is necessary, permit must be obtained from SAHRA.

23.7 Soils, Land Use and Land Capability

None.

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

24.1 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 prospecting activities as well as in accordance with all relevant legislative requirements. No fatal flaws were identified by the specialists.

All impacts have been assessed, evaluated and mitigations measures are in place to minimize any disturbance as results of prospecting activities impacts on the receiving environment, include:

- The loss of wetland habitat and ecoservices for the construction of infrastructure;
- Reduction in catchment yields as dirty water runoff within the pits will be contained in the PCDs.
- Potential loss of SCC;
- Loss and fragmentation of habitat of faunal SCC and direct loss of fauna which will be expected to move from the area because 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-low to low significance, including:

- Stormwater management plan was developed for the project and will be implemented throughout the LoM;
- The PCDs and tailings dam 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 to be reused for crop farming, livestock grazing purposes and/or game farming.

Monitoring plans, which should be implemented throughout the life of the project, 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 wetlands located outside the footprints of the prospecting areas and infrastructure, the mining operations are feasible. Rehabilitation must be implemented based on best practice principles and

the DMR, DWS and DEA should monitor activities during the construction, operational and closure phases of the proposed Bulk Sampling.

24.2 Conditions that must be included in the authorisation.

24.2.1 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, Samara Mining (Pty) Ltd must revise the project layout plan to as much as possible avoid areas of conservation importance such as wetlands;
- Environmental monitoring should take place as recommended;
- All flora 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;
- 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 always;
- 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; and
- The closure cost assessment should be updated and submitted as per the legislative requirements.

24.2.2 Rehabilitation requirements

The requirements of the final rehabilitation, decommissioning and mine closure plan are stated in Appendix 4 of the NEMA Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GNR 1147). The purpose is to identify a post mining land use that is feasible through the following:

- 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/prospecting land capability like pre-mining/prospecting of crop farming, livestock grazing purposes and/or game farming.

- 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.
- 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.

25 Period for which the Environmental Authorisation is required

The Environmental authorisation will be required for a period of 3 years.

26 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.

27 Financial Provision

The rehabilitation cost is estimated at R 536 480. This amount has been set aside for rehabilitation purposes. A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The calculated closure estimate is provided in Table 27-1.

Table 27-1: Closure Cost Estimate

CALCULATION OF THE QUANTUM			
Applicant:	**Samra Mining (Pty) Ltd**	**DMR Ref No:**	**NC12655PR**
Evaluators:	**Ndi Geological Consulting Service (Pty) Ltd**	**Date:**	**2021/07/03**

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	400	**17,32**	1	1	6928
2 (A)	Demolition of steel buildings and structures	m2	0	**241,33**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	**355,65**	1	1	0
3	Rehabilitation of access roads	m2	1000	**43,19**	1	1	43190
4 (A)	Demolition and rehabilitation of electrified railway 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/or administration facilities	m2	0	**482,67**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**1**	**245652**	**0,52**	**1**	**127739,04**
7	Sealing of shafts adits and inclines	m3	0	**129,56**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	**168679,35**	1	1	16867,935
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,1	**210087,08**	1	1	21008,708
8 (C)	Rehabilitation of processing waste deposits 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	1	**133622,5**	1	1	133622,5
11	River diversions	ha	0	**133622,5**	1	1	0
12	Fencing	m	100	**152,42**	1	1	15242
13	Water management	ha	0	**50807,03**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	1	**17782,46**	1	1	17782,46
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		382380,643
1	Preliminary and General (12.0% of Subtotal 2)		45885,67716		**weighting factor 2** 1		45885,67716
2	Contingencies (10.0% of Subtotal 2)		38238,0643				38238,0643
					Subtotal 2		466504,38
					VAT (15%)		69975,66
					Grand Total		**536480**

27.1 Explain how the aforesaid amount was derived.

The financial provision for the environmental rehabilitation and closure of any mine/prospecting and its associated operations forms an integral part of the MPRDA. Sections 41 (1) and, 41 (2), 41 (3) and 45 of the MPRDA deal with the financial provision for rehabilitation and closure. During 2012, the DMR made updated rate available for the calculation of the closure costs, where contractor's costs are not available, these apply.

The "Guideline Document for the Evaluation of Financial Provision made by the Mining Industry" was developed by the DMR in January 2005 to empower the personnel at Regional DMR offices to review the quantum determination for the rehabilitation and closure of mining sites.

With the determination of the quantum for closure, it must be assumed that the infrastructure had no salvage value (clean closure). The closure cost estimate (clean closure) was determined in accordance with the DMR guidelines.

27.2 Confirm that this amount can be provided for from operating expenditure.

Samara Mining (Pty) Ltd will fund the operation and hereby confirms that the amount is anticipated to be provided for from operating cost.

28 Deviations from the approved scoping report and plan of study

28.1 Deviations from the impact assessment methodology

There are no deviations from the impact assessment methodology that was submitted with the approved Scoping Report.

28.2 Motivation for the deviation

Not applicable.

29 Other information required by the Competent Authority.

29.1 Impact on the socio-economic conditions of any directly affected person.

There are no agricultural activities taking place, therefore the impacts that will affect the landowners include but not limited to:

- Loss of land capability where the pits will be developed;
- 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.

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 site security to regularly patrol the fences of the project infrastructure;
- Liaise with the South African Police Service to enhance police patrol activity in the project area;
- 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 project to improve the poverty levels in the host and neighbouring communities.

29.2 Impact on any national estate referred to in Section 3 (2) of the National Heritage Resources Act

In terms of archaeology and heritage in respect of the proposed Prospecting Right Application and associated Environmental Authorisation and Waste Management Licence for diamonds (alluvial and general) mining, 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 the prospecting of the land site. The procedure for reporting chance finds has clearly been laid out. This report concludes that the proposed prospecting may be approved by SAHRA to proceed as planned subject to recommendations herein made and heritage monitoring plan being incorporated into the construction EMPr (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.

30 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 specialist studies conducted did not identify any fatal flaw, for that reason it was deemed not necessary to revise the site layout plan. No location alternatives were considered since diamond mineralisation was identified in the current project location.

Environmental Management Programme Report

31 Details of the EAP

31.1 Expertise of the EAP

31.1.1 Qualifications of the EAP

Please refer to Section 3.2.1.

31.1.2 Summary of EAPs experience

Please refer to Section 3.2.2.

32 Description of the aspect of the activity

Please refer to Section 5 of this report.

33 Composite Map

The composite map is provided in Figure 33-1 and attached as Appendix 7. The following buffer areas were applied:

- 500 m buffer for wetlands;
- 100 m buffer for water courses;
- 50 m buffer for heritage resources;
- CBAs; and
- 30 m buffer for SCC.

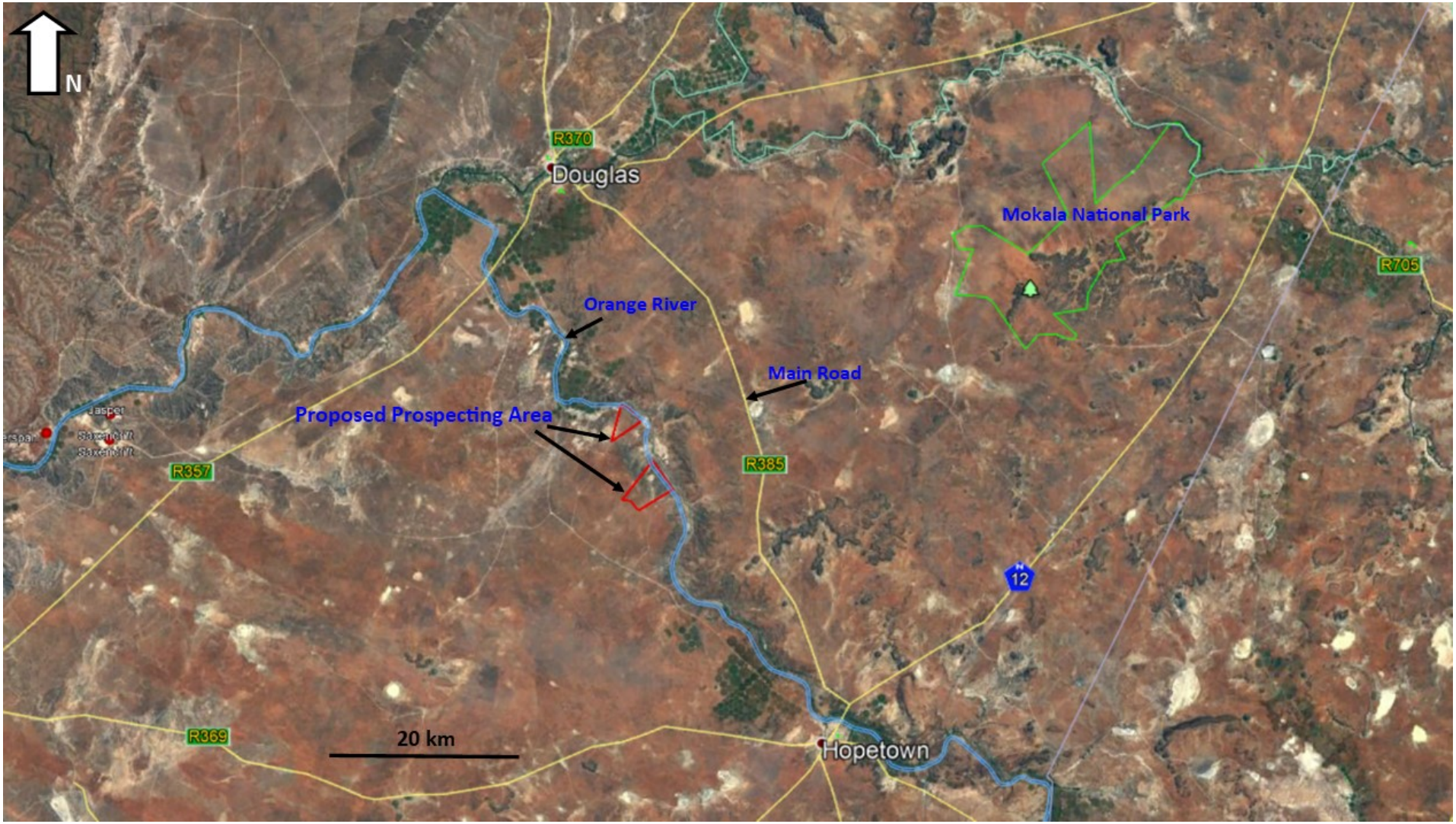

Figure 33-1: Composite Map

34 Description of impact management objectives including management statements.

34.1 Determination of closure objectives

The main aim in developing Samara Mining's rehabilitation plan is to mitigate the impacts caused by the prospecting 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 duration of the project. 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 Samara Mining project is intended to inform the closure objectives and as such is currently stated as:

To implement a post mining/prospecting 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 capability like that which existed prior to prospecting in consultation with the affected land users;
- Ensure that as little water as possible seeps out of the various sections of the project 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 site 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 like that which existed prior to prospecting;
- 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 prospecting, 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.

34.2 The process of managing environmental impacts.

Environmental impacts identified impacts for this project 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 on site. 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.

The applicant shall ensure that employees and contractors are adequately trained regarding the implementation of the EMPr, environmental legal requirements and obligations, and the ERP.

All personnel involved in the project including part time personnel who shall be trained will be expected to be compliant with environmental awareness 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 prospecting 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.

To enforce compliance, 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 project.

34.3 Potential risk of Acid Mine Drainage

The potential risk for acid mine drainage was not determined as the proposed diamond related prospecting activities are not expected to be associate with any acid-producing wastes. Therefore, the proposed activities do not pose any potential risk of acid mine drainage.

34.4 Steps taken to investigate, assess and evaluate the impact of Acid Mine Drainage

Not applicable.

34.5 Measures to be put in place to remedy any residual or cumulative impacts from acid mine drainage.

Not applicable.

34.6 Volume and rate of water use required for the mining operation.

An estimated volume of less than 10 000 litres a day will be required for running the day-to-day prospecting activities, these include water for domestic and prospecting purposes.

34.7 Has a water use licence been applied for?

A Water Use Licence for water uses identified in Section 6 will be applied for.

34.8 Impacts to be mitigated in their respective phases.

The full impact assessment with associated mitigation and management measures are presented in Section 13 as well as in Section14.

35 Impact Management Outcomes

Table 35-1: 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.	Condition of the EMPr is 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: • Ablution facilities with a footprint of no more than 16m^2; • Access roads, including a haul road running from the pit to the processing plant area; • Chemical storage area of about <0.001 ha to be used as a chemical storage facility; • Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from; • Vehicle parking area covering about <0.01 hectare be provided for vehicles and the other machinery used during prospecting as parking space; • Topsoil stockpile covering an area of about <0.5 hectares; • Vegetation clearance <20ha; • A slimes dam of about <0.1 hectares and • Fences of about 100m^2 will be erected.	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; • 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; • Runoff from this area shall be contained; and • Spill kits shall be made available, and all personnel shall	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 follow the regulations under the GN704. Samara Mining (Pty) Ltd 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
				be trained, and training records shall be made available on request.			
	Contamination of surface water resources (drainage lines and unnamed tributary	Surface water resources (drainage lines, rivers and wetlands)	Pre-Construction and Construction	• Where possible construction activities must be conducted in the dry season; • 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 wetlands; • Ensure that topsoil is properly stored, away from the wetlands, streams and drainage areas; • Vehicle and personnel movement within watercourses and wetland areas shall be strictly prohibited; • Adequate stormwater management must be incorporated into the design of the project to prevent contamination of water courses and wetlands 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 to minimize undue erosion; • Erosion can also be limited by ensuring that site vehicles and human movement is limited to project specific dedicated access ways; • Stormwater culverts and clean water diversions will be	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 follow 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
				designed and constructed to accommodate the 1:50 year storm event around the prospecting 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 monthly.			
	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 wetlands 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; • 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	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
				program must be developed and implemented within all disturbed areas; • A bi-annual alien vegetation clearance programme should be implemented during the construction phase 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 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 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 • As appropriate, fences should be erected to prevent fauna gaining access to construction and operational areas, such as open trenches and voids. <u>Vehicle-wildlife collisions</u> • Road signage indicating the potential presence and movement of wildlife should be installed within the construction footprints and along public roads. <u>Hunting, snaring and poisoning</u>	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
				• The handling, poisoning and killing of on-site fauna by site 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. <u>Noise, vibrations and lights (sensory disturbances)</u> • 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, land use 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; • 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;	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
				• 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 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 like 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; • Stockpile's 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	Wetland destruction and loss of wetland habitat and hydrological functions	Wetland and Aquatic Environmental Impacts	Pre-Construction and Construction	• Access to wetland areas outside of the construction areas shall be strictly forbidden and the wetlands 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 500 m from the edge of the wetlands and riparian zones without consent from the DWS; • The stormwater management plan must be developed and incorporated into the design of the project 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 pans; • 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	Control of access to wetland areas and within the 500 m regulated buffer area	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA.	Wetland loss is avoided and impacts on wetland 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
				wetlands 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 the 500m GN509 ZOR but outside the 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 wetlands. With regards to back filling 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. • 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	Dust control measures Dust fallout monitoring	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
				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. <u>Odours:</u> • 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 because 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 daily; • Litter and dust management measures should be always in place; • Always maintain the construction site in a neat and orderly condition; • 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. • 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	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
				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	• Conduct baseline noise monitoring prior to construction activities; • 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 regarding 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 Saturday 07H00 -14H00). However, no noise/vibration producing activities shall be undertaken on Saturdays unless this has been agreed to by the community.	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/landowners.	Noise levels
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;	Control through clear demarcation of construction sites to ensure avoidance of graves and other	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	Impact avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved

				• 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:
				  ○ Fence off and install a gate around graves; and
				  ○ 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;
					heritage sites	that the construction activities do not have detrimental impacts on heritage sites	

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. All development activities must be stopped, and a palaeontologist should be called in to determine proper mitigation measures, especially for shallow cave	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 wetlands.	Water resources (surface and groundwater) and wetlands	Pre-Construction and Construction/Operation	*Separation of waste* • 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, enough bins shall be provided for the disposal of waste; • Where necessary dedicate a storage area on site for collection of construction waste. *Storage of waste:* • No stockpiling of material shall be permitted within 100 m of water courses and/or drainage lines, or within 500 m of wetlands; • 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 to keep rainwater out; • Bins shall be emptied regularly to prevent the bins from overflowing; • All work areas shall be always 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; • 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 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
				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 because of bush clearing and construction vehicles on site	Topography	Pre-Construction and Construction/Operation	• Bush 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 because 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 always apply 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; • The number of construction vehicles and trips shall be kept to a minimum. • Materials transported on public roads must be covered.	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
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.	Communication with the municipality	Implementing mitigation measures will ensure recruitment of locals Samara prospecting project will minimise conflicts with surrounding landowners and communities.	Impact managed/reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Prepare a code of conduct for all workers and contractors associated with the project. • 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 project location. Such cases need to be addressed immediately and appropriately			
Continued vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in- stream channel habitat	Wetlands	Pre-Construction and Construction/Operation	• ; • 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 wetland and riparian areas and associated 100 m buffer zones and excluded from clearing activities 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 wetland features is 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 wetland areas along the linear development should be avoided to retain soil stability provided by the grass root structures.	Monitoring and management of wetland areas	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided. Extent of wetlands not reduced
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	Wetlands	Operation	• Access to wetland areas outside of the areas shall be strictly forbidden and the wetlands must be 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 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 pans; • 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-	Control of access to wetland areas and within the 100 m ZOI determined by the specialist. Implementation of the stormwater management plan Management and monitoring of the site for erosion	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided. Extent of wetlands not reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				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 wetland features 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 wetland 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, wetland 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 wetland features and ensure establishment of indigenous species within areas previously dominated by alien vegetation; and • Maintain the REC for each of the wetland features, as stated within the wetland report for the duration of the LOM.			

Table 35-2: 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 prospecting 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 gravel maintenance 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 prospecting 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
Stockpiling of discard and waste rock. Containment of sediment laden water in PCDs	Soil contamination due to leaching of soluble product and waste constituents into soils underlying the stockpiles;	Soil, Land Use and Land Capability	Operation	• Implement suitable measures on mining infrastructure such as the tailings dams, PCDs and waste dump areas to minimise soil contamination by controlling seepage and	Management and motoring of integrity of infrastructure		

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
	and Contamination of soil adjacent to product and waste stockpiles due to run-off or seepage of soluble product or waste rock constituents.			runoff. • Implementing regular site inspections for materials handling and storage.			
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		
Bulk sampling	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	• Develop and implement frequent (preferably with loggers) monitoring of water levels and water quality in boreholes local to the active prospecting area. • 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 project	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 pit void and extending radially. The result will be a cumulative reduction in groundwater quality.	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. • 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.	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 surrounding landowners is not adversely affected by the prospecting activities.	Impact avoided
	Contamination of groundwater resource due to seepage from waste dump areas, PCDs 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	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

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				licensed sites only. • Incorporate an adequate liner, under drainage and seepage collection facilities into the PCDs design. • Where required, design and construct the dump areas with adequate liners. • Ensure that facilities are well maintained good housekeeping rules are applied.			
	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 pollution control dam			• 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 package plant, was-bay, change-house and laundry.	Downstream water resources, wetlands	Operation	•		Implementation of mitigation measures will ensure that the prospecting activities do not have detrimental impacts on the soils, groundwater and surface water resources.	Water Quality Standards
Operational activities	Establishment and spread of alien invasive species	Flora, wetlands	Operation	• Monitoring of relocation success of rescued and relocated floral SCC should take place during the operational phase; • Harvesting of protected floral species by prospecting and operational personnel should be strictly prohibited. • The operational footprint must be kept as small as possible 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 wetland 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 wetland 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	Management and monitoring of vegetation clearance and wetland areas	The implementation of mitigation measures will ensure that the prospecting 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
				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.			
Movement of vehicles	Mortality and disturbance of fauna	Fauna	Operation	<u>Death/injury during vegetation clearing and earth works</u> • 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. <u>Vehicle-wildlife collisions</u> • Road signage indicating the potential presence and movement of wildlife should be installed within the construction footprints and along public roads. <u>Hunting, snaring and poisoning</u> • The handling, poisoning and killing of on-site fauna by site 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. <u>Noise, vibrations and lights (sensory disturbances)</u> • 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;	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

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• 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.			
Use of heavy machinery	Changes in surface water quality due to contamination from heavy construction equipment	Wetlands 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 such as flooded borrow pits / drainage canals and floodplain depressions where possible. • The Samara 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. • 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;	Surface water quality monitoring Wetland Monitoring	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided. Extent of wetlands not reduced
Operational phase activities	Loss of ecological communities within wetlands due to increased sedimentation and the potential mobilisation of pollutants	Wetlands Soils Flora	Operation	• 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 wetland areas, particularly the 500m regulated areas	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided. Extent of wetlands not reduced. Impacts on flora, especially SCC is reduced or avoided
Operational phase activities	Disturbance of wetland habitat	Wetlands	Operation	• Disturbance to of wetlands 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	Control of access to wetland areas and within the 100 m ZOI determined by the specialist.	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland features within the project area and will enable the project to comply with the requirements of the NWA	Impact avoided. Extent of wetlands not reduced

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				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 to ensure the impacts of runoff and decant of water into wetland resources is prevented or minimised; o Adequate storm water management must be incorporated into the design of the proposed development throughout all phases 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 shall 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. o All disturbance footprints must be separated from adjacent wetlands by a fence, either a security fence or five strand cattle fences. o All disturbed areas outside the direct development footprints should be rehabilitated and re-vegetated as soon as possible. Refer to the guidelines below.			
Operational and closure phase activities	Water Quality Deterioration – Acidic Mine Drainage	Surface water resources Groundwater	Operation	• Water quality should be regularly monitored, and appropriate and timely remedial interventions made in the case of non-compliance. • Treating of decanting mine water to acceptable water quality levels can be achieved by the installation of a treatment plant. The level to which the water is treated should be determined in consultation with the DWS. As a minimum, treated water should meet the standards for use for livestock watering and irrigation. • 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. • Project layout and design should take cognisance of expected decant points and should ensure that no decant points are located within any wetland or watercourse. Minimum distances of 100m between expected decant points and wetlands are recommended.	Surface water and groundwater quality monitoring Management through treatment	Implementation of mitigation measures will assist with avoiding loss of and maintaining the current state wetland 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	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	Impact Avoided

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• 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.		the noise levels emanating from the project site will not have detrimental effects on the workers and surrounding communities/landowners.	
Operational phase	Employment	Socio- Economic	Operation	• Communities within the vicinity of the project 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 Samara Mining (Pty) Ltd's recruitment policy is adhered to.	Communicate with the municipality		Impact enhanced
Operational phase	Regional and economic development	Socio- Economic	Operation	• Samara Mining (Pty) Ltd will pay royalties and tax to the government. • Samara Mining (Pty) Ltd will adhere to their commitments.	Communicate with the municipality	Implementing mitigation measures will ensure recruitment of locals as per the Samara Mining policy and will minimise conflicts with surrounding landowners and communities.	Impact enhanced
Operational phase	Increased diamond supply	Socio- Economic	Operation	• Samara Mining (Pty) Ltd will secure contracts and adhere to the terms and conditions of its consumers to avoid contract termination. • Samara Mining (Pty) Ltd will ensure the appropriate management of its workforce to ensure that deliverables are delivered accordingly.	Manage supply		Impact enhanced
Operational phase	Health and safety risk	Socio- Economic	Operation	• Samara Mining (Pty) Ltd 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). • 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;	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
				○ SAHRA will be notified immediately; ○ 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 ○ 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, prospecting activities will be undertaken such that the ambient air quality does not exceed the National Air Quality Standards.	Particulate Matter Levels Dust levels
Transportation by 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; • 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;			

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				• Avoidance of dust track-on onto neighboring paved roads; and • Wind speed reduction through sheltering (where possible).			
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; • 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;	Management and monitoring of spills Monitoring and management of the integrity of infrastructure	Implementation of mitigation measures will ensure that the prospecting activities do not have detrimental impacts on the soils, land use and land capability.	Impact avoided

Table 35-3: 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. • 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. • Limit vehicle traversing on both stockpiles and rehabilitated areas as far as possible. • Prepare rehabilitated areas properly and monitor regularly.	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		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		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 pits 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.	Groundwater, wetlands	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 Orange River and wetlands	Groundwater	Decommissioning and closure	• Additional options to divert dewatered water to the wetlands 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 pit	Groundwater, wetlands	Decommissioning and closure	• No Mitigation possible			
	Potential groundwater contamination from the pit	Groundwater	Decommissioning and closure	• No Mitigation possible			
	Potential groundwater Contamination resulting from seepage from waste rock dump.	Groundwater, wetlands	Decommissioning and closure	• Minimise footprint of waste rock dump by back filling 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, wetlands	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, wetlands	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

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
	Potential groundwater contamination caused by spillages and accidents	Groundwater, wetlands	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
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, wetlands	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 matter due to increased aeration (caused by soil disturbance) and subsequent organic matter decomposition.	Downstream water resources, wetlands	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, wetlands	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, wetlands	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	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

Activity	Potential Impact	Aspects Affected	Project Phase	Mitigation and Management Measures	Mitigation Type	Compliance with Standards	Standard to be achieved
				closure and rehabilitation phases, as per the rehabilitation programme.			
Vegetation clearing and earth works	Loss or alteration of habitat: riparian vegetation and/or in-stream channel habitat	Aquatic ecology	Decommissioning and closure	• 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.	Wetlands Monitoring Management and control of access to wetland areas. Rehabilitation of wetland areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
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. • Samara 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;	Wetlands Monitoring Management and control of access to wetland areas Rehabilitation of wetland 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	• 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.	Wetlands Monitoring Management and control of access to wetland areas Rehabilitation of wetland areas	Rehabilitated areas will be maintained to comply with the closure objectives.	Rehabilitation Standards End use objectives
Closure phase activities	Disturbance of wetland habitat	Wetlands	Decommissioning and closure	• All wetlands and an associated minimum buffer of 100m should be excluded from the proposed development and disturbance footprints. Disturbance to of wetlands 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 wetlands by a fence, either a security fence or five strand cattle fences. • All construction staff should be educated on the sensitivity of wetland areas and should be made aware of all wetland areas near the construction sites.	Wetlands Monitoring Management and control of access to wetland areas Rehabilitation of wetland 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
				• Locate all temporary stockpiles, constructor's camps, laydown areas, ablution facilities etc. a minimum of 50m from any delineated wetland 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 wetland 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
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. • 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.			

36 Impact Management Actions

Table 36-1: 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.
Site Establishment and site clearance for the construction of infrastructure: • Ablution facilities with a footprint of no more than 16m^2; • Access roads, including a haul road running from the pit to the stockpile plant area; • Chemical storage area of about <0.001 ha to be used as a chemical storage facility; • Office site with a footprint of approximately <0.01 ha for storage of stationary and for the field staff to work from; • Vehicle parking area covering about <0.01 hectare be provided for vehicles and the other machinery used during prospecting as parking space; • Topsoil stockpile covering an area of about <0.5 hectares; • Vegetation clearance <20ha; • A slimes dam of about <0.1 hectares and • Fences of about 100m2 will be erected.	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 unnamed tributary	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 prospecting 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 Transportation of material and movement of vehicles and machinery on construction areas	Wetland destruction and loss of wetland habitat and hydrological functions	Control of access to wetland areas and within the 100 m ZOI determined by the specialist.	Pre-construction and Construction phases	Compliance with the NWA and conditions of the WUL
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 because 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

Activity	Potential Impact	Mitigation Type	Time Period for Implementation	Compliance with Standards
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 wetlands.	Waste management	Pre-construction and Construction phases	Comply with the requirements of the National Environmental Management: Waste Act, 2008 (Act 51 of 2008)
Vegetation clearance	Changes in the topography may be experienced because 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 because 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:	Communicate with the municipality	Pre-construction and Construction phases	Communicate with the municipality

Table 36-2: 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	
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
Bulk sampling	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, bulk sampling 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
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
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 wetland areas and within the 500 m of wetlands.	Operation	Comply with the NWA.

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
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 wetland areas and within the 500 m of wetlands. Implementation of the stormwater management plan Management and monitoring of the site for erosion	Operation	Comply with conditions of WUL.
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 wetland habitat	Control of access to wetland areas and within the 100 m ZOI 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	Skills transfer and development		Operation	
Operational phase	Community development		Operation	
Operational phase	Regional and economic development		Operation	
Operational phase	Increased diamond supply	Manage supply	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 Manage through road upgrades	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 36-3: 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 pits with dump material; and Flooding of prospecting works and resultant altering of the groundwater flow regime.	Continued depressed groundwater levels due to dewatering during prospecting.	Groundwater monitoring	Decommissioning and closure	Comply with the closure objectives. Comply with provisions of the NWA. Comply with provisions of the WUL.
	Surface and sub- surface decant from the pit			
	Potential groundwater contamination from the pit			
	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			
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 wetland areas and within the 100 m ZOI 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	
Construction, operational and closure	Disturbance of wetland habitat	Control of access to wetland areas and within	Decommissioning and closure	

Activity	Potential impact	Mitigation Measure (Impact Management Action)	Phase	Compliance with standard
phase activities		the 100 m ZOI determined by the specialist.		
Operational and closure phase activities	Water Quality Deterioration – Acidic Mine Drainage	Surface water quality monitoring	Decommissioning and closure	
Operational and closure phase activities	Subsidence		Decommissioning and closure	Comply with the provisions of the Mine Health Act Comply with the Provisions of the Health and Safety Act
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	
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	

37 Financial Provision

37.1 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 prospecting/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 Samara proposed prospecting project is intended to inform the closure objectives and as such is currently stated as:

The overall closure objectives for the proposed project are as follows:

- Return land, disturbed by pitting, as far as possible to a land capability like that which existed prior to prospecting in consultation with the surrounding land uses;
- Ensure that as little water as possible seeps out of the various sections of the pits 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 project 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 like that which existed prior to prospecting;
- 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 prospecting, 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.

37.2 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.

37.3 Rehabilitation Plan

Each phase of the prospecting activities is dependent on the success of the preceding phase. Depending on the outcome of the desktop and geological mapping phase, bulk sampling will be initiated. The location and extent of the pits and infrastructure sites cannot be determined at this stage. Mapping of the actual prospecting activities cannot be undertaken.

Due to the nature of the activities, the potential impacts will be limited in spatial extent and will be of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. The areas for bulk sampling purposes will be the main area experiencing impacts. The impacts will be temporary in nature, and a detailed management plan has been provided to address the potential impacts associated with these activities.

The only rehabilitation that will specifically be required is pit backfilling and revegetation:

- Trench/pit backfilling: All trenches will be backfilled and rehabilitated to a state where the original land use can be reinstated.
- Re-vegetation: A suitably qualified ecologist will be appointed to determine the appropriate species that may be used for re-vegetating the area.
- Re-vegetation efforts will be monitored every second month for a period of 6 months after the initial seeding. An effective vegetation cover of 45% must be achieved. Re-seeding will be undertaken if the vegetation cover has not been achieved after 6 months.

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

The main objectives of both rehabilitation plan and closure plans are aligned which are to remove the mining infrastructure and rehabilitate the land to a suitable land use which represent pre-prospecting conditions and provides a safe and sustainable environment for surrounding receptors.

37.5 Quantum of financial provision required to manage and rehabilitate the environment.

Samara Mining has set aside an amount of R 536 480 for rehabilitation purposes. A guarantee paid to DMR for a financial guarantee as required by the Environmental Management Programme will be amended every financial year. The calculated closure estimate is provided in Table 37-1.

Table 37-1: Closure Cost Estimate

CALCULATION OF THE QUANTUM			
Applicant:	**Samra Mining (Pty) Ltd**	**DMR Ref No:**	**NC12655PR**
Evaluators:	**Ndi Geological Consulting Service (Pty) Ltd**	**Date:**	**2021/07/03**

No.	Description	Unit	A Quantity	B Master Rate	C Multiplication factor	D Weighting factor 1	E=A*B*C*D Amount (Rands)
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	400	**17,32**	1	1	6928
2 (A)	Demolition of steel buildings and structures	m2	0	**241,33**	1	1	0
2(B)	Demolition of reinforced concrete buildings and structures	m2	0	**355,65**	1	1	0
3	Rehabilitation of access roads	m2	1000	**43,19**	1	1	43190
4 (A)	Demolition and rehabilitation of electrified railway 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/or administration facilities	m2	0	**482,67**	1	1	0
6	**Opencast rehabilitation including final voids and ramps**	**ha**	**1**	**245652**	**0,52**	**1**	**127739,04**
7	Sealing of shafts adits and inclines	m3	0	**129,56**	1	1	0
8 (A)	Rehabilitation of overburden and spoils	ha	0,1	**168679,35**	1	1	16867,935
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	0,1	**210087,08**	1	1	21008,708
8 (C)	Rehabilitation of processing waste deposits 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	1	**133622,5**	1	1	133622,5
11	River diversions	ha	0	**133622,5**	1	1	0
12	Fencing	m	100	**152,42**	1	1	15242
13	Water management	ha	0	**50807,03**	1	1	0
14	2 to 3 years of maintenance and aftercare	ha	1	**17782,46**	1	1	17782,46
15 (A)	Specialist study	Sum	0			1	0
15 (B)	Specialist study	Sum				1	0
					Sub Total 1		382380,643
1	Preliminary and General (12.0% of Subtotal 2)		45885,67716		**weighting factor 2** 1		45885,67716
2	Contingencies (10.0% of Subtotal 2)		38238,0643				38238,0643
					Subtotal 2		466504,38
					VAT (15%)		69975,66
					Grand Total		**536480**

The Master Rates will be updated on an annual basis, based on CPIX or a similar approved method, or should legislation change.

37.6 Confirmation that the financial provision will be provided as determined.

Samara Mining (Pty) Ltd 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.

38 Compliance monitoring and performance assessment

Samara Mining (Pty) Ltd 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.

38.1 Monitoring of Impact Management Actions

Please refer to Table 38-1

38.2 Monitoring and Reporting Frequency

Please refer to Table 38-1

38.3 Responsible Persons (Roles and Responsibilities)

For a project to be a success, everyone involved should understand their roles and responsibilities. This goes for all the Samara Mining staff and their contractors. The following sections describe the functions of the key team members.

Generic roles that require to be defined for the project and the typical requirements of each of the roles include:

38.3.1 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 Samara prospecting project is conducted in a sustainable manner, in compliance with the relevant environmental legislation. For this current stage of the project, DMR is responsible for approving the EMPr for the project and any revisions and amendments thereto.

38.3.2 Project Developer

This is the 'owner' of the project (Samara Mining (Pty) Ltd) and as such is responsible for ensuring that the conditions of the EA 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 Samara Mining (Pty) Ltd will appoint an Environmental Control Officer, SHE Manager and Site Manager.

Samara Mining (Pty) Ltd 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 Samara Mining (Pty) Ltd employees to all team members and contractors.

During the *construction phase* Samara Mining (Pty) Ltd 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* Samara Mining (Pty) Ltd 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* Samara Mining (Pty) Ltd 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.

38.3.3 Operations Manager

The Operations Manager will report to the Samara Mining (Pty) Ltd 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.

38.3.4 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.

38.3.5 Environmental Control Officer

The ECO will report to Samara Mining (Pty) Ltd, and the ECO 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 Samara Mining (Pty) Ltd 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&APs) 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 Samara Mining (Pty) Ltd 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 Samara Mining (Pty) Ltd;
- 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 Samara Mining (Pty) Ltd;
- 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.

38.3.6 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.

38.4 Time Period for Implementing Impact Management Actions

Please refer to Table 38-1.

38.5 Mechanism for Monitoring Compliance

Please refer to Table 38-1.

Table 38-1: 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	• -Roads and dusty areas will be sprayed by water when there is a need. • -This impact will be monitored throughout the day and where it is encountered it will be suppressed by means of spraying water. • -Atmospheric pollution prevention Act will be always followed. • -Dust fall-out buckets are properly located, and this must also be monitored throughout the day. • -Monitoring of dust exposure will include use of active air sampling, passive dust collectors. • -The National Environment Management: Air Quality Act, 2004 (Act No.39 of 2004) will be always adhered to. The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) as amended and other legislation or regulations will also be always adhered to avoid air pollution. -Roads and dusty areas will be sprayed by water when there is a need. -This impact will be monitored throughout the day and where it is encountered it will be supressed by means of spraying water. -Atmospheric pollution prevention Act will be always followed. -Dust fall-out buckets are properly located, and this must also be monitored throughout the day. -Monitoring of dust exposure will include use of active air sampling, passive dust collectors. -The National Environment Management: Air Quality Act, 2004 (Act No.39 of 2004) will be always adhered to. The Mine Health and Safety Act, 1996 (Act No. 29 of 1996) as amended and other legislation or regulations will also be always adhered to avoid air pollution. •			Samara Mining (Pty) Ltd, 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 prospecting	• pH and salinity; • Major anions and cations; • Sulphate, phosphate, Nitrate, total dissolved solids, electrical conductivity; • Heavy metals and hydrocarbons	Samara Mining (Pty) Ltd, 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	Samara Mining (Pty) Ltd, ECO, Contractors	Biannually

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		
				(CEC); • Major cations and anions; • Metal and hydrocarbons; • Stockpile height (<3 m).		
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 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 substances (e.g., molasses or bitumen).	Samara Mining (Pty) Ltd, ECO, Contractors	Quarterly
Land Use change	• Maintain and minimise land use change within the prospecting area	• Evaluation of changes in land use within the prospecting precinct using satellite imagery	• prospecting license area	• Collection of satellite imagery	Samara Mining (Pty) Ltd, 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;	Samara Mining (Pty) Ltd, ECO, Contractors	Annually
Groundwater	• Monitoring of groundwater levels and water quality	• A groundwater monitoring programme will be developed and implemented. • A groundwater specialist must be appointed to identify the groundwater monitoring points the applicant must monitor in terms of groundwater levels and water quality: • All existing geological borehole data that is available should be incorporated into a more detailed and geological model update using a software such as Leapfrog-Hydra; • Compile a numerical groundwater model to incorporate all the information collected; • Groundwater will be monitored for the following parameters: *Physical Parameters* • Groundwater levels *Chemical Parameters:*			Samara Mining (Pty) Ltd, ECO, Contractors Groundwater specialist	Water quality monitoring on a quarterly basis Water levels on an annual basis

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		
		• Field measurements: pH, EC • Laboratory analyses: Anions and cations (Ca, Mg, Na, K, NO3, Cl, SO4, F, Fe, Mn, Al, & Alkalinity) • Other parameters (pH, EC, TDS) • 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.				
Surface water	• Downstream water quality	• 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 (SO4), alkalinity • Other: E. coli, faecal coliforms *Field Parameters:* • Dissolved oxygen, pH, EC and temperature.			Samara Mining (Pty) Ltd, ECO, Contractors, water quality specialist	Monthly monitoring and reporting
Surface water	• Earth works and vegetation clearing during construction, operation and decommissioning	• Assess area for erosion and spillages			Samara Mining (Pty) Ltd, ECO, Contractors, water quality specialist	Weekly or daily during high rainfall periods until construction and decommissioning are complete
Surface water	• Use and storage of chemicals, including refueling areas	• Maintain storage areas; • Clean and dispose in accordance with legislation.			Samara Mining (Pty) Ltd, 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 as and when necessary if stormwater is to be discharged and analysed for hydrocarbons and metals to assess level of contamination; • Monitor surface water resources.			Samara Mining (Pty) Ltd, 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: ○ A combined approach using both chemical and mechanical control methods;			Samara Mining (Pty) Ltd, ECO, Contractors, Ecologist	Bi-annually

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		
		○ Periodic follow-up treatments, informed by regular monitoring; and ○ Monitoring should take place in disturbed areas, as well as adjacent undisturbed areas.				
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: ○ Measurements of crown and basal cover; ○ Species diversity; ○ Species abundance; ○ Impact of dust on flora; ○ Recruitment of indigenous species; ○ Alien vs. Indigenous plant ratio; ○ Recruitment of alien and invasive plant species; ○ Erosion levels and the efficacy of erosion control measures; ○ Vegetation community structure including species composition and diversity which should be compared to pre-development conditions; and ○ Presence, abundance and condition of floral SCC communities.			Samara Mining (Pty) Ltd, ECO, Contractors, Ecologist	Bi-annually
	• Rehabilitation success ○ The rehabilitation plan must be continuously updated in accordance with the monitoring results to ensure that optimal rehabilitation measures are employed; ○ Results of the monitoring activities must be considered during all phases of the proposed mining development and action must be taken to mitigate impacts as soon as negative effects from prospecting related activities become apparent; and ○ The method of monitoring must be designed to be subjective and repeatable to ensure consistent results.				Samara Mining (Pty) Ltd, ECO, Contractors, Ecologist	Every 5 years
Aquatic Ecology	• Changes in surface water quality due to contamination from heavy construction equipment	• Samara should implement a monthly monitoring programme for surface water at all the wetland sites identified in the Wetlands Report. • Samara should also implement a monthly aquatic monitoring programme at points downstream and upstream of the Orange River 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 pans (specifically Pan 1 - 7) shall also be undertaken			Samara Mining (Pty) Ltd, ECO, Contractors, Wetland Specialist	Monthly
Aquatic Ecology	• Loss of ecological communities due to increased sedimentation and the potential mobilisation of pollutants	• Visual monitoring of soils within the 100m ZOI of all wetlands shall be undertaken.			Samara Mining (Pty) Ltd, ECO, Contractors, Wetland Specialist	Monthly

<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>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 a category that will be determined by a wetland specialist, 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>Samara Mining (Pty) Ltd, ECO, Contractors, Wetland 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 campaign 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 complaint will be recorded in a complaint register to be maintained by site management.</td><td>Samara Mining (Pty) Ltd, ECO, Contractors</td><td>Monthly monitoring and reporting</td></tr>
<tr><td>Visual</td><td>• Visual Intrusion and loss of sense of place</td><td colspan="3">• Visual monitoring shall be implemented at Key Observational Points (KOPs) which must be identified 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.</td><td>Contractors
Samara Mining (Pty) Ltd
ECO</td><td>Annual</td></tr>
<tr><td>Traffic</td><td>• Risk of vehicle collision
• Risk of pedestrian accidents
• Degradation of Public Roads</td><td colspan="3">• 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.</td><td>Contractors
Samara Mining (Pty) Ltd</td><td></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		
		○ Educate drivers on potential areas of high pedestrian and cyclist activity. ○ Educate community on dangers of construction vehicles new to their area. ○ The deterioration of public roads over time must be monitored and a maintenance plan must be negotiated with the Provincial Authority.				
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
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 monthly
Heritage resources	• Destruction of graves and cultural resources	• No activities shall impact graves and sites of heritage or cultural importance without a permit from SAHRA			ECO, Site Manager Heritage Specialist-when required	Monthly monitoring and reporting
Paleontology	• Destruction and sealing of fossils	• No activities shall impact fossils without a permit from SAHRA			ECO, Site Manager Paleontologist, when required	Monthly monitoring and reporting
Stormwater Management	• 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 monthly Annual GN704 audits

39 Frequency of submission of performance assessment report

The ECO will conduct a monthly site visit and compile a report which will also include all aspects of the EMPr, as required.

Annual environmental audits must be undertaken to ensure compliance with the EMPr and EA. The environmental audit reports must also include the financial provision and must be submitted to the DMR.

40 Environmental Awareness Plan

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.

40.1 Communication of environmental risks

The training pertaining to the environmental awareness will include the following:

- Construction and operation staff will undergo induction, which as a minimum will include Safety, Health and Environmental awareness;
- Upon receiving and understanding the induction, all attendees will sign an acknowledgement register;
- Environmental risks will be identified together with the specific job training that may be required to address these risks. All personnel 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 40-1. The purpose of this schedule is to ensure that onsite employees are not only rained, but that the principles are continuously re-enforced.

Table 40-1: 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.

Frequency	Time allocation	Objective
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 daily as part of daily toolbox talks.

40.2 Mitigation and management of Environmental Risks

Task/Issue based Risk Assessments must be undertaken with all workers involved in the specific tasks to establish an understanding of the risks associated with a specific task and the required mitigation and management measures contained in this report.

40.2.1 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.

40.2.2 Development of procedures and checklists

Procedures will be developed, and all staff and workers will be adequately trained on the content and implementation of the following:

- 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.

41 Way Risks Will Be Dealt with In Order to Avoid Pollution or The Degradation of The Environment

Procedures for internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to relevant communication from external I&APs will be established and maintained by management. 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 will be utilised 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. Contractors should take the Environmental Awareness Plan seriously 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.

To deal with non-compliance, the SHE and site manager will address it 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.

42 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 prospecting operations is governed by NEMA, as amended, which provides in Section 24P that the holder of a prospecting right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be compiled and reviewed annually as required by the DMR.

43 Conclusion and Recommendations

Ndi Geological Consulting Services (Pty) Ltd has undertaken the EIA and EMPr for the proposed Samara prospecting activities 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 prospecting activities as well as in accordance with 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 wetland 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 in the PCD;
- 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 because 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 prospecting infrastructure does not impact on the wetlands and regulated 500m buffer area without approval from the DWS;
- Ensuring the layout of the prospecting infrastructure does not impact on the heritage resources without approval from SAHRA;
- 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 grazing and crop farming 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 wetlands located outside the footprints of the prospecting areas and infrastructure, the prospecting 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 to address adverse impacts immediately. Rehabilitation must be implemented based on best practice principles and the DMR, DWS and DEA 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 Samara prospecting 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.

44 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: 14 July 2021

45 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: 14 July 2021

46 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: 14 July 2021

47 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: 14 July 2021

48 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 Samara Mining (Pty) Ltd regarding 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.

49 References

Integrated Development Plan, 2016-2020: Pixley Ka Seme District Municipality

Integrated Development Plan, 2017-2022: Pixley Ka Seme District Municipality.

Integrated Development Plan, 2018-2019: Pixley Ka Seme District Municipality.

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Nyamoki Consulting Pty Ltd, 2021: Biodiversity Impact Assessment: Application for a Prospecting Right and Associated Environmental Authorisation and Waste Management Licence (WML) for diamond (alluvial and general) on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41, situated in the Thembelihle Local Municipality, Northern Cape Province.

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Nyamoki Consulting Pty Ltd, 2021: Palaeontological Desktop Study for the Proposed Prospecting Right Application on the farm Slypsteen, Thembelihle Local Municipality, Northern Cape Province

Nyamoki Consulting Pty Ltd, 2021: Wetland Delineation: Application for a Prospecting Right and Associated Environmental Authorisation and Waste Management Licence (WML) for diamond (alluvial and general) on Farm Lot 271 and Remainder and Portion of Portion 3 of the Farm Slypsteen 41, situated in the Thembelihle Local Municipality, Northern Cape Province.

South African Institute for Race Relations, 2017: Diamonds and All That: The contribution of mining to South Africa.

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

Appendix 2: EAP CVs

Appendix 3: DMR Scoping Report and Plan of Study Acceptance Letter

Appendix 4: Locality Map

Appendix 5: Stakeholder Engagement Documentation

Appendix 6: Specialist Studies Reports

Appendix 7: Project Composite Map