

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

23 DETAILS OF EAP

Please see Section 2.3 of Part A, as well as Appendix 1.

24 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Please see Section 4 of Part A.

25 COMPOSITE MAP

Please see Final Mine Plan in Plan 3 of Part A and attached in Appendix 2.

25.1.1 Topography

Minimal preventative mitigation can be applied to manage impacts on topography in the area during the construction phase as the topography will be purposefully altered according to the project design. This will occur through soil stripping, stockpiling and levelling activities that are necessary for the mining activities and infrastructure. However, the following may be applied:

- Ensure the activities are in designated areas by demarcating the active footprint. Keep the activity footprint as compact as possible. No activity is to take place beyond the demarcations.
- Ensure soil stockpile heights do not exceed 2m. Material placement for storage should consider remediation of other impacts, such as utilising material as a berm to shield visual impacts and act as noise buffer. Stockpiles potentially can be used for upslope clean storm water diversion berm which must be well vegetated.
- Establish approved erosion control measures to reduce the risk of formation of erosion gullies.
- After construction activities are completed, all areas no longer required for operations (if any) will be fully rehabilitated. Rehabilitated areas must be contoured and free draining to prevent pooling of water and well vegetated to prevent erosion.

26 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts and prevent the realisation of these impacts - PREVENTION.
- To ensure activities that are expected to impact on the environment are undertaken and controlled in such a way so as to minimise their impacts – MODIFY and/or CONTROL.
- To ensure a system is in place for treating and/or rectifying any significant impacts that will occur due to the proposed activity – REMEDY.
- Implement an adequate monitoring programme to:
 - Ensure that mitigation and management measure are effective.
 - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
 - Reduce duration of any potential negative impacts.

Environmental management outcomes and related management statements are:

- Protect the biophysical environment as far as possible.
 - Minimise impacts to the biophysical environment.
 - Ensure relevant legislation in National Environmental Management Act and Conservation of Agricultural Resources Act are applied on site including but not limited to alien invasive management and protection of ecologically sensitive species and environments.
 - Permits for any activities related to protected species on site will be sought prior to these species being affected. Preservation and “offset” approaches will be applied to these species as far as possible.
- Protect the water resources in the area.
 - Ensure clean and dirty water separation systems are established on site from the onset and are in line with GN704 principals.
 - Use water responsibly and recycle water as much as possible.
 - Ensure relevant legislation regarding the National Water Act are applied on site.
 - Ensure IWUL is obtained prior to activities commencing on site.
 - Annually update the water balance with updated data recorded from site.
- Ensure atmospheric pollution is to a minimum:
 - Manage dust generation.
 - Revegetate all bare soil.
- Operate responsibly and ensure operation is compliant with legislative requirements.

- Ensure an adequate rehabilitation plan is compiled before decommissioning.
- Maintain soil berms and stockpiles at all times from the onset of activities.
- Conduct annual EMP audits and complete the necessary amendment process where this is deemed necessary.
- Ensure socially responsible mining:
 - Ensure the targets and objectives set out in the SLP are followed and adhered to.
 - Provide a safe environment for people to work in:
 - Ensure safety policies are established on site in line with national policy.
 - Ensure adequate PPE for staff, contractors and visitors to the site.
 - Ensure health and environmental policies are established and in line with national policies.
 - Provide a safe environment for people to live in.
 - Ensure environmental objectives are followed.
 - Provide open and transparent communication opportunity with all I&APs.
- Protect historical and cultural aspects:
 - Ensure all archaeological and cultural artefacts/sites are preserved in situ until such time that authorisation to remove these is obtained.
 - Ensure South African Heritage Resources Act principals are applied with regard to all the archaeological and cultural artefacts/sites.
- Maintain open and transparent dialogue with I&APs:
 - Conduct regular feedback meetings with I&APs (at least biannually).
 - Maintain a complaints register on site and respond to comments in a timely manner.

26.1 DETERMINATION OF CLOSURE OBJECTIVES

Closure and rehabilitation is a long-term process, which should ideally begin during the planning phase of a development. Focus on environmental management in mine closure and decommissioning has therefore shifted towards the idea of 'planning for closure'. Mine closure always aims to achieve long-term site stability and the establishment of a self-sustaining ecosystem.

EGM is committed to close its operations in a sustainable manner with the minimum possibility of residual environmental or social impacts occurring. It is important that the existing authorised EMP for EGM operations is complied with. In addition and specifically for this project, the overall closure vision is:

'To achieve suitable and sustainable landscapes that in the long term have appropriate governance mechanisms to try to achieve a revenue stream that can be used to offset all long term management, maintenance and treatment costs.'

The following closure objectives fall within this overall vision, which apply to the new consolidated Kinross TSF, the rehabilitated Winkelhaak and Leslie TSF footprints, the plant area, pipelines and Leeuwpan Dam:

- The rehabilitated landscape should ideally match the relevant landscape found in the local area.
- To ensure that the land capability and final land use of the rehabilitated areas are self-sustaining as far as possible from an environmental and socio-economic perspective.
- To achieve aesthetically pleasing rehabilitated footprint areas that do not detract from the long-term value of surrounding land.
- To ensure residual risks and impacts to the surrounding natural environment are understood and managed as far as possible; including surface water, groundwater, aquatic and wetland ecosystems, soil health and biodiversity.

These closure objectives are discussed in more detail in Section 33.1.1.

27 THE PROCESS FOR MANAGING ANY ENVIRONMENTAL IMPACTS

The management plans and processes are summarised herein for each environmental aspect during each mining phase. The actions are further detailed per activity, phase and aspect in the management action table given in Section 32 and Appendix 18. Some measures are relevant to more than one aspect. These are not reiterated for each aspect.

27.1 DESIGN AND PLANNING PHASE

The following is a summary of the actions done, in the process of being done or will be done in the design and planning phase for the proposed project:

- Make sure that plans for infrastructure have been optimally designed to prevent excessive environmental or visual impacts where feasible, and ensure maximum maintenance of vegetation on site. Refer to the TSF design report (Appendix 6).
- All applications that are required will be completed and approval obtained prior to any activities taking place. This includes:
 - Application for permits to relocate/destroy species of conservation concern (SCC) as identified in the flora report where needed.

- Integrated water use license application.
- Permit for the Mpumalanga Department of Heritage for the demolition of the farmyard (Heritage Site 11A).
- Atmospheric Emissions License if required.
- Where sensitive areas occur on the property, permanent demarcation of the appropriate buffer zone will be made and no activity will take place within these areas. The following buffer zones are relevant:
 - At least a 67m buffer from the wetlands not directly impacted on (Limosella, 2016).
 - 20m buffer the grave yard south of the new RWD's (Archaeos, 2017).
- Pre-activity photos of each of sites must be taken where relevant. Each photo must be geo-tagged, date and time stamped prior to commencing with any activity to allow for photographic comparisons post-development to ensure rehabilitation is successful.
- When purchasing equipment, consideration must be given to quieter equipment, to assist in noise level management.
- Keep to existing paths surrounding the site before the commencement of the construction phase in order to prevent unnecessary changes to the site.
- A fugitive dust management plan must be developed prior to the commencement of any onsite activities. Dust control measures need to be incorporated into the design (Rayten, 2017).

27.2 CONSTRUCTION PHASE

27.2.1 Soil and Land Capability

The soil of the new TSF will be stripped and used for the rehabilitation of the TSF surface. Thus the land capability of the area will be permanently changed and mitigation measures are limited. However, the following can be done:

- Demarcate all material stockpile areas and strip the topsoil from stockpile areas. All berms must be well vegetated to prevent erosion. If high sediment load is observed in the diverted storm water runoff, pebbles can be placed on the upslope side of the berm. This will act as flow dissipater and silt trap.
- Soil handling activities should be completed in the dry season to prevent unnecessary runoff due to summer rainfall. Furthermore, soil handling must be as per the soil utilisation guide to ensure soil is preserved for use in future rehabilitation. This will include separate stripping and stockpiling wetland from terrestrial soils.
- Topsoil and subsoil will be stripped on average to a depth of 250mm and stockpiled separately (to a height of 2m). These will be stockpiled outside the 1:100 year floodline of the nearest watercourse.

- Silt control paddocks will be installed along the perimeter of the topsoil and subsoil stockpiles, so as to minimise the release of silt generated from stormwater runoff. Gabion baskets will be included at the lowest points of the paddock walls, to allow for the slow release of storm water to the downstream environment.
- Stockpiles should be vegetated as soon as possible.
 - It is recommended that seeding must be completed within seven (7) days of stockpiling.
 - Ameliorate soils if needed to establish stable vegetation communities on berms and stockpiles.
 - Incorporate indigenous herbaceous vegetation into soil stockpiles.
- Ensure storm water management features in line with GN704, as detailed below, are established on site before other activities commence on site to reduce risk of erosion and downstream sedimentation.

27.2.2 Surface Water Resources, Wetlands and Aquatic Systems

- Apply the measures as described in the storm water management plan and IWWMP.
- Proper storm water management, soil handling and good housekeeping practices are critical through all construction activities.
- Apply topography measures to reduce impact to drainage patterns.
- Apply soil management measures to reduce sedimentation and siltation and prevent contaminated downstream runoff through surface contaminants (litter, hydrocarbons, waste, cement and chemicals).
- EGM has an existing surface water monitoring network and water monitoring procedure, which must continue to be implemented. This includes surface water samples as well as biomonitoring.
- All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level.
- Clean and dirty water separation and dirty water containment features must be established on site as soon as possible, in line with GN704 requirements and engineered designs. This will include construction of the features contained in the storm water management plan as well as the IWWMP. This will include but is not limited to the following:
 - The dirty water catchment must be demarcated and managed as small as possible.
 - Upslope soil berms will be constructed as close to the activity area as possible to divert clean water runoff around the site into natural drainage lines.

- Where diverted storm water flow enters a wetland or drainage line, flow dissipaters and / or silt traps must be installed.
 - Internal trenches will be excavated to drain dirty water from the active footprint to lined containment dams. Excavated soils will be placed upslope of the trenches to prevent contamination of the soil with dirty water runoff.
 - All storm water diversion features will be designed to divert a 1:50 year 24hr storm event.
 - Establish approved erosion control measures to reduce the risk of transported soils.
 - Road surfaces must be compacted in order to increase stability.
 - Sheet runoff from hard surfaces and roads curtailed through proper drainage control.
 - Only environmentally friendly materials must be used during the construction phase.
 - Storm water management features must be maintained on an on-going basis and all structures kept clear of obstructions.
- Pipelines and pumps required on site will be adequately sized and backups will be available on site to ensure continuation of water transfer activities in event of breakdowns. Pipelines should be laid within the designated servitudes.
 - The mine's water balance must be strictly controlled at all times to ensure optimal water use and prevent overflow in dirty storm water management system.
 - Emergency response procedures for spills into the surrounding environment will be compiled for the site and staff trained on these procedures.
 - Grey water on site must be managed to prevent contamination to water and surrounding environment:
 - Changes and consequences of water runoff associated with the loss of the watercourses and altered topography should be modelled by a hydrologist in order to understand the risk and changed pressures on the Grootspruit.
 - No activity within wetlands and 100m buffer zones can commence without an approved IWUL, or within 500m of water resources without a General Authorisation issued by DWS.
 - The wetland and buffer areas (not directly impacted on) should be visually inspected to ensure that the no-go demarcations and signs are properly established and maintained and that no activity is proceeding in the area and that no material is dumped in the area. It is critical to maintain the buffer areas as these serve to trap silt and nutrients prior to water flowing into wetlands and streams.

- Construction of RWD's in the wetlands and drainage line must be done in the dry season as far as possible and according to best practice. The construction activity must be monitored by a wetland specialist to ensure residual impacts are minimised.

27.2.3 Groundwater

- Apply surface water management measures including the storm water management plan and IWWMP.
- Tailings facility will be constructed as per engineered designs with proper under-drainage and base preparation. SLR have designed the Tailings Storage Facility (TSF) with three layers including a 1.5mm HDPE smooth geomembrane over the footprint basin of the TSF with a compacted in-situ clayey soils underlying it; 1.5mm HDPE mono textured geomembrane against the embankment face; and 1.5mm double textured HDPE overlying a compacted clay liner.
- Contain dirty water and reduce infiltration with suitable lining material to GN704 as well as the NWA:
 - Three Return Water Dam (RWD) compartments are also included in the design of the TSF complex. These compartments are to be lined with 2mm HDPE smooth geomembrane. The geomembrane will be underlain by a CCL or suitable GCL, with concrete filled geocells overlying the geomembrane on both basal floor and slope areas.
- Two additional recommended monitoring boreholes (NW and SE of new TSF) are to be incorporated into the monitoring programme. These need to be drilled according to best practice guidelines.
- Conduct quarterly groundwater quality monitoring and biannually level readings of existing boreholes and include the two additional boreholes.
- Complete and submit quarterly reporting.
- Appropriate base preparation of soil stockpile areas will reduce infiltration and water bulking.
- Divert clean water around soil stockpiles by placing topsoil stripped from stockpile areas as perimeter berms around stockpiles; prevent pooling around stockpiles.

27.2.4 Flora and Fauna

- Demarcate designated activity area to ensure only flora in that area is affected.
- 100m buffer zones / 1:100 year flood lines will be demarcated as no-go areas and no activity will proceed through such areas until authorisations are in place.
- Prioritise low sensitivity areas (disturbed old airstrip and disturbed grassland) and preserve all moist grassland areas not targeted for development.
- Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.

- No open fires must be allowed on site.
- Prohibit the harvesting of indigenous trees (if any) for firewood and indigenous flora in general.
- Do not hinder, harm or trap animals.
- Maintain downstream ecological corridors associated with wetlands and their 100m buffer zones.
- Construction activities should commence during the winter months as far as possible to minimise the impacts on breeding fauna and flora.
- Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. See soil
- Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.
- Where possible the protected species should be conserved in situ:
 - Complete a full protected species survey over natural (non-crop) areas that will be subject to development.
 - Protected plants should be removed (permit required) by a qualified specialist and replanted (where feasible) into suitable conserved areas, or maintained under suitable growing conditions until such time that it can be replanted as part of rehabilitation.
- Eradicate and control all alien invasive species on site:
 - When removing these species, the spread of seeds must be prevented.
 - All alien seedlings and saplings must be removed as they become evident for the life of mine. Manual / mechanical removal is preferred to chemical control.
 - All vehicles and equipment, as well as material brought to site should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the site.
- No domesticated animals should be allowed on site.
- Ensure any crossing opportunities (viz. culverts, pipes and bridges) are designed to also facilitate small animal movements.
- Inform staff, contractors and visitors to not handle or harm fauna in the area in any way.
- Movement of construction vehicles and workers in the natural grasslands must be minimized. In addition, workers must be instructed to minimize disturbance of birds at all times, and steps must be taken to ensure that no illegal hunting occurs.
- Conduct activities during daylight hours as far as possible. When using lighting, ensure directional floodlights are utilised that focus light on the necessary areas and reduce light pollution to surrounding environment. Utilise lights in the orange

and yellow light ranges rather than white. This has the added benefit of reducing strong light and dark contrasts which also has safety benefits for staff.

27.2.5 Sites of Archaeological and Cultural Interest

- It would be of benefit to complete photographic records of the sites before activities commence.
- Identified heritage sites that will be directly impacted upon will need specific management actions, including the following:
 - Site no. 11 is a grave yard which lies approximately 87 m from the proposed return water dams. The site should be fenced in and a cultural management plan should be drafted for the sustainable preservation thereof. The plan should be drafted by a heritage specialist and should inter alia take into account a buffer zone of at least 20 m and controlled access to descendants.
 - Site no.11a is a farm yard, lying right on the edge of the proposed return water dam. At least some of the structures will be directly impacted on. The site may be mitigated and therefore a full photographic documentation is recommended, after which it may be demolished. For this a demolition permit is needed from the relevant heritage authority.
- The remaining structures at site 11a, which will not be impacted on directly, can be left *in situ*. Should the mine however wish to have it demolished, it may be allowed, as long as it is also documented photographically.
- The other sites (sites no. 5, 8, 9, 10 and 10a) should be monitored regularly to ensure that the state of preservation does not deteriorate.
- The proposed development may continue only after the mitigation measures indicated above had been implemented and approved by SAHRA.
- Should other artefacts or archaeological items be uncovered during construction and operations, then all activity should cease immediately, the area marked off and a specialists consulted prior to any further activity.

27.2.6 Air Quality

- A fugitive dust management plan will need to be developed for proposed onsite activities (construction & operation phase).
- Where possible, purchase equipment with lower emissions.
- Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions.
- Discontinue use of faulty equipment until repaired or replaced.
- Basic wetting during construction activity and vegetation cover on the existing tailings facilities are the general standard practices for dust suppression

- Other measures that could be considered and their control efficiencies (%) are listed below.
 - Water sprays / misting at loading and offloading points (50% - 70%);
 - Wind breaks at active stockpiles (up to 30%);
 - Water spray with chemical binding agents (up to 90%);
 - Rock cladding or top soiling and vegetating stockpiles (up to 30%);
 - Vegetation and re-vegetation of exposed areas (30 – 90%);
 - Chutes at tipping points (up to 75%);
 - Enclosure of dust sources (up to 99%); and
 - Abatement equipment for stack emissions (up to 99%).
- The choice of mitigation measures will depend on the availability of resources, practicality, effectiveness and affordability. Therefore, it is recommended that a detailed air quality management plan is developed for the mine, incorporating mitigation measures as discussed above.
- Monthly dust monitoring and annual PM10 assessments and recording must be done.
- Once off registration on NAEIS and annual reporting to NAEIS.

27.2.7 Noise

- Consideration will be given to buying quieter equipment where feasible.
- Machinery and equipment will be regularly serviced.
- Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site.
- Machinery will be maintained within operational noise limits and will be switched off when not in use.
- Mine will limit noisy activities during the day if needed.

27.2.8 Visual Aspects

- Proper housekeeping and maintenance must be carried out continuously as part of the adaptive environmental management philosophy.
- Ensure new TSF design and development follows engineered designs at all times.
- Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures.
- Apply dust control measures and other environmental measures to ensure impact area is contained.

- Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary.
- Prevent removal of plants or trees in areas not targeted for development.
- Vegetate any bare soils with self-sustaining indigenous species.
- Waste generated on site should be collected in skips and bins placed around the site, separated and recycled as far as possible and sold/given to interested contractors. Where relevant, waste will be stored according to the Norms and Standards for Storage of Waste and should not be stored on site for excessive periods.
- The staff must be given training on how to keep the area litter free. Bins to be provided on site.

27.2.9 Traffic and Safety

- The mine should look at negotiating a chartered contract with existing minibus taxi or bus operators to transport the majority of the workers during the various stages of the development.
- All intersections with main tarred roads will be clearly signposted.
- Drivers will be enforced to keep to the set speed limits.
- All mine-related vehicles and contractor vehicles will be in a road worthy condition.
- Contractor is required to monitor the condition of the roads used and repair the road where it becomes damaged due to construction traffic.

27.2.10 Regional Socio-Economic Structure & I&AP Concerns

- Implementing a "local first" recruitment policy. Employ as per S&LP.
- Ensure that the local jobs created are linked to a skills development programme for permanent employment.
- Adopt preferential procurement policies towards local suppliers and distributors.
- Ensuring that principle of "local first" when procuring consumables, construction materials etc. working with and through the local Business Forum.
- Ensure workers have information available and sign a "code of conduct" at the start of employment which gives an overview of acceptable behaviour and information regarding health, safety and good environmental practices on the site.
- A complaints/comments register should be established on site at a site accessible to I&APs.

27.3 OPERATIONAL PHASE

Construction phase management activities must continue into operations phase where relevant. Only additional operational measures have been included below.

27.3.1 Soil and Land Capability

- Construction phase management processes must be continued into the operational phase.
- Soil stockpiles and berms must be maintained throughout the life of mine.
- Soil handling during concurrent rehabilitation of the new TSF surface and any other material handling will be conducted as per the soil utilisation guide from the onset for the life of operations.
- Biological amelioration must be conducted on soils placed on side walls and soil in berms and stockpiles so as to promote soil microbial activity which will in turn allow for the release of nutrients once seeding takes place.
- Spill kits must be available on site and personnel trained to utilise these to remediate spills immediately.

27.3.2 Surface Water, Wetlands and Aquatic Systems

- All construction phase processes and procedures must be carried through into the operational phase where relevant.
- Apply the measures as described in the storm water management plan and IWWMP.
- Apply soil management measures to reduce sedimentation and siltation and prevent contaminated downstream runoff through surface contaminants (litter, hydrocarbons, waste, cement and chemicals).
- Should poor quality seepage be noted at downstream environments through the water quality monitoring, an investigation into the remedial actions required should be done and the resultant recommendations implemented.
- Inspect, maintain and repair pipelines and pumps regularly.
- Access to water storage facilities should be restricted and warning signs must be placed at prominent locations.
- Clean and dirty water separation and dirty water containment features must be maintained at all times in line with GN704 requirements and engineered designs:
 - Storm water management features must be maintained on an on-going basis and all structures kept clear of obstructions.
 - Clean out silt build up over dry season.
- The mine's water balance will be updated annually and any necessary amendments to water uses and the IWUL will be applied for.

- Weekly inspections of all water management features, including berms and silt traps, for their operational life and maintain inspection log.
- General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log.
- Continue with monthly surface water monitoring and complete and submit quarterly reports.
- Continue with biannual biomonitoring and reporting.
- Measures should be put in place in critical areas to ensure that changed sources of water input into downstream watercourses does not cause erosion.
- Measures should be put in place in critical areas to ensure that polluted water from the Tailings Storage Facility is contained and does not seep to downstream environments.
- The wetland and buffer areas should be visually inspected on a monthly basis to ensure that the no-go demarcations and signs are maintained and that no activity is proceeding in the area.

27.3.3 Groundwater

- Construction phase processes and actions must be carried through into the operational phase where necessary.
- Continue with current EGM biannual groundwater quality monitoring and level readings of existing boreholes and include the two additional boreholes.
- Complete and submit annual reporting.
- Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps.
- Conduct weekly visual inspections of pump houses to ensure facilities orderly and operating as required with no spills and maintain inspection log.
- Follow emergency response plan for spills and keep back-up pumps and pipes on site. All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.
- Regular annual updates of the numerical groundwater flow and contaminant transport models may be done to help ensure that the results discussed in this document remain relevant with changes in mining operations, and also increase the level of confidence in the model results (calibrating the model based on time series groundwater levels, dewatering volumes, and qualities yield higher levels of confidence than calibrating the models on once-off data points collected during this study.

27.3.4 Flora and Fauna

- Construction phase processes and actions are to be carried through into the operational phase where relevant.
- Eradicate and control all alien invasive species on site.
- Conduct monthly visual surveys of berms, soil stockpiles and any other areas re-seeded once established for germination and reseed areas with poor germination and consider planting these areas with seedling plugs.

27.3.5 Sites of Archaeological and Cultural Interest

- Monitoring the identified sites must be carried out for any potential damage.

27.3.6 Air Quality

Construction phase processes and actions should be carried through into the operational phase. The mitigation measures recommended per activity/source is summarised in Table 41 below (Rayten, 2017). The following general measures must also be included:

- Apply dust control measures such as water spray or misting during times of high dust generation.
- Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.
- Construct the new TSF as per engineered designs and clad and vegetate the sides as it develops.
- Monthly dust monitoring and annual PM10 assessments and recording must be done.

Table 41: Recommended control measures to control dust emissions associated with operational activities (Rayten, 2017)

Source	Recommended Control Measures	Control Efficiency (%)
Loading stockpiles	Variable height stacker	25
	Water sprays	50
	Telescopic chute with sprays	75
	Total enclosure	99
Unloading stockpiles from	Water Sprays	50
	Wind breaks	30
Miscellaneous transfer and conveying	Water sprays with chemicals	90
	Enclosure	70
	Enclosure and use of fabric filters	99

Source	Recommended Control Measures	Control Efficiency (%)
Wind erosion from stockpiles	Water sprays	50
	Wind breaks	30
	Total enclosure	99
	Rock armour and/or topsoil applied	30
Wind erosion	Primary rehabilitation	30
	Secondary rehabilitation	60
	Vegetation	40
	Re-vegetation	90
	Fully rehabilitated	100

27.3.7 Noise

- Construction phase processes and actions must continue into operational phase were relevant.
- Noise monitoring must continue during operations when required.

27.3.8 Visual Aspects

- All berms and other visual screens must be maintained.
- Apply dust control measures and other environmental measures to ensure impact area is contained.
- Apply good housekeeping practices to ensure visual impact is mitigated.

27.3.9 Traffic and safety

- The mine should look at negotiating a chartered contract with existing minibus taxi or bus operators to transport the majority of the workers during the various stages of the development.
- Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow.
- Limit mine-related vehicle traffic on public roadways to off-peak commuting times as far as practically possible to minimize impacts on local commuters.
- Enter into agreement with the roads agency as needed to ensure roads are maintained.

27.3.10 Waste Management

A detailed Waste Management Plan will be finalised prior to the operational phase commencing, which ensures that waste is characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926. The following is recommended:

- No landfill site will be constructed on site. All waste will be separated and stored as per the relevant Norms and Standards where applicable.
- Waste should be recycled as far as possible and sold/given to interested contractors.
- Waste will be stored according to the Norms and Standards for Storage of Waste.
- Recyclable waste should not be stored for excessive periods.
- Chemical waste must be stored as per MSDSs and not stored on site for excessive periods.
- General waste must be collected and disposed of at a registered waste disposal site
- The mine will register and report on the South African Waste Information System (SAWIS).

In addition, a modular sewage treatment plant will be installed at the Elikhulu plant area to cater for the admin block, change house and ablution facilities. The plant will be designed with a throughput capacity of 4500 litres / day. Treated water effluent from the plant will be recycled back to the process water dam for use within the plant. Sludge from the plant is minimal and will be collected by a reputable contractor for disposal of at the Municipal Sewage Works (Refer to Appendix 16 for details on the sewage treatment plant).

Furthermore, portable toilets will be provided at each of the TSF areas for use by the hydraulic miners. These will be managed by a reputable contractor and emptied on a regular basis.

27.3.11 Hazardous Substances Management Measures

The storage and use of reagents at the Elikhulu Plant contains hazardous substances that represent risk to the surrounding environment and to the people. The following is a summary of processes recommended to mitigate any potential impacts.

- The International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold (Cyanide Code) must be used as best practice for the management of cyanide for the project.
- The Sodium Cyanide storage facility will be enclosed in a secondary fenced area, and transported to the plant storage facilities as and when required. The briquettes stored in this area will be enclosed, safeguarding it from the elements.

- Lime, Cyanide, Caustic, HCl and Oxygen will be delivered in bulk, and transferred directly from the road tankers to the respective mixing facilities. The road tankers will not enter the secondary fenced off area, but will remain outside the plant perimeters at all times.
- Concentrated Sodium cyanide will be supplied to all main plant dosage points via a running/ standby pumping configuration.
- HCN, NH₃ gas detection and a spillage pump pumping back to the dosing tanks or CIL circuit has been made.
- A spillage pump and safety shower installed in the lime mixing bund is provided.
- Chemicals and reagents will be labelled as per the GHS system. Material Safety Data Sheets (MSDS) will be kept on site.
- Storage areas will be bunded.

27.3.12 Regional Socio-Economic Structure and I&AP Concerns

- Construction phase processes and actions must continue into the operational phase.
- Any retrenchment and employment will be done in accordance with the S&LP.
- Monitoring must be done as per S&LP requirements.
- Ensure environmental management measures are conscientiously applied and adaptive management is applied by way of taking appropriate actions to any issues identified through the monitoring plan to ensure environmental impact is contained and ensure an environment that is not harmful to surrounding land owners and users.

27.4 DECOMMISSIONING AND POST-CLOSURE PHASE

Many of the operation phase management measures will need to be applied during decommissioning as activities are slowly phased out. Only additional measures strictly related to rehabilitation and closure phase are discussed below.

27.4.1 Topography

- The rehabilitation model and plan for all areas will be finalised during the final stages of operations and applied from the onset of decommissioning.
- The final elevation of the rehabilitated footprints of Winkelhaak and Leslie TSF's must return to original ground level (OGL) where possible. The exposed area must be surveyed and mapped once all the contaminated material has been removed to inform where re-profiling is required.
- The new landscapes must be profiled to ensure water runoff and prevent water ponding.

- The detailed rehabilitation phase will determine if any material shortfalls exist for the new landscape. If this is the case, more effort will be required for landscape profiling and additional mitigation measures may be required to managed erosion and water pollution risks, such as contour drains and berms.
- All excavations, trenches and dams no longer required at the Elikhulu TSF will be filled, contoured and rehabilitated as per the rehabilitation plan to allow for free surface water drainage.
- Areas where pooling of water occurs, or where erosion is prevalent should immediately be addressed to ensure that this does not occur by filling in and grading depressions and lifting eroded soils back to the eroded sites and revegetating the areas. If erosion is persistent or severe then erosion control measures, such as gabions, must be established at the sites.

27.4.2 Soil and Land Capability

- The rehabilitation model and plan for all areas will be finalised during the final stages of operations and applied from the onset of decommissioning.
- The footprints of the Winkelhaak and Leslie TSF's must be cleared of all remnant tailings material until the in situ soil is visible.
- An independent radiation assessment should be undertaken on the exposed soils to check if the soils are below the acceptable levels set by The National Nuclear Regulator (NNR).
- The contaminated soil, if present, must be removed and placed onto the new TSF. This will also inform how much re-profiling will be required to achieve the desired topography.
- The remaining soils will need to be scarified and/or disc.
- Chemical amelioration requirements will be determined following the results of the radiation assessment and soil fertility assessments done. It is likely that lime in the form of limestone ammonium nitrate (LAN) will be used as well as standard KNP to fertilize the soil in preparation for vegetation establishment.
- Soil specialists should be consulted to conduct annual assessments and determine the correct treatment of soils on rehabilitated land to achieve the desired post-mining land capability. This must be undertaken for at least 2-3 years after closure. Apply specialist's recommendations on site.
- If radiation is in excess or the soil health is greatly degraded, mulching and fertilisation may need to be done every growing season until adequate soil health and vegetation growth is achieved.

27.4.3 Surface Water, Wetlands and Aquatic Systems

- All water within the area of activity will be contained on site and only released into the environment when rehabilitation is largely completed and water runoff from areas is of adequate quality.

- The Elikhulu TSF and the rehabilitated footprints of the Winkelhaak and Leslie TSF's must be rehabilitated in line with designs and water runoff management features maintained on site in the long term to prevent runoff from this facility entering the downstream environment until such time that water quality is adequate
- Monitor area for erosion and pooling and rehabilitate if necessary.
- Continue with monthly surface water monitoring and complete and submit quarterly reports.
- Continue with biannual biomonitoring and reporting.

27.4.4 Groundwater

- No specific management measures are required, but once areas are fully rehabilitated, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately
- Continue with biannual groundwater quality monitoring and water level readings of existing boreholes and include the two additional boreholes.
- Complete and submit annual³⁵ reporting.

27.4.5 Flora and Fauna

- Seeding of the rehabilitated TSF footprints should take place at the beginning of the rainy season (at the same time as chemical amelioration) for rapid vegetation establishment. This must comprise indigenous species from the study area and may include nitrogen fixating legumes, pioneer grass species and some climax species.
- Conduct monthly visual surveys of seeded areas for germination and reseed areas with poor germination and consider planting these areas with seedling plugs.
- Conduct annual floral surveys to monitor floral establishment on rehabilitated areas and apply specialist recommendations on site.

27.4.6 Air Quality

- No additional measures, but continue with dust suppression and monitoring.

27.4.7 Noise

- Construction phase processes and actions must be carried out during decommissioning; specifically with regards to the deconstruction of the Elikhulu plant.
- Noise monitoring must continue during decommissioning when required.

27.4.8 Visual

- Apply the rehabilitation model and rehabilitation plan on site.

- Continue with general good housekeeping practices.

27.4.9 Traffic and safety

- No additional measures; continue with operational phase measures as long as traffic to and from site continues.

27.4.10 Regional Socio-Economic Structure and I&AP Concerns

- Should any new contracts be created during the decommissioning phase, then local contractors should be sought first.
- All SLP initiatives and commitments should be applied particularly with regard to retrenchment.
- Employ staff at other operations if feasible.

27.5 POTENTIAL RISK OF ACID MINE DRAINAGE

The project does not represent a risk of acid mine drainage (AMD).

However, it must be noted that the new TSF does represent a similar pollution risk through seepage of contaminants into the groundwater if unmitigated. This section briefly describes the measures taken to understand and mitigate this risk.

27.6 STEPS TAKEN TO INVESTIGATE, ASSESS AND EVALUATE THE IMPACT OF ACID MINE DRAINAGE

There is no risk of AMD; however the following has been completed to understand a similar risk posed by the mine residue.

A waste classification study was completed for the project with reference to R.634, R.635 and R.636 of NEM:WA (Future Flow, 2016, Appendix 5), the results of which conclude that the mine residue can be classed as Type 3 waste and therefore requires disposal to a facility with a Class C liner or equivalent.

Furthermore, as part of the Groundwater study, the potential sulphate plume has been modelled into the future of the structure. Please refer to Section 10.1.3.

27.7 ENGINEERING OR MINE DESIGN SOLUTIONS TO BE IMPLEMENTED TO AVOID OR REMEDY ACID MINE DRAINAGE

There is no risk of AMD; however the following has been completed to mitigate a similar risk posed by the mine residue: A barrier with an equivalent performance to Class C is required over the TSF expansion footprint. The proposed alternative barrier system consists of the following elements (from the top down):

- Above-liner drainage;
- A 1.5mm thick, black, HDPE geomembrane, conforming to GRI-GM13 as amended in November 2014, and installed to SANS 10409.
 - The geomembrane shall be smooth over the majority of the basin, double-textured (co-extruded) along the outer ~50m to improve side slope stability, and monotextured (co-extruded) up the upstream face of the heel wall (placed textured side down).
- An adequately prepared sub base as per the requirements of SANS 10409.
 - Suitable clay material has been identified over the site and generally occurs near surface. This material will be temporarily stockpiled during construction as the underlying material will be used to construct the various embankments and fills. A 300mm thick compacted clay liner (CCL) will be formed over the entire basin using the stockpiled clay material and compacted in 150mm layers to 98% Standard Proctor density (at 2-3% above optimum moisture content). Certain areas will invariably contain excessive amounts of gravels at surface which will negatively affect hydraulic contact between the geomembrane and sub base. A bedding layer of fine clayey material will typically need to be placed and compacted over the prepared in-situ surface in these areas, prior to geomembrane installation.

27.8 MEASURES THAT WILL BE PUT IN PLACE TO REMEDY ANY RESIDUAL OR CUMULATIVE IMPACT THAT MAY RESULT FROM ACID MINE DRAINAGE

There is no risk of AMD; however monitoring will be completed to understand any residual risk posed by the TSF.

28 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE MINING OPERATION

It is anticipated that water for domestic use will be sourced from Rand Water, similarly to the current Kinross plant. It is anticipated that approximately 9000 l per day will be required for domestic and potable use; this is based on 150 litres per person per day per shift, which totals 60 persons a day.

The water requirements of the mining operations includes all water required for the hydrological mining of the tailings material to be treated, as well as the water required in the processing plant itself. This will require on average 39,339.73m³ of process water / day. Water for the project will be sourced from the mine's

evaporation dam, known as the Leeuwan Dam, as well as from the mine's underground workings and water recycled from the RWDs.

The surplus water from the EGM operations is 6 701 m³/day and the volume of return water pumped back from the TSF is 24 087.37 m³/day. Thus, make-up water required from Leeuwan Dam is 8 551.4 m³/day. The water balance assessment is included in Appendix 8 (DRA, 2016), which shows that the Leeuwan Dam is able to sustainably supply the project with this amount.

29 HAS A WATER USE LICENSE BEEN APPLIED FOR?

EGM is the holder of an existing water use licence (licence no. 08/C12D/abgj/539) issued in May 2011 (to then Harmony Gold) and amended in April 2012. A water use license application (IWULA) and associated Integrated Water and Waste Management Plan (IWWMP) has been completed as an amendment to the existing licences. This was submitted to the DWS on 3 February 2017 together with the preliminary IWWMP (EXM, 2017), proof of submission is attached in Appendix 17.

Table 42 below summaries the existing and proposed water uses on site:

Table 42: EGM Water Uses Current and Applied for as taken from EXM (2017)

EVANDER GOLD MINES (PTY) LTD WATER USE LICENCE REVIEW, AMENDMENT, AND NEW APPLICATIONS							
Application Forms Reference	Name of Activity	Currently Licensed	Actions Required				Comments
			Yes/ No	New Licence Activity	Amendment to Existing Activity	Existing Lawful Use	
Section 21 a Taking Water form a Water Resources							
7b	Use of water from Shaft #7 at Kinross Metallurgical Plant	Yes	Yes		X		Increase volume Use water at Elikhulu TRP
7a	Use of water from Shaft #8 at Kinross Metallurgical Plant	Yes	Yes		X		Increase volume Use water at Elikhulu TRP
7c	Use of Water from the Grootspruit to Control Pollution	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
Section 21b Storage of Water							
Licensed	Storage of water in the Evander Dam	Yes	No				
Section 21 c and 21i Altering beds and Banks or Diverting or Altering Flow in a Watercourse							
8a	Kinross Extension Return Water Dam Diversion	No	Yes	X			Elikhulu Project water use
8b	Grootspruit Wetland <500m	No	Yes	X			Elikhulu Project water use
8c	Kinross TSF Extension Watercourse Destruction	No	Yes	X			Elikhulu Project water use
8d	Kinross TSF Extension Watercourse Impedance	No	Yes	X			Elikhulu Project water use
8e	Kinross TSF Extension Pan Destruction	No	Yes	X			Elikhulu Project water use

EVANDER GOLD MINES (PTY) LTD WATER USE LICENCE REVIEW, AMENDMENT, AND NEW APPLICATIONS

Application Forms Reference	Name of Activity	Currently Licensed	Actions Required				Comments
			Yes/ No	New Licence Activity	Amendment to Existing Activity	Existing Lawful Use	
8f	Grootspruit V-Notch	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8g	Kinross Pipeline Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8h	Kinross TSF Pan 2 <500m	No	Yes	X			Eikhulu Project water use
8i	Leslie Road Crossing East	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8j	Bracken Kariba Dam Diversion	No	Yes				Registered, to be included in licence Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
8k	Shaft #8 Waste Rock Dump Watercourse Intrusion	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8l	Shaft #7 Road Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8m	Shaft #8 East Road and Pipeline Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8n	Shaft #8 West Road and Pipeline Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8o	Toe Dam Watercourse Diversion and Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998

EVANDER GOLD MINES (PTY) LTD WATER USE LICENCE REVIEW, AMENDMENT, AND NEW APPLICATIONS

Application Forms Reference	Name of Activity	Currently Licensed	Actions Required				Comments
			Yes/ No	New Licence Activity	Amendment to Existing Activity	Existing Lawful Use	
8p	Waterval River Leeuwpan Pipeline Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8q	Waterval River Road Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8r	Wildebesspruit Leeuwpan Pipeline Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8s	Winkelhaak Kariba Dam Diversion	No	Yes			X	Registered, to be included in licence Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
8t	Winkelhaak Pipeline Crossing North	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8u	Winkelhaak Pipeline Crossing South	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8v	Winkelhaak Pipeline Crossing West	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8w	Winkelhaak Road Crossing	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
8x	Leslie Emergency Dam Diversion	No	Yes			X	Registered, to be included in licence Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
8y	Leslie Emergency Dam <500m Wetland	No	Yes			X	Registered, to be included in licence

EVANDER GOLD MINES (PTY) LTD WATER USE LICENCE REVIEW, AMENDMENT, AND NEW APPLICATIONS

Application Forms Reference	Name of Activity	Currently Licensed	Actions Required				Comments
			Yes/ No	New Licence Activity	Amendment to Existing Activity	Existing Lawful Use	
							Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
8z	Bracken Kariba Dam <500m Wetland	No	Yes			X	Registered, to be included in licence Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
8aa	Winkelhaak Emergency Dam <500m Wetland	No	Yes			X	Registered, to be included in licence Note: Registration certificate included as Appendix 1 in the IWWMP and Technical Report
Section 21g Disposing of a Waste in a Manner that May be Detrimental to a Water Resource							
Licensed	Leslie Emergency Dam	Yes	No				Licence given in section 2 of the IWWMP submission file, volume 1
Licensed	Leeuwpans Dam	Yes	No				Licence given in section 2 of the IWWMP submission file, volume 1
Licensed	Bracken Kariba Return Water Dam	Yes	No				Licence given in section 2 of the IWWMP submission file, volume 1
Licensed 9e	Kinross Kariba Return Water Dam	Yes	Yes			X	The facility is licensed. An improved design has been applied for more efficient water management Changes to the Design and Operation of the Facility
Licensed	Winkelhaak Emergency Dam	Yes	No				Licence given in section 2 of the IWWMP submission file, volume 1

EVANDER GOLD MINES (PTY) LTD WATER USE LICENCE REVIEW, AMENDMENT, AND NEW APPLICATIONS

Application Forms Reference	Name of Activity	Currently Licensed	Actions Required				Comments
			Yes/ No	New Licence Activity	Amendment to Existing Activity	Existing Lawful Use	
Licensed	Winkelhaak Slimes Dam	Yes	No				Licence given in section 2 of the IWWMP submission file, volume 1
Licensed	Kinross Slimes Dam	Yes	Yes				Licence given in section 2 of the IWWMP submission file, volume 1
9a	Kinross Slimes Dam Consolidation	No	Yes		X		An application has been made to allow for an extension of the existing Kinross Slimes Dam. The application reflects the total Kinross Slimes Dam Consolidated (existing + extension). This forms part of the Elikhulu project
9b	Kinross Slimes Dam Extension Return Water Dam	No	Yes				An application has been made to include a new return water dam to cater for dirty water run-off from the Kinross Consolidation Tailings Storage Facility as part of the Elikhulu project
9c	Toe Dam Pollution Control Dam	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
9d	Shaft #8 Sewage Surge Dam	No	Yes			X	Refer to IWWMP and Technical report for aerial photo of use undertaken prior to 1998
Section 21j Removing water from Underground to Continue with Safe Mining							
10a	Use of water from Shaft #7 at Kinross Metallurgical Plant	Yes	Yes		X		Increase volume to cater for other shafts inflow
10b	Use of water from Shaft #8 at Kinross Metallurgical Plant	Yes	Yes		X		Increase volume to cater for other shafts inflow

30 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

The EIA process has led to mitigation actions being proposed for all impacts, these actions are summarised in the table below according to the phase of the proposed project. The full impact assessment table is presented in Appendix 18.

Table 43: Impacts to be mitigated in the Respective Phases

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
Reprocessing of Winkelhaak and Leslie/Bracken TSFs & new pump station at Kinross TSF						
Construction and operation of pump houses at each of the TSFs (x3)	Construction	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	Kinross – 970m ² Winkelhaak – 1,260m ² Leslie – 1,260m ²	CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals. REMEDY Pumps must be placed on top of the diesel collector and/or oil traps in the event that pumps leak. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill clean-up.	Handle and store hydrocarbons in line with prescribed SANS SABS standards. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construction sites must be properly demarcated and necessary storm water management measures (berms, trenches, silt traps) established prior to any construction activities taking place. All necessary hazardous material (hydrocarbons) storage and handling areas must be prepared and fitted with necessary spill kits before material is stored/utilised on site.
Construction and operation of pump houses at each of the TSFs (x3)	Operation	Pumps will contribute to elevated noise level	Kinross – 970m ² Winkelhaak – 1,260m ² Leslie – 1,260m ²	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: MODIFY Consideration will be given to buying quieter pumping equipment where feasible. CONTROL Pumps will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing the pump houses. All pumping equipment will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS 10103:2008.	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as needed.
Hydraulic mining & slurry generation and pumping	Operation	Failure of benches or flooding of trenches will release slurry to the downstream environment	Kinross – 169 Ha Winkelhaak – 348 Ha Leslie – 245 Ha	MODIFY Existing dirty water management infrastructure must be upgraded where needed to ensure containment of slurry during an emergency incident at the TSFs. CONTROL Apply storm water runoff management measures to ensure impact area is contained to activity area to ensure all water runoff and spilled slurry in the area is contained and ensure no discharge to the environment. Ensure mine blocks are mined as per the prescribed mine plan. REMEDY Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Spillages must be controlled through sandbags where necessary to prevent direct spillage to streams. Spillages must be cleared immediately in line with the emergency response procedures.	Hydraulic mining will be conducted in line with MPRDA Regulations and best practices. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Facilities for the containment of slurry from potential bench failure or spillages from channels must be considered before mining the next compartments. Spillage control and clean up equipment (sandbags, back-up pumps, pipelines) must be available at site at all times during hydraulic mining.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				Ensure back-up pumps and pipelines are easily accessible.		
Hydraulic mining & slurry generation and pumping	Operation	Hydraulic mining will contribute to elevated noise level	Kinross – 169 Ha Winkelhaak – 348 Ha Leslie – 245 Ha	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: CONTROL Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Mine will limit noisy activities during the day if needed.	Environmental noise managed to baseline conditions and SANS 10103:2008.	Suggested mitigation measures will be applied immediately if any complaints about noise are received.
Construction and utilisation of slurry pipelines from pump houses to Elikhulu Plant	Operation	Failure of slurry reticulation system and infrastructure will release mine water to the downstream environment, which will be of particular significance at river crossings	±12.8kms	MODIFY Pipelines have been established in existing servitudes to a large extent to avoid disturbance of new areas. CONTROL Pipelines should be laid within the dirty water footprint area or paddocks must be established in clean water area which will serve to contain any leaks. Pipelines should be tested with clean water to ensure no leaks before allowing piping of slurry. Additional containment measures must be provided at river crossings, such as placing pipelines within drains that drain into sumps or other acceptable containment infrastructure. Pipelines should have a series of shut-off valves which can prevent flow of contaminated water should leaks occur. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site. STOP Dirty water pipelines will remain outside 100m buffer zones / 1:100 year flood lines until authorisations under both NEMA and NWA have been obtained where needed.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure) will be completed before other activities commence on site and maintained for the life of mine. Spillage control and clean up equipment (sandbags, back-up pumps, pipelines) must be available and accessible at site before slurry pumping commences for the life of operations.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Increased dust and associated particulate matter emissions.	Winkelhaak – 350 Ha Leslie – 433 Ha	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas. Rehabilitate and revegetate as soon as possible to stabilise the area and protect from wind erosion.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Poor rehabilitation will result in sedimentation of downstream environments and water quality impairment.	Winkelhaak – 350 Ha Leslie – 433 Ha	REMEDY The area should be re-landscaped to blend in with the surrounding topography and drainage lines. Runoff must only be allowed to enter the surrounding environment once it is proven that the water is of an acceptable water quality and a radiation clearance certificate is granted. Soil must be ameliorated after application as per specialist recommendations in order to sustain a vegetative cover. The areas should be monitored to ensure that seeds germinate sufficiently, a good vegetative cover is achieved and the vegetation progress through succession stages.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be maintained over rehabilitated areas to ensure adequate vegetative cover for grazing land use until rehabilitated areas are stable and self-

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				Consideration should be given to utilising the vegetation removed from the TSF expansion area and placing directly as clods over soil berms where feasible (otherwise herbaceous vegetation should be stockpiled with topsoil to maintain organic content and seed bank). It is recommended that Landscape Functional Analysis (LFA) forms part of the rehabilitation and monitoring process.		sustaining.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Free drainage restored to area and downstream flow restored.	Winkelhaak – 350 Ha Leslie – 433 Ha	-	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Areas will be rehabilitated completely as soon as tailings have been removed from the dumps.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Eradication of two TSFs and removal of contaminating tailings material from the site	Winkelhaak – 350 Ha Leslie – 433 Ha	-	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Eradication of two dumps and profiling and rehabilitation of surface area.	Winkelhaak – 350 Ha Leslie – 433 Ha	-	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	Areas will be rehabilitated completely as soon as tailings have been removed from the TSF footprint. Soil quantity & quality and vegetative cover & diversity will be maintained over rehabilitated areas to ensure grazing land use until rehabilitated areas are stable and self-sustaining.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Revegetation and floral community establishment will attract animals to the area.	Winkelhaak – 350 Ha Leslie – 433 Ha	-	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Operation	Alien invasive establishment and bush encroachment.	Winkelhaak – 350 Ha Leslie – 433 Ha	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.	Alien and invasive species managed in terms of NEM:BA and CARA.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	TSFs will be removed from property and visual aesthetic will be improved but land will remain mine land and may require some time to recover.	Winkelhaak – 350 Ha Leslie – 433 Ha	No mitigation required.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Decommissioning, Closure	Radiation will persist and affect the immediate environment of the historic TSF footprints.	Winkelhaak – 350 Ha Leslie – 433 Ha	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. The level and depth of penetration of radiation will only be known once the tailings have been removed. Therefore, once the facilities have been mined an independent specialist must be contracted to assess radiation levels of in situ soils, including the depth of penetration of radiation and potential remediation levels required to be granted a clearance certificate from the NNR. Only after this has been completed can appropriate final land uses be determined in conjunction with the specialist. Continue with current radiation management and monitoring on site.	Comply with the Nuclear Act and relevant regulations.	Continue with current radiation management, monitoring and reporting for the life of mine. Contract specialist to assess radiation levels in the TSF footprint as soon as the site is cleared of final tailing material.
Establishment of portable toilet facilities at the pump houses.	Construction, Operation, Decommissioning	Potential contamination of surface water bodies and surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	-	CONTROL Keep portable toilet facilities in clean and hygienic state. REMEDY Inspection and regular emptying of tanks to ensure no leaks and risk of overflow.	Downstream water quality will be within background quality limits and compared to SAN 2011 drinking water quality guidelines for bacteria.	Develop an inspection protocol for portable toilets and empty regularly to the sewage treatment facility at the Elikhulu Plant.
Domestic waste generation at containerised offices at pump stations.	Construction, Operation	Potential surface contamination which will impact surrounding areas through runoff and seepage.	-	CONTROL Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. REMEDY Inspect and clear all litter and waste.	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.
Reclamation of tailings facilities and associated activities detailed above	Construction, Operation	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	Kinross – 187 Ha Winkelhaak – 260 Ha Leslie – 295	CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.	Good housekeeping practices will be applied over mining and infrastructure areas at all times.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
			Ha			
New TSF (Expansion of Kinross TSF)						
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Soil erosion and associated sedimentation with reduced ingress and increased runoff with increased hydrological yield to downstream environments	230 Ha	<p>MODIFY Temporary attenuation dams must be constructed downstream of activity area if construction occurs during the wet season.</p> <p>CONTROL Establish adequately sized storm water control measures before any other activities commence to ensure clean and dirty water separation and dirty water containment. This will include upslope berms to divert clean water around the site of activity into natural drainage lines and silt traps downstream of areas of activity to trap sediment before water drains to the natural area. Vegetation removal must be over as small an area as possible. Establish approved erosion control measures to reduce the risk of transported soils. Road surfaces must be compacted in order to increase stability. Sheet runoff from hard surfaces and roads curtailed through proper drainage control. Install flow dissipaters where rapid flow of diverted clean storm water runoff occurs.</p> <p>REMEDY All disturbed areas no longer required must be reshaped and revegetated. All bare surface areas must be re-vegetated in order to avoid the transportation of sediments and the creation of erosion gullies. Flow dissipaters will be installed in any areas with high flow velocity. Erosion control measures (gabions) will be established in areas with severe or persistent erosion.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure) will be completed before other activities commence on site and maintained for the life of mine. Rehabilitate areas completely as soon as activity in those areas ceases. Establish erosion control measures as soon as erosion is observed on site.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction	Reduction in groundwater quantity through reduced infiltration due to footprint development activities	230 Ha	<p>CONTROL Properly demarcate areas for development (TSF expansion) and ensure activity is maintained within the demarcations to keep affected area as small as possible. Vegetation removal must be over as small an area as possible.</p> <p>REMEDY All disturbed areas no longer required must be reshaped and revegetated. Erosion control measures (gabions) will be established in areas with severe or persistent erosion.</p>	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Rehabilitate and revegetate areas completely as soon as these areas are no longer required. Establish erosion control measures as soon as erosion is observed on site.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Destruction of channelled and unchannelled valley bottom wetlands.	230 Ha	<p>REMEDY Loss of wetland habitat should be offset by rehabilitating and protecting alternative wetlands with similar functions so that no nett loss is obtained.</p> <p>STOP Wetlands cannot be destroyed until the authorisations under NEMA and NWA are obtained and engineered diversion channels established.</p>	Maintain downstream water flow patterns in line with catchment RWQOs.	Offset areas should be identified prior to the wetlands being demolished and offset management plan implemented for the life of mine.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction	Loss of soil characteristics, erosion and compaction	230 Ha	<p>CONTROL Demarcate designated activity area and keep as small as possible. Strip topsoil from all activity areas and stockpile as berms or soil stockpiles (maximum 2m height) to clad the sides of TSF facility. Incorporate herbaceous vegetation into soil stockpiles. Subsoil may also be used for berms if additional material is required, or soil</p>	NEMA, MPRDA & CARA regarding soil handling, storage and management.	Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m. Construct drainage and erosion controls where needed, such as gabion baskets, levees. REMEDY Rehabilitate all disturbed areas as soon as they are no longer required and cordon off areas until vegetation has established. Revegetate all bare soils.		observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for vegetative growth.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Loss in land capability	230 Ha	No Mitigation possible; soil preservation required for cladding and rehabilitation of TSF	NEMA, MPRDA & CARA regarding rehabilitation of mine residue deposits.	Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is observed on site. Soil surveys will be undertaken annually over stockpiles / berms until to maintain soil chemistry for vegetative growth.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Destruction of protected species.	230 Ha	REMEDY Retain species in situ where areas are not targeted for development and as far as possible species from targeted development areas should be transplanted to suitable nearby habitat. CONTROL Specialist will have to walk area and plot all protected species. Preserve all other species in situ. Prohibit the harvesting of general flora in the area. STOP Protected species cannot be removed until the necessary permits are obtained under NEM:BA.	Permits will be obtained under NEM:BA to relocate / destroy protected species.	Protected species on or near site must be monitored to prevent destruction to species for the life of the operation. Permits must be obtained for any species that will be removed or destroyed before activity takes place.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Loss of biodiversity through vegetation clearance and habitat destruction.	230 Ha	CONTROL Demarcate designated activity area to ensure only flora in that area is affected. Prioritise low sensitivity areas (disturbed old airstrip and disturbed grassland) and preserve all moist grassland areas not targeted for development. Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. No open fires must be allowed on site such as for cooking. Prohibit the harvesting of indigenous flora in general. Do not hinder, harm or trap animals. Maintain downstream ecological corridors associated with wetlands and their 100m buffer zones. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	NEM:BA and associated National and Provincial regulations in terms of protection of biodiversity.	Demarcate sensitive areas (wetlands and CBA area) not targeted for development before any activity takes place and maintain these for life of mine. Demarcate activity areas and ensure activity only takes place within these areas.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Alienation of, and disturbance to, animals.	230 Ha	CONTROL Keep areas of vegetation clearance to a minimal. New activities should commence from existing infrastructure in a linear direction as far as possible to prevent fauna from being "boxed-in" and providing them opportunity to safely flee the area. Do not hinder, harm or trap animals. Maintenance of downstream wetlands and associated natural vegetation	NEM:BA and associated National and Provincial regulations in terms of protection of biodiversity.	Demarcate sensitive areas (wetlands and CBA area) not targeted for development before any activity takes place and maintain these for life of mine.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				will provide ecological corridors and refuges for animals. Animals under threat from the development will be relocated from site by specialists.		
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction	Dust generation and particulate matter, which will result in elevated PM10 at Brendan Village, northern parts of Embalenhle and over the western parts of Evander.	230 Ha	CONTROL Speed limits must be established on site. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Loss of and disturbance to archaeological / heritage sites	230 Ha	No heritage sites expected as surface has been disturbed by mining and agriculture STOP Cultural site and graves uncovered during operations will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	SAHRA will be complied with regarding permits for destruction and relocation or management of sites in situ.	Once off inspection of all activity areas will be completed prior to construction. If sites are uncovered during surface development, all activity will cease immediately and a specialist consulted prior to any further activities taking place.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Shallow excavations may affect subsurface fossils	230 Ha	No known occurrences of fossils in the area and the affected area already disturbed by mining or agriculture in the past; impact is considered very low. CONTROL If fossil material is discovered during the development of the site, then it is strongly recommended that a professional palaeontologist be called to assess the importance and to rescue them if necessary (with the relevant SAHRA permit). If the fossil material is deemed to be of scientific interest then further visits by a professional palaeontologist would be required to collect more material and deposit a representative sample in a recognized institute for further study.	SAHRA will be complied with regarding permits for destruction and relocation or management of uncovered fossils.	If fossils are uncovered during surface development, all activity will cease immediately and a specialist consulted prior to any further activities taking place.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation, Decommissioning, Closure	Significant levels of dust may emanate from the use of heavy construction vehicles which would impact on runoff water quality	230 Ha	CONTROL Apply dust control measures such as water spray or misting during times of high dust generation.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Construction, Operation	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	230 Ha	MODIFY Consider methods and equipment that will have the least impact on watercourses. Construction in and around watercourses must be restricted to the dryer winter months where possible CONTROL Effective sediment traps should be installed as well as flow dissipaters where needed. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Establish erosion control measures as soon as erosion is

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				Protect all areas susceptible to erosion and ensure that there is no undue soil erosion. Runoff from the construction area must be managed to avoid erosion and pollution problems. Implement buffer zones to trap sediments. Monitoring should be done to ensure that sediment pollution is timeously addressed.	of CARA and MPRDA regulations.	observed on site.
Topsoil and subsoil stockpiling.	Construction, Operation	Loss of soil characteristics, erosion and compaction	Topsoil – 28 Ha Subsoil – 66 Ha	CONTROL Demarcate designated stockpile areas and keep as small as possible. Ensure that topsoil from stockpile areas has been stripped and placed as perimeter berms around stockpile areas. Keep topsoil stockpiles below 2m. Subsoil may also be used for berms if additional material is required, or soil will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m. All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes. Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will be ripped, disced or scarified as needed and vegetated. REMEDY Revegetate all bare soils, including all berms and soil stockpiles. Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.	NEMA, MPRDA & CARA regarding soil handling, storage and management.	Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for vegetative growth.
Topsoil and subsoil stockpiling.	Operation	Alien invasive establishment and bush encroachment.	Topsoil – 28 Ha Subsoil – 66 Ha	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Seed long terms soil stockpiles and berms with self-sustaining indigenous species.	Alien and invasive species managed in terms of NEM:BA and CARA.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.
Topsoil and subsoil stockpiling.	Construction, Operation	Dust generation and particulate matter.	Topsoil – 28 Ha Subsoil – 66 Ha	CONTROL Stockpile heights must not exceed 2m for topsoil, 6m for subsoil. Vegetate soil stockpiles and berms and all exposed areas. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Topsoil and subsoil stockpiling.	Construction, Operation, Decommissioning	Soil erosion and associated sedimentation	Topsoil – 28 Ha Subsoil – 66 Ha	MODIFY Keep topsoil stockpiles below 2m. Keep subsoil stockpiles below 6m. All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes. Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will ripped, disced or scarified as needed and vegetated. REMEDY Revegetate all bare soils, including all berms and soil stockpiles.	NEMA, MPRDA & CARA regarding soil handling, storage and management. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Establish erosion control measures as soon as erosion is observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for vegetative growth.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.		
Topsoil and subsoil stockpiling.	Construction, Operation, Decommissioning, Closure	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	Topsoil – 28 Ha Subsoil – 66 Ha	CONTROL Appropriate base preparation of soil stockpile areas will reduce infiltration and water bulking. Divert clean water around soil stockpiles by placing topsoil stripped from stockpile areas as perimeter berms around stockpiles; prevent pooling around stockpiles.	Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs for the catchment.	Strip topsoil and placement into perimeter berms and compact the base of the stockpile area before soil stockpiling takes place.
Utilising roads, establishing access control and fencing.	Construction, Operation	Dust generation and particulate matter.	10,000m	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Speed limits must be established on site. Manage dust through water carts or sprinklers.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Utilising roads, establishing access control and fencing.	Construction, Operation	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	10,000m	CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals. REMEDY Discontinue use of faulty equipment until repaired or replaced. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill clean-up. Spill kits to be made available on site.	Keep equipment, machinery and vehicles operating within their manufacturing specifications. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Vehicles, machinery and equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Operation	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment as the RWDs are constructed within a watercourse.	30 Ha	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.
Construction of additional RWD (2 compartments), silt trap and dirty	Operation, Decommissioning, Closure	Decrease in hydrological yield due to dirty water containment and downstream flow	30 Ha	Necessary measure to contain dirty water runoff. MODIFY Keep dirty water runoff areas as small as possible to increase clean water runoff footprint area. CONTROL	Mine water will be contained on site as per GN704.	Demarcate limited active areas before any activity takes place and maintain for life of mine. Construct ALL water management features before

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
water collection trenches from TSF		interruption with RWD constructed within a water course; will additionally impact on aquatic and wetland ecosystems		Clean storm water cut off trench or channel must be constructed to divert rainwater away from the dirty catchment area such as the industrial area and the proposed TSF to natural drainage lines. The existing flow patterns in nearby tributaries should be maintained at all times.		other activities commence on site and maintain for life of mine.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Construction, Operation, Decommissioning, Closure	Impairment of groundwater quality due to seepage or overflow from RWDs to underlying aquifers.	30 Ha	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. Recycle water in RWD within processing plant. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Construction, Operation	Disturbance to nearby (87m) grave yard	~ 30 Ha	CONTROL The site should be fenced in with at least a 20m buffer zone prior to any activity commencing in the area. A cultural management plan should be drafted for the sustainable preservation of the site which must be drafted by a heritage specialist and should take into account controlled access to the site for descendants and include a monitoring and management plan of the site. STOP Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	SAHRA will be complied with regarding management of site in situ.	The cultural management plan must be drafted and the site fenced before any activity commences on the new RWDs.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Construction, Operation	Disturbance to sections of an old farmstead adjacent to the RWD.	~ 30 Ha	CONTROL Full photographic documentation of the entire site is recommended, after which it may be demolished. The remaining structures not in the vicinity of the RWD can be left in situ. STOP Demolition permit from SAHRA must be obtained before an activity proceeds near the site. Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	SAHRA will be complied with regarding permits for destruction and/or management of site in situ.	Proper records of the site will be made by the specialist, which will be required in order to apply for a permit for destruction. The permit for destruction must be obtained prior to any activities related to the RWDs.
Storm water diversion structures, including berm for the diversion of a water	Construction	Construction & development of the Kinross TSF will change flow regime	1,300 m	MODIFY Keep dirty water runoff areas as small as possible to increase clean water runoff footprint area. CONTROL Clean storm water cut-off trench or channel must be constructed to divert runoffs away from dirty water catchment area of the proposed TSF.	Storm water runoff and diversion will be established on site as per GN704 and NWA.	Demarcate limited active areas before any activity takes place and maintain for life of mine. Construct diversion berm before other activities commence on site and maintain for life of

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
course				The existing flow patterns in nearby tributaries should be maintained at all times.		mine.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	TSF will permanently alter the topographical nature of the area.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	As the TSF will be an extension of the existing Kinross TSF, resulting in the elimination of two smaller TSFs this impact is considered positive in terms of topography. CONTROL Ensure TSF design and development follows engineered designs at all times. On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Polluted runoff from dirty areas will release mine water to the downstream environment if not properly contained	Existing – 169 Ha New – 230 Ha Total ~400 Ha	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704. Construct the TSF as per engineered designs. Only environmentally friendly materials must be used during the construction of water management features to minimise pollution to water. Apply good housekeeping practices and constantly maintain TSF. REMEDY On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Impairment of local tributaries and streams and day lighting of contaminated groundwater seepage will contaminate the nearby Grootspuit which is regionally connected and has national implications.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	In addition to the other water mitigation measures, the following is relevant in terms of the greater catchment: CONTROL Engineering recommendations regarding designs for all infrastructures must be implemented on site. Remove seepage with drains to RWD. Contain dirty water with sound storm water control measures to reduce the overall volume of water that must be handled in the system. Divert clean water from the site. Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration. On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system. 12 months water monitoring must be conducted after mine closure, before runoff from site can be released to the nearby dams.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Rehabilitate areas completely as soon as activity in those areas ceases and area are no longer needed. Establish erosion control measures as soon as erosion is observed on site.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Wetland deterioration due to water quality impacts, should water from the TSF not be contained or through TSF	Existing – 169 Ha New – 230 Ha Total ~400 Ha	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. REMEDY Treatment of pollution identified should be prioritized accordingly as	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
		failure.		needed.	conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	commence on site and maintained for their operational life. Establish erosion control measures as soon as erosion is observed on site.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	MODIFY Construction in and around watercourses must be restricted to the dryer winter months where possible. Upgrade the existing Kariba RWD to engineered designs. CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. Consider methods and equipment that will have the least impact on watercourses. Effective sediment traps should be installed as well as flow dissipaters where needed. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers; . If necessary fence off to prevent vehicular, pedestrian and livestock access. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion. Runoff from the construction area must be managed to avoid erosion and pollution problems. Implement buffer zones to trap sediments. Monitoring should be done to ensure that sediment pollution is timeously addressed.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Transformation/loss of wetlands and changes to the topography and runoff characteristics affecting the flow quantity and fluctuation properties of the Grootspuit	Existing – 169 Ha New – 230 Ha Total ~400 Ha	CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. Measures should be put in place in critical areas to ensure that changed sources of water input into downstream watercourses does not cause erosion. Measures should be put in place in critical areas to ensure that polluted water from the Tailings Storage Facility is contained and does not seep to downs stream environments. STOP No activity within wetlands and 100m buffer zones can commence without an approved IWUL, or within 500m of water resources without a General Authorisation issued by DWS.	Water will be managed in terms of GN704. Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Establish erosion control measures as soon as erosion is observed on site.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Impairment of groundwater quality due to leachate seeping to underlying aquifers from the	Existing – 169 Ha New – 230 Ha Total ~400 Ha	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
		tailings facility.		<p>Construct the TSF as per engineered designs. Contain seepage from the proposed tailings and re-direct to the RWD. Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration. Install downstream monitoring boreholes and monitor for potential contaminated seepage. If needed install downstream cut-off trench and direct seepage to RWD. Apply good housekeeping practices and TSF is constantly maintained.</p> <p>REMEDY Should pollution be identified, a specialist should be consulted regarding the application of appropriate remedial measures for the specific incident. Remedial measures could include the following; Natural Attenuation (through biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants); Interception by means of surface cut-off drains combined with a treatment of the polluted water; interception by means of interceptor boreholes combined with a treatment of the polluted water; installation of reactive barriers; phyto-remediation.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>		The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	<p>CONTROL Appropriate base preparation of TSF will reduce infiltration and water bulking. Engineering of water management structures / facilities, including lining. Divert clean water around TSF to prevent pooling around the facility</p>	Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs for the catchment.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Impacts to local streams impair water quality for downstream users and cattle watering	Existing – 169 Ha New – 230 Ha Total ~400 Ha	<p>Water monitoring results indicate high sodium which should not have severe impacts on livestock.</p> <p>MODIFY Upgrade the existing Kariba RWD to engineered designs to ensure adequate capacity. Recycle water on site and prioritise water from RWDs before using water from Leeuwpan.</p>	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Rehabilitate areas completely as soon as activity in those areas ceases and area are no longer needed. Establish erosion control measures as soon as erosion is observed on site.
Tailings disposal and facility management through	Operation, Decommissioning, Closure	Dust and PM generation with hazardous chemical	Existing – 169 Ha New – 230 Ha Total ~400 Ha	<p>CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty</p>	Dust fallout will be monitored and managed as per GNR827 and	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
progressive rehabilitation		components including arsenic, cadmium, cobalt and chromium from dried tailing material along the outer edges. Elevated PM10 levels may be experienced in Evander.		areas. REMEDY Construct the TSF as per engineered designs. On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system.	maintained within 1200mg/m2/day on site. Emissions will be monitored and managed to GN1210 limits.	As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Alien invasive establishment and bush encroachment.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.	Alien and invasive species managed in terms of NEM:BA and CARA.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.
Tailings disposal and facility management through progressive rehabilitation	Operation, Decommissioning, Closure	Alteration in visual aesthetics and sense of place.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system. Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices to ensure visual impact is mitigated. REMEDY Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary.	Industry best practices and standards.	Good housekeeping practices and proper storage of materials in designated areas, from the onset of construction throughout the life of mine. Regular communications with I&APs.
Tailings disposal and facility management through progressive rehabilitation	Construction, Operation	Change in land use to mining.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	No mitigation required. This extension eliminates two other TSFs within the mineral boundary.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Decommissioning, Closure	Existing TSF will be extended but remains within the mineral boundary and an active mine area.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. On-going concurrent rehabilitation of the side slopes will be considered in the design of the cover system. Apply good housekeeping practices to ensure visual impact is mitigated.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
Tailings disposal and facility management through progressive rehabilitation	Decommissioning, Closure	Radiation will affect the immediate environment of the TSF.	Existing – 169 Ha New – 230 Ha Total ~400 Ha	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. Continue with current TSF radiation management and monitoring and apply to the expansion of the TSF as needed.	Complies with the Nuclear Act and relevant regulations.	Continue with current radiation management, monitoring and reporting for the life of mine.
Domestic waste generation	Construction, Operation	Potential surface contamination which will impact surrounding areas through runoff and seepage.	-	CONTROL Bins to be provided. Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDSs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. REMEDY Inspect and clear all litter and waste.	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.
Use of equipment during TSF expansion activities	Construction, Operation, Decommissioning	Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.	NA	MODIFY Where possible, purchase equipment with lower emissions. CONTROL Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. REMEDY Discontinue use of faulty equipment until repaired or replaced.	Keep equipment, machinery and vehicles operating within their manufacturing specifications.	Vehicles, machinery and equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine.
Use of equipment during TSF expansion activities	Construction, Operation, Decommissioning	Increased noise levels.	NA	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: MODIFY Consideration will be given to buying quieter equipment where feasible. CONTROL Machinery and equipment will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS 10103:2008.	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as needed.
Expansion of Kinross TSF and associated activities detailed above	Construction, Operation	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	~ 480 Ha	CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.	Good housekeeping practices will be applied over mining and infrastructure areas at all times.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
Establishment of Elikhulu Plant and associated infrastructure adjacent to the existing plant						
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Construction, Operation	Polluted runoff from dirty areas and slurry spills will pollute the downstream environment if not properly contained	10 Ha	<p>CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution.</p> <p>REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.</p>	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Construction, Operation	Wetland deterioration due to water quality impacts that may arise from slurry spills and poor water containment at the plant.	10 Ha	<p>CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment dams, to ensure dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution.</p> <p>REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.</p>	Mine water will be contained on site as per GN704. Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Construction	Excavation for the establishment of foundations will generate dust.	10 Ha	<p>Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation.</p> <p>CONTROL Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.</p>	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Operation	Emission of particulate matter, CO ₂ , SO _x and NO _x	10 Ha	<p>CONTROL All control measures must be applied as per industry best practices and legislative requirements such as stacks over combustion units, air scrubbers and / or filters.</p>	Emissions will be monitored and managed to GN1210 limits.	Emission controls will be implemented before any processing activities commence. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Construction, Operation	Operation of the CIL Plant will contribute to noise levels.	10 Ha	<p>Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered:</p> <p>MODIFY Consideration will be given to buying quieter equipment where feasible.</p> <p>CONTROL Machinery and equipment will be regularly serviced.</p>	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as needed. Suggested noise control mitigation measures will be

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
				Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.	10103:2008.	applied immediately if any complaints about noise are received.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Construction, Operation, Decommissioning	Deterioration in visual aesthetics and sense of place.	10 Ha	Area is within an existing mine complex and visual impact will be minimal CONTROL Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices to ensure visual impact is mitigated.	Industry best practices and standards.	Good housekeeping practices and proper storage of materials in designated areas, from the onset of construction throughout the life of mine. Regular communications with I&APs.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpan dam)	Operation	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment	10 Ha	CONTROL PCD & Event Pond must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Dirty water dams and trenches must be regularly inspected and silt build up cleared as and when required to ensure adequate capacity and functioning . Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpan dam)	Construction, Operation	Impairment of groundwater quality due to seepage or overflow from dirty water dams at the plant to underlying aquifers.	10 Ha	CONTROL Contain dirty water and reduce infiltration with suitable lining material. Separation of clean water with effective storm water control. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. Leaks detection system should be incorporated into the design system or install monitoring boreholes downstream of the dirty water dams to monitor for seepage. REMEDY Recycle process water. Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.	Construct ALL water management features before other activities commence on site and maintain for life of mine.

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
Chemical / Reagent Storage	Construction, Operation, Decommissioning, Closure	Spillages of hazardous material or incorrect storage of chemicals may impair quality of water runoff which could impact on the surrounding environment if not properly managed.	~ 905 m ³	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHPA will be complied with regarding signage and access control.	Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .
Chemical / Reagent Storage	Construction, Operation	Impairment of groundwater quality due to ad hoc spillages at the plant seeping to underlying aquifers.	~ 905 m ³	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHPA will be complied with regarding signage and access control.	Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .
Chemical / Reagent Storage	Construction, Operation	Spillages of hazardous material or incorrect storage of chemicals may lead to chemical fires, chemical gasses which will impair air quality and also be a risk to staff.	~ 905 m ³	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHPA will be complied with regarding signage and access control.	Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .
Ablutions and change house with sewage treatment plant	Construction, Operation, Decommissioning	Irresponsible use of water and water wastage.	Change house – 112m ² Sewage treatment plant – 10m ²	<p>CONTROL Saving water initiatives will be included in environmental awareness training. Utilise water on site responsibly. Record all water usage on site.</p> <p>REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and immediate repair and maintenance.</p>	No standards applicable but once the mine has determined average monthly water use then this should be utilised as standard (exceeding this may indicate leaks in the system).	Water use will be monitored for the life of mine as soon as water use commences. ALL water management features will be completed before other activities commence in the areas and will be maintained for their operational life.
Ablutions and change house with sewage treatment plant	Construction, Operation, Decommissioning	Potential contamination of surface water bodies and	Change house – 112m ²	<p>CONTROL Keep all bathrooms in clean and hygienic state.</p> <p>REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and</p>	Reduced bacterial contamination on neighbouring areas.	Construct sewage treatment plant, before other activities commence in the area and maintain for their operational

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
		surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	Sewage treatment plant – 10m ²	immediate repair and maintenance.		lifetime.
General and hazardous waste handling	Construction, Operation	Potential surface contamination which will impact surrounding areas through runoff and seepage.	-	<p>CONTROL</p> <p>Waste storage area will be treated as a dirty area and any runoff from site must be contained.</p> <p>Waste should be recycled as far as possible and sold/given to interested contractors.</p> <p>Waste will be stored according to the Norms and Standards for Storage of Waste.</p> <p>Recyclable waste should not be stored for excessive periods.</p> <p>Chemical waste must be stored as per MSDSs and not stored on site for excessive periods.</p> <p>General waste must be collected and disposed of at a registered waste disposal site.</p> <p>Waste handling and storage areas will have clear waste type and warning signs as needed. Colour coding can be used but must be accompanied by training.</p> <p>Emergency response plan must be in place for any incidences that may occur with hazardous waste on site.</p> <p>REMEDY</p> <p>Inspect and clear all litter and waste.</p>	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.
Processing and associated activities detailed above	Construction, Operation	Contamination by way of slurry, hydrocarbon, chemicals, dust and waste to surrounding environment will be hazardous to flora and fauna.	-	<p>CONTROL</p> <p>Ensure hydrocarbon, slurry, chemicals and waste handling is conducted in line with the EMP and that mitigation measures above are applied.</p> <p>REMEDY</p> <p>Spills and illegally dumped waste must be cleared immediately.</p>	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.	Good housekeeping practices will be applied over mining and infrastructure areas at all times.
Process water supply and reticulation						
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Construction, Operation	Irresponsible use of water and water wastage through leaks which will alter downstream water dynamics	Floating pump supplying 8.55 ML/day water, ±16.6kms water pipelines	<p>REMEDY</p> <p>Inspection of ALL water features for leaks and repair immediately.</p> <p>CONTROL</p> <p>Saving water initiatives will be included in environmental awareness training.</p> <p>Utilise water on site responsibly.</p> <p>Record all water usage on site.</p>	Abstraction volumes will remain within those stipulated in the water balance and IWUL.	Water use will be monitored for the life of mine as soon as water use commences. ALL water management features will be completed before other activities commence in the areas and will be maintained for their operational life.
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and	Construction, Operation	Water balance completed for the Leeuwpam Dam indicates the dam can provide the operation with	Floating pump extracting 8.55 ML/day water.	<p>REMEDY</p> <p>Where possible, area should be cleared of fine surface material as the dam recedes and while material is still wet. This material can be disposed of on the tailings facility. This will remove the bulk of the fines which will be more prone to dispersal and generating dust.</p> <p>If available, soil should be applied as the dam recedes to the exposed and</p>	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
reticulation through pipelines to TSF sites		requirements, but increased abstraction will reduce the size of the Leeuwpans Dam. This will expose parts of the dam and aggravate dust generation.	Leeuwpans will decrease from 730 Ha to ~ 300 - 260 Ha	cleaned areas and the area vegetated to obtain a good vegetative cover. Consideration should be given to water spray / sprinklers to keep exposed areas moist during dry windy conditions.		maintained over rehabilitated areas to ensure adequate vegetative cover for grazing land use until rehabilitated areas are stable and self-sustaining.
Installation of barge & pump at Leeuwpans Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Construction, Operation	Recreational use of the dam by the farmer will be affected by reduction in dam size.	Floating pump extracting 8.55 ML/day water. Leeuwpans will decrease from 730 Ha to ~ 300 - 260 Ha	No Mitigation Possible. It must be stated that the dam is licensed and has been operated as a mine water dam for evaporation purposes since the 1960's. Once water levels rebound the recreational uses may be reinstated.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be maintained over rehabilitated areas to ensure adequate vegetative cover for grazing land use until rehabilitated areas are stable and self-sustaining.
Employment of staff, contractors						
Employment opportunities during construction – 700 jobs	Construction, Operation, Decommissioning	Direct improvement of socio-economic situation of contractors and indirect benefits through multiplier effects.	700 jobs	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for permanent employment.	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP	As per S&LP requirements
Employment opportunities during operations – 250 jobs	Construction, Operation, Decommissioning	Direct improvement of socio-economic situation of contractors and staff and indirect benefits through multiplier effects.	250 jobs	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for permanent employment.	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP	As per S&LP requirements
Local / Regional business	Construction, Operation, Decommissioning	Local / Regional business support	-	Adopt preferential procurement policies towards local suppliers and distributors. Ensuring that principle of "local first" when procuring consumables, construction materials etc.	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP	As per S&LP requirements
Neighbouring business	Construction, Operation,	Neighbouring business affected	-	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under	Dust fallout will be monitored and	Dust suppression will continue for the life of mine in line with a

Activity	Applicable Mine Phase	Impact	Size and scale of disturbance	Mitigation	Compliance with standards	Time periods for EMP implementation
	Decommissioning	by working environment, machinery affected by elevated dust		legislation. CONTROL Speed limits must be established on dirt roads. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	managed as per GNR827 and maintained within 1200mg/m ² /day on site.	site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.
Increased traffic largely passenger vehicles with additional employment and some trucks for machinery and equipment	Construction, Operation, Decommissioning	Increased potential for road incidences.	-	CONTROL Where feasible contract with minibus taxi or bus operators to transport staff to and from site. Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow. Limit mine-related vehicle traffic on public roadways to off-peak commuting times as far as practically possible to minimize impacts on local commuters. Enter into agreement with the roads agency as needed to ensure roads are maintained.	Operations will comply with MHSA and Regulations. Vehicles will be serviced and maintained in road worthy condition.	Internal roads and intersections with public roads will be maintained from the onset of construction throughout the life of mine Speed inspections will be undertaken sporadically on site throughout the life of mine to ensure contractors are obeying speed limits.

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31 IMPACT MANAGEMENT OUTCOMES

The EIA process has led to mitigation actions being proposed for all impacts, these actions are summarised in the table below according to the each different aspect and phase of the proposed project. The full impact assessment table is presented in Appendix 18.

Table 44: Impact Management Outcomes

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
Reprocessing of Winkelhaak and Leslie/Bracken TSFs & new pump station at Kinross TSF					
Construction and operation of pump houses at each of the TSFs (x3)	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	Surface water & associated wetlands & aquatic ecosystems; Groundwater through seepage	Construction	<p>CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals.</p> <p>REMEDY Pumps must be placed on top of the diesel collector and/or oil traps in the event that pumps leak. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill clean-up.</p>	Surface water & Groundwater quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Construction and operation of pump houses at each of the TSFs (x3)	Pumps will contribute to elevated noise level	Noise	Operation	<p>Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered:</p> <p>MODIFY Consideration will be given to buying quieter pumping equipment where feasible.</p> <p>CONTROL Pumps will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing the pump houses. All pumping equipment will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.</p>	Keep equipment operating within their manufacturing specifications. Noise level at mineral boundary and sensitive receptor maintained at baseline levels.
Hydraulic mining & slurry generation and pumping	Failure of benches or flooding of trenches will release slurry to the downstream environment	Surface water & associated wetlands & aquatic ecosystems; Groundwater through seepage	Operation	<p>MODIFY Existing dirty water management infrastructure must be upgraded where needed to ensure containment of slurry during an emergency incident at the TSFs.</p> <p>CONTROL Apply storm water runoff management measures to ensure impact area is contained to activity area to ensure all water runoff and spilled slurry in the area is contained and ensure no discharge to the environment. Ensure mine blocks are mined as per the prescribed mine plan.</p> <p>REMEDY Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Spillages must be controlled through sandbags where necessary to prevent direct spillage to streams. Spillages must be cleared immediately in line with the emergency response procedures. Ensure back-up pumps and pipelines are easily accessible.</p>	Surface water & Groundwater quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Hydraulic mining & slurry generation and pumping	Hydraulic mining will contribute to elevated noise level	Noise	Operation	<p>Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected.</p>	Noise level at mineral boundary and sensitive receptor maintained at baseline levels.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				<p>The following should be considered:</p> <p>CONTROL Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Mine will limit noisy activities during the day if needed.</p>	
Construction and utilisation of slurry pipelines from pump houses to Elikhulu Plant	Failure of slurry reticulation system and infrastructure will release mine water to the downstream environment, which will be of particular significance at river crossings	Surface water & associated wetlands & aquatic ecosystems; Groundwater through seepage	Operation	<p>MODIFY Pipelines have been established in existing servitudes to a large extent to avoid disturbance of new areas.</p> <p>CONTROL Pipelines should be laid within the dirty water footprint area or paddocks must be established in clean water area which will serve to contain any leaks. Pipelines should be tested with clean water to ensure no leaks before allowing piping of slurry. Additional containment measures must be provided at river crossings, such as placing pipelines within drains that drain into sumps or other acceptable containment infrastructure. Pipelines should have a series of shut-off valves which can prevent flow of contaminated water should leaks occur.</p> <p>REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.</p> <p>STOP Dirty water pipelines will remain outside 100m buffer zones / 1:100 year flood lines until authorisations under both NEMA and NWA have been obtained where needed.</p>	Surface water & Groundwater quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Increased dust and associated particulate matter emissions.	Air quality	Decommissioning, Closure	<p>Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation.</p> <p>CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas. Rehabilitate and revegetate as soon as possible to stabilise the area and protect from wind erosion.</p>	Dust fallout will be managed within national ambient dust level standards.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Poor rehabilitation will result in sedimentation of downstream environments and water quality impairment.	Topography & land use & capability, surface water & associated wetlands & aquatic ecosystems	Decommissioning, Closure	<p>REMEDY The area should be re-landscaped to blend in with the surrounding topography and drainage lines. Runoff must only be allowed to enter the surrounding environment once it is proven that the water is of an acceptable water quality and a radiation clearance certificate is granted. Soil must be ameliorated after application as per specialist recommendations in order to sustain a vegetative cover. The areas should be monitored to ensure that seeds germinate sufficiently, a good vegetative cover is achieved and the vegetation progress through succession stages. Consideration should be given to utilising the vegetation removed from the TSF expansion area and placing directly as clods over soil berms where feasible (otherwise herbaceous vegetation should be stockpiled with topsoil to maintain organic content and seed bank). It is recommended that Landscape Functional Analysis (LFA) forms part of the rehabilitation and monitoring process</p>	Rehabilitation will aim to replace and ameliorate soils in order to restore grazing land capability supporting self-sustaining indigenous species.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Free drainage restored to area and downstream flow restored.	Surface water & associated wetlands & aquatic	Decommissioning, Closure	-	Surface water quality in neighbouring areas will be maintained close to baseline conditions.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
		ecosystems			Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and removal of contaminating tailings material from the site	Groundwater	Decommissioning, Closure	-	Groundwater quality and quantity in neighbouring areas will be maintained close to baseline conditions.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and profiling and rehabilitation of surface area.	Soil & Flora	Decommissioning, Closure	-	Rehabilitation will aim to restore land to at least grazing potential.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Revegetation and floral community establishment will attract animals to the area.	Fauna	Decommissioning, Closure	-	Rehabilitation will aim to restore local, indigenous vegetation communities.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Alien invasive establishment and bush encroachment.	Flora & Fauna	Operation	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.	Alien and invasive species managed with the view to eradicate on the property and surrounding areas.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	TSFs will be removed from property and visual aesthetic will be improved but land will remain mine land and may require some time to recover.	Property value & Visual Aesthetics	Decommissioning, Closure	No mitigation required.	Rights of people must not be infringed upon. Rehabilitation will aim to restore local, indigenous vegetation communities.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Radiation will persist and affect the immediate environment of the historic TSF footprints.	Soil, flora, fauna, atmosphere and water in the vicinity of the historic TSF footprints.	Decommissioning, Closure	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. The level and depth of penetration of radiation will only be known once the tailings have been removed. Therefore, once the facilities have been mined an independent specialist must be contracted to assess radiation levels of in situ soils, including the depth of penetration of radiation and potential remediation levels required to be granted a clearance certificate from the NNR. Only after this has been completed can appropriate final land uses be determined in conjunction with the specialist. Continue with current radiation management and monitoring on site.	Ensure that no inadvertent exposure to threatening radiation levels can occur.
Establishment of portable toilet facilities at the pump houses.	Potential contamination of surface water bodies and surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	Surface water & associated wetlands & aquatic ecosystems; social health	Construction, Operation, Decommissioning	CONTROL Keep portable toilet facilities in clean and hygienic state. REMEDY Inspection and regular emptying of tanks to ensure no leaks and risk of overflow.	Reduced bacterial contamination on neighbouring areas.
Domestic waste generation at containerised offices at pump	Potential surface contamination which will impact surrounding areas	Groundwater & surface water & associated wetlands &	Construction, Operation	CONTROL Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors.	Attain "cradle to grave" management of waste on site.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
stations.	through runoff and seepage.	aquatic ecosystems		Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. REMEDY Inspect and clear all litter and waste.	
Reclamation of tailings facilities and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	Flora & Fauna	Construction, Operation	CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Prevent impact to surrounding environments and associated biota.
New TSF (Expansion of Kinross TSF)					
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Soil erosion and associated sedimentation with reduced ingress and increased runoff with increased hydrological yield to downstream environments	Surface water & associated wetlands & aquatic ecosystems	Construction, Operation	MODIFY Temporary attenuation dams must be constructed downstream of activity area if construction occurs during the wet season. CONTROL Establish adequately sized storm water control measures before any other activities commence to ensure clean and dirty water separation and dirty water containment. This will include upslope berms to divert clean water around the site of activity into natural drainage lines and silt traps downstream of areas of activity to trap sediment before water drains to the natural area. Vegetation removal must be over as small an area as possible. Establish approved erosion control measures to reduce the risk of transported soils. Road surfaces must be compacted in order to increase stability. Sheet runoff from hard surfaces and roads curtailed through proper drainage control. Install flow dissipaters where rapid flow of diverted clean storm water runoff occurs. REMEDY All disturbed areas no longer required must be reshaped and revegetated. All bare surface areas must be re-vegetated in order to avoid the transportation of sediments and the creation of erosion gullies. Flow dissipaters will be installed in any areas with high flow velocity. Erosion control measures (gabions) will be established in areas with severe or persistent erosion. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Surface water quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Reduction in groundwater quantity through reduced infiltration due to footprint development activities	Groundwater	Construction	CONTROL Properly demarcate areas for development (TSF expansion) and ensure activity is maintained within the demarcations to keep affected area as small as possible. Vegetation removal must be over as small an area as possible. REMEDY All disturbed areas no longer required must be reshaped and revegetated. Erosion control measures (gabions) will be established in areas with severe or persistent erosion.	Groundwater quality and quantity in neighbouring areas will be maintained close to baseline conditions.
Clearing of vegetation, topsoil and subsoil stripping & base	Destruction of channelled and unchannelled valley bottom wetlands.	Wetlands & aquatic ecosystems & associated surface	Construction, Operation	REMEDY Loss of wetland habitat should be offset by rehabilitating and protecting alternative wetlands with similar functions so that no nett loss is obtained. STOP	Maintain downstream flow levels to ensure downstream wetland and aquatic ecosystem integrity are maintained close to baseline

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
preparation.		water environment		Wetlands cannot be destroyed until the authorisations under NEMA and NWA are obtained and engineered diversion channels established.	PES..
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of soil characteristics, erosion and compaction	Soil	Construction	<p>CONTROL Demarcate designated activity area and keep as small as possible. Strip topsoil from all activity areas and stockpile as berms or soil stockpiles (maximum 2m height) to clad the sides of TSF facility. Incorporate herbaceous vegetation into soil stockpiles. Subsoil may also be used for berms if additional material is required, or soil will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m. Construct drainage and erosion controls where needed, such as gabion baskets, levees.</p> <p>REMEDY Rehabilitate all disturbed areas as soon as they are no longer required and cordon off areas until vegetation has established. Revegetate all bare soils.</p>	Soil on site will be preserved for use in rehabilitation of the tailings facility and surrounds in order to attain rehabilitation objectives.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss in land capability	Land capability	Construction, Operation	No Mitigation possible; soil preservation required for cladding and rehabilitation of TSF	Area will be developed into permanent TSF. TSF must be rehabilitated in accordance to approved rehabilitation plans.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Destruction of protected species.	Flora & Fauna	Construction, Operation	<p>REMEDY Retain species in situ where areas are not targeted for development and as far as possible species from targeted development areas should be transplanted to suitable nearby habitat.</p> <p>CONTROL Specialist will have to walk area and plot all protected species. Preserve all other species in situ. Prohibit the harvesting of indigenous trees (if any) for firewood and general flora in the area.</p> <p>STOP Protected species cannot be removed until the necessary permits are obtained under NEM:BA.</p>	Conserve protected species as far as possible.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of biodiversity through vegetation clearance and habitat destruction.	Flora & Fauna	Construction, Operation	<p>CONTROL Demarcate designated activity area to ensure only flora in that area is affected. Prioritise low sensitivity areas (disturbed old airstrip and disturbed grassland) and preserve all moist grassland areas not targeted for development. Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas. No open fires must be allowed on site such as for cooking. Prohibit the harvesting of indigenous trees (if any) for firewood and indigenous flora in general. Do not hinder, harm or trap animals. Maintain downstream ecological corridors associated with wetlands and their 100m buffer zones.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>	Ecological statuses of downstream wetlands and aquatic ecosystem and surrounding flora maintained as close as possible to baseline conditions.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Alienation of, and disturbance to, animals.	Fauna	Construction, Operation	<p>CONTROL Keep areas of vegetation clearance to a minimal. New activities should commence from existing infrastructure in a linear direction as far as possible to prevent fauna from being "boxed-in" and providing them opportunity to safely flee the area. Do not hinder, harm or trap animals.</p>	Keep activity area compact and maintain surrounding habitats.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				Maintenance of downstream wetlands and associated natural vegetation will provide ecological corridors and refuges for animals. Animals under threat from the development will be relocated from site by specialists.	
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Dust generation and particulate matter, which will result in elevated PM10 at Brendan Village, northern parts of Embalenhle and over the western parts of Evander.	Air quality & Social	Construction	CONTROL Speed limits must be established on site. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be managed within national ambient dust level standards.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of and disturbance to archaeological / heritage sites	Heritage sites	Construction, Operation	No heritage sites expected as surface has been disturbed by mining and agriculture STOP Cultural site and graves uncovered during operations will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	Preservation and responsible handling of heritage sites.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Shallow excavations may affect subsurface fossils	Palaeontology	Construction, Operation	No known occurrences of fossils in the area and the affected area already disturbed by mining or agriculture in the past; impact is considered very low. CONTROL If fossil material is discovered during the development of the site, then it is strongly recommended that a professional palaeontologist be called to assess the importance and to rescue them if necessary (with the relevant SAHRA permit). If the fossil material is deemed to be of scientific interest then further visits by a professional palaeontologist would be required to collect more material and deposit a representative sample in a recognized institute for further study.	Preservation and responsible handling of fossils.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Significant levels of dust may emanate from the use of heavy construction vehicles which would impact on runoff water quality	Surface water & associated wetlands & aquatic ecosystems	Construction, Operation, Decommissioning, Closure	CONTROL Apply dust control measures such as water spray or misting during times of high dust generation.	Dust fallout will be managed within national ambient dust level standards.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	Wetlands & aquatic ecosystems & associated surface water environment	Construction, Operation	MODIFY Consider methods and equipment that will have the least impact on watercourses. Construction in and around watercourses must be restricted to the dryer winter months where possible CONTROL Effective sediment traps should be installed as well as flow dissipaters where needed. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion. Runoff from the construction area must be managed to avoid erosion and pollution problems. Implement buffer zones to trap sediments. Monitoring should be done to ensure that sediment pollution is timeously addressed.	Surface water quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Topsoil and subsoil stockpiling.	Loss of soil characteristics, erosion and compaction	Soil	Construction, Operation	CONTROL Demarcate designated stockpile areas and keep as small as possible. Ensure that topsoil from stockpile areas has been stripped and placed as perimeter berms around stockpile areas. Keep topsoil stockpiles below 2m. Subsoil may also be used for berms if additional material is required, or soil will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m.	Soil on site will be preserved for use in rehabilitation of the tailings facility and surrounds in order to attain rehabilitation objectives.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes. Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will be ripped, disced or scarified as needed and vegetated. REMEDY Revegetate all bare soils, including all berms and soil stockpiles. Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.	
Topsoil and subsoil stockpiling.	Alien invasive establishment and bush encroachment.	Flora & Fauna	Operation	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Seed long terms soil stockpiles and berms with self-sustaining indigenous species.	Alien and invasive species managed with the view to eradicate on the property and surrounding areas.
Topsoil and subsoil stockpiling.	Dust generation and particulate matter.	Air quality	Construction, Operation	CONTROL Stockpile heights must not exceed 2m for topsoil, 6m for subsoil. Vegetate soil stockpiles and berms and all exposed areas. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be managed within national ambient dust level standards.
Topsoil and subsoil stockpiling.	Soil erosion and associated sedimentation	Surface water	Construction, Operation, Decommissioning	MODIFY Keep topsoil stockpiles below 2m. Keep subsoil stockpiles below 6m. All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes. Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will be ripped, disced or scarified as needed and vegetated. REMEDY Revegetate all bare soils, including all berms and soil stockpiles. Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.	Surface water quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Topsoil and subsoil stockpiling.	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	Groundwater	Construction, Operation, Decommissioning, Closure	CONTROL Appropriate base preparation of soil stockpile areas will reduce infiltration and water bulking. Divert clean water around soil stockpiles by placing topsoil stripped from stockpile areas as perimeter berms around stockpiles; prevent pooling around stockpiles.	Groundwater quantity in neighbouring areas will be maintained close to baseline conditions.
Utilising roads, establishing access control and fencing.	Dust generation and particulate matter.	Air quality	Construction, Operation	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Speed limits must be established on site. Manage dust through water carts or sprinklers.	Dust fallout will be managed within national ambient dust level standards.
Utilising roads, establishing access control and fencing.	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	Groundwater & surface water & associated wetlands & aquatic ecosystems	Construction, Operation	CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals. REMEDY Discontinue use of faulty equipment until repaired or replaced. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill	Surface water & Groundwater quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				clean-up. Spill kits to be made available on site.	
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment as the RWDs are constructed within a watercourse.	Surface water	Operation	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Containment of dirty water.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Decrease in hydrological yield due to dirty water containment and downstream flow interruption with RWD constructed within a water course; will additionally impact on aquatic and wetland ecosystems	Surface water & associated wetlands & aquatic ecosystems	Operation, Decommissioning, Closure	Necessary measure to contain dirty water runoff. MODIFY Keep dirty water runoff areas as small as possible to increase clean water runoff footprint area. CONTROL Clean storm water cut off trench or channel must be constructed to divert rainwater away from the dirty catchment area such as the industrial area and the proposed TSF to natural drainage lines. The existing flow patterns in nearby tributaries should be maintained at all times.	Reduce loss of water to downstream environment.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Impairment of groundwater quality due to seepage or overflow from RWDs to underlying aquifers.	Groundwater	Construction, Operation, Decommissioning, Closure	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. Recycle water in RWD within processing plant. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Containment of dirty water. Groundwater quality in neighbouring areas will be maintained close to baseline conditions.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Disturbance to nearby (87m) grave yard	Heritage Sites	Construction, Operation	CONTROL The site should be fenced in with at least a 20m buffer zone prior to any activity commencing in the area. A cultural management plan should be drafted for the sustainable preservation of the site which must be drafted by a heritage specialist and should take into account controlled access to the site for descendants and include a monitoring and management plan of the site.	Preservation and responsible management of the graveyard.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				STOP Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Disturbance to sections of an old farmstead adjacent to the RWD.	Heritage Sites	Construction, Operation	CONTROL Full photographic documentation of the entire site is recommended, after which it may be demolished. The remaining structures not in the vicinity of the RWD can be left in situ. STOP Demolition permit from SAHRA must be obtained before an activity proceeds near the site. Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	Ensure adequate record of the site (photographic and written) by a qualified specialist.
Storm water diversion structures, including berm for the diversion of a water course	Construction & development of the Kinross TSF will change flow regime	Surface water & associated wetlands & aquatic ecosystems	Construction	MODIFY Keep dirty water runoff areas as small as possible to increase clean water runoff footprint area. CONTROL Clean storm water cut-off trench or channel must be constructed to divert runoffs away from dirty water catchment area of the proposed TSF. The existing flow patterns in nearby tributaries should be maintained at all times.	Reduce loss of water to downstream environment.
Tailings disposal and facility management through progressive rehabilitation	TSF will permanently alter the topographical nature of the area.	Topography	Operation, Decommissioning, Closure	As the new TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs this impact is considered positive in terms of topography. CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures.	TSF will be constructed, developed and maintained in line with engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Polluted runoff from dirty areas will release mine water to the downstream environment if not properly contained	Surface water & associated wetlands & aquatic ecosystems	Operation, Decommissioning, Closure	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704. Construct the TSF as per engineered designs. Only environmentally friendly materials must be used during the construction of water management features to minimise pollution to water. Apply good housekeeping practices and constantly maintain TSF. REMEDY Clad and vegetate TSF as it develops. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	TSF will be constructed, developed and maintained in line with engineered designs.
Tailings disposal and facility management through progressive rehabilitation	Impairment of local tributaries and streams and day lighting of contaminated groundwater seepage will contaminate the nearby Grootspuit which is regionally connected and has national implications.	Surface water & associated wetlands & aquatic ecosystems	Operation, Decommissioning, Closure	In addition to the other water mitigation measures, the following is relevant in terms of the greater catchment: CONTROL Engineering recommendations regarding designs for all infrastructures must be implemented on site. Remove seepage with drains to RWD. Contain dirty water with sound storm water control measures to reduce the overall volume of water that must be handled in the system. Divert clean water from the site. Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration.	Water quality within the Grootspuit must be maintained to baseline conditions, with an aim of targeting for catchment specific RWQOs.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				12 months water monitoring must be conducted after mine closure, before runoff from site can be released to the nearby dams.	
Tailings disposal and facility management through progressive rehabilitation	Wetland deterioration due to water quality impacts, should water from the TSF not be contained or through TSF failure.	Wetlands	Operation, Decommissioning, Closure	<p>MODIFY Upgrade the existing Kariba RWD to engineered designs.</p> <p>CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal.</p> <p>REMEDY Treatment of pollution identified should be prioritized accordingly as needed.</p>	Surface water quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Tailings disposal and facility management through progressive rehabilitation	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	Wetlands	Operation, Decommissioning, Closure	<p>MODIFY Construction in and around watercourses must be restricted to the dryer winter months where possible. Upgrade the existing Kariba RWD to engineered designs.</p> <p>CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. Consider methods and equipment that will have the least impact on watercourses. Effective sediment traps should be installed as well as flow dissipaters where needed. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers . If necessary fence off to prevent vehicular, pedestrian and livestock access. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion. Runoff from the construction area must be managed to avoid erosion and pollution problems. Implement buffer zones to trap sediments. Monitoring should be done to ensure that sediment pollution is timeously addressed.</p>	TSF will be constructed, developed and maintained in line with engineered designs and all erosion from the TSFs will be curbed and contained.
Tailings disposal and facility management through progressive rehabilitation	Transformation/loss of wetlands and changes to the topography and runoff characteristics affecting the flow quantity and fluctuation properties of the Grootspuit	Wetlands	Operation, Decommissioning, Closure	<p>CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. Measures should be put in place in critical areas to ensure that changed sources of water input into downstream watercourses does not cause erosion. Measures should be put in place in critical areas to ensure that polluted water from the Tailings Storage Facility is contained and does not seep to down stream environments.</p> <p>STOP No activity within wetlands and 100m buffer zones can commence without an approved IWUL, or within 500m of water resources without a General Authorisation issued by DWS.</p>	Water quality and quantity within the Grootspuit must be maintained to baseline conditions, with an aim of targeting for catchment specific RWQOs.
Tailings disposal and facility management through progressive rehabilitation	Impairment of groundwater quality due to leachate seeping to underlying aquifers from the tailings facility.	Groundwater	Operation, Decommissioning, Closure	<p>MODIFY Upgrade the existing Kariba RWD to engineered designs.</p> <p>CONTROL Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704. Construct the TSF as per engineered designs. Contain seepage from the proposed tailings and re-direct to the RWD. Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration. Install downstream monitoring boreholes and monitor for potential contaminated seepage. If needed install downstream cut-off trench and direct seepage to RWD. Apply good housekeeping practices and TSF is constantly maintained.</p>	TSF will be constructed, developed and maintained in line with engineered designs. Groundwater quality in neighbouring areas will be maintained close to baseline conditions.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				<p>REMEDY Should pollution be identified, a specialist should be consulted regarding the application of appropriate remedial measures for the specific incident. Remedial measures could include the following: Natural Attenuation (through biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants); Interception by means of surface cut-off drains combined with a treatment of the polluted water; interception by means of interceptor boreholes combined with a treatment of the polluted water; installation of reactive barriers; phyto-remediation.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>	
Tailings disposal and facility management through progressive rehabilitation	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	Groundwater	Operation, Decommissioning, Closure	<p>CONTROL Appropriate base preparation of TSF will reduce infiltration and water bulking. Engineering of water management structures / facilities, including lining. Divert clean water around TSF to prevent pooling around the facility</p>	Groundwater quantity in neighbouring areas will be maintained close to baseline conditions.
Tailings disposal and facility management through progressive rehabilitation	Impacts to local streams impair water quality for downstream users and cattle watering	Social & Water quality	Operation, Decommissioning, Closure	<p>Water monitoring results indicate high sodium which should not have severe impacts on livestock. MODIFY Upgrade the existing Kariba RWD to engineered designs to ensure adequate capacity. Recycle water on site and prioritise water from RWDs before using water from Leeuwpan.</p>	Surface water quality in neighbouring areas will be maintained close to baseline conditions. Wetland systems and Aquatic ecosystem integrity will be maintained close to baseline PES.
Tailings disposal and facility management through progressive rehabilitation	Dust and PM generation with hazardous chemical components including arsenic, cadmium, cobalt and chromium from dried tailing material along the outer edges. Elevated PM10 levels may be experienced in Evander.	Air quality & Social	Operation, Decommissioning, Closure	<p>CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.</p> <p>REMEDY Construct the TSF as per engineered designs and clad and vegetate the TSF side as it develops.</p>	Dust fallout and PM10 will be managed within national ambient dust level standards.
Tailings disposal and facility management through progressive rehabilitation	Alien invasive establishment and bush encroachment.	Flora & Fauna	Operation, Decommissioning, Closure	<p>CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site.</p> <p>REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.</p>	Alien and invasive species managed with the view to eradicate on the property and surrounding areas.
Tailings disposal and facility management through progressive rehabilitation	Alteration in visual aesthetics and sense of place.	Visual Aesthetic & Socio-economic	Operation, Decommissioning, Closure	<p>The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures. Apply dust control measures and other environmental measures to ensure impact area is contained.</p>	Surface area kept clean and orderly through good housekeeping practices and applying industry best practices.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				Apply good housekeeping practices to ensure visual impact is mitigated. REMEDY Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary.	
Tailings disposal and facility management through progressive rehabilitation	Change in land use to mining.	Land use	Construction, Operation	No mitigation required. This extension eliminates two other TSFs within the mineral boundary.	Area will be developed into permanent TSF. TSF must be rehabilitated in accordance to approved rehabilitation plans.
Tailings disposal and facility management through progressive rehabilitation	Existing TSF will be extended but remains within the mineral boundary and an active mine area.	Property value	Decommissioning, Closure	The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures. Apply good housekeeping practices to ensure visual impact is mitigated.	Rights of people must not be infringed upon. Rehabilitation will aim to restore local, indigenous vegetation communities.
Tailings disposal and facility management through progressive rehabilitation	Radiation will affect the immediate environment of the TSF.	Soil, flora, fauna, atmosphere and water in the vicinity of the TSF	Decommissioning, Closure	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. Continue with current TSF radiation management and monitoring and apply to the expansion of the TSF as needed.	Ensure that no inadvertent exposure to threatening radiation levels can occur.
Domestic waste generation	Potential surface contamination which will impact surrounding areas through runoff and seepage.	Groundwater & surface water & associated wetlands & aquatic ecosystems	Construction, Operation	CONTROL Bins to be provided. Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDSs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. REMEDY Inspect and clear all litter and waste.	Attain "cradle to grave" management of waste on site.
Use of equipment during TSF expansion activities	Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.	Air quality	Construction, Operation, Decommissioning	MODIFY Where possible, purchase equipment with lower emissions. CONTROL Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. REMEDY Discontinue use of faulty equipment until repaired or replaced.	Keep equipment, machinery and vehicles operating within their manufacturing specifications.
Use of equipment during TSF expansion activities	Increased noise levels.	Noise	Construction, Operation, Decommissioning	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: MODIFY Consideration will be given to buying quieter equipment where feasible. CONTROL Machinery and equipment will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.	Keep equipment operating within their manufacturing specifications. Noise level at mineral boundary and sensitive receptor maintained at baseline levels.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
Expansion of Kinross TSF and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	Flora & Fauna	Construction, Operation	CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Prevent impact to surrounding environments and associated biota.
Establishment of Elikhulu Plant and associated infrastructure adjacent to the existing plant					
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Polluted runoff from dirty areas and slurry spills will pollute the downstream environment if not properly contained	Surface water & associated wetlands & aquatic ecosystems	Construction, Operation	CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.	Containment of dirty water.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Wetland deterioration due to water quality impacts that may arise from slurry spills and poor water containment at the plant.	Wetlands	Construction, Operation	CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment dams, to ensure dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.	Containment of dirty water.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Excavation for the establishment of foundations will generate dust.	Air quality	Construction	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be managed within national ambient dust level standards.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Emission of particulate matter, CO ₂ , SO _x and NO _x	Air quality & Social	Operation	CONTROL All control measures must be applied as per industry best practices and legislative requirements such as stacks over combustion units, air scrubbers and / or filters.	PM, SO _x and NO _x will be managed within national standards in line with NEM:AQA requirements.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt	Operation of the CIL Plant will contribute to noise levels.	Noise	Construction, Operation	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: MODIFY	Keep equipment operating within their manufacturing specifications. Noise level at sensitive receptors maintained at baseline levels.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
house)				<p>Consideration will be given to buying quieter equipment where feasible.</p> <p>CONTROL Machinery and equipment will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.</p>	
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Deterioration in visual aesthetics and sense of place.	Visual Aesthetic & Social	Construction, Operation, Decommissioning	<p>Area is within an existing mine complex and visual impact will be minimal</p> <p>CONTROL Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices to ensure visual impact is mitigated.</p>	Visual impact reduced. Surface area kept clean through good housekeeping practices.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpans dam)	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment	Surface water	Operation	<p>CONTROL PCD & Event Pond must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage.</p> <p>REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Dirty water dams and trenches must be regularly inspected and silt build up cleared as and when required to ensure adequate capacity and functioning . Follow emergency response plan for spills and keep back-up pumps and pipes on site.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>	Containment of dirty water.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpans dam)	Impairment of groundwater quality due to seepage or overflow from dirty water dams at the plant to underlying aquifers.	Groundwater	Construction, Operation	<p>CONTROL Contain dirty water and reduce infiltration with suitable lining material. Separation of clean water with effective storm water control. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. Leaks detection system should be incorporated into the design system or install monitoring boreholes downstream of the dirty water dams to monitor for seepage.</p> <p>REMEDY Recycle process water. Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site.</p>	Containment of dirty water. Groundwater quality in neighbouring areas will be maintained close to baseline conditions.
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may impair quality of water runoff which	Surface water	Construction, Operation, Decommissioning, Closure	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS.</p>	Dangerous goods stored and managed appropriately. Surface water and groundwater quality in neighbouring areas will be maintained close to baseline

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
	could impact on the surrounding environment if not properly managed.			Wet and dry chemicals, reducing and oxidising agents, will be stored separately. REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.	conditions.
Chemical / Reagent Storage	Impairment of groundwater quality due to ad hoc spillages at the plant seeping to underlying aquifers.	Groundwater	Construction, Operation	CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately. REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.	Dangerous goods stored and managed appropriately. Groundwater quality in neighbouring areas will be maintained close to baseline conditions.
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may lead to chemical fires, chemical gasses which will impair air quality and also be a risk to staff.	Air quality & Social	Construction, Operation	CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately. REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.	Dangerous goods stored and managed appropriately. Groundwater quality in neighbouring areas will be maintained close to baseline conditions.
Ablutions and change house with sewage treatment plant	Irresponsible use of water and water wastage.	Surface water	Construction, Operation, Decommissioning	CONTROL Saving water initiatives will be included in environmental awareness training. Utilise water on site responsibly. Record all water usage on site. REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and immediate repair and maintenance.	Reduce water wastage.
Ablutions and change house with sewage treatment plant	Potential contamination of surface water bodies and surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	Surface water & associated wetlands & aquatic ecosystems; social health	Construction, Operation, Decommissioning	CONTROL Keep all bathrooms in clean and hygienic state. REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and immediate repair and maintenance.	Reduced bacterial contamination on neighbouring areas.
General and hazardous waste handling	Potential surface contamination which will impact surrounding areas through runoff and seepage.	Groundwater & Surface water & associated wetlands & aquatic ecosystems	Construction, Operation	CONTROL Waste storage area will be treated as a dirty area and any runoff from site must be contained. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDSs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. Waste handling and storage areas will have clear waste type and warning signs as	Attain "cradle to grave" management of waste on site.

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
				needed. Colour coding can be used but must be accompanied by training. Emergency response plan must be in place for any incidences that may occur with hazardous waste on site. REMEDY Inspect and clear all litter and waste.	
Processing and associated activities detailed above	Contamination by way of slurry, hydrocarbon, chemicals, dust and waste to surrounding environment will be hazardous to flora and fauna.	Flora & Fauna	Construction, Operation	CONTROL Ensure hydrocarbon, slurry, chemicals and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Prevent impact to surrounding environments and associated biota.
Process water supply and reticulation					
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Irresponsible use of water and water wastage through leaks which will alter downstream water dynamics	Surface water & associated wetlands & aquatic ecosystems	Construction, Operation	REMEDY Inspection of ALL water features for leaks and repair immediately. CONTROL Saving water initiatives will be included in environmental awareness training. Utilise water on site responsibly. Record all water usage on site.	Maximise water recycling.
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Water balance completed for the Leeuwpam Dam indicates the dam can provide the operation with requirements, but increased abstraction will reduce the size of the Leeuwpam Dam. This will expose parts of the dam and aggravate dust generation.	Air quality	Construction, Operation	REMEDY Where possible, area should be cleared of fine surface material as the dam recedes and while material is still wet. This material can be disposed of on the tailings facility. This will remove the bulk of the fines which will be more prone to dispersal and generating dust. If available, soil should be applied as the dam recedes to the exposed and cleaned areas and the area vegetated to obtain a good vegetative cover. Consideration should be given to water spray / sprinklers to keep exposed areas moist during dry windy conditions.	Rehabilitation will aim to replace and ameliorate soils in order to restore grazing land capability supporting self-sustaining indigenous species.
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Recreational use of the dam by the farmer will be affected by reduction in dam size.	Social	Construction, Operation	No Mitigation Possible. It must be stated that the dam is licensed and has been operated as a mine water dam for evaporation purposes since the 1960's. Once water levels rebound the recreational uses may be reinstated.	Rehabilitation will aim to replace and ameliorate soils in order to restore grazing land capability supporting self-sustaining indigenous species.
Employment of staff, contractors					
Employment opportunities during construction – 700 jobs	Direct improvement of socio-economic situation of contractors and indirect benefits through multiplier effects.	Socio-economic	Construction, Operation, Decommissioning	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for permanent employment.	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured.
Employment opportunities during	Direct improvement of socio-economic	Socio-economic	Construction, Operation,	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for	Ensure that the principles underpinned by Black Economic

Activity	Impact	Aspect	Applicable Mine Phase	Mitigation Type Relevant	Standard to be achieved
operations – 250 jobs	situation of contractors and staff and indirect benefits through multiplier effects.		Decommissioning	permanent employment.	Empowerment Act of 2003 are honoured.
Local / Regional business	Local / Regional business support	Socio-economic	Construction, Operation, Decommissioning	Adopt preferential procurement policies towards local suppliers and distributors. Ensuring that principle of "local first" when procuring consumables, construction materials etc.	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured.
Neighbouring business	Neighbouring business affected by working environment, machinery affected by elevated dust	Socio-economic & air quality	Construction, Operation, Decommissioning	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Speed limits must be established on dirt roads. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust fallout will be managed within national ambient dust level standards.
Increased traffic largely passenger vehicles with additional employment and some trucks for machinery and equipment	Increased potential for road incidences.	Traffic & safety	Construction, Operation, Decommissioning	CONTROL Where feasible contract with minibus taxi or bus operators to transport staff to and from site. Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow. Limit mine-related vehicle traffic on public roadways to off-peak commuting times as far as practically possible to minimize impacts on local commuters. Enter into agreement with the roads agency as needed to ensure roads are maintained.	Maintain high safety standards on site and on public roads with reduced safety risks.

32 IMPACT MANAGEMENT ACTIONS

The EIA process has led to mitigation actions being proposed for all impacts, these actions are summarised in the table below according to the each different aspect and phase of the proposed project. The full impact assessment table is presented in Appendix 18.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
Reprocessing of Winkelhaak and Leslie/Bracken TSFs & new pump station at Kinross TSF				
Construction and operation of pump houses at each of the TSFs (x3)	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	<p>CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals.</p> <p>REMEDY Pumps must be placed on top of the diesel collector and/or oil traps in the event that pumps leak. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill clean-up.</p>	Construction sites must be properly demarcated and necessary storm water management measures (berms, trenches, silt traps) established prior to any construction activities taking place. All necessary hazardous material (hydrocarbons) storage and handling areas must be prepared and fitted with necessary spill kits before material is stored/utilised on site.	Handle and store hydrocarbons in line with prescribed SANS SABS standards. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction and operation of pump houses at each of the TSFs (x3)	Pumps will contribute to elevated noise level	<p>Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered:</p> <p>MODIFY Consideration will be given to buying quieter pumping equipment where feasible.</p> <p>CONTROL Pumps will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing the pump houses. All pumping equipment will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.</p>	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as needed.	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS 10103:2008.
Hydraulic mining & slurry generation and pumping	Failure of benches or flooding of trenches will release slurry to the downstream environment	<p>MODIFY Existing dirty water management infrastructure must be upgraded where needed to ensure containment of slurry during an emergency incident at the TSFs.</p> <p>CONTROL Apply storm water runoff management measures to ensure impact area is contained to activity area to ensure all water runoff and spilled slurry in the area is contained and ensure no discharge to the environment. Ensure mine blocks are mined as per the prescribed mine plan.</p> <p>REMEDY Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Spillages must be controlled through sandbags where necessary to prevent direct spillage to streams. Spillages must be cleared immediately in line with the emergency response procedures. Ensure back-up pumps and pipelines are easily accessible.</p>	Facilities for the containment of slurry from potential bench failure or spillages from channels must be considered before mining the next compartments. Spillage control and clean up equipment (sandbags, back-up pumps, pipelines) must be available at site at all times during hydraulic mining.	Hydraulic mining will be conducted in line with MPRDA Regulations and best practices. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Hydraulic mining &	Hydraulic mining will	Existing noise readings taken in 2011 around the Kinross TSF and Plant	Suggested mitigation measures will be	Environmental noise managed to

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
slurry generation and pumping	contribute to elevated noise level	indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: CONTROL Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Mine will limit noisy activities during the day if needed.	applied immediately if any complaints about noise are received.	baseline conditions and SANS 10103:2008.
Construction and utilisation of slurry pipelines from pump houses to Elikhulu Plant	Failure of slurry reticulation system and infrastructure will release mine water to the downstream environment, which will be of particular significance at river crossings	MODIFY Pipelines have been established in existing servitudes to a large extent to avoid disturbance of new areas. CONTROL Pipelines should be laid within the dirty water footprint area or paddocks must be established in clean water area which will serve to contain any leaks. Pipelines should be tested with clean water to ensure no leaks before allowing piping of slurry. Additional containment measures must be provided at river crossings, such as placing pipelines within drains that drain into sumps or other acceptable containment infrastructure. Pipelines should have a series of shut-off valves which can prevent flow of contaminated water should leaks occur. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site. STOP Dirty water pipelines will remain outside 100m buffer zones / 1:100 year flood lines until authorisations under NEMA and NWA have been obtained where needed.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure) will be completed before other activities commence on site and maintained for the life of mine. Spillage control and clean up equipment (sandbags, back-up pumps, pipelines) must be available and accessible at site before slurry pumping commences for the life of operations.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Increased dust and associated particulate matter emissions.	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas. Rehabilitate and revegetate as soon as possible to stabilise the area and protect from wind erosion.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Poor rehabilitation will result in sedimentation of downstream environments and water quality impairment.	REMEDY The area should be re-landscaped to blend in with the surrounding topography and drainage lines. Soil must be ameliorated after application as per specialist recommendations in order to sustain a vegetative cover. The areas should be monitored to ensure that seeds germinate sufficiently, a good vegetative cover is achieved and the vegetation progress through succession stages. Consideration should be given to utilising the vegetation removed from the TSF expansion area and placing directly as clods over soil berms where feasible (otherwise herbaceous vegetation should be stockpiled with topsoil to maintain organic content and seed bank). It is recommended that Landscape Functional Analysis (LFA) forms part of the rehabilitation and monitoring process.	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be maintained over rehabilitated areas to ensure adequate vegetative cover for grazing land use until rehabilitated areas are stable and self-sustaining.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.

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Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Free drainage restored to area and downstream flow restored.	-	Areas will be rehabilitated completely as soon as tailings have been removed from the TSFs.	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and removal of contaminating tailings material from the site	-	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and profiling and rehabilitation of surface area.	-	Areas will be rehabilitated completely as soon as tailings have been removed from the TSFs. Soil quantity & quality and vegetative cover & diversity will be maintained over rehabilitated areas to ensure grazing land use until rehabilitated areas are stable and self-sustaining.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Revegetation and floral community establishment will attract animals to the area.	-	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Alien invasive establishment and bush encroachment.	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.	Alien and invasive species managed in terms of NEM:BA and CARA.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	TSFs will be removed from property and visual aesthetic will be improved but land will remain mine land and may require some time to recover.	No mitigation required.	No specific management measures are required, but once areas are fully rehabilitated and seeded, monthly visual inspections of rehabilitated areas must be undertaken to ensure any issues that may arise are attended to immediately	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Radiation will persist and affect the immediate environment of the historic TSF footprints.	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. The level and depth of penetration of radiation will only be known once the tailings have been removed. Therefore, once the facilities have been mined an independent specialist must be contracted to assess radiation levels of in situ soils, including the depth of penetration of radiation and potential remediation levels required to be granted a clearance certificate from the NNR. Only after this has been completed can appropriate final land uses be determined in conjunction with the specialist. Continue with current radiation management and monitoring on site.	Continue with current radiation management, monitoring and reporting for the life of mine. Contract specialist to assess radiation levels in the TSF footprint as soon as the site is cleared of final tailing material.	Comply with the Nuclear Act and relevant regulations.
Establishment of portable toilet facilities at the	Potential contamination of surface water bodies and surrounding	CONTROL Keep portable toilet facilities in clean and hygienic state. REMEDY	Develop an inspection protocol for portable toilets and empty regularly to the sewage treatment facility at the	Downstream water quality will be within background quality limits and compared to SAN 2011 drinking water quality

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pump houses.	environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	Inspection and regular emptying of tanks to ensure no leaks and risk of overflow.	Elikhulu Plant.	guidelines for bacteria.
Domestic waste generation at containerised offices at pump stations.	Potential surface contamination which will impact surrounding areas through runoff and seepage.	<p>CONTROL Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDSs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site.</p> <p>REMEDY Inspect and clear all litter and waste.</p>	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.
Reclamation of tailings facilities and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	<p>CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied.</p> <p>REMEDY Spills and illegally dumped waste must be cleared immediately.</p>	Good housekeeping practices will be applied over mining and infrastructure areas at all times.	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.
New TSF (Expansion of Kinross TSF)				
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Soil erosion and associated sedimentation with reduced ingress and increased runoff with increased hydrological yield to downstream environments	<p>MODIFY Temporary attenuation dams must be constructed downstream of activity area if construction occurs during the wet season.</p> <p>CONTROL Establish adequately sized storm water control measures before any other activities commence to ensure clean and dirty water separation and dirty water containment. This will include upslope berms to divert clean water around the site of activity into natural drainage lines and silt traps downstream of areas of activity to trap sediment before water drains to the natural area. Vegetation removal must be over as small an area as possible. Establish approved erosion control measures to reduce the risk of transported soils. Road surfaces must be compacted in order to increase stability. Sheet runoff from hard surfaces and roads curtailed through proper drainage control. Install flow dissipaters where rapid flow of diverted clean storm water runoff occurs.</p> <p>REMEDY All disturbed areas no longer required must be reshaped and revegetated. All bare surface areas must be re-vegetated in order to avoid the transportation of sediments and the creation of erosion gullies. Flow dissipaters will be installed in any areas with high flow velocity. Erosion control measures (gabions) will be established in areas with severe or persistent erosion.</p> <p>STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas</p>	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure) will be completed before other activities commence on site and maintained for the life of mine. Rehabilitate areas completely as soon as activity in those areas ceases. Establish erosion control measures as soon as erosion is observed on site.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.		
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Reduction in groundwater quantity through reduced infiltration due to footprint development activities	CONTROL Properly demarcate areas for development (TSF expansion) and ensure activity is maintained within the demarcations to keep affected area as small as possible. Vegetation removal must be over as small an area as possible. REMEDY All disturbed areas no longer required must be reshaped and revegetated. Erosion control measures (gabions) will be established in areas with severe or persistent erosion.	Rehabilitate and revegetate areas completely as soon as these areas are no longer required. Establish erosion control measures as soon as erosion is observed on site.	Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Destruction of channelled and unchannelled valley bottom wetlands.	REMEDY Loss of wetland habitat should be offset by rehabilitating and protecting alternative wetlands with similar functions so that no net loss is obtained. STOP Wetlands cannot be destroyed until the authorisations under NEMA and NWA are obtained and engineered diversion channels established.	Offset areas should be identified prior to the wetlands being demolished and offset management plan implemented for the life of mine.	Maintain downstream water flow patterns in line with catchment RWQOs.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of soil characteristics, erosion and compaction	CONTROL Demarcate designated activity area and keep as small as possible. 1 Strip topsoil from all activity areas and stockpile as berms or soil stockpiles (maximum 2m height) to clad the sides of TSF facility. Incorporate herbaceous vegetation into soil stockpiles. Subsoil may also be used for berms if additional material is required, or soil will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m. Construct drainage and erosion controls where needed, such as gabion baskets, levees. REMEDY Rehabilitate all disturbed areas as soon as they are no longer required and cordon off areas until vegetation has established. Revegetate all bare soils.	Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for vegetative growth.	NEMA, MPRDA & CARA regarding soil handling, storage and management.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss in land capability	No Mitigation possible; soil preservation required for cladding and rehabilitation of TSF	Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is observed on site. Soil surveys will be undertaken annually over stockpiles / berms until to maintain soil chemistry for vegetative growth.	NEMA, MPRDA & CARA regarding rehabilitation of mine residue deposits.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Destruction of protected species.	REMEDY Retain species in situ where areas are not targeted for development and as far as possible species from targeted development areas should be transplanted to suitable nearby habitat. CONTROL Specialist will have to walk area and plot all protected species. Preserve all other species in situ. Prohibit the harvesting of indigenous trees (if any) for firewood and indigenous flora in general. STOP Protected species cannot be removed until the necessary permits are obtained under NEM:BA.	Protected species on or near site must be monitored to prevent destruction to species for the life of the operation. Permits must be obtained for any species that will be removed or destroyed before activity takes place.	Permits will be obtained under NEM:BA to relocate / destroy protected species.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of biodiversity through vegetation clearance and habitat destruction.	CONTROL Demarcate designated activity area to ensure only flora in that area is affected. Prioritise low sensitivity areas (disturbed old airstrip and disturbed grassland) and preserve all moist grassland areas not targeted for development.	Demarcate sensitive areas (wetlands and CBA area) not targeted for development before any activity takes place and maintain these for life of mine. Demarcate activity areas and ensure	NEM:BA and associated National and Provincial regulations in terms of protection of biodiversity.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		<p>Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.</p> <p>No open fires must be allowed on site such as for cooking.</p> <p>Prohibit the harvesting of indigenous trees (if any) for firewood and indigenous flora in general.</p> <p>Do not hinder, harm, trap animals.</p> <p>Maintain downstream ecological corridors associated with wetlands and their 100m buffer zones.</p> <p>STOP</p> <p>100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.</p>	activity only takes place within these areas.	
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Alienation of, and disturbance to, animals.	<p>CONTROL</p> <p>Keep areas of vegetation clearance to a minimal.</p> <p>New activities should commence from existing infrastructure in a linear direction as far as possible to prevent fauna from being "boxed-in" and providing them opportunity to safely flee the area.</p> <p>Do not hinder, harm, trap animals.</p> <p>Maintenance of downstream wetlands and associated natural vegetation will provide ecological corridors and refuges for animals.</p> <p>Animals under threat from the development will be relocated from site by specialists.</p>	Demarcate sensitive areas (wetlands and CBA area) not targeted for development before any activity takes place and maintain these for life of mine.	NEM:BA and associated National and Provincial regulations in terms of protection of biodiversity.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Dust generation and particulate matter, which will result in elevated PM10 at Brendan Village, northern parts of Embalenhle and over the western parts of Evander.	<p>CONTROL</p> <p>Speed limits must be established on site.</p> <p>Manage dust through water carts or sprinklers.</p> <p>Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.</p>	<p>Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan.</p> <p>As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.</p>	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of and disturbance to archaeological / heritage sites	<p>No heritage sites expected as surface has been disturbed by mining and agriculture</p> <p>STOP</p> <p>Cultural site and graves uncovered during operations will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.</p>	Once off inspection of all activity areas will be completed prior to construction. If sites are uncovered during surface development, all activity will cease immediately and a specialist consulted prior to any further activities taking place.	SAHRA will be complied with regarding permits for destruction and relocation or management of sites in situ.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Shallow excavations may affect subsurface fossils	<p>No known occurrences of fossils in the area and the affected area already disturbed by mining or agriculture in the past; impact is considered very low.</p> <p>CONTROL</p> <p>If fossil material is discovered during the development of the site, then it is strongly recommended that a professional palaeontologist be called to assess the importance and to rescue them if necessary (with the relevant SAHRA permit).</p> <p>If the fossil material is deemed to be of scientific interest then further visits by a professional palaeontologist would be required to collect more material and deposit a representative sample in a recognized institute for further study.</p>	If fossils are uncovered during surface development, all activity will cease immediately and a specialist consulted prior to any further activities taking place.	SAHRA will be complied with regarding permits for destruction and relocation or management of uncovered fossils.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Significant levels of dust may emanate from the use of heavy construction vehicles which would impact on runoff water quality	<p>CONTROL</p> <p>Apply dust control measures such as water spray or misting during times of high dust generation.</p>	<p>Dust suppression will continue for the life of mine.</p> <p>As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.</p>	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Clearing of vegetation, topsoil	Sedimentation of downstream water	<p>MODIFY</p> <p>Consider methods and equipment that will have the least impact on</p>	ALL water management features (clean water diversion or dirty water collection,	Water will be managed in terms of GN704.

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and subsoil stripping & base preparation.	bodies and associated wetlands, including the Grootspuit.	<p>watercourses. Construction in and around watercourses must be restricted to the dryer winter months where possible</p> <p>CONTROL Effective sediment traps should be installed as well as flow dissipaters where needed. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion. Runoff from the construction area must be managed to avoid erosion and pollution problems. Implement buffer zones to trap sediments. Monitoring should be done to ensure that sediment pollution is timeously addressed.</p>	<p>transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Establish erosion control measures as soon as erosion is observed on site.</p>	<p>Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.</p>
Topsoil and subsoil stockpiling.	Loss of soil characteristics, erosion and compaction	<p>CONTROL Demarcate designated stockpile areas and keep as small as possible. Ensure that topsoil from stockpile areas has been stripped and placed as perimeter berms around stockpile areas. Keep topsoil stockpiles below 2m. Subsoil may also be used for berms if additional material is required, or soil will be stored in designated subsoil stockpile. Keep subsoil stockpiles below 6m. All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes. Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will ripped, disced or scarified as needed and vegetated.</p> <p>REMEDY Revegetate all bare soils, including all berms and soil stockpiles. Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.</p>	<p>Material handling will be conducted as per the soil utilisation guide from the onset for the life of operations. Establish erosion control measures as soon as erosion is observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for vegetative growth.</p>	<p>NEMA, MPRDA & CARA regarding soil handling, storage and management.</p>
Topsoil and subsoil stockpiling.	Alien invasive establishment and bush encroachment.	<p>CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site.</p> <p>REMEDY Seed long terms soil stockpiles and berms with self-sustaining indigenous species.</p>	<p>An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.</p>	<p>Alien and invasive species managed in terms of NEM:BA and CARA.</p>
Topsoil and subsoil stockpiling.	Dust generation and particulate matter.	<p>CONTROL Stockpile heights must not exceed 2m for topsoil, 6m for subsoil. Vegetate soil stockpiles and berms and all exposed areas. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.</p>	<p>Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.</p>	<p>Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m²/day on site.</p>
Topsoil and subsoil stockpiling.	Soil erosion and associated sedimentation	<p>MODIFY Keep topsoil stockpiles below 2m. Keep subsoil stockpiles below 6m. All soil stockpiles will have top and toe perimeter berms with no more than 1:3 side slopes.</p>	<p>Establish erosion control measures as soon as erosion is observed on site. Soil surveys will commence in year 1 and be undertaken annually over stockpiles / berms to maintain soil chemistry for</p>	<p>NEMA, MPRDA & CARA regarding soil handling, storage and management. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.</p>

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		Construct drainage and erosion controls where needed, such as gabion baskets, levees. Compacted soils will be ripped, disced or scarified as needed and vegetated. REMEDY Revegetate all bare soils, including all berms and soil stockpiles. Incorporate herbaceous vegetation into soil stockpiles. Apply fertilisers as needed to encourage vegetation growth and cover.	vegetative growth.	
Topsoil and subsoil stockpiling.	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	CONTROL Appropriate base preparation of soil stockpile areas will reduce infiltration and water bulking. Divert clean water around soil stockpiles by placing topsoil stripped from stockpile areas as perimeter berms around stockpiles; prevent pooling around stockpiles.	Strip topsoil and placement into perimeter berms and compact the base of the stockpile area before soil stockpiling takes place.	Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs for the catchment.
Utilising roads, establishing access control and fencing.	Dust generation and particulate matter.	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Speed limits must be established on site. Manage dust through water carts or sprinklers.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life of mine.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Utilising roads, establishing access control and fencing.	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	CONTROL Prevent contact between clean and dirty areas and recycle contaminated water. Install oil collection pans in or under vehicles. Diesel powered equipment and machinery should be serviced at regular intervals. REMEDY Discontinue use of faulty equipment until repaired or replaced. Spillages on site must be handled as emergency incidents in line with the requirements of Section 19 of the NWA. Train staff and contractors on correct reporting and handling procedures for spill clean-up. Spill kits to be made available on site.	Vehicles, machinery and equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine.	Keep equipment, machinery and vehicles operating within their manufacturing specifications. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment as the RWDs are constructed within a watercourse.	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction of additional RWD (2 compartments), silt	Decrease in hydrological yield due to dirty water containment and	Necessary measure to contain dirty water runoff. MODIFY Keep dirty water runoff areas as small as possible to increase clean water	Demarcate limited active areas before any activity takes place and maintain for life of mine.	Mine water will be contained on site as per GN704.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
trap and dirty water collection trenches from TSF	downstream flow interruption with RWD constructed within a water course; will additionally impact on aquatic and wetland ecosystems	runoff footprint area. CONTROL Clean storm water cut off trench or channel must be constructed to divert rainwater away from the dirty catchment area such as the industrial area and the proposed TSF to natural drainage lines. The existing flow patterns in nearby tributaries should be maintained at all times.	Construct ALL water management features before other activities commence on site and maintain for life of mine.	
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Impairment of groundwater quality due to seepage or overflow from RWDs to underlying aquifers.	CONTROL RWD must be sized and lined according to GN704 as well as the NWA. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage. Recycle water in RWD within processing plant. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and pipes on site. STOP 100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue activities in such areas.	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Disturbance to nearby (87m) grave yard	CONTROL The site should be fenced in with at least a 20m buffer zone prior to any activity commencing in the area. A cultural management plan should be drafted for the sustainable preservation of the site which must be drafted by a heritage specialist and should take into account controlled access to the site for descendants and include a monitoring and management plan of the site. STOP Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	The cultural management plan must be drafted and the site fenced before any activity commences on the new RWDs.	SAHRA will be complied with regarding management of site in situ.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Disturbance to sections of an old farmstead adjacent to the RWD.	CONTROL Full photographic documentation of the entire site is recommended, after which it may be demolished. The remaining structures not in the vicinity of the RWD can be left in situ. STOP Demolition permit from SAHRA must be obtained before an activity proceeds near the site. Cultural site and graves uncovered during construction of the RWDs will be cordoned off, and marked as no-go zones and evaluated by a specialist before proceeding with further activity.	Proper records of the site will be made by the specialist, which will be required in order to apply for a permit for destruction. The permit for destruction must be obtained prior to any activities related to the RWDs.	SAHRA will be complied with regarding permits for destruction and/or management of site in situ.
Storm water diversion structures, including berm for the diversion of a water course	Construction & development of the Kinross TSF will change flow regime	MODIFY Keep dirty water runoff areas as small as possible to increase clean water runoff footprint area. CONTROL Clean storm water cut-off trench or channel must be constructed to divert runoffs away from dirty water catchment area of the proposed TSF. The existing flow patterns in nearby tributaries should be maintained at all times.	Demarcate limited active areas before any activity takes place and maintain for life of mine. Construct diversion berm before other activities commence on site and maintain for life of mine.	Storm water runoff and diversion will be established on site as per GN704 and NWA.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
Tailings disposal and facility management through progressive rehabilitation	TSF will permanently alter the topographical nature of the area.	As the TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs this impact is considered positive in terms of topography. CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.
Tailings disposal and facility management through progressive rehabilitation	Polluted runoff from dirty areas will release mine water to the downstream environment if not properly contained	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704. Construct the TSF as per engineered designs. Only environmentally friendly materials must be used during the construction of water management features to minimise pollution to water. Apply good housekeeping practices and constantly maintain TSF. REMEDY Clad and vegetate TSF as it develops. STOP Tailings disposal will remain outside 100m buffer zones / 1:100 year flood lines unless authorisation is obtained from DWS to do so.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.
Tailings disposal and facility management through progressive rehabilitation	Impairment of local tributaries and streams and day lighting of contaminated groundwater seepage will contaminate the nearby Grootspuit which is regionally connected and has national implications.	In addition to the other water mitigation measures, the following is relevant in terms of the greater catchment: CONTROL Engineering recommendations regarding designs for all infrastructures must be implemented on site. Remove seepage with drains to RWD. Contain dirty water with sound storm water control measures to reduce the overall volume of water that must be handled in the system. Divert clean water from the site. Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration. 12 months water monitoring must be conducted after mine closure, before runoff from site can be released to the nearby dams.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Rehabilitate areas completely as soon as activity in those areas ceases and area are no longer needed. Establish erosion control measures as soon as erosion is observed on site.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.
Tailings disposal and facility management through progressive rehabilitation	Wetland deterioration due to water quality impacts, should water from the TSF not be contained or through TSF failure.	MODIFY Upgrade the existing Kariba RWD to engineered designs. CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. REMEDY Treatment of pollution identified should be prioritized accordingly as needed.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Establish erosion control measures as soon as erosion is observed on site.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.
Tailings disposal and facility management through progressive rehabilitation	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	MODIFY Construction in and around watercourses must be restricted to the dryer winter months where possible. Upgrade the existing Kariba RWD to engineered designs. CONTROL Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal. Consider methods and equipment that will have the least impact on watercourses.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		<p>Effective sediment traps should be installed as well as flow dissipaters where needed.</p> <p>Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area.</p> <p>Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.</p> <p>Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers . If necessary fence off to prevent vehicular, pedestrian and livestock access.</p> <p>Protect all areas susceptible to erosion and ensure that there is no undue soil erosion.</p> <p>Runoff from the construction area must be managed to avoid erosion and pollution problems.</p> <p>Implement buffer zones to trap sediments.</p> <p>Monitoring should be done to ensure that sediment pollution is timeously addressed.</p>		
Tailings disposal and facility management through progressive rehabilitation	Transformation/loss of wetlands and changes to the topography and runoff characteristics affecting the flow quantity and fluctuation properties of the Grootspuit	<p>CONTROL</p> <p>Apply surface water and groundwater mitigation measures stipulated in this table with regards to tailings disposal.</p> <p>Measures should be put in place in critical areas to ensure that changed sources of water input into downstream watercourses does not cause erosion.</p> <p>Measures should be put in place in critical areas to ensure that polluted water from the Tailings Storage Facility is contained and does not seep to downstream environments.</p> <p>STOP</p> <p>No activity within wetlands and 100m buffer zones can commence without an approved IWUL, or within 500m of water resources without a General Authorisation issued by DWS.</p>	<p>ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life.</p> <p>Establish erosion control measures as soon as erosion is observed on site.</p>	<p>Water will be managed in terms of GN704.</p> <p>Water quality and quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.</p> <p>Erosion control measures will be considered in terms of CARA and MPRDA regulations.</p>
Tailings disposal and facility management through progressive rehabilitation	Impairment of groundwater quality due to leachate seeping to underlying aquifers from the tailings facility.	<p>MODIFY</p> <p>Upgrade the existing Kariba RWD to engineered designs.</p> <p>CONTROL</p> <p>Proper clean and dirty water separation and dirty water containment infrastructure must be in place. These must be designed and operated in line with GN704.</p> <p>Construct the TSF as per engineered designs.</p> <p>Contain seepage from the proposed tailings and re-direct to the RWD.</p> <p>Rehabilitate, profile, topsoil and vegetate TSF in accordance to best practices to reduce infiltration.</p> <p>Install downstream monitoring boreholes and monitor for potential contaminated seepage. If needed install downstream cut-off trench and direct seepage to RWD.</p> <p>Apply good housekeeping practices and TSF is constantly maintained.</p> <p>REMEDY</p> <p>Should pollution be identified, a specialist should be consulted regarding the application of appropriate remedial measures for the specific incident.</p> <p>Remedial measures could include the following: Natural Attenuation (through biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants); Interception by means of surface cut-off drains combined with a treatment of the polluted water; interception by means of interceptor boreholes combined with a treatment of the polluted water; installation of reactive barriers; phyto-remediation.</p> <p>STOP</p> <p>100m buffer zones / 1:100 year flood lines to be demarcated as no-go areas until authorisations are obtained, in terms of NWA and NEMA, to continue</p>	<p>Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences.</p> <p>The TSF development will be monitored for the life of mine and audited against the engineered designs.</p>	<p>NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.</p>

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		activities in such areas.		
Tailings disposal and facility management through progressive rehabilitation	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	CONTROL Appropriate base preparation of TSF will reduce infiltration and water bulking. Engineering of water management structures / facilities, including lining. Divert clean water around TSF to prevent pooling around the facility	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs for the catchment.
Tailings disposal and facility management through progressive rehabilitation	Impacts to local streams impair water quality for downstream users and cattle watering	Water monitoring results indicate high sodium which should not have severe impacts on livestock. MODIFY Upgrade the existing Kariba RWD to engineered designs to ensure adequate capacity. Recycle water on site and prioritise water from RWDs before using water from Leeuwpan.	ALL water management features (clean water diversion or dirty water collection, transfer and/or containment infrastructure, silt traps, flow dissipaters) will be completed before other activities commence on site and maintained for their operational life. Rehabilitate areas completely as soon as activity in those areas ceases and area are no longer needed. Establish erosion control measures as soon as erosion is observed on site.	Water will be managed in terms of GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs. Erosion control measures will be considered in terms of CARA and MPRDA regulations.
Tailings disposal and facility management through progressive rehabilitation	Dust and PM generation with hazardous chemical components including arsenic, cadmium, cobalt and chromium from dried tailing material along the outer edges. Elevated PM10 levels may be experienced in Evander.	CONTROL Apply dust control measures such as water spray or misting during times of high dust generation. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas. REMEDY Construct the TSF as per engineered designs and clad and vegetate the TSF side as it develops.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site. Emissions will be monitored and managed to GN1210 limits.
Tailings disposal and facility management through progressive rehabilitation	Alien invasive establishment and bush encroachment.	CONTROL Clear all vehicles coming to site of any vegetative material to prevent introduction and spread of potential alien and invasive species. Compile and implement an alien and invasive species management plan to eradicate and control all alien invasive species. Mechanical methods should be utilised in preference to chemical methods. Dispose of the eradicated plant material at an approved solid waste disposal site. REMEDY Rehabilitate all disturbed areas and seed with self-sustaining indigenous species.	An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine.	Alien and invasive species managed in terms of NEM:BA and CARA.
Tailings disposal and facility management through progressive rehabilitation	Alteration in visual aesthetics and sense of place.	The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures. Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices to ensure visual impact is mitigated. REMEDY Visual screens (vegetated berms, trees or wind breaks) will be considered where necessary.	Good housekeeping practices and proper storage of materials in designated areas, from the onset of construction throughout the life of mine. Regular communications with I&APs.	Industry best practices and standards.
Tailings disposal and facility	Change in land use to mining.	No mitigation required. This extension eliminates two other TSFs within the mineral boundary.	Construction of the TSF foundations will be supervised by the engineer and as	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
management through progressive rehabilitation			built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	
Tailings disposal and facility management through progressive rehabilitation	Existing TSF will be extended but remains within the mineral boundary and an active mine area.	The TSF will be an extension of the existing Kinross TSF and result in the elimination of two smaller TSFs CONTROL Ensure TSF design and development follows engineered designs at all times. Continuously grade, clad and vegetate the side of the TSF and ensure proper erosion control measures. Apply good housekeeping practices to ensure visual impact is mitigated.	Construction of the TSF foundations will be supervised by the engineer and as built designs completed and signed by engineer before tailings disposal commences. The TSF development will be monitored for the life of mine and audited against the engineered designs.	NEMA, MPRDA and NEM:WA regulations regarding mine residue handling.
Tailings disposal and facility management through progressive rehabilitation	Radiation will affect the immediate environment of the TSF.	Current radiation monitoring indicates that radiation to the surrounding environment is within acceptable dose limits. Continue with current TSF radiation management and monitoring and apply to the expansion of the TSF as needed.	Continue with current radiation management, monitoring and reporting for the life of mine.	Complies with the Nuclear Act and relevant regulations.
Domestic waste generation	Potential surface contamination which will impact surrounding areas through runoff and seepage.	CONTROL Bins to be provided. Waste will be collected in bins / skips and taken to the plant waste storage area for final separation, recycling or disposal. Waste should be recycled as far as possible and sold/given to interested contractors. Waste will be stored according to the Norms and Standards for Storage of Waste. Recyclable waste should not be stored for excessive periods. Chemical waste must be stored as per MSDSs and not stored on site for excessive periods. General waste must be collected and disposed of at a registered waste disposal site. REMEDY Inspect and clear all litter and waste.	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.
Use of equipment during TSF expansion activities	Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.	MODIFY Where possible, purchase equipment with lower emissions. CONTROL Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions. REMEDY Discontinue use of faulty equipment until repaired or replaced.	Vehicles, machinery and equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine.	Keep equipment, machinery and vehicles operating within their manufacturing specifications.
Use of equipment during TSF expansion activities	Increased noise levels.	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered: MODIFY Consideration will be given to buying quieter equipment where feasible. CONTROL Machinery and equipment will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as needed.	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS 10103:2008.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		switched off when not in use. Mine will limit noisy activities during the day if needed.		
Expansion of Kinross TSF and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	CONTROL Ensure hydrocarbon, slurry and waste handling is conducted in line with the EMP and that mitigation measures above are applied. REMEDY Spills and illegally dumped waste must be cleared immediately.	Good housekeeping practices will be applied over mining and infrastructure areas at all times.	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.
Establishment of Elikhulu Plant and associated infrastructure adjacent to the existing plant				
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Polluted runoff from dirty areas and slurry spills will pollute the downstream environment if not properly contained	CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Wetland deterioration due to water quality impacts that may arise from slurry spills and poor water containment at the plant.	CONTROL Ensure water management measures are established before any other activities commence at the plant, including dirty water containment dams, to ensure dirty water containment. Ensure water separation and dirty water containment on site as per GN704 requirements. All dams will be constructed and lined as per designs and operated with a 0.8m freeboard. Only environmentally friendly materials must be used during the construction phase to minimise pollution. REMEDY Inspect, maintain and repair pipelines and pumps. Follow emergency response plan for spills. Keep back-up pumps and pipes on site.	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Mine water will be contained on site as per GN704. Water quantity in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Excavation for the establishment of foundations will generate dust.	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Emission of particulate matter, CO ₂ , SO _x and NO _x	CONTROL All control measures must be applied as per industry best practices and legislative requirements such as stacks over combustion units, air scrubbers and / or filters.	Emission controls will be implemented before any processing activities commence. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.	Emissions will be monitored and managed to GN1210 limits.
Construction and Operation of Elikhulu Plant (CIL plant with	Operation of the CIL Plant will contribute to noise levels.	Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). Noise levels significantly exceeding the current baseline are not expected. The following should be considered:	Equipment will be maintained within their operating specifications through servicing, calibration and general maintenance for the life of mine as	Keep equipment operating within their manufacturing specifications. Environmental noise managed to baseline conditions and SANS

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
dedicated smelt house)		<p>MODIFY Consideration will be given to buying quieter equipment where feasible.</p> <p>CONTROL Machinery and equipment will be regularly serviced. Noise control measures will be considered if complaints are received such as erecting sound barriers (berms), soundproofing of point sources, use of silencers, using strobe lights rather than beepers where feasible and where this won't compromise safety of people on site. Machinery will be maintained within operational noise limits and will be switched off when not in use. Mine will limit noisy activities during the day if needed.</p>	needed. Suggested noise control mitigation measures will be applied immediately if any complaints about noise are received.	10103:2008.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Deterioration in visual aesthetics and sense of place.	<p>Area is within an existing mine complex and visual impact will be minimal</p> <p>CONTROL Apply dust control measures and other environmental measures to ensure impact area is contained. Apply good housekeeping practices to ensure visual impact is mitigated.</p>	Good housekeeping practices and proper storage of materials in designated areas, from the onset of construction throughout the life of mine. Regular communications with I&APs.	Industry best practices and standards.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpan dam)	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment	<p>CONTROL PCD & Event Pond must be sized and lined according to GN704 as well as the NWA. Pumps and pipelines required for water transfer must be adequately sized to avoid leaks. All dams will be constructed and lined as per designs and managed with a 0.8m freeboard. All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs. Install monitoring boreholes downstream of the dirty water dams to monitor for seepage.</p> <p>REMEDY Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Dirty water dams and trenches must be regularly inspected and silt build up cleared as and when required to ensure adequate capacity and functioning .</p> <p>Follow emergency response plan for spills and keep back-up pumps and pipes on site.</p> <p>STOP Dams will remain outside 100m buffer zones / 1:100 year flood lines unless authorisation is obtained from DWS to do so.</p>	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Mine water will be contained on site as per GN704. Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpan dam)	Impairment of groundwater quality due to seepage or overflow from dirty water dams at the plant to underlying aquifers.	<p>CONTROL Contain dirty water and reduce infiltration with suitable lining material. Separation of clean water with effective storm water control. All dirty surface water control facilities (dam, drain) must be designed and operated to have a minimum freeboard above full supply level, at such manner that they can always handle 1:50 year flood-event on top of its mean operation level. Leaks detection system should be incorporated into the design system or install monitoring boreholes downstream of the dirty water dams to monitor for seepage.</p> <p>REMEDY Recycle process water. Inspect, maintain and repair all water management features including dams, trenches, berms, silt traps, pipelines and pumps. Follow emergency response plan for spills and keep back-up pumps and</p>	Construct ALL water management features before other activities commence on site and maintain for life of mine.	Water quality in neighbouring areas will be maintained close to baseline conditions or RWQOs.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
		pipes on site.		
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may impair quality of water runoff which could impact on the surrounding environment if not properly managed.	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	<p>Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .</p>	<p>Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control.</p>
Chemical / Reagent Storage	Impairment of groundwater quality due to ad hoc spillages at the plant seeping to underlying aquifers.	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	<p>Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .</p>	<p>Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control.</p>
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may lead to chemical fires, chemical gasses which will impair air quality and also be a risk to staff.	<p>CONTROL Materials will be stored within designated areas at all times within concrete bunded areas. Designated areas should be enclosed with appropriate signs and not be exposed to the elements. Chemicals will be stored as per requirements with the MSDS. Wet and dry chemicals, reducing and oxidising agents, will be stored separately.</p> <p>REMEDY All spillages must be handled as pollution incidents. Emergency response protocol must be established for contractors. Ensure appropriate spill kits are available on site to clear specific chemical spills and ensure staff is trained to utilise these or have access to appropriate specialists.</p>	<p>Appropriate chemical storage and handling sites will be developed before any chemicals are stored and utilised on site. Storage and handling of chemicals will be conducted in terms of the chemical's specifications and / or MSDS as long as chemicals are stored on site .</p>	<p>Dangerous goods stored and managed as per SANS 10228:2006 and MSDSs and MPRDA Regulations. MHSA will be complied with regarding signage and access control.</p>
Ablutions and change house with sewage treatment plant	Irresponsible use of water and water wastage.	<p>CONTROL Saving water initiatives will be included in environmental awareness training. Utilise water on site responsibly. Record all water usage on site.</p> <p>REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and immediate repair and maintenance.</p>	<p>Water use will be monitored for the life of mine as soon as water use commences. ALL water management features will be completed before other activities commence in the areas and will be maintained for their operational life.</p>	<p>No standards applicable but once the mine has determined average monthly water use then this should be utilised as standard (exceeding this may indicate leaks in the system).</p>
Ablutions and change house with sewage treatment plant	Potential contamination of surface water bodies and surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic	<p>CONTROL Keep all bathrooms in clean and hygienic state.</p> <p>REMEDY Inspection of ALL plumbing and bathrooms to ensure no leaks and immediate repair and maintenance.</p>	<p>Construct sewage treatment plant, before other activities commence in the area and maintain for their operational lifetime.</p>	<p>Reduced bacterial contamination on neighbouring areas.</p>

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
	environments.			
General and hazardous waste handling	Potential surface contamination which will impact surrounding areas through runoff and seepage.	<p>CONTROL</p> <p>Waste storage area will be treated as a dirty area and any runoff from site must be contained.</p> <p>Waste should be recycled as far as possible and sold/given to interested contractors.</p> <p>Waste will be stored according to the Norms and Standards for Storage of Waste.</p> <p>Recyclable waste should not be stored for excessive periods.</p> <p>Chemical waste must be stored as per MSDSs and not stored on site for excessive periods.</p> <p>General waste must be collected and disposed of at a registered waste disposal site.</p> <p>Waste handling and storage areas will have clear waste type and warning signs as needed. Colour coding can be used but must be accompanied by training.</p> <p>Emergency response plan must be in place for any incidences that may occur with hazardous waste on site.</p> <p>REMEDY</p> <p>Inspect and clear all litter and waste.</p>	Good housekeeping practices will be applied over mining and infrastructure areas and areas will be kept clear of litter and illegally dumped waste from the onset of construction throughout the life of mine.	Waste characterised, classified, handled and stored as per NEM:WA and its regulations: GNR634 & GNR926.
Processing and associated activities detailed above	Contamination by way of slurry, hydrocarbon, chemicals, dust and waste to surrounding environment will be hazardous to flora and fauna.	<p>CONTROL</p> <p>Ensure hydrocarbon, slurry, chemicals and waste handling is conducted in line with the EMP and that mitigation measures above are applied.</p> <p>REMEDY</p> <p>Spills and illegally dumped waste must be cleared immediately.</p>	Good housekeeping practices will be applied over mining and infrastructure areas at all times.	Manage biodiversity on site in line with NEM:BA and relevant municipal regulations.
Process water supply and reticulation				
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Irresponsible use of water and water wastage through leaks which will alter downstream water dynamics	<p>REMEDY</p> <p>Inspection of ALL water features for leaks and repair immediately.</p> <p>CONTROL</p> <p>Saving water initiatives will be included in environmental awareness training.</p> <p>Utilise water on site responsibly.</p> <p>Record all water usage on site.</p>	Water use will be monitored for the life of mine as soon as water use commences. ALL water management features will be completed before other activities commence in the areas and will be maintained for their operational life.	Abstraction volumes will remain within those stipulated in the water balance and IWUL.
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Water balance completed for the Leeuwpam Dam indicates the dam can provide the operation with requirements, but increased abstraction will reduce the size of the Leeuwpam Dam. This will expose parts of the dam and aggravate dust generation.	<p>REMEDY</p> <p>Where possible, area should be cleared of fine surface material as the dam recedes and while material is still wet. This material can be disposed of on the tailings facility. This will remove the bulk of the fines which will be more prone to dispersal and generating dust.</p> <p>If available, soil should be applied as the dam recedes to the exposed and cleaned areas and the area vegetated to obtain a good vegetative cover.</p> <p>Consideration should be given to water spray / sprinklers to keep exposed areas moist during dry windy conditions.</p>	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be maintained over rehabilitated areas to ensure adequate vegetative cover for grazing land use until rehabilitated areas are stable and self-sustaining.	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.
Installation of barge & pump at Leeuwpam Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Recreational use of the dam by the farmer will be affected by reduction in dam size.	No Mitigation Possible. It must be stated that the dam is licensed and has been operated as a mine water dam for evaporation purposes since the 1960's. Once water levels rebound the recreational uses may be reinstated.	Areas will be rehabilitated completely as soon as activity in those areas ceases and must be implemented throughout the life of mine. Soil quantity and quality will be maintained over rehabilitated areas to ensure adequate vegetative cover for	NEMA & MPRDA principals and regulations regarding decommissioning and rehabilitation.

Activity	Potential Impact	Mitigation Type	Time periods for EMP implementation	Compliance with standards
			grazing land use until rehabilitated areas are stable and self-sustaining.	
Employment of staff, contractors				
Employment opportunities during construction – 700 jobs	Direct improvement of socio-economic situation of contractors and indirect benefits through multiplier effects.	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for permanent employment.	As per S&LP requirements	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP
Employment opportunities during operations – 250 jobs	Direct improvement of socio-economic situation of contractors and staff and indirect benefits through multiplier effects.	Implementing a "local first" recruitment policy. Ensure that the local jobs created are linked to a skills development programme for permanent employment.	As per S&LP requirements	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP
Local / Regional business	Local / Regional business support	Adopt preferential procurement policies towards local suppliers and distributors. Ensuring that principle of "local first" when procuring consumables, construction materials etc.	As per S&LP requirements	Ensure that the principles underpinned by Black Economic Empowerment Act of 2003 are honoured. Conditions stipulated in S&LP
Neighbouring business	Neighbouring business affected by working environment, machinery affected by elevated dust	Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. CONTROL Speed limits must be established on dirt roads. Manage dust through water carts or sprinklers. Consider the use of windbreaks, enclosures, shelters or misting at very dusty areas.	Dust suppression will continue for the life of mine in line with a site-specific fugitive dust management plan. As a controlled Group C emitter, the mine must register and report to the NAEIS site immediately for the life mine.	Dust fallout will be monitored and managed as per GNR827 and maintained within 1200mg/m ² /day on site.
Increased traffic largely passenger vehicles with additional employment and some trucks for machinery and equipment	Increased potential for road incidences.	CONTROL Where feasible contract with minibus taxi or bus operators to transport staff to and from site. Instruct and require all personnel and contractors to adhere to speed limits to ensure safe and efficient traffic flow. Limit mine-related vehicle traffic on public roadways to off-peak commuting times as far as practically possible to minimize impacts on local commuters. Enter into agreement with the roads agency as needed to ensure roads are maintained.	Internal roads and intersections with public roads will be maintained from the onset of construction throughout the life of mine. Speed inspections will be undertaken sporadically on site throughout the life of mine to ensure contractors are obeying speed limits.	Operations will comply with MHSA and Regulations. Vehicles will be serviced and maintained in road worthy condition.

33 FINANCIAL PROVISION

33.1 DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION

33.1.1 Describe the Closure Objectives and the Extent to which these are Aligned to the Baseline Environment

Closure and rehabilitation is a long-term process, which should ideally begin during the planning phase of a development. Focus on environmental management in mine closure and decommissioning has therefore shifted towards the idea of 'planning for closure'. Mine closure always aims to achieve long-term site stability and the establishment of a self-sustaining ecosystem.

EGM is committed to close its operations in a sustainable manner with the minimum possibility of residual environmental or social impacts occurring as per the objectives of the existing, approved EMP. In addition and specifically for this project, the overall closure vision is:

'To achieve suitable and sustainable landscapes that in the long term have appropriate governance mechanisms to try to achieve a revenue stream that can be used to offset all long term management, maintenance and treatment costs.'

The following closure objectives fall within this overall vision, which apply to the new consolidated Kinross TSF, the rehabilitated Winkelhaak and Leslie TSF footprints, the decommissioned and rehabilitated plant area, pipelines and Leeuwpan Dam:

- The rehabilitated landscape should ideally match the relevant landscape found in the local area.
- To ensure that the land capability and final land use of the rehabilitated areas are self-sustaining as far as possible from an environmental and socio-economic perspective.
- To achieve aesthetically pleasing rehabilitated footprint areas that do not detract from the long-term value of surrounding land.
- To ensure residual risks and impacts to the surrounding natural environment are understood and managed as far as possible; including surface water, groundwater, aquatic and wetland ecosystems, soil health and biodiversity.

These closure objectives have been further detailed below according to the relevant baseline environmental aspects; these include:

- Topography:
 - To ensure that the final post-closure elevation of the rehabilitated footprints of Winkelhaak and Leslie TSF's may result in the return of the

natural surface drainage pattern once the site's potential to generate pollution is minimized.

- To ensure that the final slope of the new consolidated TSF surface will be capable of supporting vegetation, which will give rise to runoff of an acceptable standard of water quality that is suitable for discharge to the environment, after minimal passive treatment provided by the catchment paddock system.
- Soil, Land Capability and Land Use:
 - To achieve a sustainable landscape that leads to a rehabilitated area that enhances vegetation cover and increased biodiversity.
 - To achieve aesthetically pleasing rehabilitated footprint areas (mined TSF's) to improve their current status that do not detract from the long-term value of surrounding land.
 - The soils of the mined footprints must be remediated to ensure that a clearance certificate is issued by the National Nuclear Regulator (NNR) after an independent radiation assessment is completed.
 - To ensure that the land capability and final land use of the rehabilitated areas are self-sustaining as far as possible.
 - To ensure the new soils exposed by the decreased Leeuwpan dam area are remediated to ensure vegetation establishment.
- Surface Water
 - To ensure that no dirty water from the contained TSF site enters the surrounding surface water systems.
 - To ensure all clean water is delivered to the surrounding hydrological environment in a manner that does not alter flow characteristics and promote erosion.
 - To minimize impacts to flow in downstream rivers to minimize deterioration of ecological status.
- Groundwater
 - To ensure that all action is taken to minimize impacts from the contamination plumes from the TSF on the surface water features or surrounding users' boreholes.
 - To ensure that groundwater users that are impacted (if any) have alternative sustainable water sources of the similar quality and quantity.
- Flora and Fauna
 - To ensure that vegetation growth and cover on the rehabilitated areas is sustainable through suitable post-mining land use activities; i.e. to ensure the land is not left to become fallow.

- To ensure that alien invasive growth is eradicated until the closure certificate is granted.
- To encourage surrounding animals (e.g. birds and rodents) to return into the rehabilitated areas to maintain the surrounding biodiversity. Caution must be taken to allow animals that have the potential to damage the vegetation such as unmanaged livestock.
- To ensure the new area created by the decreased Leeuwpan dam area is rehabilitated concurrently through vegetation establishment.
- Aquatic Ecosystems
 - To ensure surface water, groundwater and aquatic ecosystem health monitoring is completed to understand the potential risk and impacts from seepage, spills and other actions on the aquatic ecosystems to ensure protection of downstream habitat.
- Wetlands:
 - To ensure that the wetlands adjacent to the Leslie/Bracken and Winkelhaak TSF's are not negatively impacted but rather improved by the rehabilitation of the footprints. This can be achieved by improving the water quantity and quality reporting to these systems post-closure.
 - The wetland offset project (required due to wetlands lost from the construction of the new TSF) must be completed to ensure that a no nett loss of wetland functionality is realised in the catchment after closure.
 - To ensure the decommissioned RWD's will be rehabilitated using the correct soils and species assemblage to match the surrounding wetland functionality and biodiversity.
 - To ensure the remaining Leeuwpan Dam wetland is remediated if need be to ensure the wetland ecosystem status does not degrade.
- Air Quality
 - To ensure that dust is minimize in all areas post-mining.

33.1.2 Confirm that the Environmental Objectives in Relation to Closure have been Consulted with Landowner and I&APs

Closure objectives will be presented in the EIA/EMP phase meeting where all registered I&APs and landowners will be invited to attend. Furthermore this draft EIA/EMPr will be made available to I&APs and landowners for a 30 day review period.

33.1.3 Rehabilitation Plan to Attain Closure Objectives Including Proposed Post-Mining Land Capability and Land Use

EGM is committed to rehabilitating all TSF's and areas where infrastructure has been demolished at the end of the LOM with the generalised aim of a nett increase in the natural vegetated areas. The rehabilitation actions summarised herein are to attain the desired closure objectives understood at the time of the EIA EMP compilation. The rehabilitation actions must also be in alignment with the approved EMP for the current EGM operations. This rehabilitation plan is a preliminary guideline that must go through detailed design before implementation.

The proposed project has four areas that will require rehabilitation action as determined from the list of activities (Figure 13). The actions discussed below are separated into the sub-headings accordingly and general rehabilitation principles that are key are also discussed.



Figure 13: The four main areas of the project that will require rehabilitation

33.1.3.1 REHABILITATION OF THE LESLIE AND WINKELHAAK TSF FOOTPRINTS

The three TSFs will be re-processed sequentially, being Kinross first, Leslie/Bracken next and finally Winkelhaak. The Kinross footprint will not require rehabilitation as it will be incorporated into the new consolidated TSF (refer to the next section for rehabilitation objectives for the new TSF.) The Leslie/Bracken and Winkelhaak footprints will require full rehabilitation. This is likely to entail the following 5 steps, which are briefly discussed below:

- Step 1: Removal of remnant slimes material, continued management of water and dust as well as completion of a radiation assessment;
- Step 2: Re-profiling of the area including surface hydrology management;
- Step 3: Soil amelioration and vegetation establishment;
- Step 4: Monitoring and Maintenance for approximately three to five years;
- Step 5: Final handover of the land based on the identified end land use.

Step 1: Removal of Remnant Slimes and Radiation assessment

The sites must be cleared of all remnant tailings material until the in situ soil is visible; these are assumed present as soil stripping typically did not occur during the time of construction. Due to this, the soils will be contaminated through the long term historical leaching that occurred from the tailings facility into the soils. Although current radiation levels are reported to be low, of particular concern is radiation levels of the base soils. Thus, an independent radiation assessment should be undertaken on the exposed soils to check if the soils are below the acceptable levels set by The National Nuclear Regulator (NNR).

The contaminated soil, if present, must be removed and placed on new TSF. This will inform how much re-profiling will be required in the next step.

During this phase, management of dust and surface water impacts is important as the area has high risk to the surrounding environment if unmitigated. Runoff must continue to be captured as the area is still considered dirty.

Step 2: Re-profiling of the area and surface hydrology management

The final elevation of the rehabilitated footprints of Winkelhaak and Leslie TSF's must return to original ground level (OGL) where possible. The exposed area must be surveyed and mapped once all the contaminated material has been removed to inform where re-profiling is required. The new landscape must be profiled to ensure water runoff and prevent water ponding.

The detailed rehabilitation phase will determine if any material shortfalls exist for the new landscape. If this is the case, more effort will be required for landscape profiling and additional mitigation measures may be required to managed erosion and water pollution risks, such as contour drains and berms.

Step 3: Soil amelioration and Vegetation establishment

The soils exposed after the removal of the Winkelhaak and Leslie/Bracken TSFs will require both physical and chemical amelioration. The remaining soils will need to be scarified and/or disc ploughed as they will be compacted from the previous weight of the TSF.

Chemical amelioration requirements will be determined following the results of the radiation assessment and soil fertility assessments done. It is likely that lime in the form of limestone ammonium nitrate (LAN) will be used as well as standard KNP to fertilize the soil in preparation for vegetation establishment.

Seeding should take place at the beginning of the rainy season (at the same time as chemical amelioration) for rapid vegetation establishment. This must include

indigenous species from the study area and may include nitrogen fixing legumes, pioneer grass species and some climax species. If radiation is in excess or the soil health is greatly degraded, mulching and fertilisation may need to be done every growing season until adequate soil health and vegetation growth is achieved.

Additionally, alien and invasive plant species are important aspects to control during the establishment of vegetation and must be monitored for in the next step.

Step 4: Monitoring and Maintenance for three to five years

The rehabilitated area will need to be monitored for a period of at least three years to ensure that all problem areas have been identified and remediated such as:

- Presence of radioactive hotspots;
- Vegetation die back;
- Establishment of alien and invasive plants;
- Soil erosion; and
- Water contamination.

Monitoring should be done biannually, once at the start of the season to determine the required amelioration actions for soils. Thereafter, vegetation should be assessed at the end of the growing season to determine the achieved vegetation yield and success.

Step 5: Final handover of pre-determined end land use

The above steps aim to remediate the land to such a point that the area is declared safe for future use and hand over discussions with the end land owner can be finalised.

The EMP may need to be amended to update the final land use. Change of surface rights ownership will need to be done.

33.1.3.2 REHABILITATION OF THE NEW EXPANDED KINROSS TSF

The new TSF will be a permanent feature in the landscape and thus rehabilitation of the facility is required. This process starts from the construction phase as the soil stripped will be the soil used for the rehabilitation of the TSF. The following steps are thus relevant:

- Step 1: Soils stripping, handling and stockpiling (construction phase);
- Step 2: Continual shaping of the TSF surface (operational phase);

- Step 3: Placement of cover material and vegetation establishment;
- Step 4: Final rehabilitation of TSF for closure;
- Step 5: Monitoring and Maintenance.

Step 1: Soils stripping, handling and stockpiling (Operation phase)

Retaining soil and the inherent characteristics is one of the most critical components to successful rehabilitation. Stripping and stockpiling of topsoil will take place during the construction phase at the TSF footprint area as well as the designated stockpile areas. This is assumed to be covered in operating costs. The following actions are recommended:

- A detailed soils study must be undertaken on the areas earmarked for the new TSF and the stockpiles to inform soil stripping, stockpiling and ultimately use of the soils for rehabilitation of the TSF surface. This is recommended to be undertaken on 150m x 150m grid and special attention must be paid to wetland soils present.
- Stripping must be supervised to ensure soils are stripped correctly. Topsoil and subsoil will be stripped on average to a depth of 250mm and stockpiled separately to a height of 2m. These will be stockpiled outside the 1:100 year floodline of the nearest watercourse.
- Soil handling activities should be completed in the dry season to prevent unnecessary runoff due to summer rainfall. Furthermore, soil handling must be as per the soil utilisation guide to ensure soil is preserved for use in future rehabilitation. This will include separate stripping and stockpiling wetland from terrestrial soils.
- Wetland soils must be stripped and stockpiled separately from the terrestrial soils. Special management measures must be put in place to manage these soils for future use.
- Silt control paddocks should be installed along the perimeter of the topsoil and subsoil stockpiles so as to minimise the release of silt generated from storm water runoff. Gabion baskets will be included at the lowest points of the paddock walls, to allow for the slow release of storm water to the downstream environment.
- Stockpiles should be vegetated as soon as possible to prevent erosion. This may include:
 - It is recommended that seeding must be completed within seven (7) days of stockpiling. This must include indigenous herbaceous species.
 - Ameliorate soils if needed to establish stable vegetation communities on berms and stockpiles.

- If high sediment load is observed in the diverted storm water runoff, pebbles can be placed on the upslope side of the berm. This will act as flow dissipater and silt trap.
- Ensure storm water management features in line with GN704, as detailed below, are established on site before other activities commence on site to reduce risk of erosion and downstream sedimentation.

Step 2: Continual shaping of the TSF surface (operational phase);

As per the detailed design report (SLR, 2016; Appendix 6), the TSF will be designed to ensure a constant outer slope of 1v:4h for the following reasons:

- Traditional design of step-ins with steeper intermediate slopes have too high erosion rates, which renders the surface unsustainable;
- The flatter slope of 1v:4h has been found to be more erosionally stable than other designs;
- No step-ins are used to facilitate concurrent rehabilitation; and
- The cyclone underflow is expected to naturally result in an angle of around 1v:4h; leading towards minimal earthmoving to achieve the desired slope.
- This is expected to be an operational cost.

Step 3: Placement of cover material and vegetation establishment

The type of cover system determined to be the most suitable for the new TSF is a "Store and Release" (SLR, 2016; Appendix 6). This type of cover consists of one or more layers that are designed to maximised root penetration and soil moisture storage. The root zone is not limited to the cover layer but may extend into the upper layers of the mine waste. The cover material consequently primarily serves as a medium for initiating plant growth and to avoid wind and water erosion of the underlying waste material.

The proposed cover involves placement of a cover material consisting of topsoil, subsoil and rocky material which is placed onto the side slope and then ripped into the surface. The mix of the soil cladding typically consists of roughly 200mm of topsoil/subsoil and 100mm of rock material should the tailings be non-acid generating. This layer will certainly have some of the larger rock particles protruding above the thickness of the cover material. These protrusions are advantageous as they mimic natural slopes and dissipate the kinetic energy of rain drops as they strike the surface. The rocky material will typically need to be sourced from site and stockpile during initial construction and should have a range of particle sizes generally between 25mm and 300mm. (SLR, 2016; Appendix 6)

The side slope will require vegetating as soon as the cover material has been placed. The vegetation should consist of a mix of trees, shrubs and grasses and match the indigenous vegetation of the surrounding area. This vegetating of the slope can be undertaken through the manual planting of young plants and hydro seeding.

Step 4: Final rehabilitation of TSF for closure

The top surface of the TSF will need to be rehabilitated in preparation for closure. The top will not be shaped in a basin as typically used as this often results in concentrated storm water runoff and subsequent erosion. The top of the TSF will therefore be designed with 'paddocks' to create smaller catchments to handle storm water more effectively. The paddocks are typically sized to store fairly average and frequent rainfall events, with the runoff from larger storm events then spilling over and accumulating at the central low point. This spilling over will attenuate the flood hydrograph as well as hold back some of the runoff and silt within each paddock.

The full top surface will be covered with 200mm of topsoil mixed into the top 150mm of the tailings beach; should the tailings be shown to be non-acid generating. The slope of the top surface is negligible and consequently results in extremely low erosion rates as desired. The placement of this cover will have to take place over several years as the rehabilitation team will initially not be able to access the central portion of the wet TSF. In addition, a large rock clad berm should also be constructed around the crest of the TSF at closure to contain large storm events and reduce wind erosion of the crest.

Furthermore, the RWD's will not remain in perpetuity. Once the water quality is determined to be of a good enough quality to allow the runoff to enter the surrounding environment, the RWD's will be decommissioned and thus rehabilitation will be required in preparation for closure. All concrete structures and HDPE liners will be removed and the area will be fully rehabilitated including soil placement and vegetation establishment. This area, however, is characterised by valley bottom wetland and it is advised that this habitat is re-established. During the detailed rehabilitation phase, which is expected closer to the time of closure, a wetland and rehabilitation specialist should be consulted to advise on the detailed rehabilitation actions. It is unlikely that the wetland soils stripped in this area during construction will retain integrity for the ~15 years until closure and thus cannot be used for rehabilitation purposes. A constructed wetland approach may need to be taken with input from all relevant specialists.

Step 5: Monitoring and Maintenance.

The rehabilitated TSF will need to be monitored and maintained to ensure all residual impacts are understood and mitigated to achieve the closure objectives. This will need detailed design closer to the time of closure to ensure the efforts are sustainable as the TSF will require some kind of constant management. The monitoring process will be used to assess whether the rehabilitation process has been successful or not and to ensure that no further deterioration of the surrounding environment is realised.

It is advised the intensive monitoring, maintenance and aftercare is planned for five years after the project has ceased. This step will need to ensure that all rehabilitation problem areas have been identified and remediated such as:

- Vegetation die back;
- Presence of erosion hotspots;
- Establishment of alien and invasive plants; and
- Water contamination.

Refer to Section 34 for the detailed monitoring action table.

Steps to take if premature closure is realised:

If premature closure occurs for any reason, rehabilitation actions will need to be carried out at the stage of the project to ensure minimization of impacts. This must be assessed in detail when required but may include the following:

- If this is realised before the liner is in place, soil will need to be placed back from where they were taken from and remediated and the area re-vegetated.
- If premature closure happens after the liner is in place but no tailings is yet in place, the liner must be removed the soil will need to be placed back from where they were taken from and remediated and the area re-vegetated;
- If premature closure happens once some tailings has been placed, topsoil must be used to cover the area and remediated and the area vegetated.

33.1.3.3 REHABILITATION OF THE ELIKHULU PLANT AND ASSOCIATED INFRASTRUCTURE

The future land use of decommissioned Elikhulu plant area is expected to be that of an alternative development as this is within a largely industrialised area and rehabilitation to grazing or wilderness will not be practical. It is predicted that there will be no alternative use for the infrastructure held within the Elikhulu Plant; thus, it will need to be decommissioned. The foundations may be left in situ if these are

rendered safe to be used by the new land owner. The supporting infrastructure associated with the plant (such as offices, workshops etc.) may have alternative uses and this will be investigated during closure planning.

Concrete and steel should be demolished, crushed and placed on top of the TSF in a single area. The steel, if safe, can be sold off.

33.1.3.4 REHABILITATION OF THE REMAINING LEEUWPAN DAM

The Leeuwpan Dam is able to sustainably supply the project with its required 8.55 Ml/day but this, however, will decrease the dam from the current size of approximately 730 ha to approximately 300 - 260ha at the end of the project. The exposed soils and areas will require significant rehabilitation actions to prevent dust, erosion, water quality deterioration, spread of alien plants and degradation of the value of the surrounding land from a socio-economic perspective.

The previously saturated soils will need to be ameliorated so that natural terrestrial vegetation may be established. A detailed soil analysis should take place as the dam decreases in size and concurrent rehabilitation is advised to be carried out. Similar to the rehabilitation actions of the other areas, only indigenous vegetation found in the surrounding natural habitats should be used and particular effort must go in to controlling alien and invasive species.

In addition to the rehabilitation of the exposed areas, the remaining wetland may require restoration of ecological integrity. It is recommended that the wetland is monitored throughout the life of the project as per the monitoring plan to inform concurrent remediation actions that are needed. In addition, it is recommended that a final wetland assessment be carried out at the end of the project by a wetland specialist to inform a wetland rehabilitation plan if needed.

The above actions must be carried out with constant communication with the land owner to ensure that all efforts and results are sustainable.

33.1.3.5 DECOMMISSIONING OF THE PIPELINES

The above ground water and slurry reticulation pipelines will be decommissioned, removed and the area rehabilitated where needed to achieve the closure objectives. EGM is committed to removing the pipelines to ensure minimized residual impact post-closure. Detailed rehabilitation actions may be determined closer to the time of decommissioning; however the following steps are likely to be completed:

- The slurry pipelines represent a risk of soil and water contamination; thus they will be flushed clean prior to the disassembling.
- The impacted areas of soil will be reshaped and remediated where needed; such as where plinths are removed and where soil compaction and/or erosion has occurred from the use of machinery.
- Vegetation will be established as soon as possible using indigenous herbaceous species as found in the natural area. All alien and invasive species will be removed and a management plan put in place where needed.
- Decommissioning activities should occur in the dry season to prevent increased erosion and rehabilitation activities should occur immediately prior to the start of the summer rainfall to promote growth.

33.1.4 Quantum of the Financial Provision Required to Manage and Rehabilitate the Environment

As per NEMA financial provision regulations, itemised costs must be provided within the financial provision for decommissioning, rehabilitation, remediation and closure cost including management of latent impacts. The financial provision assessments have been completed for all current mining activities (EXM, 2016) as well as those proposed with the Elikhulu project (SLR, 2016). Each action is detailed in the assessment reports for which a cost is calculated. The total values are summarised in Table 45 below.

Table 45: Summary of financial provision calculated amounts for existing and proposed mine operations

Operation Details	Provision amount 2016
Existing EGM Operations (EXM, 2016)	
Kinross Complex	R 69 606 980.81
Winkelhaak Complex	R 55 120 536.75
Leslie-Bracken Complex, including Leeuwpan	R 60 052 159.73
<i>Sub-total</i>	<i>R 184 779 677.29</i>
Preliminary & General	R 22 173 561.27
Contingency @ 10%	R 18 477 967.73
Total	R 225 431 206.29

New Proposed Elikhulu TSF (SLR, 2016)	
Kinross expansion, including compartment 1U & 1L	R 43 494 319.82
Preliminary & General @ 20%	R 8 698 863.96
Contingency @ 10%	R 4 349 431.98
<i>Sub-total</i>	<i>R 13 048 295.94</i>
VAT @ 14% of Sub-total	R 7 915 966.21
Total	R 64 458 581.97
New Proposed Elikhulu Plant (SLR, 2016)	
New Elikhulu CIL Plant	R 8 849 269.70
Preliminary & General @ 12%	R 1 061 912.37
Contingency @ 10%	R 884 926.97
<i>Sub-total</i>	<i>R 1 946 839.34</i>
VAT @ 14% of Sub-total	R 1 511 455.27
Total	R 12 307 564.31
GRAND TOTAL	R 302 197 352.57

33.1.5 Confirm that the Financial Provision will be Provided as Determined

EGM's rehabilitation Trust Fund currently stands at R276,984,120.00, thus a shortfall of R25,213,232.57 will need to be provided by EGM.

Financial Provision will be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

34 MONITORING OF IMPACT MANAGEMENT ACTIONS

The EIA process has led to mitigation actions being proposed for all impacts, these actions are summarised in the table below according to the each different aspect and phase of the proposed project. The full impact assessment table is presented in Appendix 18. The table below details the monitoring details, including: Monitoring and reporting frequency; Responsible persons; Time period for implementing impact management actions; and Mechanism for monitoring compliance.

Table 46: Monitoring of Impact Management Actions

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
Reprocessing of Winkelhaak and Leslie/Bracken TSFs & new pump station at Kinross TSF				
Construction and operation of pump houses at each of the TSFs (x3)	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	1. Ensure good housekeeping practices are applied at pump houses and issues are dealt with in a timely manner. 2. Ensure that spills on surface are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager	Conduct weekly visual inspections of pump houses to ensure facilities orderly and operating as required with no spills and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with quarterly groundwater monitoring during construction phase of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit quarterly reporting. Continue with biannual biomonitoring and reporting.
Construction and operation of pump houses at each of the TSFs (x3)	Pumps will contribute to elevated noise level	1. Ensure equipment and machinery do not produce excessive noise and emissions and are not prone to leaks. 2. Ensure environmental noise generation at boundaries and sensitive receptors is not excessive.	1. Site manager. 2. Environmental manager	Weekly inspection of all service and maintenance plans/logbooks to ensure maintenance is scheduled in time. Quarterly environmental noise monitoring.
Hydraulic mining & slurry generation and pumping	Failure of benches or flooding of trenches will release slurry to the downstream environment	1. Ensure hydraulic mining is proceeding as per SOPs and in an environmentally responsible manner. 2. Ensure that surface activities are not impacting on surrounding water resources.	1. Mine manager 2. Environmental manager	Conduct daily inspections of hydraulic mining as soon as mining commences and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual groundwater monitoring of existing boreholes and 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting. Continue with biannual biomonitoring and reporting.
Hydraulic mining & slurry generation and pumping	Hydraulic mining will contribute to elevated noise level	1. Ensure environmental noise generation at boundaries and sensitive receptors is not excessive.	1. Environmental manager	Quarterly environmental noise monitoring.
Construction and utilisation of slurry pipelines from pump houses to Elikhulu Plant	Failure of slurry reticulation system and infrastructure will release mine water to the downstream environment, which will be of particular significance at river crossings	1. Ensure slurry pipelines are operating within their specifications, are not leaking and are maintained for operational life. 2. Ensure that spills on surface are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager	Continuous metering and recording of slurry entering and exiting the pipeline will provide an indication of leaks. Weekly inspections of ALL water management features, including pipelines and servitudes, for their operational life and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with quarterly groundwater monitoring and reporting during construction phase of existing boreholes and include the 2 additional boreholes NW and SE of TSF. During the operational phase, continue with biannual groundwater monitoring of existing boreholes and the 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting. Continue with biannual biomonitoring and reporting.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Increased dust and associated particulate matter emissions.	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Rehabilitation of	Poor rehabilitation will result	1. Ensure soil quality and quantity over rehabilitated	1. Environmental	Annual soil surveys until area are self-sustaining and stable.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
Winkelhaak and Leslie/Bracken TSF footprints	in sedimentation of downstream environments and water quality impairment.	areas is adequate for vegetation establishment to obtain grazing land capability. 2. Ensure proper vegetative cover over rehabilitated ground. 3. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities. 4. Ensure radiation clearance certificate is obtained prior to allowing run off from site to drain to natural catchments.	manager will contract a soil specialist 2. Environmental manager 3. Environmental manager will ensure that a flora specialist is contracted 4. Environmental manager	Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine. Annual floral surveys of rehabilitated areas for the life of mine. Monitoring of the rehabilitation success should take place for at least five years and include corrective follow-up action. Continue with radiation monitoring and auditing as per the existing EMP and NNR requirements.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Free drainage restored to area and downstream flow restored.	1. Ensure rehabilitated areas are not impacting on surrounding water resources.	1. Environmental manager	Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and removal of contaminating tailings material from the site	1. Ensure rehabilitated areas are not impacting on surrounding groundwater resources.	1. Environmental manager	Continue with biannual groundwater monitoring of existing boreholes and 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Eradication of two TSFs and profiling and rehabilitation of surface area.	1. Ensure soil quality and quantity over rehabilitated areas is adequate for vegetation establishment. 2. Reduce erosion, pooling of water and soil compaction in the general area and over rehabilitated areas. 3. Ensure proper vegetative cover over rehabilitated ground. 4. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities.	1. Environmental manager will contract a soil specialist 2. Environmental manager 3. Environmental manager 4. Environmental manager will ensure that a flora specialist is contracted	Annual soil surveys and reporting until area are self-sustaining and stable. Monthly visual inspections of the surface of rehabilitated areas for the life of mine, and maintain inspection log and photographic record. Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine and maintain inspection log and photographic record. Annual floral surveys and reporting of rehabilitated areas for the life of mine.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Revegetation and floral community establishment will attract animals to the area.	1. Ensure proper vegetative cover over rehabilitated ground. 2. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities.	1. Environmental manager 2. Environmental manager will ensure that a flora specialist is contracted	Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine and maintain inspection log and photographic record. Annual floral surveys and reporting of rehabilitated areas for the life of mine.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Alien invasive establishment and bush encroachment.	1. Control, with the aim of eradicating, alien and invasive species listed under CARA and NEM:BA from the relevant properties.	1. Environmental manager	Area must be generally inspected every 4 months and maintain inspection log; areas where plants were removed must also be revisited monthly to remove any new saplings.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	TSFs will be removed from property and visual aesthetic will be improved but land will remain mine land and may require some time to recover.	1. Ensure proper vegetative cover over rehabilitated ground. 2. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities.	1. Environmental manager 2. Environmental manager will ensure that a flora specialist is contracted	Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine and maintain inspection log and photographic record. Annual floral surveys and reporting of rehabilitated areas for the life of mine.
Rehabilitation of Winkelhaak and Leslie/Bracken TSF footprints	Radiation will persist and affect the immediate environment of the historic TSF footprints.	1. Ensure that no person is inadvertently exposed to threatening levels of radiation by knowing the existing status.	1. Environmental manager with the necessary specialist contractor	Radiation monitoring and reporting as prescribed by legislation.
Establishment of portable toilet	Potential contamination of surface water bodies and	1. Ensure no bacterial contamination of downstream water resources by including bacterial analysis of	1. Environmental manager	Weekly inspections of ALL water management features, including portable toilets. Incorporate bacterial assessment of nearby surface water and groundwater

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
facilities at the pump houses.	surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	water sources near to sewage treatment facility.		,monitoring points into the existing water monitoring plan.
Domestic waste generation at containerised offices at pump stations.	Potential surface contamination which will impact surrounding areas through runoff and seepage.	1. Prevent illegal littering and dumping of waste on site in undesignated areas.	1. Environmental manager	Monthly visual inspection of the site for illegal dumping of waste for the life of mine and maintain inspection log.
Reclamation of tailings facilities and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	1. Prevent impacts to surrounding environment.	1. Environmental manager	Monthly visual inspection surrounding area to ensure areas remain unaffected by mining activities.
New TSF (Expansion of Kinross TSF)				
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Soil erosion and associated sedimentation with reduced ingress and increased runoff with increased hydrological yield to downstream environments	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms and silt traps, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Reduction in groundwater quantity through reduced infiltration due to footprint development activities	1. Ensure active areas are not impacting on surrounding groundwater resources.	1. Environmental manager	Continue with quarterly groundwater quality monitoring and biannually level readings during construction phase of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit quarterly reporting.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Destruction of channelled and unchannelled valley bottom wetlands.	1. Ensure no deterioration in downstream wetland and aquatic ecosystems.	1. Environmental manager	Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of soil characteristics, erosion and compaction	1. Ensure stripping and stockpiling is done in accordance with the soil utilisation guide and stockpile heights are maintained. 2. Ensure soil quality in stockpiles/berms is adequate for vegetation establishment. 3. Reduce erosion and associated sedimentation on site.	1. Site manager 2. Environmental manager will contract a soil specialist 3. Site manager	Monthly inspection of material handling as soon as soil stripping commences and maintain inspection log. Annual soil surveys and reporting. General monthly inspection of site for erosion, ponding and soil compaction and maintain inspection log.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss in land capability	1. Ensure stripping and stockpiling is done in accordance with the soil utilisation guide and stockpile heights are maintained. 2. Ensure soil quality in stockpiles/berms is adequate for vegetation establishment. 3. Reduce erosion and associated sedimentation on site.	1. Site manager 2. Environmental manager will contract a soil specialist 3. Site manager	Monthly inspection of material handling as soon as soil stripping commences and maintain inspection log. Annual soil surveys and reporting. General monthly inspection of site for erosion, ponding and soil compaction and maintain inspection log.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Destruction of protected species.	1. Ensure destruction or relocation of protected species is legally undertaken. 2. Ensure that protected species on site not targeted for destruction / relocation do not deteriorate or come under threat from the proposed	1. Environmental manager 2. Environmental manager	Relocation / destruction of protected species will occur once-off before any activity commences in the area once permits are obtained. General monthly inspections of protected species within area for the life of mine and maintain inspection log and photographic record.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
		development.		
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of biodiversity through vegetation clearance and habitat destruction.	1. Maintain all demarcations for active and no-go areas. 2. Ensure all demarcated no-go zones are not impacted by indiscriminate activities.	1. Site manager 2. Environmental Manager	Monthly inspection of all demarcations / barriers and replacement of these as needed. General monthly inspection of all no go areas and nearby wetlands and CBA area to ensure no activity is taking place in these areas.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Alienation of, and disturbance to, animals.	1. Maintain all demarcations for active and no-go areas. 2. Ensure all demarcated no-go zones are not impacted by indiscriminate activities.	1. Site manager 2. Environmental Manager	Monthly inspection of all demarcations / barriers and replacement of these as needed. General monthly inspection of all no go areas and nearby wetlands and CBA area to ensure no activity is taking place in these areas.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Dust generation and particulate matter, which will result in elevated PM10 at Brendan Village, northern parts of Embalenhle and over the western parts of Evander.	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Loss of and disturbance to archaeological / heritage sites	1. Preserve any heritage and cultural sites that may be identified/uncovered during construction and excavation.	1. Social manager	Once-off prior to activities taking place.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Shallow excavations may affect subsurface fossils	1. Preserve any fossils that may be uncovered during construction and excavation.	1. Social manager	Once-off prior to activities taking place.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Significant levels of dust may emanate from the use of heavy construction vehicles which would impact on runoff water quality	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Clearing of vegetation, topsoil and subsoil stripping & base preparation.	Sedimentation of downstream water bodies and associated wetlands, including the Grootspruit.	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms, silt traps and flow dissipaters, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Topsoil and subsoil stockpiling.	Loss of soil characteristics, erosion and compaction	1. Ensure stripping and stockpiling is done in accordance with the soil utilisation guide and stockpile heights are maintained. 2. Ensure soil quality in stockpiles/berms is adequate for vegetation establishment. 3. Reduce erosion and associated sedimentation on site.	1. Site manager 2. Environmental manager will contract a soil specialist 3. Site manager	Monthly inspection of material handling as soon as soil stripping commences and maintain inspection log. Annual soil surveys and reporting. General monthly inspection of site for erosion, ponding and soil compaction and maintain inspection log.
Topsoil and subsoil stockpiling.	Alien invasive establishment and bush encroachment.	1. Control, with the aim of eradicating, alien and invasive species listed under CARA and NEM:BA from the relevant properties.	1. Environmental manager	1. Area must be generally inspected every 4 months and maintain inspection log; areas where plants were removed must also be revisited monthly to remove any new saplings.
Topsoil and subsoil stockpiling.	Dust generation and particulate matter.	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Topsoil and subsoil	Soil erosion and associated	1. Ensure stockpile heights and slopes are	1. Site manager	Monthly inspection of soil stockpiles and maintain inspection log.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
stockpiling.	sedimentation	maintained. 2. Ensure soil quality in stockpiles/berms is adequate for vegetation establishment. 3. Ensure erosion and associated sedimentation is properly managed on site. 4. Ensure stockpile areas are not impacting on surrounding water resources.	2. Environmental manager will contract a soil specialist 3. Site manager 4. Environmental manager	Annual soil surveys and reporting. General monthly inspection of site for erosion, ponding and soil compaction and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Topsoil and subsoil stockpiling.	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	1. Ensure the soils stockpile areas have been properly prepared .	1. Environmental manager	Once-off site inspection with sign-off and photographic evidence that area was appropriately prepared before soil stockpiling commenced.
Utilising roads, establishing access control and fencing.	Dust generation and particulate matter.	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Utilising roads, establishing access control and fencing.	Impairment of groundwater quality and surface water resources due to spillage of hazardous materials or oils and fuels.	1. Ensure vehicles, equipment and machinery do not leak. 2. Ensure that spills on surface are not impacting on surrounding water resources.	1. Site manager 2. Site manager	Weekly inspection of all service and maintenance plans/logbooks to ensure maintenance is scheduled in time. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with quarterly groundwater monitoring during construction phase of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit quarterly reporting. Continue with biannual biomonitoring and reporting.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment as the RWDs are constructed within a watercourse.	1. Ensure proper storm water diversion and separation and ensure adequately sized storm water management features. 2. Ensure effective storm water management and mine water containment.	1. Site manager 2. Environmental manager	Monthly inspection of all demarcations / barriers and replacement as needed. Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Annual inspections of all liners of dirty water trenches and PCDs. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Decrease in hydrological yield due to dirty water containment and downstream flow interruption with RWD constructed within a water course; will additionally impact on aquatic and wetland ecosystems	1. Maintain all demarcations for active and no-go areas. 2. Ensure proper storm water diversion and separation and ensure adequately sized storm water management features. 3. Ensure effective storm water management and mine water containment.	1. Site manager 2. Site manager 3. Environmental manager	Monthly inspection of all demarcations / barriers and replacement as needed. Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Annual inspections of all liners of dirty water trenches and PCDs. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Impairment of groundwater quality due to seepage or overflow from RWDs to underlying aquifers.	1. Ensure RWDs are not impacting on surrounding groundwater resources.	1. Environmental manager	Annual inspections of all liners of dirty water trenches and PCDs. Continue with quarterly groundwater quality monitoring and biannually level readings of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit quarterly reporting.
Construction of additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	Disturbance to nearby (87m) grave yard	1. Monitor as per the cultural management plan.	1. Social manager	At least monthly visual inspections to be carried out, but the requirements of the cultural management plan must be followed and logged.
Construction of	Disturbance to sections of	-	-	-

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
additional RWD (2 compartments), silt trap and dirty water collection trenches from TSF	an old farmstead adjacent to the RWD.			
Storm water diversion structures, including berm for the diversion of a water course	Construction & development of the Kinross TSF will change flow regime	1. Ensure proper storm water diversion with no pooling and ensure diversion berm is adequately sized.	1. Environmental manager	Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	TSF will permanently alter the topographical nature of the area.	1. Ensure that TSF construction is in line with engineered designs. 2. Ensure that TSF development is in line with engineered designs and best practices.	1. Site manager with engineer 2. Site manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records.
Tailings disposal and facility management through progressive rehabilitation	Polluted runoff from dirty areas will release mine water to the downstream environment if not properly contained	1. Ensure that TSF construction and development is in line with engineered designs and best practices. 2. Ensure effective storm water management and mine water containment.	1. Site manager with engineer 2. Environmental manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	Impairment of local tributaries and streams and day lighting of contaminated groundwater seepage will contaminate the nearby Grootspuit which is regionally connected and has national implications.	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms, silt traps and flow dissipaters, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	Wetland deterioration due to water quality impacts, should water from the TSF not be contained or through TSF failure.	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms, silt traps and flow dissipaters, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	Sedimentation of downstream water bodies and associated wetlands, including the Grootspuit.	1. Ensure that TSF construction and development is in line with engineered designs and best practices. 2. Ensure effective storm water management and mine water containment.	1. Site manager with engineer 2. Environmental manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	Transformation/loss of wetlands and changes to the topography and runoff characteristics affecting the flow quantity and fluctuation properties of the Grootspuit	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms, silt traps and flow dissipaters, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility	Impairment of groundwater quality due to leachate	1. Ensure that TSF construction is in line with engineered designs.	1. Site manager with engineer	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
management through progressive rehabilitation	seeping to underlying aquifers from the tailings facility.	2. Ensure that TSF development is in line with engineered designs and best practices. 3. Ensure effective storm water management and mine water containment.	2. Site manager 3. Environmental manager	annual audits and maintain inspection log with photographic records. Annual inspections of all liners of dirty water trenches and PCDs. Continue with biannual groundwater monitoring of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Tailings disposal and facility management through progressive rehabilitation	Alteration in ground water quantity and flow due to bulking of water under stockpiles and TSF.	1. Ensure that TSF construction is in line with engineered designs. 2. Ensure that TSF development is in line with engineered designs and best practices. 3. Ensure effective storm water management and mine water containment.	1. Site manager with engineer 2. Site manager 3. Environmental manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records. Annual inspections of all liners of dirty water trenches and PCDs. Continue with biannual groundwater monitoring of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Tailings disposal and facility management through progressive rehabilitation	Impacts to local streams impair water quality for downstream users and cattle watering	1. Ensure proper storm water diversion, separation and containment. 2. Reduce erosion, pooling of water and soil compaction in the general area. 3. Ensure active areas are not impacting on surrounding water resources.	1. Site manager 2. Environmental manager 3. Environmental manager	Weekly inspections of ALL water management features, including berms, silt traps and flow dissipaters, for their operational life and maintain inspection log. General monthly inspection of site for erosion, ponding and to determine areas that must be rehabilitated / repaired / seeded and maintain inspection log. Continue with monthly surface water monitoring and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Tailings disposal and facility management through progressive rehabilitation	Dust and PM generation with hazardous chemical components including arsenic, cadmium, cobalt and chromium from dried tailing material along the outer edges. Elevated PM10 levels may be experienced in Evander.	1. Ensure that dust levels and PM10 are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and annual PM10 assessments and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Tailings disposal and facility management through progressive rehabilitation	Alien invasive establishment and bush encroachment.	1. Control, with the aim of eradicating, alien and invasive species listed under CARA and NEM:BA from the relevant properties.	1. Environmental manager	Area must be generally inspected every 4 months and maintain inspection log; areas where plants were removed must also be revisited monthly to remove any new saplings.
Tailings disposal and facility management through progressive rehabilitation	Alteration in visual aesthetics and sense of place.	1. Ensure all material is stored in designated areas and the site is neat and orderly. 2. Maintain communication with I&APs and provide a platform for I&APs to lodge any comments.	1. Site manager 2. Social manager	General monthly inspections of areas for any materials not within designated areas, spills or litter and maintain inspection log. Daily inspection of complaints register.
Tailings disposal and facility management through progressive rehabilitation	Change in land use to mining.	1. Ensure that TSF construction is in line with engineered designs. 2. Ensure that TSF development and progressive rehabilitation is in line with engineered designs and best practices.	1. Site manager with engineer 2. Site manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records.
Tailings disposal and facility management through progressive rehabilitation	Existing TSF will be extended but remains within the mineral boundary and an active mine area.	1. Ensure that TSF construction is in line with engineered designs. 2. Ensure that TSF development is in line with engineered designs and best practices.	1. Site manager with engineer 2. Site manager	Continuous survey of base preparation and once-off sign-off by engineer. Monthly visual inspection of mine residue disposal and TSF development with annual audits and maintain inspection log with photographic records.
Tailings disposal and facility management through progressive rehabilitation	Radiation will affect the immediate environment of the TSF.	1. Ensure that no person can inadvertently be exposed to threatening levels of radiation.	1. Environmental manager with the necessary specialist contractor	Radiation monitoring and reporting as prescribed by legislation.
Domestic waste generation	Potential surface contamination which will	1. Prevent illegal littering and dumping of waste on site in undesignated areas.	1. Environmental manager	Monthly visual inspection of the site for illegal dumping of waste for the life of mine and maintain inspection log.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
	impact surrounding areas through runoff and seepage.			
Use of equipment during TSF expansion activities	Emissions into the atmosphere through use of diesel powered equipment, machinery and vehicles.	1. Ensure vehicles, equipment and machinery do not produce excessive noise and emissions and are not prone to leaks.	1. Site manager	Weekly inspection of all service and maintenance plans/logbooks to ensure maintenance is scheduled in time.
Use of equipment during TSF expansion activities	Increased noise levels.	1. Ensure equipment and machinery do not produce excessive noise and emissions and are not prone to leaks. 2. Ensure environmental noise generation at boundaries and sensitive receptors is not excessive.	1. Site manager. 2. Environmental manager	Weekly inspection of all service and maintenance plans/logbooks to ensure maintenance is scheduled in time. Quarterly environmental noise monitoring.
Expansion of Kinross TSF and associated activities detailed above	Contamination by way of slurry, hydrocarbon, dust, and waste to surrounding environment will be hazardous to flora and fauna.	1. Prevent impacts to surrounding environment.	1. Environmental manager	Monthly visual inspection surrounding area to ensure areas remain unaffected by mining activities.
Establishment of Elikhulu Plant and associated infrastructure adjacent to the existing plant				
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Polluted runoff from dirty areas and slurry spills will pollute the downstream environment if not properly contained	1. Ensure proper storm water diversion and separation and ensure adequately sized storm water management features. 2. Ensure effective storm water management and mine water containment.	1. Site manager 2. Environmental manager	Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Wetland deterioration due to water quality impacts that may arise from slurry spills and poor water containment at the plant.	1. Ensure proper storm water diversion and separation and ensure adequately sized storm water management features. 2. Ensure effective storm water management and mine water containment.	1. Site manager 2. Environmental manager	Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Excavation for the establishment of foundations will generate dust.	1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Emission of particulate matter, CO ₂ , SO _x and NO _x	1. Ensure that PM ₁₀ , SO _x and NO _x levels are within environmental limits 2. Ensure legal compliance through registration and reporting on NAEIS website.	1. Environmental manager 2. Environmental manager	Annual emissions recording. Once off registration on NAEIS and annual reporting to NAEIS.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Operation of the CIL Plant will contribute to noise levels.	1. Ensure equipment and machinery do not produce excessive noise and emissions and are not prone to leaks. 2. Ensure environmental noise generation at boundaries and sensitive receptors is not excessive.	1. Site manager. 2. Environmental manager	Weekly inspection of all service and maintenance plans/logbooks to ensure maintenance is scheduled in time. Quarterly environmental noise monitoring.
Construction and Operation of Elikhulu Plant (CIL plant with dedicated smelt house)	Deterioration in visual aesthetics and sense of place.	1. Ensure all material is stored in designated areas and the site is neat and orderly. 2. Maintain communication with I&APs and provide a platform for I&APs to lodge any comments.	1. Site manager 2. Social manager	General monthly inspections of areas for any materials not within designated areas, spills or litter and maintain inspection log. Daily inspection of complaints register.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpans dam)	Failure or flooding of dirty water infrastructure will release mine water to the downstream environment	1. Ensure proper storm water diversion and separation and ensure adequately sized storm water management features. 2. Ensure effective storm water management and mine water containment.	1. Site manager 2. Environmental manager	Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Annual inspections of all liners of dirty water trenches and PCDs. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Construction and operation of dirty water containment features (trenches, PCD & Event Pond) and process water supply dam (water sourced from Leeuwpans dam)	Impairment of groundwater quality due to seepage or overflow from dirty water dams at the plant to underlying aquifers.	1. Ensure dirty water dams are not impacting on surrounding groundwater resources.	1. Environmental manager	Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life. Annual inspections of all liners of dirty water trenches and PCDs. Continue with quarterly groundwater monitoring and reporting during construction phase of existing boreholes and include the 2 additional boreholes NW and SE of TSF. During the operational phase, continue with biannual groundwater monitoring of existing boreholes and the 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may impair quality of water runoff which could impact on the surrounding environment if not properly managed.	1. Ensure proper storage and handling of chemicals on site, ensure MSDSs are available for all chemicals stored on site and ensure chemical storage area is clean and clear of spills.	1. Environmental manager	Daily inspection of chemical storage and handling areas while chemicals are stored on site and maintaining inspection log. Continue with monthly surface water monitoring, biannually flow metering in downstream tributaries and nearby rivers and complete and submit quarterly reports. Continue with biannual biomonitoring and reporting.
Chemical / Reagent Storage	Impairment of groundwater quality due to ad hoc spillages at the plant seeping to underlying aquifers.	1. Ensure proper storage and handling of chemicals on site, ensure MSDSs are available for all chemicals stored on site and ensure chemical storage area is clean and clear of spills.	1. Environmental manager	Daily inspection of chemical storage and handling areas while chemicals are stored on site and maintaining inspection log. Continue with biannual groundwater monitoring of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Chemical / Reagent Storage	Spillages of hazardous material or incorrect storage of chemicals may lead to chemical fires, chemical gasses which will impair air quality and also be a risk to staff.	1. Ensure proper storage and handling of chemicals on site, ensure MSDSs are available for all chemicals stored on site and ensure chemical storage area is clean and clear of spills. Ensure proper evacuation procedures and training of staff on procedures in event of chemical spills.	1. Environmental manager 2. SHEQ Officer	Daily inspection of chemical storage and handling areas while chemicals are stored on site and maintaining inspection log. Continue with biannual groundwater monitoring of existing boreholes but include 2 additional boreholes NW and SE of TSF. Complete and submit annual reporting.
Ablutions and change house with sewage treatment plant	Irresponsible use of water and water wastage.	1. Record water usage to determine actual use, determine what water conservation measures can be put in place, determine any water spikes which may indicate faulty equipment. 2. Reduce the risk of spills and leaks to optimise water use and minimise wasting of water.	1. Environmental manager 2. Site manager	Continuous water metering and monthly recording for the life of mine. Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life.
Ablutions and change house with sewage treatment plant	Potential contamination of surface water bodies and surrounding environment through runoff with sewage and potential nutrient enrichment of aquatic environments.	1. Reduce the risk of spills and leaks to optimise water use and minimise wasting of water. 2. Ensure no bacterial contamination of downstream water resources by including bacterial analysis of water sources near to sewage treatment facility.	1. Site manager 2. Environmental manager	Weekly inspections of ALL water management features. Incorporate bacterial assessment of nearby surface water and groundwater monitoring points into the existing water monitoring plan.
General and hazardous waste	Potential surface contamination which will	1. Prevent illegal littering and dumping of waste on site in undesignated areas.	1. Environmental manager	Monthly visual inspection of the site for illegal dumping of waste for the life of mine and maintain inspection log.

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
handling	impact surrounding areas through runoff and seepage.			
Processing and associated activities detailed above	Contamination by way of slurry, hydrocarbon, chemicals, dust and waste to surrounding environment will be hazardous to flora and fauna.	1. Prevent impacts to surrounding environment.	1. Environmental manager	Monthly visual inspection surrounding area to ensure areas remain unaffected by mining activities.
Process water supply and reticulation				
Installation of barge & pump at Leeuwan Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Irresponsible use of water and water wastage through leaks which will alter downstream water dynamics	1. Record water usage and water volumes flowing at each end of the pipeline to determine actual use, determine what water conservation measures can be put in place, determine any water spikes/drops which may indicate faulty equipment or leaks. 2. Reduce the risk of spills and leaks to optimise water use and minimise wasting of water.	1. Environmental manager 2. Site manager	Continuous water metering and monthly recording for the life of mine. Weekly inspections of ALL water management features, water containment facilities, and all water-related infrastructures for their operational life.
Installation of barge & pump at Leeuwan Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Water balance completed for the Leeuwan Dam indicates the dam can provide the operation with requirements, but increased abstraction will reduce the size of the Leeuwan Dam. This will expose parts of the dam and aggravate dust generation.	1. Ensure soil quality and quantity over rehabilitated areas is adequate for vegetation establishment to obtain grazing land capability. 2. Ensure proper vegetative cover over rehabilitated ground. 3. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities.	1. Environmental manager will contract a soil specialist 2. Environmental manager 3. Environmental manager will ensure that a flora specialist is contracted	Annual soil surveys until area are self-sustaining and stable. Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine. Annual floral surveys of rehabilitated areas for the life of mine. Monitoring of the rehabilitation success should take place for at least five years and include corrective follow-up action.
Installation of barge & pump at Leeuwan Dam, water abstraction from the dam and reticulation through pipelines to TSF sites	Recreational use of the dam by the farmer will be affected by reduction in dam size.	1. Ensure soil quality and quantity over rehabilitated areas is adequate for vegetation establishment to obtain grazing land capability. 2. Ensure proper vegetative cover over rehabilitated ground. 3. Ensure that vegetation is establishing on rehabilitated areas and ensure the area is stabilising and self-sustaining in terms of vegetation communities.	1. Environmental manager will contract a soil specialist 2. Environmental manager 3. Environmental manager will ensure that a flora specialist is contracted	Annual soil surveys until area are self-sustaining and stable. Monthly visual inspection of vegetation establishment and germination over rehabilitated areas for the life of mine. Annual floral surveys of rehabilitated areas for the life of mine. Monitoring of the rehabilitation success should take place for at least five years and include corrective follow-up action.
Employment of staff, contractors				
Employment opportunities during construction – 700 jobs	Direct improvement of socio-economic situation of contractors and indirect benefits through multiplier effects.	As per S&LP requirements	As per S&LP requirements	As per S&LP requirements
Employment opportunities during operations – 250 jobs	Direct improvement of socio-economic situation of contractors and staff and indirect benefits through multiplier effects.	As per S&LP requirements	As per S&LP requirements	As per S&LP requirements
Local / Regional business	Local / Regional business support	As per S&LP requirements	As per S&LP requirements	As per S&LP requirements

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements For Monitoring	Roles And Responsibilities	Monitoring And Reporting Frequency And Time Periods For Implementing Impact Management Actions
Neighbouring business	Neighbouring business affected by working environment, machinery affected by elevated dust	<ol style="list-style-type: none"> 1. Ensure that dust levels are within environmental thresholds. 2. Ensure legal compliance through registration and reporting on NAEIS website. 	<ol style="list-style-type: none"> 1. Environmental manager 2. Environmental manager 	<p>Monthly dust monitoring and recording. Once off registration on NAEIS and annual reporting to NAEIS.</p>
Increased traffic largely passenger vehicles with additional employment and some trucks for machinery and equipment	Increased potential for road incidences.	<ol style="list-style-type: none"> 1. Maintain roads on site to reduce road incidences and ensure that intersections with public roads are maintained with appropriate signage and are as safe as possible for other road users. 2. Ensure that on site speed limits are enforced to reduce dust generation and road incidences. 	<ol style="list-style-type: none"> 1. Site manager 2. Site manager 	<p>Monthly inspections will be undertaken of all internal roads and intersections throughout the life of mine Speed inspections will be undertaken sporadically on site throughout the life of mine.</p>

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35 SPECIFIC MONITORING PLANS

35.1 SURFACE WATER MONITORING

35.1.1 Water Quality

Surface water quality monitoring is completed as part of the current EGM operations and must continue. These are conducted as monthly surface water sampling and biannually flow metering in downstream tributaries and nearby rivers. The results must be submitted in quarterly reports to the DWS.

35.1.2 Water management features

Weekly inspections of all water management features, water containment facilities, and all water-related infrastructures must be carried out during the operational life. Monitoring must also ensure adequately sized storm water management features, effective storm water management and mine water containment. Monitoring of the storm water management features must be done to ensure proper storm water diversion and separation is occurring through all phases of the project.

Annual inspections of all liners of dirty water trenches and PCDs must be done.

35.2 GROUNDWATER MONITORING

Groundwater quality monitoring is completed as part of the current EGM operations and must continue. This must be done on the existing boreholes (Plan 15 in Part A) but must include 2 additional boreholes located northwest and southeast of the new TSF. Groundwater quality and levels must be assessed quarterly and biannually respectively and reported. Groundwater quality and levels must be assessed biannually and reported on annually during the operational phase. Monitoring will continue for a period of at least 3 years post closure.

35.3 AQUATIC BIOMONITORING

Aquatic biomonitoring has been on-going since 2011 of the full EGM MRA as part of the existing EMP. The latest biomonitoring reports are completed by Scientific Aquatic Services (SAS, 2016) and included in Appendix 11. Six bio-monitoring sites are studied, which are upstream and downstream of possible point and diffuse sources of pollution associated with the EGM area. Four rivers, namely the Grootspruit, Wildebeesspruit, Winkelhakspruit and the Waterval Stream are assessed. This biomonitoring plan must continue to be implemented throughout the life of the proposed project as well as for at least five years after decommissioning phase.

35.4 VEGETATION MONITORING

35.4.1 Alien and invasive plants

An alien and invasive management plan must be implemented on site from the onset of construction throughout the life of mine. Area must be generally inspected every 4 months and maintain inspection log. Control, with the aim of eradicating, alien and invasive species listed under CARA and NEM:BA from the relevant properties must be carried out. Areas where plants were removed must also be revisited monthly to remove any new saplings.

35.4.2 Monitoring of Relocated SCC

The EIA process confirmed the presence of three Declining species and one Near Threatened species. Relocation / destruction of protected species will occur once-off before any activity commences in the area once permits are obtained. General monthly inspections of protected species within area for the life of mine and maintain inspection log and photographic record.

35.5 ATMOSPHERIC CONDITIONS

35.5.1 Air Quality

Dust monitoring in the surrounding areas indicates that dust levels are below national standards except for sporadic exceedances allowed under legislation. It is thus recommended that monthly dust fallout monitoring as per the National Dust Control Regulations (2013) is conducted with required reporting during construction and operation phases (Rayten, 2017).

In addition, stack emissions monitoring will need to be conducted annually during the operational phase. If emission rates exceed the acceptable limits for sub-category 4.1 (Drying and Calcining) and sub-category 4.17 (Precious & Base Metal Production and Refining) then pollution control technology will need to be installed to reduce emissions.

35.5.2 Noise

Existing noise readings taken in 2011 around the Kinross TSF and Plant indicated acceptable noise limits (38-50dB) with slightly elevated noise at stations near the road (<70dB). A noise level monitoring programme is proposed to be implemented to monitor these locations. Additional locations will need to be monitored near the Leslie and Winkelhaak TSF's when they are being mined.

Ambient noise is to be monitored on a quarterly basis at the desired monitoring sites. Where exceedances are observed at boundaries further assessments will be made

at sensitive receptors beyond that boundary to determine if mitigation measures need to be applied regarding noise at these sites. Noise level data recorded will be available on site for inspection purposes.

35.6 RADIATION MONITORING

EGM has an established Public Radiation Protection Program (PRPP2015) which includes environmental monitoring according to the NNR Requirement Document RD-007. EGM must continue with this radiation monitoring and include the new sources as proposed in this application; i.e. the new Elikhulu Plant and Expanded Kinross TSF as well as relevant associated infrastructure.

In addition, random monitoring must be conducted to determine the radiation exposure as required by the Worker Radiation Protection Program.

36 INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT

All information as required by the various Government Departments should be captured and be readily available for submission when required and also for review by the external consultant conducting the performance assessment and audits.

As per NEMA EIA Regulations (GNR982 of 2014), a performance assessment/audit will be conducted by an external consultant throughout the life of mine at intervals stipulated in the EA. It is recommended to complete these audits annually. This is conducted to assess the adequacy and compliance to the EMP and the relevant legislation. As per NEMA, any amendments to the EMP that may be required due to the performance assessment findings will be completed if necessary.

The Quantum of the Financial Provision will be reviewed on an annual basis, and submitted to the DMR.

In addition to the NEMA requirements, the IWUL will be audited as per conditions once this is obtained, at which time the site will also be audited against GN704. The IWWMP will be updated annually once approved.

37 ENVIRONMENTAL AWARENESS PLAN

37.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM EMPLOYEES OF ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK

37.1.1 Training Needs

Environmental awareness and training is already a part of the operating procedures of EGM and will continue to be so with the proposed project. It is important for employees to be fully aware of the risks of the work and thus training is an important part of managing this risk as well as ensuring the correct response and remedial actions are followed in the case of an incident.

A training needs analysis can be performed through all levels of the organization for the new and existing employees. After the training needs have been identified, it is the responsibility of the Safety, Health and Environment (SHE) Office to ensure that personnel attend the relevant identified training, either existing or new. Training will aim to address the specific measures and actions as listed in this EIA and EMP as well as existing ones.

An existing Emergency Response Report is provided in Appendix 19 and can be referred to for details. The Emergency Plan is and will be presented to all new and existing employees attending induction or refresher training at the EGM Training Centre. Furthermore, monthly environmental awareness training occurs, has already been planned for the year of 2017 and includes the program as summarised below.

Table 47: Planned monthly topic schedule for environmental training


 <p>EVANDER GOLD MINING (PTY) LTD A Subsidiary of Pan African Resources</p>	<h1>EVANDER GOLD MINE</h1>
<h2>Monthly Environmental Topic Schedule</h2>	
Month	Topic
January 2017	Environmental Policy
February 2017	Environmental Legislation / Law
March 2017	1. Water Pollution 2. National Water week
April 2017	Procedure for cleaning up of hydrocarbon and chemical spillages
May 2017	Environmental incidents reporting procedure
June 2017	1.Veld fire 2.World Environment day
July 2017	Bund wall and bund wall procedures
August 2017	1.Air pollution 2.Electricity(energy saving)
September 2017	1. Littering in sumps, Drains and trenches-storm water management 2.National Arbor week 3. National Ozone day
October 2017	1.Oil recycling 2.World habitat day 3.National Marine week
November 2017	1.Material Safety data Sheets 2.Procedure for handling and clean-up of spills(epr005)
December 2017	Use of drip trays

Table 48: General Environmental Awareness Training Requirements

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge And Input	Training Required	Interval
Senior Management including Process Managers and Head of Department	Managing the S&LP and the Safety, Health & Environmental (SHE) Management System	<p>Understanding the purpose of the SHE Management System</p> <p>Knowledge of the significant impacts as described in the EIA/EMP during the various LoM phases</p> <p>Knowledge of the commitments and management proposed within the EMP</p> <p>Setting and reviewing the mine's Environmental objectives</p> <p>Emergency preparedness and response</p>	<p>General in-house, management training on the EIA and EMP report</p> <p>Training on the applicable environmental legislation</p>	<p>Once off</p> <p>Annually</p>
Environmental Management Representative, SHE Officer & Internal Auditor	Managing the SHE Management System, Monitoring and auditing	<p>Understanding the purpose of the SHE Management System</p> <p>Knowledge of the significant impacts as described in the EIA/EMP during the various LoM phases</p> <p>Knowledge of the commitments and management proposed within the EMP</p> <p>Setting and reviewing the mine's Environmental objectives</p> <p>Directing the SHE management system, and monitoring their progress</p>	<p>General in-house, management training on the EIA and EMP report</p> <p>Training on the applicable environmental legislation and best practice guidelines</p>	<p>Once off</p> <p>Annually</p>
		<p>Emergency preparedness and response</p> <p>Knowledge in spill management, stockpile management, discard management, water management and waste</p>	<p>Meetings and Talk Topics</p>	<p>Continuous</p>

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge And Input	Training Required	Interval
		management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
		Knowledge of the SABS standards and other relevant legislation regarding the correct storage of chemicals	Training on the SABS standards and other legislation	Annually
		Knowledge of auditing techniques and report writing	Auditor training	Once off
Section Managers & Section Engineers	Implementation and daily management of the SHE Management System	Understanding the purpose of the SHE Management System Knowledge of the significant impacts as described in the EIA/EMP during the various LoM phases Knowledge of the commitments and management proposed within the EMP	General in-house, management training on the EIA and EMP report	Once off
		Emergency preparedness and response Knowledge in spill management, stockpile management, discard management, water management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in correct storage of chemicals	Meetings and Talk Topics Environmental Awareness Training as part of the annual induction training	Continuous Annual

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge And Input	Training Required	Interval
Engineering HOD & General Engineering Supervisor	Implementation and daily management of the SHE Management System	<p>Understanding the purpose of the SHE Management System</p> <p>Knowledge of the relevant department's significant impacts as described in the EIA/EMP during the construction and operational phases</p> <p>Actively implementing actions to achieve compliance with the EMP and Environmental Objectives.</p>	General in-house, management training on the EIA and EMP report	Once off
		<p>Emergency preparedness and response</p> <p>Knowledge in spill management, stockpile management, discard management, water management and waste management</p> <p>Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting</p> <p>Knowledge in correct storage of chemicals</p>	<p>Meetings and Talk Topics</p> <p>Environmental Awareness Training as part of the annual induction training</p>	<p>Continuous</p> <p>Annual</p>
Mine Captain & General Engineering Supervisors	General Environmental Awareness and job specific impacts	<p>General Awareness of aim and purpose of the SHE Management System</p> <p>Understanding the EMP relevant to their operations</p> <p>Understanding the requirements for not polluting the environment</p> <p>General understanding of the relevant Operational procedures,</p>	Environmental Awareness Training as part of the annual induction training	Annual

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge And Input	Training Required	Interval
		Emergency Response Plans and Incident reporting		
		Knowledge in spill management and waste management Knowledge of the relevant Operational procedures, Emergency Response Plans and Incident reporting Knowledge in the correct storage and handling of chemicals Understanding the requirements for not polluting the environment	Meetings and talk topics	Continuous
Supervisors, Shift Boss & Forman	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SHE Management System Understanding the EMP relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training as part of the annual induction training	Annual
Operators, tradespersons & Floor Employees	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SHE Management System Understanding the EMP relevant to their operations Understanding the requirements for not polluting the environment	Environmental Awareness Training as part of the annual induction training	Annual

Occupation Category	Environmental Management Responsibility / Role	Required Knowledge And Input	Training Required	Interval
		General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting		
General Administration Staff	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SHE Management System Understanding the EMP relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training as part of the annual induction training	Annual
Security	General Environmental Awareness and job specific impacts	General Awareness of aim and purpose of the SHE Management System Understanding the EMP relevant to their operations Understanding the requirements for not polluting the environment General understanding of the relevant Operational procedures, Emergency Response Plans and Incident reporting	Environmental Awareness Training as part of the annual induction training	Annual

37.1.2 Specialised Skills

The Training Department in conjunction with the SHE Officer are responsible for ensuring job specific training for personnel performing tasks, which can cause significant environmental and social impacts (e.g. receipt of bulk hazardous chemicals/fuel, hazardous materials handling, responding to emergency situations etc.). The Mine Manager with the assistance of the SHE Officer must identify relevant personnel and training courses.

37.1.3 Review of Training Material

Effectiveness of the environmental management training will be done by the management through task observations and during internal and external audits. All training material for presentation to personnel and contractors will be reviewed annually to ensure consistency with organisational requirements and best practice guidelines. In addition to this, annual monitoring reports, audit results and all incident reports will be reviewed; any short comings and non-compliance will be highlighted and management measures incorporated or improved upon within the training material.

37.1.4 Records

Records from the implementation of this environmental awareness plan will be kept and controlled in accordance with the SHE Management System Control of Records Procedure, which is required to be implemented so as to provide evidence of conformity and effective operation of the relevant requirements of the SHE management system.

37.2 MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT

EGM has an Emergency Plan formulated from risk assessments that were conducted throughout the entire Evander Division surface operations. The plan addresses all probable emergencies, both general in nature (such as a flood or tornado) and specific to the facility (fire, power failure or hazardous chemical spill). The report detailing the plan was complete in April 2014 but is updated regularly with the latest revision dated April 2016.

The Emergency Response Report is provided in Appendix 19 and must be referred to for details. This report contains detailed procedures for the following:

- Fires, including:
 - Plant or vehicle fires;
 - Surface veld fires;

- Surface structure fires; and
 - Other surface fires;
- Bomb threats;
- Natural Perils;
- Hazardous chemical spills;
- Personal Medical Condition;
- Worker Unrest;
- Large seismic event;
- Surface Flooding;
- Surface power failure;
- Accident / Incident;
- Explosion;
- Cyanide related procedures including:
 - Cyanide exposure due to explosion;
 - Liquid Cyanide spillage;
 - Cyanide exposure;
 - Cyanide Emergency Drill procedure
 - Cyanide poisoning;
 - Cyanide exposure on TSF; and
 - Hydrogen cyanide gas generation exposure
- Slimes Dam failure;
- Search, Rescue and All clear notification;
- Evacuation procedure; and
- Environmental Procedures for:
 - Cyanide monitoring of borehole water
 - Cyanide monitoring of surface water

In the case of environmental emergencies, the remedial measures and actions as listed in the Emergency Response Plan should be followed, in addition the relevant authorities should be contacted; these are listed below:

Dept. of Water Affairs:	012 – 392 1300
Dept. of Mineral Resources:	013 – 653 0500

38 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

All information committed to in the scoping report and as requested by the DMR to date has been incorporated in the EIA/EMPr, including:

- Superimposed map with proposed activities and infrastructure with buffers for environmental sensitive areas included in the document and in Appendix 2 as A3.
- A3 size locality map is included in Appendix 2.
- A3 maps of area of exact location of proposed development to development to have the following attributes: maps related to on another, coordinates, legends, indicating alternatives, scale and vegetation types included in Appendix 2.
- Financial provisions for rehab, closure and on-going post decommissioning management.
- Feasible and reasonable alternatives identified and assessed.
- PPP to be transparent and all comments included in EMP.
- Proof of correspondence with stakeholders.
- Comments from I&APs to be in EIA.
- For linear activities, coordinates of corridor where activities will be undertaken.
- Another other matters required in Appendix 3(3) and Appendix 4 (1) on EIA Reg 2014

39 REFERENCES

- Archaetnos, 2017. A Report on a Cultural Heritage Impact Assessment for Additional Infrastructure at the Evander Gold Mine, Mpumalanga Province. Archaetnos Culture & Cultural Resource Consultants.
- Bamford, 2017. Palaeontological Impact Assessment for the proposed re-mining and expansion of Kinross dump, Mpumalanga Province. Prof Marion Bamford, Evolutionary Studies Institute, University of the Witwatersrand
- De Wet, 2011. Evander Gold Mine Terrestrial Biodiversity Survey.
- Dimela, 2016. Vegetation composition and plants of conservation concern survey. Report drafted for Cabanga Environmental for the Evander Gold Mines Limited Tailings Storage Facility (Option C) Project. Dimela Eco Consulting.
- DRA, 2016. Elikhulu TSF Project Mining Report. DRA Ref:KZADP00125.
- DRA, 2016. Water Balance Report. Elikhulu Project Technical Note 005, Document Number: KZADBP00125-PM-TDN-0005
- EGM, 2016. Emergency Response Plan.
- EXM, 2017. Evander Gold Mines (Pty) Ltd Review, Assessment and Adjustment of Financial Provision for 2016. EXM Advisory Services
- Future Flow, 2016. Evander Gold Mine Waste Classification Study. Future Flow Reference: CAB.16.012. Future Flow Groundwater and Project Management Solutions
- HOH Lab CC, 2011. Environmental Noise & Pm10 Assessment, Harmony Evander Gold Mine, Evander. Report No: HAR/ENV001/01/11. Health and Occupational Hygiene Laboratory CC
- Letsolo, 2016. Hydrological Impact Assessment For Re-Processing Of Kinross, Winkelhaak, And Bracken/Leslie TSFs Situated In The Magisterial District Of Govan Mbeki: Mpumalanga Region. Report Reference: LWES 350
- Limosella, 2011. Wetland Assessment Report. Harmony Gold Mining Co Ltd.'s Evander Operations Property Area, Mpumalanga Province. . Limosella Consulting (Pty) Ltd
- Limosella, 2016. Wetland/Riparian Delineation and Functional Assessment, Expansion of Evander/Kinross Dump, Evander, Mpumalanga Province. Limosella Consulting (Pty) Ltd

Mucina, L. and Rutherford, M.C. (eds) 2012. *The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19*. South African National Biodiversity Institute, Pretoria.

Pan Africa, 2015. Social and Labour Plan for Evander Gold Mining (Pty) Ltd.

Rayten, 2017. Air Quality Impact Assessment for Evander Gold Mine, Elikhulu Gold Project. Rayten Project No: RES-CE- 16/1519, Rayten Engineering Solutions

SAS, 2011. PES, Wetland Function And Service Assessment For The Leeuwpan Wetland Located in the Vicinity Of The Harmony Gold Mine, Evander, Mpumalanga. Scientific Aquatic Services CC.

Shangoni, 2016. Geohydrological Impact Assessment and Model Update for a Water Use License Application and EIA of the Extension of Kinross TSF footprint and construction of new treatment plant. Project Number: AS-PAN-EVA-16-09-05. Shangoni AquiScience, a division of Shangoni Management Services (Pty) Ltd

SLR, 2016. Site Selection Process Report. Project Reference: 720.04026.00009. SLR Consulting (South Africa) (Pty) Ltd

SLR, 2016. Calculation of the Life of Mine Closure Liability Associated with the Elikhulu Tailings Storage Project, Note for the Record NR 08. Project Reference: 720.04026.00009. SLR Consulting (South Africa) (Pty) Ltd

SLR, 2017. Elikhulu Project Tailings Storage Facility Preliminary Design Report. SLR Project No.: 720.04026.00009. SLR Consulting (South Africa) (Pty) Ltd

40 UNDERTAKING

The EAP herewith confirms

- a) The correctness of the information provided in the reports
- b) The inclusion of comments and inputs from stakeholders and I&APs ;
- c) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed;

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