24 APPENDIX F: FINAL REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN

Final Rehabilitation, Decommissioning and Mine Closure Plan

Including Environmental Risk Assessment

Dansile Nxikwe Diamonds CC

DEIR (23/09/2021)

DMR REF: NC 30/5/1/1/2/12672PR

Portion of Remainder Plot 516, Plot 678 and Plot 668, Port Nolloth Township

Contents

1 Contact Person & Correspondence Address

1.1 Details of the EAP

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1.2 Expertise of the EAP

Table 1: The qualifications of the Environmental Assessment Practitioner (EAP)

NAME	Helene Botha	Pieter Badenhorst
QUALIFICATIONS	B. Sc. (Zoology & Genetics) B. SC. Hons. (Animal Behaviour) M. Env. Man (Masters' Degree in Environmental Management)	B. SC. B. Eng. (Civil) M. Eng. (Irrigation) B. Hons. (B&A) MBA
PROFESSIONAL REGISTRATION	Registration with Environmental Assessment Practitioners Association of South Africa (EAPASA): Reg. No.: 2019/558.- in progress	Professional Engineer, member of the Engineering Council of South Africa Member of the South African Institute of Civil Engineers Member of the International Association of Impact Assessment (South Africa) Registration with Environmental Assessment Practioners Association of South Africa (EAPASA): Reg. No.: 2019/1108– in progress

2 Introduction

This document serves to comply with regulation 6 of the NEMA Financial Regulations (2015) that states that an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for—

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;
(b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and
(c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

2.1 The annual rehabilitation plan

The annual rehabilitation plan provides for concurrent or progressive rehabilitation and contains information that defines activities on an annual basis and how these relate to the Final closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan.

The objective of the annual rehabilitation plan is to–

- review concurrent rehabilitation and remediation activities already implemented;
- establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-prospecting land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan;
- establish a plan, schedule and budget for rehabilitation for the forthcoming 12 months;
- identify and address shortcomings experienced in the preceding 12 months of rehabilitation; and
- evaluate and update the cost of rehabilitation for the 12 month period and for closure, for purposes of supplementing the financial provision guarantee or other financial provision instrument.

Taking into account the objective of the annual rehabilitation plan it is clear that it cannot form part of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 but will be submitted on an annual basis as part of the environmental audit report in terms of Regulation 34 (1) (b) of the NEMA EIA Regulations (2014), as amended by GN 517 of 11 June 2021.

2.2 Final rehabilitation, decommissioning and mine closure plan

According to the NEMA Financial Regulations the Final Rehabilitation, Decommissioning And Mine Closure Plan will form a component of the Environmental Management Programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the Environmental Management Programme regarding opportunities for stakeholder review and comment as well as auditing.

The objectives of this final rehabilitation, decommissioning and mine closure plan is to identify a post-prospecting land use that is feasible through-

- providing the vision (goals), objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
- outlining the design principles for closure;
- explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
- committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
- identifying knowledge gaps and how these will be addressed and filled;
- detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
- outlining monitoring, auditing and reporting requirements.

2.3 Environmental risk assessment report

According to the NEMA Financial Regulations the environmental risk assessment report will also form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing.

The objective of the environmental risk assessment report is to–

- ensure timeous risk reduction through appropriate interventions;
- identify and quantify the potential latent environmental risks related to post closure;
- detail the approach to managing the risks;
- quantify the potential liabilities associated with the management of the risks; and
- outline monitoring, auditing and reporting requirements.

This document then fulfils the requirements of both the Final rehabilitation, decommissioning and mine closure plan and the Environmental risk assessment report

3 Context of the project

3.1 Issues that have guided the development of the plan

Three approaches were employed to identify the key aims for the closure process that form part of the approved Final Closure Plan submitted and approved in terms of the MPRDA:

- Technical assessments which involved the recording of the project activities over the full life cycle of the prospecting operation (including closure) and the consequent potential impacts on the environment (including cumulative impacts). This resulted in the compilation of a final closure plan that facilitated discussions with the authorities as well as Interested and Affected Parties (I&APs).
- Identification and consultation with the relevant authorities to record their requirements as well as public meetings with I&APs to solicit/record their suggestions/issues/concerns.
- The collection of available/published environmental data, the review thereof for adequacy and hence the identification of the need for more comprehensive environmental studies/investigations and/or further information gathering.

Subsequent to the above activities/processes, advertisements of the operations were placed in local newspapers to notify I&AP's about the intended projects and invitations to register and participate in the consultation process. As a result of the consultation and recommendations from the environmental studies/investigations completed the company identified three key closure goals for the final decommissioning and closure of the prospecting operation that are listed below.

- To create a safe and healthy post-prospecting environment with no residual environmental impact.
- To create a stable, free draining post-prospecting landform, which is compatible with the surrounding landscape
- To provide optimal post-prospecting social opportunities

Each goal is supported by a suite of key objectives and activities which are elaborated on in section 4 and 5 of this plan. This plan also describes how these objectives are planned to be met and elaborate on the implementation of certain risk mitigation actions (section 6). With risk assessment and mitigation being integral to the planning and executing of the rehabilitation and closure of the mine. Aftercare and maintenance of rehabilitated sites is often the difference between the ultimate successes or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved.

Several pieces of legislation are applicable to mine closure. Importantly, public participation is an integral part of mine closure and the process followed needs to fulfil the requirements of all relevant legislation. The following government departments have been identified amongst others as playing a key role in the closure process:

- Department of Minerals Resources (DMR). Lead agent, facilitator of closure inspections and issues the closure certificate,
- Department of Water Affairs (DWA). Lead agent for potential water related issues and signs off on the mine closure certificate. Cancellation of Water Use license.
- Provincial Department of Environment and Nature Conservation. Gives input into the closure plan and guides and monitors protection of the natural environment.
- The local municipality and district municipality. Gives input into the mine closure plan and interfacing thereof with their integrated development plan (IDP) of the local area.

4 Prospecting plan and schedule

4.1 Prospecting plan

Dansile Nxikwe Diamonds CC is the holder of Prospecting right with a section 20 permission NC30/5/1/1/2/11976PR on a portion of Plot 516 Port Nolloth to prospect for and remove and dispose of diamonds (alluvial). Desktop studies during this exploration project also covered the surrounding area including the area covered by this application, which included sourcing of historical exploration data. The most important of these is the Alexkor exploration conducted over this area. As part of the exploration the stretch between Alexander Bay and Port Nolloth were divided into twelve sub-areas, namely: Alexander Bay, Cape Voltas, Peacock Bay, Rietfontein, Giftkop, Holgat North, Holgat South, Perdevlei, Cliffs, Langpan, Muisvlak and Port Nolloth Reserve 155.

For this application the information obtained during exploration of the Port Nolloth Reserve 155, provided very useful bedrock elevation contours. The bedrock elevation data also clearly shows the course of the Kamma River palaeo-channel (Figure 1). The results of the exploration completed by Alexkor describes the emerged (as opposed to submerged) marine gravel terraces from Alexander Bay to Port Nolloth Reserve 155 as the Lower Terrace (0-9 mamsl), the Middle Terrace (10-30 mamsl), the Upper Terrace (30-55 mamsl). This application area covers portions of the Lower and Middle Terrace.

It needs to be pointed out that all the trenching done in this area as part of the Alexkor exploration are primary trenches, which means that the trenches were placed across zones where marine gravels were delineated by drilling. No secondary trenches, which are used to delineate zones of enrichment found by primary trenching, have been undertaken in the area. As part of the recommendations in the exploration report on the existing project it was recommended that the redefinition of the Prospecting Right Area must be addressed as soon as possible, so that pre-bulk sampling work (geophysics and exploration pits) can be undertaken on the selected target areas as depicted in Figure 1. Ultimately the rest of the Prospecting Right Area must be examined to determine the potential for prospecting of the buried marine terraces.

To prevent possible amendments to this prospecting work program at a later stage, bulk sampling is also applied for although the bulk of the work will consist of pre-bulk sampling work, as shown in Figure 1. During this exploration program any potential extension of the known diamond deposits will be identified and evaluated.

The proposed location of the pitting positions within the prospecting application area are therefore shown **in** Figure 1 and the proposed positions of the bulk samples are therefore shown in Figure 2 below.

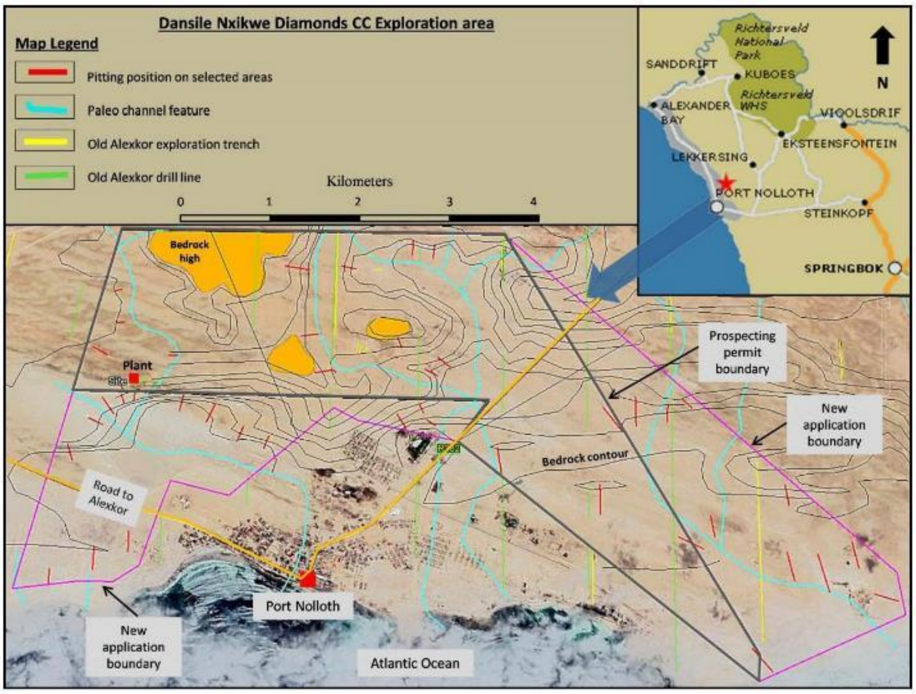

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Figure 1: Proposed location of pitting positions within the application area

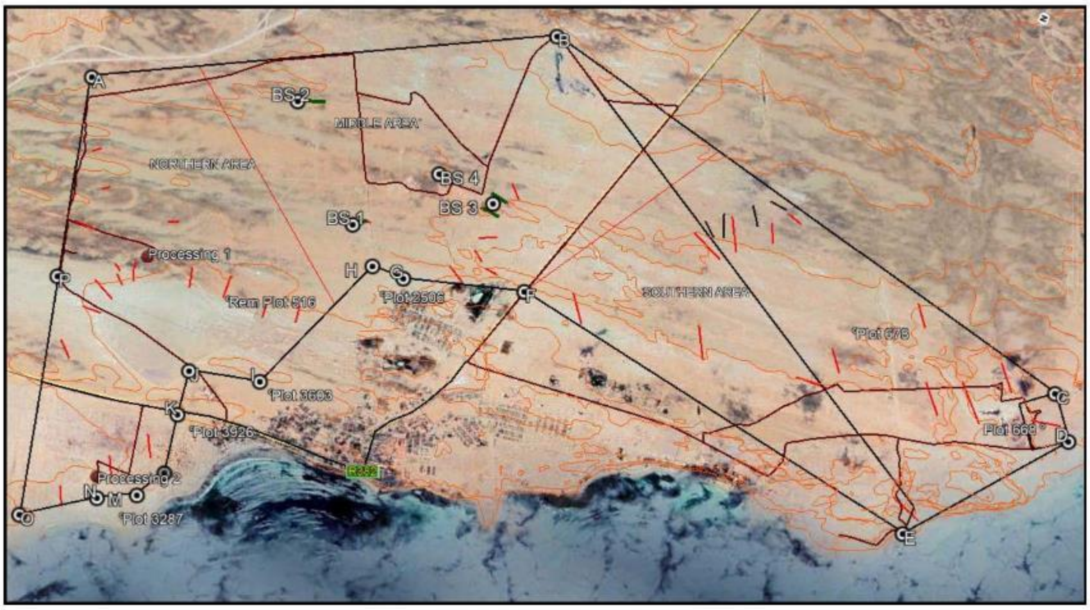

Figure 2: Proposed location of bulk samples within the application area determined through previous exploration.

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5 Description of the Proposed Activities

5.1 Introduction and Background

Dansile Nxikwe Diamonds CC is the holder of Prospecting right with a section 20 permission NC30/5/1/1/2/11976PR on the adjacent portion of Plot 516 Port Nolloth to prospect for and remove and dispose of diamond (alluvial).

As part of the exploration report, it was stated that redefinition of the Prospecting Right Area must be addressed as soon as possible, so that pre-bulk sampling work (geophysics and pitting) can be done on the selected target areas as depicted in **Figure 1** of this document.

This application is an extension of the existing right to determine the continuation and extend of the Kamma River paleo-channel beyond the boundaries of the current prospecting area, and to investigate other target areas in the area related to other paleo-channels or paleo beaches as depicted in **Figure 3**. The ultimate aim would be to apply for a mining right for the combined area once a resource statement has been completed.

The evaluation of a diamond deposit is the process followed to establish economic viability and to identify the "footprint" of the deposit. The "footprint" is a profile of the type of diamonds present, which may be important for market planning. Economic sensitivity analyses indicate that all diamond deposits are most sensitive to diamond value and grade, and these are the dominant factors that influence the decision to proceed with a project. The objective of the preliminary evaluation phase is to establish the global macro diamond grade and an initial estimate of value per carat to arrive at an Inferred Resource. If the results of this work are favourable, the project may move on to the evaluation phase (bulk sampling), where local grades and macro diamond values are established to arrive at a Measured Resource. If conceptual economic modelling of the measured resource indicates that the deposit may be viable, then the project will move to the feasibility and mining phase (Prospecting Works Programme; 2020).

A risk decision is made each time a project moves or does not move from one phase to the next. A risk decision may be made to skip phases of the process, for example, the project may proceed to feasibility and mining directly from the preliminary evaluation stage. The way risk decisions are managed is to enter the available geological data into economic models with variables such as operating costs, capital costs, recovery factors, dilution, stripping ratios, etc. In this way, projects that are most likely and least likely to be viable can be prioritised, held or abandoned. The effect of changes in parameters such as diamond values, new technology, royalties, etc., can then be recognised in terms of their effect on the potential return on investment for the project.

5.2 The Scope of the Proposed Activities

The information in Table 2 below is referenced from the Prospecting Works Programme (PWP) (2020).

Table 2: Details of the Mineral Resource (PWP; 2020)

ITEM	DETAIL
Type of mineral	Da Diamonds Alluvial
Locality (direction and distance from nearest town)	The prospecting area lies adjacent to the town of Port Nolloth as shown in Figure 1 **and** Figure 2.
Extent of application	2212 Ha Refer to Figure 1.
Depth of mineral below surface	To be determined through prospecting
Geological formation	Namaqua Metamorphic Belt Described further in the EIAR.

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Figure 3: Geological Map providing justification for possibility that the minerals being applied for could occur on the land.

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6 Project Description

6.1 Construction Phase: Development of infrastructure and logistics

- Access and service roads: Access to the exploration works will be via existing farm tracks as shown in Figure 1 and Figure 2. Existing farm tracks will be used or as haul roads and will be upgraded where needed.
- Water supply: Sea water will be used as process water and stored in mobile tanks at the processing area.
- Electricity supply: Electrical supply will be provided by gensets.
- Logistics: No permanent infrastructure is present or will be required due to the small scale of operations and the close proximity of the Port Nolloth settlement.
- All logistics and infrastructure required for processing will be mobile units and plants.
- No workshops will be constructed, only a service and wash bay will be required for emergency maintenance. All major repairs will be done in workshops in Port Nolloth.
- Limited waste management facilities will be provided at the processing area and will consist of the following:
  - Plastic containers for domestic waste, which will be transported daily to the municipal solid waste disposal facility;
  - Temporary storage area for used lubrication products and other hazardous chemicals for the collection of the small volume of waste before it is removed to a registered disposal site; and,
  - Hydrocarbon management systems will consist of drip trays for stationary equipment and mobile fuel trailer in bunded parking area.

<u>Mine logistics</u>

The logistics area will comprise a temporary service and wash bay, storage facilities, waste management facilities, ablution facilities and the processing plant, totalling a footprint of approximately 0.5 Ha in size.

<u>Processing Plant Design</u>

- The processing plant is a basic rotary pan plant where the sea water will wash the excavated material. The sea water will be returned from the dewatering screen for recycling. Refer to the process flow at **Figure 6**.
- The tailings containing seawater and alluvial deposit that has been processed, will be deposited into the historically excavated area where the mobile processing plant is to be located.
- The pump will be placed on a rocky shore outside the inter-tidal zone and not on the beach. The intake pump will be a portable petrol-driven mono pump, to be positioned above the High Water Mark (HWM) of the sea, to extract sea water from the inter-tidal pools. No permanent or temporary infrastructure will be required at the intake. The portable pump will be removed at the end of every working day to reduce environmental risk and for security reasons.
- The seawater will be transported via a 50mm pipeline in a direct line to the edge of the processing plant located approximately 250m from the edge of the beach or approximately 230m from the HWM.
- The seawater will be stored in 3 x 10 000 ℓ plastic tanks within the processing plant area.
- The plant will be run for 12 hours a day over week days only.

<u>Road Access and Haul Routes</u>

Existing public roads will be used as access and haul roads. Sections of new haul and access roads could be required, as could the upgrading of existing roads, which includes the potential for realignment of roads required during Phase 3 Bulk Sampling.

<u>Security and access control</u>

The processing plant and logistics area will be fenced and access control provided to ensure security.

<u>Power supply</u>

Power will be supplied by a genset (generator) located at the processing plant. A 100 litre fuel bowser will be used for the supply of fuels, and stored in a bunded area with a volume of less than $80m^2$.

Water Supply

- **Process water** supply is to be sourced from the sea located approximately 250m from the processing plant. Sea water will be extracted from inter-tidal pools with a portable petrol-driven mono pump via a 50mm surface pipeline and the water will be stored in 3 x 10 000ℓ plastic tanks. No permanent or temporary infrastructure will be required at the intake. The sea water will be returned from the dewatering screen for recycling.
- **Potable water** will be trucked in and stored in water tanks for domestic consumption.

6.1.1 Operational Phase

PHASE 1: Literature Study Imagery Analysis Geological Mapping Geophysical Survey

During this phase, the desktop studies and studying of available information on surrounding exploration work that has been undertaken will be supplemented by field observations. Ground Resistivity measurements will also be used to "home in" on target areas.

PHASE 2: Preliminary evaluation - Prospecting Pits

The objective of the preliminary evaluation phase is to determine a ballpark estimate of grade and size and thus possible in-situ value of the deposit. This is normally established by collecting mini samples by the most cost-effective method available. Due to the relative shallow overburden prospecting pits is the most common technique and will be employed during this exploration program to allow for geological samples.

The results of the existing exploration program have indicated that the paleo-channel running through the saltpan southwards and then westwards comprises a very promising target measuring about 3.5km long by 500 meters wide. The raised marine beaches on the rest of the property also comprises attractive targets.

Pit development will be the same as for trench development (Bulk Sampling) as shown in **Figure 4 and Figure 5**, but on a much smaller scale. There will only ever be three prospecting pits open at any given time, one in the process of rehabilitation, one that is operational and one in the process of development and it is anticipated that no more than 30 such pits will be developed. After results are logged the pit will be backfilled immediately for security and safety reasons before the project is moved to the next pit position. In case of sudden closure of the project there will only be one open pit to be dealt with as part of final decommissioning and rehabilitation.

The following volumes requiring earthmoving is an estimation used in the costing exercise, based on the dimensions provided in **Figure 4:**

- Pit floor to inspect and logged the gravel: 5.0m long and 2.0m wide ($10m^2$)
- Depth of Topsoil: 0.5m to be stockpiled separate from overburden.
- Depth of Overburden: 5m to be stockpiled separate from topsoil.
- Depth of Gravel: 1m where sampling takes place.
- Total Depth of Prospecting Pit: 6.5m
- Footprint including 3m bench: 11m long x 8m wide ($88m^2$)
- Volume topsoil: $88m^2$ X 0.5m = $44m^3$
- Volume overburden: $50m^2$ (average $88m^2$ top & $10m^2$ bottom) X 5m = $250m^3$
- Volume gravel: $10m^2$ X 1m = $10m^3$

Total footprint from 30 Prospecting pits: $88m^2$ X 30 = $2640m^2$
Total earthmoving from 30 Prospecting pits: ($44m^3$+$250m^3$) X 30 = $8820m^3$
Total gravel from 30 Prospecting pits: $10m^3$ X 30 = $300m^3$
Note that gravel from the pits is not taken out and treated but left intact and closed after logging of results.

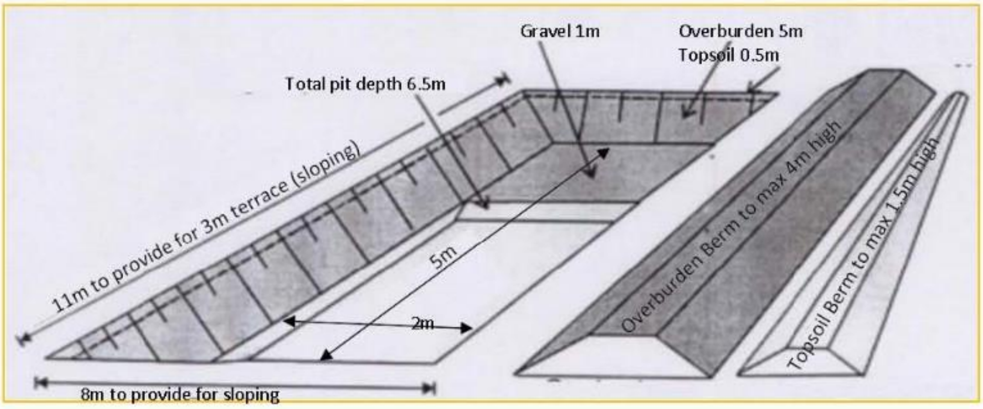

Figure 4: Schematic Pit Development

PHASE 3: Bulk sampling (Trenches)

The bulk sample will consist of a trench excavated perpendicularly to the paleo channel or paleo beach. There will only ever be one bulk sample open at any given time and it is anticipated that between 5 and 10 such sample sites will be developed. The bulk sampling or trial mining/prospecting however needs to continue till approximately 1 000 carats has been recovered in order for the feasibility of the mine to be concluded and the determination to continue with a Mining Right application. The information from this trial mining is also essential to determine the most efficient final recovery method.

The following are pertinent considerations regarding the prospecting trench development:

The trench width will be determined by:

- Overburden depth; the deeper the overburden, the wider the trench will be at the surface.
- The angle of repose and safety of the sidewalk in terms of slumping. The operator on site must determine these, as there are in situ safety considerations.
- Topsoil (barely discernible) from underlying dune sands.

Prospecting trenching development will consist of the following procedures. Refer to **Figure 5:**

- Remove topsoil to either side of the eventual trench lateral extension. Note that the sand that makes up the topsoil forms part of a mobile sand dune system and thus the "topsoil" is very recent and has not had chance to develop the structure of topsoil. The upper 50cm will be treated as topsoil as it contains a seedbank at present.
- Remove the overburden to an average of 5m below the "topsoil" cover to a separate stockpile berm placed between the trench and topsoil berm.
- Extract alluvial material approximately 1m thick layer.
- Use an infield screen to remove fines and oversize +2mm and -25mm. Approximately 90% is scalping for immediate backfill.
- The remaining 10% (ROM – Run of Mine) will be trucked to the processing plant and stockpiled.
- The excavation will then be backfilled with the overburden before the topsoil cover is returned and the area allowed to revegetate naturally.

Processing plant

- Refer to **Figure 6** for an illustration of the typical flow diagram of the mobile processing plant.
- The location of the processing plant is shown in **Figure 2** and is located to the north-west of Port Nolloth and to the west of the R382 road to Alexkor. The site selected for the processing plant is within an existing disturbed footprint that is a deep excavation from historical mining located approximately 500 m inland from the sea, with an average depth of 5 mbgl.
- Sea water will be pumped to the processing plant for use in processing.
- ROM materials are loaded in feeder bins by FEL and transported by 2 conveyors feeding to 2X10 ft rotary

wash pan-plant.

- In a Rotary Pan Plant (RPP)[1] the diamond-bearing gravel, sand and earth are mixed with water to create a slurry, often known as a 'puddle,' with a specific gravity in the range of 1.3 to 1.5 g/cm^3. The puddle is then stirred in the pan by rotating angled 'teeth'. The heavier minerals will settle at the bottom of the pan where they are forced down to an area where the concentrate can be extracted. Many of the lighter minerals overflow the pan and can be removed to waste.

- Concentrate from the rotary pans (10% of ROM) is transported via conveyor to classifier/scrubber to clean last excess sand and mud from the concentrate.
- From the classifier/scrubber the concentrate goes into a two stage FLOW SORT X-ray Media Separator and the final concentrate for recovery is deposited in safe boxes.
- Safe boxes from Flowsort are then opened and diamonds are sorted by hand.
- The tailings of the Flowsort is recovered and then put through a Boesman jig and sorted by hand.
- To concentrate the Run of Mine (ROM) for final recovery it will be reduced by approximately 99% and the tailings and slimes from the plant will be trucked during the return trips for backfilling in the excavation to reduce cost of final rehabilitation and decommissioning.

Tailings Waste Management[2]

- The tailings will be comprised of the by-product of the alluvial ore that has been processed using seawater for cleaning that will be disposed in the existing historical excavation where the processing will take place. The total volume of tailings from an estimated 5 trenches is calculated based on 1% final recovery, resulting in 2475m^3 for disposal. The depth of the existing excavation is on average 5 metres deep, which means that even should the maximum number of 10 bulk trenches be sampled, the tailings will fill only 10% of the excavation (excavation volume is estimated at 50 000m^3).
- Generic characteristics of the tailings based on desk-top research, and not on a representative sample analyzed by a specialist on waste classification or tailings storage facility design, are broadly commented on below:

  Physical:

  - Alluvium is typically made up of a variety of materials, including fine particles of silt and clay and larger particles of sand and gravel. Alluvium is loose, unconsolidated (not cemented together into a solid rock) soil or sediment that has been eroded, reshaped by water in some form, and redeposited in a non-marine setting. When this loose alluvial material is deposited or cemented into a lithological unit, or lithified, it is called an alluvial deposit[3].
  - Details on the size distribution of the principle constituents; permeability of the material; void ratios of the material; consolidation or settling characteristics of the material under its own weight and that of any overburden; the strength of material; specific gravity of the solid constituents; the water content of the material at the time of deposition, and at other phases in the life of the deposit; and, the change in these properties with time, are unknown.

  Chemical:

  - The only chemical characteristic that can be commented on, is related to the water separated from the solids, which will be seawater extracted from the adjacent coastline. Seawater has a likely pH of 8.1[4] and high salinity, including a variety of dissolved solids and gases.

  Mineral content:

  - No information is available on the specific gravity of the residue particles or its impact on particle segregation and consolidation.

- Classification of tailings waste disposal is undertaken based on the characteristics of the tailings, location

[1] https://www.ehudlaniado.com/home/index.php/news/entry/diamond-recovery-methods

[2] Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015, as amended by GNR 990 of 21 September 2018.

[3] https://en.wikipedia.org/wiki/Alluvium#:~:text=Alluvium%20is%20typically%20made%20up,is%20called%20an%20alluvial%20deposit.

and dimensions of the deposit (height, surface area); importance and vulnerability of the environmental components that are at risk; the spatial extent, duration and intensity of potential impacts; and, the pollution control measures are determined as a result of the risk analysis.

- The importance and vulnerability of the receiving environment within the Prospecting Right area is detailed in Section 8 of this report. The receiving environment within the historical excavation where the primary processing will take place, including the disposal of the waste by-product, is on average 5 metres deep, and is being used as an illegal dump site. There is sparse vegetation growing in the disturbed area. Refer to Photograph Series 1.
- This risk analysis will be undertaken in the EIA phase when the spatial extent, duration and intensity of impacts are assessed.

The following **volumes requiring earthmoving** is an estimation used in the costing exercise (Refer **Figure 5**):

- Depth of Topsoil: 0.5m to be stockpiled separate from overburden.
- Depth of Overburden: 5m to be stockpiled separate from topsoil.
- Depth of Gravel: 1m
- ROM: Gravel scalped by 90% through infield screening 10% ROM (+2mm and -25mm) trucked to processing plant
- Total Depth of Prospecting Trench: 6.5m
- Footprint of trench: 100m long x 50m wide (5000m^2 or 0.5Ha)
- Volume topsoil: 5000m^2 X 0.5m = 2500m^3
- Volume overburden: 5000m^2 X 5m = 25 000m^3
- Gravel: 5000m^2 X 1m = 5000m^3 X 2SG = 10 000 tons
- ROM 5000m^3 X 10% = 500m^3 X 2SG = 1000 tons

Total surface disturbance: 5 Trenches: 0.5Ha X 5 = 2.5Ha
Total earthmoving: 5 Trenches: (2 500m^3+25 000m^3) x 5 =137 500m^3
Total ROM from 5 Trenches: 500m^3 X 5 = 2500m^3 X 2SG = 5 000 tons
Total tailings to return for backfilling of 5 trenches: 2500m^3-1% final recovery = 2475m^3

The existing historical excavation is estimated at 50 000m^3 at an average depth of 5 meters, which means that even if the maximum of 10 bulk samples is excavated only 10% of the excavation will be filled. Therefore at final closure the floor of the excavation needs to be levelled and the sides sloped to create an even depression, or if prospecting advances to full scale mining then the excavation will remain for processing during mining activities.

The applicant requires 5 000 tons ROM for processing to obtain a representative sample for sufficient statistical analysis to complete a resource statement and to determine a grade.

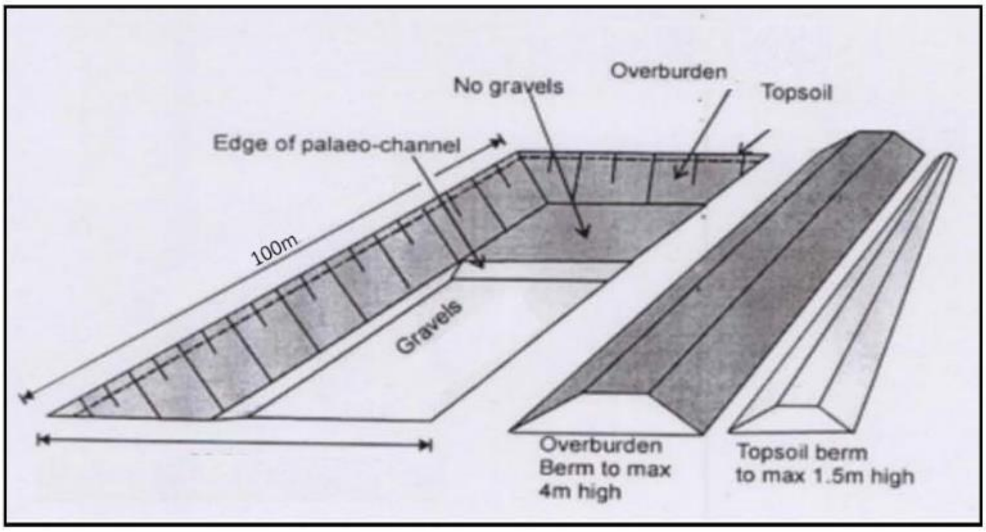

Figure 5: Schematic Trench Development

Table 3: Bulk Sampling Activities

ACTIVITY		DETAILS		
Number of pits/trenches planned		Estimated 5 to 10 bulk sample excavations until 1 000 carats has been recovered		
Dimensions of excavations	Number of excavations	Length	Breadth	Depth
	5 to 10	100m	50m	6.5m
Locality		The Middle channel Sample sites has been demarcated Refer Figure 5 and the rest will be developed perpendicularly to the paleo channel or paleo beach to be determined during Phase 2		
Volume Overburden (Waste) per bulk sample area		5 000m² X 5m = 25 000m³		
Volume Ore per bulk sample area		5 000m² X 1m = 5 000m³ Infield screening (remove 90% fines and oversize from gravel) 90% x 5 000m³ = 4 500 m³ for immediate backfill ROM = 500m³		
Density Overburden		25 000m³ X SG of 2 = 50 000 tons		
Density Ore		ROM = 500m³ X SG of 2 = 1 000 tons		
Phase(s) when bulk sampling will be required		Phase 3		
Timeframe(s)		Year 3 and 4		

PHASE 4 and 5: Resource Estimation

The project manager monitors the program, consolidates and processes the data and amends the program depending on the results. This is a continuous process throughout the program and continues even when no prospecting is undertaken on the ground.

Each physical phase of prospecting is followed by desktop studies involving interpretation and modelling of all data gathered. These studies will determine the manner in which the work program is to proceed in terms of activity, quantity, resources, expenditure and duration.

6.1.2 Decommissioning and Closure Phase

- Waste can be removed as it is created.
- Excavations can be planned so that topography restoration is less complicated.
- At final closure, the floor of the excavation needs to be levelled and the sides sloped to create an even depression, or if prospecting advances to full scale mining then the excavation will remain for processing during mining activities.
- The decommissioning and closure phase at the end of the life of the mine will consist of implementing in this plan.

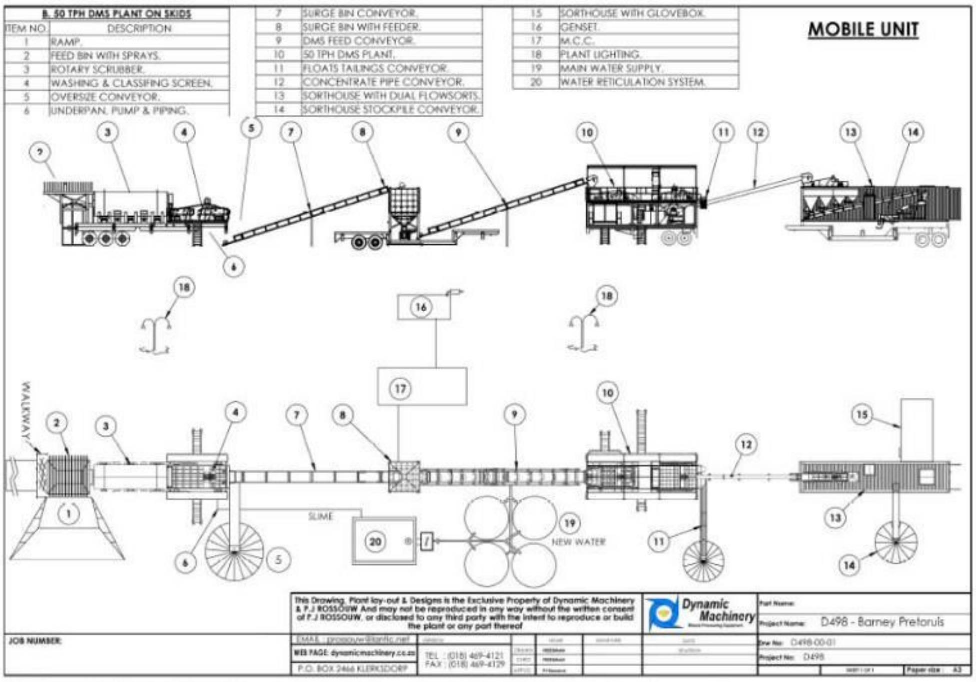

Figure 6: Example of a Typical Flow Diagram for the Mobile Processing Plant (Provided by the Applicant)

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7 Environmental Authorisation (EMPr) requirements

Objective 1 - To create a safe and healthy post-prospecting environment

- Safe excavations
  - Slope stability of remaining excavation
  - No potentially dangerous areas secured if required
- Limited residual environmental impact
  - Develop a landscape that reduces the requirement for long term monitoring and management
  - No surface and/or groundwater contamination
  - Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post prospecting landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
  - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
  - Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post prospecting landform
  - Prevent alteration or diverting natural drainage lines and reduced natural runoff.
  - Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-prospecting social opportunities

- Optimised benefits for the social environment
  - Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
  - Undertaking environmental management according to approved EMPr and Closure plans and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
  - Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of an increase in the ambient noise levels
  - Prevent disturbance of archaeological sites and implement mitigating measures according to the heritage and paleontological assessment.

From the point of view of the environmental impact created, diamond prospecting is a relatively benign industry. There are some emissions besides those of the diesel-powered earthmoving equipment utilised in its extraction. Contamination of water resources is only likely in the event of petrochemical spillages from storage facilities and equipment, and these can largely be either prevented or cleaned up effectively.

Similarly, prospecting methods themselves generally have a low impact on the surrounding environment due to the small area impacted on.

The environmental impacts of prospecting are generally significant, are mainly of temporary duration, and can be effectively managed. While there is an economic cost to limiting environmental impacts, these costs are can be made less significant in diamond prospecting if proper planning and consideration is applied from the exploration stage through to mine closure. In fact, it has been noted that truly environmentally conscious operation requires that activities be conducted with the future in mind, and that this will not only minimize the environmental effects of each activity, but will also result in significant cost savings. In the context of the diamond industry, these cost savings are not limited to costs of restoration, but may also be real cost savings in operating costs when proper planning over the lifecycle of a deposit is applied.

Concurrent or progressive rehabilitation of disturbed areas is good practice and should be undertaken as this offers a number of advantages such as limiting the mine's environmental liability and limiting costs at closure as rehabilitation is included in the operational activities of the mine.

Rehabilitation measures to be implemented include improving the visual appearance of the disturbed areas, establishing a cover to provide erosion control, improving runoff water quality by minimising silt loads and controlling dust.

Concurrent rehabilitation and remediation are provided for in the annual rehabilitation plan and contain information that defines activities on an annual basis and how these relate to the Final closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan.

Annual reviews in terms of regulations 6(a) and 11(1)(a) of the NEMA Financial Regulations, that form part of the Annual Environmental Audit, assesses what closure objectives and criteria are being achieved through the implementation of the plan.

While some disturbed areas can be rehabilitated on a progressive basis during operation, others cannot be rehabilitated until prospecting is complete. For this reason, some rehabilitation is generally still required during and after closure. Remedial initiatives to minimize environmental impact during and after prospecting can be divided into three main categories:

- Firstly, the removal of surface infrastructure that cannot be used for other purposes.
- Secondly, the remediation and rehabilitation of tailings, old pits to remove the hazard they present to people and animals. Earthworks and contouring the mine area to as close as possible to the pre-prospecting landscape. This includes filling pits, trenches and small excavations; making pit side's safe and covering the surface area with subsoil and topsoil as necessary; and mitigation or restoration of all surface disturbances and revegetation of the pit slopes and waste rock dumps.
- Lastly, the removal and isolation of potential pollutants from the environment. Containment and treatment of contaminated water and correct storage and removal of hazardous materials. Waste rock present specific problems, as they are unsuitable for other uses. For this reason, all waste rock produced are destined to remain in the environment.

The aims of rehabilitation should therefore look at limiting the long-term liabilities that will be borne by future generations. Where possible, natural systems will be used to control water pollution and vegetation cover should limit windblown dust pollution. Gradients will be reduced to levels where erosion is minimal, and natural revegetation is possible.

Maintenance of rehabilitated sites is often the difference between the ultimate successes or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved.

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities.

Depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include erosion, slow recovery of vegetation, stock that has been abandoned (e.g. oil drums, scrap equipment) and old (unserviceable) structures.

The main closure objective is to hand back the rehabilitated properties in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aim therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. Aftercare and maintenance required can only be identified post decommissioning and depending on success of rehabilitation and mitigating measures.

8 Basic rehabilitation methodology and closure strategy

8.1 Infrastructure and Logistics areas

The main post closure objective for the infrastructure areas is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated.

The general approach adopted is the complete removal of all infrastructure and equipment and to reuse all infrastructures and equipment at another location by the company. Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded. All steel structures and reinforcing will be discarded or sold as scrap. Building rubble will be buried together with any remaining waste blocks. The compacted salvage yard, lay down and movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. All redundant water pipes, pumps, power lines and cable associated with raw water and electrical supply will be removed. Service roads needs to be maintained and handed over to the landowner in a good state of repair and all redundant fences needs to be removed. All temporary waste storage areas need to be cleaned out and waste removed. Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the complete area and disposed of at a recognised landfill facility. It will not be buried or burned on the site.

8.2 Pits, Tailings and Waste Dumps

Diamond prospecting influences the topography on the site creating depressions. .

The waste rock is dumped away from the pit onto a surface waste dump if not used to fill pits or excavated areas. Due to the size of prospecting pits, this will not be a problem and only small depressions may be left after prospecting. Post prospecting topography for most of the area will follows the original landform shape except where changes due to quarrying or waste dumps have occurred.

The main objective is usually to make the pits safe and to landscape the waste rock dumps.

The post closure objective will be to restore the land to its pre-prospecting status Re-vegetation of disturbed areas will follow a process of natural plant succession starting with pioneer plants.

The main closure objective therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated.

The basic rehabilitation methodology will therefore strive to replicate the pre-prospecting topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.

9 Risk Assessment

9.1 Risk sources

9.1.1 Infrastructure and Logistics areas

- Access and Haul Roads
- Access from the HQ to the mine workings is via a duel use public road system and existing farm tracks.
- Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite.
- The service roads will remain as part of farm improvement and the mine is only responsible for the maintenance of the road.
- Services and associated infrastructure
- Potable water are obtained and trucked in from the municipality.
- Process water are obtained and pumped from the sea via a mobile pump.
- Storage consisting of a 10 000-litre plastic tank that can be re-used on another operation.
- A collection sump for the recycling of process water used to wash tailings, if possible.
- Electrical supply for the processing are generated by mobile gensets supplied with generator bay and spill prevention measures.
- Underground water reticulation laid-on to the mine work area to feed water to the logistics.
- Accommodation and Logistics
- Development and upgrading of infrastructure and waste management facilities are still in progress.
- No steel or reinforced concrete buildings and structures are present on the prospecting area that will require demolition.
- All waste rock structures used as part of accommodation, site office and secure storage needs to be demolished and waste blocks buried together with any remaining cement floors or footings.
- Structures in the form of pre-fabricated buildings including the fuel tank that can be re-used on another location must be removed from site
- The cement structures for the fuel supply including service aprons needs to be demolished together with any remaining cement floors or footings.
- Waste management facilities
- As part of waste management facilities, a salvage yard, laydown area with parking and temporary waste storage facilities will be provided.
- Domestic waste is collected in plastic containers and transported weekly to the municipal refuse site.
- Petrochemical and hazardous waste including contaminated/used spares, filters and used oil are collected and stored in special containers with spill containment measures for disposal at a registered disposal site.
- The workshop area needs to be upgraded with a temporary waste storage area, bio cell and laydown area
- Domestic waste is collected in plastic containers and transported weekly to the municipal refuse site.
- Petrochemical and hazardous waste including contaminated/used spares, filters and used oil are collected and stored in special containers with spill containment measures for disposal at a registered disposal site.
- Oil/grease/diesel management systems
- The service and wash bay at the infrastructure area will be used.
- The fuel supply tank is provided at the infrastructure area and fuel is trucked onto the site for the generators and equipment.
- The fuel truck must be provided with a parking area with spill containment measures.
- The generators must be supplied with generator bays with spill containment measures.

9.1.2 Pits, tailings and waste dumps

- Opencast workings (including final voids and ramps)
- Deep unsafe excavations not backfilled

- Residue deposits overburden and spoils
  - The only spoils to be generated are the volumes of rocks after screening.
  - Only one waste dump needs to be created per bulk excavation and the creation of secondary waste dumps must be prevented by regularly moving waste to the designated areas.
  - The existing waste dumps will be used during new operations
  - Secondary waste dumps need to be shaped and rehabilitated as part of the annual rehabilitation plan.
- Surface disturbance (compacted areas)
  - The stockpile and dispatch area for gravel together with the sorting and stockpile area for gravel needs to be demarcated and the footprint contained.
  - Regular sorting and dispatch of gravel to be done as part of housekeeping.
  - Demarcation needs to be removed to the demarcated waste dump at final closure.
  - The sorting area together with stockpile area for gravel to be ripped and profiled with erosion control measures.

9.2 Risk Identification

The potential risks arising from the prospecting operation are generic for any diamond prospecting and listed below. The impact rating of applicable risks and mitigation actions are addressed in the risk assessment section below.

9.2.1 Potential Risks with regard to safe excavations and changes in topography

- The change in topography from prospecting activities would be slight depressions created in the landscape. These depressions would be minimal as only 1% is taken for final recovery.
- The tailings are returned to the trenches for backfilling. The 1% will backfilled in the historical pit, and will fill 10% of this historical excavation, should there be 10 sample trenches.
- Potentially dangerous areas like deep mine pit or equipment left behind and uncontrolled access to a potentially unsafe post-prospecting area
- Post-prospecting topography not compatible with original landform.
- Unsafe erosion gulley's

9.2.2 Potential Risks associated with prospecting.

- Safety of personnel operating large earth moving equipment.
- Management of dust, noise and vibration associated with prospecting activities, in relation to surrounding communities.
- Potentially dangerous areas like excavations or equipment left behind and uncontrolled access to a potentially unsafe post-prospecting areas.

9.2.3 Potential risk of environmental impacts

- Disturbance to sensitive environments such as land with historical or conservation value, watercourses including the salt pan and wetland feature, terrestrial habitats, fauna and flora and any associated biodiversity corridors, and high potential agricultural land.
- Potential contamination of groundwater from tailings, unmanaged use of hydrocarbons on site, and incorrect storage of hazardous substances.
- Waste classes not kept in separate streams and incomplete removal of waste.
- Stockpiles and leftover product remaining after prospecting.
- Loss of indigenous vegetation due to disturbed footprints at prospecting pits and bulk sampling.
- Increased soil erosion causing loss of topsoil.
- Climate change causing increase in temperature and decrease in rainfall, reducing vegetation cover leading to wind-blown soil erosion.
- Dust generation from unsurfaced roads.

- Chemical contaminants impacting surface and/or groundwater quality or resulting in discharge that exceeds the concentrations permitted.
- Vehicle wash bays and workshop facilities produce petrochemical and solvent contaminated runoff.
- Sanitary conveniences, fuel depot or storage facilities of potentially polluting substances can contaminate surface water.
- Oil fuel leaks onto soil through the earthmoving and transport equipment and machinery or spillage of fuel during transfer from fuel bowser to equipment.
- Post-prospecting landscape that increases the requirement for long-term monitoring and management.
- Unwanted ruins, buildings, foundations, footings and waste management practices creating or leaving legacies.
- Sub-surface infrastructure remaining behind, limiting the intended post closure land use including footings and foundations, power supply and water installations including pumps and pipelines.
- Equipment and other items used during the prospecting operation left behind.
- Incomplete removal of re-usable infrastructure.
- Rubble from demolished infrastructure left behind.
- Post-prospecting topography not compatible with original landform.

9.2.4 Potential risks associated with viable and sustainable land.

- Uncontrolled expansion of prospecting footprint by not restricting the area disturbed by prospecting and the associated activities/infrastructure, resulting in loss of land with agricultural potential.
- Uncontrolled development of roads, where existing farm roads are not used for prospecting operations and redundant internal roads are left behind.
- Post-prospecting landform not compatible with the surrounding landscape and not capable of a productive land use that achieves a land capability equal to that of pre-prospecting conditions.
- Long term changes in land use caused by not implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Unsuccessful rehabilitation can reduce the post-prospecting land use options. Rehabilitated areas could be too unstable to support post-prospecting land use objectives compatible with surrounding areas.
- Disturbance of ecology due to loss of habitat and cumulative impact of illegal collecting during long-term or life of mine can degrade areas and reduce the viability of adjacent areas.
- Inadequate control of alien invasive vegetation species can result in establishment of populations or seed sources that threaten adjacent areas.

9.2.5 Potential Risks associated with a post-prospecting landform.

- Impact on surface water and the salt pan through modification of infiltration rates by increasing the extent of hardened surfaces.
- Inadequate topsoil restoration or creation of unnatural surface topography or slope form which could impact lower or adjacent slopes due to increased runoff velocity.
- Altered storm water runoff response due to large impervious areas and concentrated runoff in drainage systems. Concentrated storm runoff from infrastructure areas is erosive, causing sheet, rill and donga erosion features.
- Potentially dangerous areas like excavations or tailings incorrectly rehabilitated including uncontrolled access to potentially unsafe post-prospecting areas.

9.2.6 Potential Risks associated with the socio-economic environment.

- Disturbance of local communities in urban and rural areas caused by noise and dust emissions and increase in heavy vehicles along transport routes.

- An influx of people into the local communities looking for work, with an increase in demand for housing, schooling and services. Such an influx of workers into a community often results in a change in social dynamics.
- Positive impacts include for example, the creation of both formal and informal businesses to supply additional needs, whilst negative social impacts include for example, an increase in substance abuse, HIV transmission and unwanted pregnancies.
- Staff losing their jobs at mine closure can have devastating effects on communities that are reliant on mine-based income.
- Job losses of secondary industries, businesses and contractors and contractual agreements with service providers surpassing mine closure date.
- Lack of compliance with the approved EMPr and a lack of auditing of the EMPr.
- Prospecting activities closure stalled due to non-compliance with relevant legislation (national, provincial and local).
- Insufficient funds for complete rehabilitation.

9.2.7 Potential Risks associated with visual intrusion, noise, vibration, light pollution and air emissions.

- Terrain morphology plays a critical role in defining the visual envelope of prospecting developments and can either reduce or enhance visual impact. Apart from visual intrusion there is also the risk of reduced sense of place. The visual intrusion impact of prospecting activity would be on nearby roads, homesteads, settlements, tourist accommodation, and along tourism routes or corridors.
- Visual disturbance would be caused by prospecting activities such as excavations. Buildings provide a colour contrast, as do disturbed areas against adjacent natural areas.
- Nuisance effects of air emissions due to a lack of implementation dust suppression activities could impact on communities.
- Dust generated on haul roads reduces visibility, representing a safety hazard.
- Dust can retard vegetation growth and reduce the palatability of vegetation.
- The cumulative effect of a raise in the ambient noise levels or high noise levels in specific areas that exceed specified levels would impact on communities in close proximity.
- Noise disturbance and light pollution would result from night-time activities (if applicable) in areas that are in close proximity to communities.

9.2.8 Potential Risks associated with regard archaeological sites, cultural heritage sites or graves.

- Disturbance of identified surface, or unknown sub-surface archaeological sites, if mitigation and monitoring is not implemented as per mitigating measures in a Heritage and Palaeontology Impact Assessment
- Progressive development can encroach upon or disturb archaeological sites, cultural heritage sites or graves.

9.3 Risk impact rating

Each impact or risk is assessed in terms of: nature (character status); extent (spatial scale); duration (time scale); probability (likelihood) of occurring; reversibility of the impact; the degree to which the impact may cause irreplaceable loss of resources; the significance (size or magnitude scale) prior to mitigation; the degree to which the impact can be mitigated; and, the significance (size or magnitude scale) after mitigation as per the criteria in

Table 4 below.

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Table 4: Impact Assessment Criteria

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
High	The impact would result in significant cumulative effects
Medium	The impact would result in moderate cumulative effects
Low	The impact would result in minor cumulative effects
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
High	The impact could be significantly avoided/managed/mitigated.
Medium	The impact could be fairly avoided/managed/mitigated.
Low	The impact could be avoided/managed/mitigated to a limited degree.
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact from occurring.

9.4 Risk Mitigation and Closure objectives

In addition to the goals and objectives for final decommissioning and mine closure the vision for the post closure land form is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The vision is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof and that the aesthetic value of the area will be reinstated.

For the vision to be realised the objectives and associated risk management strategies and mitigating measures for the operational phase described in Table 5 below needs to implemented, monitored and evaluated.

The aim with risk mitigation actions is to over time manage significant and medium risks to become insignificant, or at least medium and under control with management actions. Once achieved, a risk will continue to be monitored to confirm its insignificance rating as part of aftercare and maintenance.

The closure process involves a series of actions, executed over a number of years as indicated in the annual closure plans, with continual monitoring, review and remedial actions (if required). Identified and assessed risks feed into mitigation actions (or primary tasks) of which successful implementation result in achievement of the mine closure goals and objectives.

Financial provision is made in section 6 to deal with these mitigating measures in case of temporary closure or sudden closure during the normal operation of the project or at final planned closure.

The identified risks and their levels are listed together with their associated mitigating actions for the operational phase in Table 5 below.

Table 5: Risks, risk levels and mitigating actions: Operational Phase

IMPACTS AND ASPECTS	RISK LEVEL AFTER MITIGATION: PREFERRED AND ONLY ALTERNATIVE	MITIGATING ACTIONS
1. CHANGE IN TOPOGRAPHY: The change in topography from prospecting activities would be slight depressions created in the landscape. These depressions would be minimal as only 1% is taken for final recovery. The tailings are returned to the trenches for backfilling. The 1% will backfilled in the historical pit, and will fill 10% of this historical excavation, should there be 10 sample trenches.	Low Risk	• Pit development will be the same as for trench development (Bulk Sampling), but on a much smaller scale. There will only ever be three prospecting pits open at any given time, one in the process of rehabilitation, one that is operational and one in the process of development and it is anticipated that no more than 30 such pits will be developed. After results are logged the pit will be backfilled immediately for security and safety reasons before the project is moved to the next pit position. In case of sudden closure of the project there will only be one open pit to be dealt with as part of final decommissioning and rehabilitation. • The existing historical excavation is estimated at 50 000m³ at an average depth of 5 meters, which means that even if the maximum of 10 bulk samples is excavated only 10% of the excavation will be filled. Therefore, at final closure the floor of the excavation needs to be levelled and the sides sloped to create an even depression, or if prospecting advances to full scale mining then the excavation will remain for processing during mining activities.
2. SOIL EROSION & SOIL COMPACTION: The potential for soil erosion by wind and storm water run-off; soil compaction from repeated use of access tracks.	Low / Insignificant Risk	• After clearing, the affected area shall be stabilised to prevent any erosion or sediment runoff. Stabilised areas shall be demarcated accordingly. • Incremental clearing of vegetation should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and storm water run-off. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • The basic rehabilitation methodology will therefore strive to replicate the pre-prospecting topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures. • Provision must also be made for efficient storm water control to prevent erosion of roadways. • Soil erosion on haul roads is to be regularly monitored and repaired. • Top soil shall be removed separately and stockpiled separately from other soil base layers.

		• The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. • In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Tailings may only be located on the old excavated pit to reduce impacts on undisturbed areas.
3. WATER RESOURCES (QUALITY AND QUANTITY): Potable water from the Municipality will be trucked in and stored in water tanks. Sea water will be pumped from the inter-tidal zone and used (with recycled) for process materials. There are no permanent surface water features on site that could be impacted on.	Very-Low / Insignificant Risk	Implement and follow water saving procedures and methodologies. • Only the allowed amount may be used from the municipal supply. • 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. • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • 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. • Ensure that good housekeeping rules are applied. • Minimise storage of hazardous substances onsite during construction. • Service and refuel construction vehicles at a fit-for-purpose facility to minimise pollution risks. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • Provide mobile ablution facilities • Drinking water to be brought on site as per existing practices. • Clear demarcation of access areas, close to salt pan. Waste water (i.e., including process water and grey water) • A biozone system will be used to treat effluent (containerised). • By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled.

		• Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. • Slow storm water runoff with contoured, low-gradient drains and channels. - Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas.
4. LIMITED LOSS OF NATURAL VEGETATION AND ECOLOGICAL FUNCTIONING: The proposed prospecting area footprint will result in an impact on localized ecological functioning, although limited as: bulk sampling, prospecting and mining has already occurred in some places; the tailing storage facility will be situated in a historically excavated areas; access and haul roads exist; and the site camp area will also be on a disturbed area. Transport of materials will be along existing access tracks resulting in little impact on ecological functioning at a local level during the operation phase. The machinery and trucks will continue to disturb local fauna, already accustomed to the existing mining activities. No section of the site is classified as a Critical Biodiversity Area or Ecological Support Area. The ephemeral salt pan is classified as a NFEPA Wetland.	Medium-Low / Insignificant Risk	• Demarcate the sample pit, sample trench, and topsoil stockpiles using green shade cloth to contain the area of disturbance. Leave a 50cm gap between the bottom of the shade cloth and the ground to allow for the movement of small fauna. • Demarcate the sections of existing tracks that may be used to access each sample pit or trench, including the area for turning circles of vehicles. • Conduct a "search and rescue" operation to identify any plants of conservation concern prior to clearing each prospecting pit (footprint of each sample pit is 88m²); and for the increased area required for a prospecting trench, should the sample pit provide an indication of a viable mineral resource for further bulk sampling (0.5Ha), • No indigenous plants outside of the demarcated work areas may be damaged. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the sampling pit or trench. • The noise and vibration caused by the earthmoving equipment will disturb mobile fauna that should move away when activities commence. Should any animals be encountered these should be relocated by a suitably trained nature conservation officer. • Demarcate areas for the sample pits and trenches and ensure that all other adjacent areas are regarded as no-go areas. • The Closure plan must be implemented.
5. POTENTIAL FOR SOIL CONTAMINATION, AND WASTE MANAGEMENT DURING OPERATIONAL PHASE: Tailings are to be collected in the tailings storage facility located in the old excavation; overburden; industrial waste (hazardous wastes, oil & grease); and domestic waste	Low / Insignificant Risk	Tailings collected within the tailings storage facility in the old excavation. • Sea-water used as part of processing will be collected in the tailings storage facility from where the water will be re-used if possible. Overburden, cover, and/or "soft" material including topsoil • Remove and stockpile 300mm topsoil in berms or heaps less than 1,5m high and turn soil or re-use every six months. • Remove and stockpile topsoil building platforms and stockpile areas prior to construction for use to restore disturbed areas. To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness.

		• Contaminated soil must be treated by first removing the source of contamination - removing the source of contamination should allow the system to recover without further clean-up required. • Petrochemical spillages to be collected in a drip tray and drum to store excavated spill affected soil for disposal at a registered facility or onsite treatment. • The most promising techniques for in on-site treatment involve bioremediation. Bioremediation involves the use of microorganisms to destroy hazardous contaminants. Other non-specification waste • Any product stockpiles left or oversize boulders must be removed and used to backfill excavations. • Waste or rock material used as refill or landscaping, crushed for other applications, or otherwise dealt with responsibly. Industrial waste (i.e. including hazardous wastes and oils and greases) • Separation of wastes into classes will ensure that waste is disposed of safely and according to the correct procedure. In order to ensure that waste classes are kept in separate streams, people will be trained on the different waste classes. • Unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard. • Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment. • All steel structures and reinforcing will be discarded or sold as scrap. • All equipment and other items used during the prospecting operation needs to be removed from the site. • Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company. • All waste in the temporary storage area for used lubrication products and other hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company. • Mobile generators will supply electricity to the machinery. Generator bays will be constructed with the necessary pollution control measures (drip trays). • Clean out content of oil traps and dispose of waste at registered and purpose designed landfill sites. • Hydrocarbon contaminated sludge (collected in oil traps) - Removed from the oil traps and removed from site for recycling (if possible) or disposal at a suitably permitted facility. • All temporary waste storage areas need to be cleaned out and waste removed. • Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc. • Batteries to be return to supplier or dispose at a permitted hazardous waste facility.

		• Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility. • Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities). • Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. • Industrial chemicals (laboratory waste) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. These liquid wastes cannot be disposed of on the waste dumps. <u>Domestic waste (i.e., waste that is generated from the accommodation and offices)</u> • Domestic waste - Separated at source into recyclable products. These must then be removed and recycled by recognised contractors. (Note that the mine is responsible for the waste from cradle to grave). • Disposal at a registered and officially permitted commercial or municipal landfill site is the most cost-effective option for materials that cannot be recycled. • Domestic waste generated by workers needs to be sorted and all biodegradable waste must be stored in separate drums provided for. - This biodegradable waste will be dumped in a landfill provided for onsite.
6. VISUAL INTRUSION: Caused by the machinery, topsoil and overburden stockpiles, cleared areas, and movement of trucks on site.	Low / Insignificant Risk	• The site shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Mitigation of the visual impact by screening of prospecting pits or trenches with green shade cloth.
7. EMISSIONS (DUST, VEHICLES & NOISE): Noise and dust will be created by the prospecting and processing activities; from the equipment (e.g. front-end loaders) and hauling vehicles that also emit Greenhouse Gases.	Low / Insignificant Risk	• Health and safety equipment is required for workers. • The wetting of the roads helps reduce dust generation during transporting of processing materials. • No amplified music should be allowed on site. • Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Incremental clearing of ground cover should take place to minimise exposed surfaces.
8. ARCHAEOLOGICAL RESOURCES	Low Risk	**The following recommendations are made:**

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<table>
<tr>
<td>Direct impacts to archaeological resources would occur primarily during the construction phase in terms of stone age sites and the copper railway (e.g. if an excavator drives beyond the demarcated area during construction).
Archaeological resources are fragile and very easily damaged or destroyed, especially in a landscape prone to erosion when the surface is disturbed. These sites have the potential to provide much scientific information on the past inhabitants of the area.</td>
<td></td>
<td>Mandatory avoidance of some areas with 50m buffer, avoidance (with 50m buffer) or archaeological excavation of others
The assigned heritage grade and the nature of mitigation go hand in hand as shown in table below (taken from HIA). Many sites are very ephemeral and/or obviously lack cultural materials. These sites are graded GPC and require no further work.
<table>
<tr><td>Grade</td><td>Mitigation</td><td>Purpose of mitigation</td></tr>
<tr><td>GPC</td><td>One</td><td>No apparent cultural significance, no mitigation required.</td></tr>
<tr><td>GPB</td><td>Small sample</td><td>The small sample provides a record of the site and its contents with the main record anticipated to be of the shellfish. This sampling also serves as a test excavation to determine whether further excavations might be required. This would be in the event that the initial sample produces an elevated density of cultural materials. Some sites were allocated slightly more time because the chances of encountering cultural materials seemed higher from the initial surface examination. Note that as a precautionary measure in some large clusters of scatters (that might represent single site complexes) where only certain waypoints have been suggested for mitigation, all waypoints have been assigned the same grade so that if significant subsurface deposits are found the whole site will be available for potential further investigation.</td></tr>
<tr><td>GPA</td><td>Excavation</td><td>Sites where many cultural materials were evident on the surface were assigned a grade of GPA. These are sites with a medium-high local cultural significance because there is clearly much scientific data to be gained through their excavation. At these sites a fairly large area should be sampled.</td></tr>
<tr><td>IIIA</td><td>Avoidance and in situ protection</td><td>This grade was allocated to all finds related to the historic copper railway. The copper mining landscape is of very high local cultural significance and must not be disturbed by prospecting.</td></tr>
</table>

Sampling of sites graded GPB will entail excavation of at least one square meter, and more where this becomes warranted (i.e. if many cultural materials are found).
More significant sites were graded GPA and will need a larger scale excavation that samples a wider area and gathers valuable scientific data. This work would have to be done under a permit issued to the consulting archaeologist by SAHRA.
It is noted, however, that the intention is to try and avoid as many archaeological sites as possible, so mitigation as described here will only be required for those sites that cannot be avoided.</td>
</tr>
</table>

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		For avoidance, buffers of 30 m around sites are required by SAHRA. To effect this, buffers of 50 m around the waypoints have been provided to account for the area of the site plus a buffer of at least 30 m for all waypoints of GPB or higher grading. Management measures are also required. This will entail the careful planning by the developer of the project layout, both the test pitting phase and the bulk sampling phase. Maps should be prepared showing all areas that will require disturbance. These should be examined by an archaeologist and submitted to SAHRA for the record. Any mitigation required will need to be decided upon and commissioned. Prospecting work may not commence in the relevant areas until SAHRA has approved of the disturbance plan (if no impacts are expected) or the mitigation report.
9. GRAVES Impacts to graves could occur during the construction and operational phase. It is quite possible that graves could be found during excavation. They are very sensitive to disturbance.	Low Risk	Provision needs to be made for the immediate protection and reporting of any accidental finds of human remains to an archaeologist for evaluation and rescue as necessary. The SAHRA protocols at the time for dealing with human remains will need to be followed.
10. CULTURAL LANDSCAPES The extreme density of archaeological resources means that the landscape is also a precolonial cultural landscape. The cultural landscape can be easily affected by visual intrusion from inappropriate development. The proposed project is consistent with the past mining and prospecting activities that have happened in the area but without rehabilitation the quality of the landscape can be further diminished.	Low Risk	The only mitigation measure suggested is to ensure that correct rehabilitation measures are applied. This measure has already been included into the project design.
11. PALEONTOLOGICAL RESOURCES The impact on paleontological resources takes place during all earthmoving activities. 1. Loss of fossil bones from excavations in the marine Avontuur, Hondeklipbaai and Curlew Strand formations. 2. Loss of fossil bones from excavations in the aeolian formations, included pedocretes and pan deposits.	Medium / Low Risk	The only mitigation measure suggested is to ensure that correct rehabilitation measures are applied. This measure has already been included into the project design. 1. Loss of fossil bones from excavations in the marine Avontuur, Hondeklipbaai and Curlew Strand formations. • Prospecting personnel to be alert for rare fossil bones and follow "Fossil Finds Procedure". • Cease construction on discovery of fossil bones and protect fossils from further damage. • Contact appointed palaeontologist providing information and images. • Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for preservation, collection and record keeping.

3. Loss of fossil shells from excavations in the Avontuur and Hondeklipbaai formations. 4. Loss of fossil shells from excavations in the marine Curlew Strand Formation raised beaches.		2. Loss of fossil bones from excavations in the aeolian formations, included pedocretes and pan deposits. • Prospecting personnel to be alert for rare fossil bones and follow "Fossil Finds Procedure". • Cease construction on discovery of fossil bones and protect fossils from further damage. • Contact appointed palaeontologist providing information and images. • Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for preservation, collection and record keeping. 3. Loss of fossil shells from excavations in the Avontuur and Hondeklipbaai formations. • Prospecting personnel and ECO to be aware that a substantial temporary exposure of marine shelly beds may require sampling and recording. • In the event of a large exposure of shell beds, the appointed palaeontologist must be notified and provided with information and images. Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for sample collection and record keeping. • Selected exposed fossiliferous sections in earthworks recorded and sampled by appointed palaeontologist. 4. Loss of fossil shells from excavations in the marine Curlew Strand Formation raised beaches. • Prospecting personnel and ECO to be aware that a substantial temporary exposure of marine shelly beds may require sampling and recording. • In the event of a large exposure of shell beds, the appointed palaeontologist must be notified and provided with information and images. Palaeontologist will assess information and establish suitable response, such as the importance of the find and recommendations for sample collection and record keeping. • Selected exposed fossiliferous sections in earthworks recorded and sampled by appointed palaeontologist.
12. SOCIO-ECONOMIC: Creation of employment & job security during operational phase with local and regional economic spin-offs	Medium / Low Risk	Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)

10 Estimated cost for requirements to fully decommission the site

With the repeal of Section 41 of the MPRDA (Act 28 of 2002) that requires that the owner of a mine must make financial provision for the remediation of environmental damage, regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) were issued in 2015.

According to regulation 6 an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for— (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

According to regulation 7 the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11(1) for a period of at least 10 years forthwith. In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

In terms of regulation 11(2) the holder of a right or permit must, on completion of the actions contemplated in sub regulation (1), ensure that the adequacy of the financial provision is assessed and any adjustments that need to be made to the financial provision are identified within one year of the commencement of the operations authorised in the right or permit; or where the operations has commenced immediately after its financial year end that follows such commencement.

10.1 Assessment of financial provision

The assessment of the financial provision requirements for annual rehabilitation in terms reg. 6(a) is provided for as part of the annual rehabilitation plan that form part of the annual environmental audit of the implementation of the environmental authorization and closure plan in terms of the NEMA EIA regulations (2014).

No remediation of latent or residual environmental impacts which may become known in the future were identified at this stage. Financial provision in terms of reg. 6(c) are covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in this final rehabilitation, decommissioning and mine closure plan in terms of reg. 6(b).

The following risk-based criteria and assumptions were used to calculate the final rehabilitation, decommissioning and closure cost:

- The illegal waste disposal sites as well as the quarry and quad bike track with buffer (150-meter diameter) and the demarcated solid waste disposal site will be excluded from prospecting.
- Return of land to its pre-mining land capability where possible.
- Removal of all structures and infrastructure.
- Remove all assets.
- All vehicles, plant and workshop equipment will be removed for salvage or resale.
- All fixed assets that can be profitably removed will be removed for salvage or resale.

- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site.
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level.
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place.
- A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility.
- All services related to the operation, water supply lines and storage on site will have to be demolished; the closure cost is therefore included in this estimate.
- All compacted areas due to hauling and stockpiling must be ripped to 300 mm.
- All disturbed and exposed surfaces will be covered with at least 150 mm of topsoil and re-vegetation must be allowed to take place naturally.
- Existing tracks will be used and new tracks must be restricted to the absolute minimum.
- Haul roads will be developed in relation to the bulk sample sites by following the shortest route from existing tracks.
- Movement of processing plant to restrict haul distance to less than 1.5 km.
- All compacted areas due to hauling and stockpiling must be ripped to 300 mm.
- Where possible disturbed land will be used for development of processing area.
- Slimes dams will be rehabilitated and vegetated by means of flattening the slopes to 1vertical:3horisontal using overburden and covering this layer with 150 mm of topsoil and sub-dividing the top surface into paddocks (50 m x 50 m grid) to control storm water, and covering the top surfaces with a 150 mm layer of topsoil.
- The tailings and waste rock dumps will not exceed the planned area footprint.
- Infield screening will take place to reduce the volume of material to be hauled to the processing plant.
- The waste rock dumps at the processing plant will be hauled back to the excavation to be backfilled as a first layer (backfilling will be done during the operational phase).
- The extent of the stockpiles at the plant will never exceed 200m³.
- It is assumed that the post-mining pit stability will be addressed as part of the operation and necessary remedial actions implemented prior to closure.
- In case of sudden un-planned closure there will always only be 2 excavations present on site one in the process of rehabilitation and one in the process of development.
- The general approach adopted for excavations is to reinstating the original profile of the dune landscape and ensuring the hydrological integrity of the area. Topography to follow the original landform shape.
- The excavations will be filled in with overburden, the top 150 mm being topsoil.
- No surface rehabilitation will be done outside the bulk sample perimeter, except for ripping of the haul road to facilitate the growth of natural vegetation.
- There is sufficient topsoil for rehabilitation purposes.
- Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling.

10.2 Calculation of Closure cost

For each closure element, various possible combinations of required rehabilitation work were identified and costs were calculated for each of these, based on quotations obtained from independent third party suppliers for earthmoving equipment rental and various other consumables.

Table 6: Rates and tariffs used for calculation of closure cost

Cost Factor	Item					
	Earth Moving Equipment	**Rental Rate**	**Fuel Cost**	**Total Cost**		
	Bulldozer Cat D9R	R1 151.00	R429.00	R1 580.00		
	Front End Loader - 30 Ton	R687.00	R429.00	R1 116.00		
	Excavator - 45 Ton	R687.00	R429.00	R1 116.00		
	Excavator - 30 Ton	R392.00	R286.00	R678.00		
	Excavator - 20 Ton	R322.00	R234.00	R556.00		
	Cat 14 H Grader	R453.00	R234.00	R687.00		
	Articulated Dump Truck - 30 Ton	R392.00	R182.00	R574.00		
	Tipper Truck 6m³	R255.00	R156.00	R411.00		
	Tipper Truck 10m³	R309.00	R182.00	R491.00		
	Manual Labour /hour			R25.00		
Cost Factor	**Infrastructure Closure Element**	**Cost calculation**				
1	**Demolish and remove Buildings/Infrastructure including subsurface structures and bunded fuel storage - Salvage useable material, break structure and dispose in waste dump**	**Cost/h**	**Service hours**	**Labour**	**R/Unit**	
	Tipper Truck 10m³ transport building rubble to excavations	R491.00	4.00	0	R1 964.00	
	Excavator - 20 Ton Demolish concrete and loading	R556.00	8.00	0	R4 448.00	
	Cleanup	R25.00	8.00	4	R800.00	
	Total				**R7 212.00**	
2	**Remove waste from temporary storage and scrap from salvage yard**	**Cost/h**	**Service hours**	**Labour**	**R/Unit**	
	Tipper Truck 10m³ transport to waste disposal site	R491.00	8.00	*	R3 928.00	
	Treat petrochemical waste from sumps in oil seperator - fuel storage, service apron & washbay	R1 200.00	6.00	*	R7 200.00	
	Cleanup	R25.00	8.00	2	R400.00	
	Total				**R11 528.00**	
3	**Final cleanup - remove all mining related waste**	**Cost/h**	**Service hours**	**Labour**	**R/Ha**	
	Tipper Truck 10m³ transport to waste disposal site	R491.00	8.00	*	R3 928.00	
	Areas to be screened for petrochemical spills and cleaned	R25.00	8.00	4	R800.00	
	Cleanup	R25.00	8.00	2	R400.00	
	Total				**R5 128.00**	
4	**Areas to be screened for petrochemical spills and cleaned before ripped/levelled - Remove 20cm of cover and dispose**	**m³/m² Soil**	**R/m³**	**R/m²**	**R/Ha**	
	Loading and transport of polluted soil	5	R9.79	R1.96	R19 575.96	
	Total			**R1.96**	**R19 575.96**	
Cost Factor	**Mining Closure Element**	**Cost calculation**				
5	**Back filling by means of Loading and hauling - distances 80-500m**	**Load Vol m³**	**Loads/h**	**m³/h**	**R/h**	**R/m³**
	Excavator cycle	1.2	120	144	R678.00	R4.71
	ADT cycle	17	7	113	R1 148.00	R10.16
	Total cost/m³					**R14.87**
6	**Back filling by means of dozing - distances 20 - 80m**	**Load Vol m³**	**Loads/h**	**m³/h**	**R/h**	**R/m³**
	Backfilling, profiling and shaping - Cat D9 R Bulldozer	*	*	500	R1 580.00	R3.16
	Total cost/m³					**R3.16**
7	**Sloping Sides remaining excavations and overburden dumps 18°**	**m³/h**	**m²/h**	**R/h**	**R/m²**	**R/Ha**
	Excavator - 20 Ton	*	250	R687.00	R2.75	R27 480.00
	Total cost				**R2.75**	**R27 480.00**
8	**Level and reinstate topography ripp compacted areas**	**m³/h**	**m²/h**	**R/h**	**R/m²**	**R/Ha**
	Cat D9 R Bulldozer	*	5000	R1 580.00	R0.32	R3 160.00
	Total cost				**R0.32**	**R3 160.00**
9	**Final cleanup - remove all mining related waste**	**m³/h**	**m²/m³**	**R/m³**	**R/m²**	**R/Ha**
	Tipper Truck 10m³ transport to waste disposal site	10	1000	49.10	R0.05	R491.00
	Areas to be screened for petrochemical spills and cleaned		5	R9.79	R1.96	R19 575.96
	Total cos				**R2.01**	**R20 066.96**
10	**Aftercare and maintenance for 2 years**	**h/Ha**			**R/h**	**R/Ha**
	Annual clean-up	1	*	*	R25.00	R25.00
	Erosion control & invader plant clearing	2	*	*	R25.00	R50.00
	Total cost/Ha					**R75.00**

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10.3 Total estimated cost for requirements to fully decommissioned the mining site at final closure

Table 7: Total liability calculations for final decommissioning and mine closure

Infrastructure and Processing Areas

Risk based criteria and assumptions with regard to rehabilitation

- The illegal waste disposal sites , road quarry and quad bike track with buffer (150 meter diameter) and the demarcated solid waste disposal site as well as the oxidation ponds will be excluded from prospecting and do not form part of the closure plan
- Removal of all structures and infrastructure not developed as part of farm improvement
- Remove all assets, all vehicles, plant and workshop equipment will be removed for salvage or resale
- All fixed assets that can be profitably removed will be removed for salvage or resale
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
- A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility as part of housekeeping
- All services related to the operation, water supply lines and storage on site will have to be demolished
- All compacted areas due to hauling and stockpiling must be ripped to 300 mm
- The compacted salvage yard, lay down and movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled.
- All disturbed and exposed surfaces will be prepared to facilitate natural revegetation
- Existing tracks will be used and new tracks must be restricted to the absolute minimum.
- Disturbed land will be used for development of processing areas and all FRD's to be developed within existing excavations
- Infield screening to be done at excavations to reduce the volume of material to be hauled to the processing plant
- No new tailings or waste rock dumps will be created above surface as part of this operation
- Return of land to its pre-mining land capability where possible
- Haul roads will be developed in relation to the bulk sample sites by following the shortest route from existing tracks.
- The tailings and waste rock dumps at the processing plant will not exceed the planned area footprint (200m²) and must be used to backfill the existing excavation

Closure Element Mitigating measures	Unit	No Units	Unit Cost	Total Cost Element	Final Closure
Generator Bay - demolish remove scrap and waste (CF 1)	Sites	1	R7 212.00	R7 212.00	R7 212.00
Salvage Yard - demolish remove scrap and waste (CF 2)	Sites	1	R11 528.00	R11 528.00	R11 528.00
Bulk Fuel storage - demolish remove scrap and waste (CF 1)	Sites	1	R7 212.00	R7 212.00	R7 212.00
Generator Bay - demolish remove scrap and waste (CF 1)	Sites	1	R7 212.00	R7 212.00	R7 212.00
Temporary waste storage - demolish remove scrap and waste (CF 2)	Sites	1	R11 528.00	R11 528.00	R11 528.00
Cleanout sumps - service apron, service/wash bay, waste storage (CF 2)	Sites	3	R11 528.00	R34 584.00	R34 584.00
Remove waste from temporary storage and scrap from salvage yard (CF 4)	Ha	0.5	R19 575.96	R9 787.98	R9 787.98
Final clean-up (CF 3)	Ha	5	R5 128.00	R25 640.00	R25 640.00
Aftercare and Maintenance (CF 10)	Ha	5	R75.00	R375.00	R375.00
				Total liability infrastructure	**R115 078.98**

Mining Area

Risk based criteria and assumptions with regard to rehabilitation

- FRD's will be created within the existing excavations.
- No new overburden, coarse tailings or oversize dumps will be created as part of this operation.
- The general approach adopted for excavations is to reinstating the original profile of the landscape and ensuring the hydrological integrity of the area.
- Topography to follow the original landform shape, or be modified to provide for a solar farm the proposed post mining landuse
- The excavations will be filled in with overburden, the top 150 mm being topsoil
- Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling
- The post-mining topography at the excavations will be adjusted where possible to minimise the effect on water flow and increase potential for re-vegetation.
- Ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchments dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time.

Closure Element Mitigating measures	Unit	No Units	Unit Cost	Cost per Element	Final Closure
Overburden to be backfilled - loading and hauling >80m (CF 5)	m³	0	R14.87	R0.00	R0.00
Overburden be backfilled - dozing <80m (CF 6)	m³	58750	R3.16	R185 650.00	R185 650.00
Surface disturbance to be profiled (CF 7)	Ha	1	R27 480.00	R27 480.00	R27 480.00
Rip compacted areas (CF 8)	Ha	0.5	R3 160.00	R1 580.00	R1 580.00
Final clean-up - remove all mining related waste (CF 9)	Ha	2	R20 066.96	R40 133.92	R40 133.92
Aftercare and Maintenance (CF 10)	Ha	2	R75.00	R150.00	R150.00
Total liability surface disturbance					**R254 993.92**
				Total liability Final decommissioning and mine closure	**R370 072.90**

11 The Public Participation Process

11.1 Principles and Objectives

The Public Participation Process (PPP) was designed to fulfil the requirements of several pieces of legislation applicable to mine closure. It forms an integral component of the mine closure process by affording Interested and Affected Parties (I&APs) the opportunity to identify environmental issues and concerns relating to the proposed closure, which they feel should be addressed. This is consistent with the provisions of the National Environmental Management Act (Act No. 107 of 1998), Section 2(4) (f), which states that "the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured".

The objective of the prospecting operation is to develop a working PPP that informs key stakeholders', I&APs and the general public about prospecting closure objectives and activities during the prospecting activities. The PPP was designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

- Identify issues of concern, and provide suggestions for enhanced benefits and alternatives associated with mine closure,
- Identify risks not yet identified during the risk assessment exercise,
- Identify risks associated with mine closure and rehabilitation,
- Contribute local knowledge and experience,
- Verify that their issues have been considered.
- Comment on the Risk Assessment and Mine Closure Plan at the time of final decommissioning of the project, including the significance of potential risks that have been identified and associated impacts,
- Play an oversight role in the monitoring and evaluation of the closure of the prospecting activities.

11.2 Stakeholder Identification and Project Data Base

Existing data bases were used to inform the list of stakeholders. Special consideration was given to ensure that organizations and individuals that had expressed interest in the activities of the operation, and those who are potentially affected by mine closure, were included on the data base. The following are principles which governed the PPP:

- Key stakeholder groups and the general public comprised the target audience in the development of the PPP.
- Providing information to lay people to allow them to contribute to and participate meaningfully in the process.
- Stakeholder participation is most effective when the proponent and the practitioner recognise, acknowledge and validate stakeholder values when designing a PPP (i.e. there should be no underestimation of the technical and professional competence of citizens).
- The recognition that in the current political climate of South Africa, consultation, empowerment and capacity building is particularly important.

The process of involving stakeholders had three main objectives:

- Steps should be taken to ensure that stakeholder input into the project is relevant and representative.
- Stakeholders should be made aware of their objectives and role in the process,
- An efficient communication and feedback mechanism should be developed during the process to ensure that all stakeholders are kept informed of progress.

Stakeholders were drawn from the sectors outlined below:

- National (DMR), Provincial (DENC, DALR, DWA) and Local Government (Local and District Municipalities)
- Neighbouring mining company
- Corporations and businesses (service providers to operation)
- Operations staff

The operation set up a database of I&APs using existing project databases as a starting point.

Names of persons and organisations have been added to or deleted from the database where appropriate, and personal information protected in terms of the Protection of Personal Information Act, 2013 (Act No. 14 of 2013) (POPIA).

12 Way Forward

This final Rehabilitation, Decommissioning and Mine Closure Plan will be reviewed on an annual basis to align such approved financial provision set out in regulations 9 and 11, of the NEMA Financial Regulations. Concurrent rehabilitation and remediation will be provided for in the annual rehabilitation plan and will contain information that defines activities on an annual basis and how these relate to the closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan.

When final planned closure is applied for the operation will submit a final environmental performance audit report to DMR as lead agent for final perusal with the objective to issue a closure certificate. At that point, the closure process, and associated public participation program, will close.