

Appendix G. Environmental Management Programme

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
1	APPOINTMENTS, ROLES AND RESPONSIBILITIES		
1.1	Environmental Control Officer (ECO)		
	Environmental Aspect / Impact Source:		
	Non-compliance with the EMP due to a lack of understanding and delegation of responsibilities.		
	Goals and Objectives:		
	Define organisational and administrative arrangements for Environmental Management Programme (EMP) implementation. Adequate management and mitigation of environmental impacts.		
	Mitigation Measures:		
1.1.1	An ECO is to be appointed for the construction phase of the project.	Prior to construction.	
1.1.2	The ECO to oversee the implementation of the EMP on a day to day basis, verifying that the EMP mitigation measures and conditions of all authorisations and approvals are adhered to at all times, and to act as guide and advisor to Contractors and personnel on matters related to EMP implementation.	Ongoing	
1.1.3	Where necessary, the ECO to develop and oversee implementation of EMP procedures, to give effect to the commitments of the EMP. EMP procedures are live documents and the ECO may amend them from time to time to bring them in line with environmental conditions and issues pertaining to the New Kathu Cemetery and surroundings. However, there cannot be any deviation from the approved EMP without approval from the Competent Authority.	As required.	
1.1.4	Where necessary, the ECO to issue EMP instructions to Contractors or any party present on site to address and correct non-compliances with the EMP and specific environmental issues pertaining to the New Kathu Cemetery and surroundings.	As required.	
1.1.5	The ECO to provide a copy of the EMP (and all updates / amendments) to Contractors appointed. Records to be kept of documents issued, including details and signature of Contractors' responsible person to whom the documents were issued.	As required.	
1.1.6	The ECO to provide copies of EMP procedures (and all revisions) to Contractors appointed, if the procedures apply to the nature of their activities and contract. The ECO to keep proof that documentation has been provided to the Contractor.	As required.	
1.1.7	The ECO to be responsible for regular internal inspections of the New Kathu Cemetery area and surroundings to monitor and verify that the EMP is implemented and that environmental impacts are kept to a minimum during construction. Records of findings to be kept and submitted to management.	Weekly inspections. EMP verification every two months.	
1.1.8	The ECO to arrange, facilitate, attend and minute regular meetings to discuss environmental performance and EMP implementation with the Contractors' project manager.	Monthly.	

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		Construction	Operation
1.1.9	The ECO to keep records of all matters concerning compliance monitoring, environmental performance and EMP implementation in the incident reporting system and to make it available for inspection to a relevant and competent authority in respect of this project.	Ongoing, as required.	
1.1.10	The ECO to keep a legal register, listing legislation applicable to the project and a summary of how the legislation applies to the project.	Ongoing	
1.1.11	The ECO to keep copies of the approved EMP and all authorisation / approval letters on site. The authorisations / approvals to be produced to authorised officials of a relevant or competent government department who requests to see it and to be made available for inspection by any employee or agent of the holder of the authorisation who works or undertakes work at the site.	Annually	
1.1.12	In addition to EMP compliance, the ECO is to monitor overall environmental compliance with relevant legislation.	Ongoing	
1.1.13	The ECO shall maintain copies of all correspondence to and from competent authorities.	Ongoing	
1.1.14	The ECO to produce regular environmental reports for submission to the Gamagara Local Municipality management, covering EMP compliance, general environmental performance, incidents, complaints, EMP procedures and instructions issued, and results of meetings and inspections during the reporting period.	Quarterly	
1.1.15	The ECO is to submit compliance reports to the Gamagara Local Municipality Management / Project Manager.	Quarterly	
1.1.16	The ECO to report environmental incidents and major EMP non-compliances (that could result in significant environmental damage or pollution) to the Gamagara Local Municipality Management / Project Manager who will then be responsible to report to competent authorities.	As soon as possible, but at least within 24 hours	
1.1.17	The ECO is to manage environmental incidents in accordance with a formal incident response and reporting procedure.	Ongoing, as required	
1.1.18	The ECO to oversee environmental awareness induction training to all contractor staff.	Prior to individuals starting work on site	
1.1.19	The ECO to ensure that the necessary environmental induction training takes place and that records of attendance are maintained and up to date.	Ongoing	
1.1.20	The ECO to put in place an incident reporting procedure and to keep this up to date at all times.	At start of construction phase, ongoing thereafter	
1.1.21	Other duties as listed as being the ECO's responsibility under various EMP headings.	Ongoing	
1.1.22	The ECO to manage the process of submitting any proposed changes/amendments to the EMP to the competent authorities for approval before such changes can be implemented.	Every six months, or as required	
1.1.23	ECO to arrange regular submission of monitoring and compliance reports (performance assessments and other audits) to competent authorities as required by the various authorisations issued.	Quarterly	
1.2	Site Supervisor / Manager		

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		Construction	Operation
	Environmental Aspect / Impact Source:		
	Non-compliance with the EMP due to a lack of understanding and delegation of responsibilities.		
	Goals and Objectives:		
	Adequate management and mitigation of environmental impacts.		
	Mitigation Measures:		
1.2.1	A site supervisor / manager is to be appointed during the operation phase for the establishment of graves.		Prior to operation
1.2.2	The site supervisor is to be appropriately trained with regard to implementation of the EMP conditions and is to ensure compliance with the EMP conditions throughout the operation phase.		Prior to operation
	The site supervisor is to ensure implementation of the burial procedure.		Ongoing
1.3	Contractors		
	Environmental Aspect / Impact Source:		
	Non-compliance with the EMP due to a lack of understanding and delegation of responsibilities.		
	Goals and Objectives:		
	Define organisational and administrative arrangements for EMP implementation. Adequate management and mitigation of environmental impacts.		
	Mitigation Measures:		
1.3.1	Contractors to familiarise themselves with the EMP and to ensure that contract prices allow for environmental legal compliance and costs associated with EMP implementation.	Ongoing	Ongoing
1.3.2	Contractors to comply with the EMP where it applies to the nature of their activities and contract. Compliance requirements are to be included in contracts.	Ongoing	Ongoing
1.3.3	Contractors to implement EMP amendments, EMP procedures and written EMP instructions issued to them by the ECO (during construction) and the site supervisor/ manager (during operation), within the timeframe specified in the EMP procedure or instruction.	Ongoing	Ongoing
1.3.4	Contractors not to deviate from the procedures and instructions issued without written approval by the ECO (during construction) and site supervisor/ manager (during operation).	Ongoing	Ongoing
1.3.5	Contractors to ensure that their workforce, sub-contractors and suppliers comply with the EMP.	Ongoing	Ongoing
1.3.6	Contractors to be responsible for rectifying and rehabilitating, at their own expense, any environmental damage caused by their activities on the New Kathu Cemetery and surroundings. Measures to repair damage and rehabilitate the affected area to be approved and signed off by the ECO (during construction) and site supervisor/ manager (during operation).	Ongoing	Ongoing

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		Construction	Operation
1.3.7	Instructions must be included in contracts that will restrict work and workers to the clearly defined limits of the cemetery site.	At start of construction phase.	At start of construction phase.
2	TRAINING AND AWARENESS		
	Environmental Aspect / Impact Source:		
	Environmental impacts resulting from an insufficient understanding of risks associated with work conditions and job description, resulting in insufficient "duty of care".		
	Goals and Objectives:		
	Ensure adequate knowledge and understanding of EMP stipulations, policies and procedures. Understanding the interface between the work environment and environmental protection.		
	Mitigation Measures:		
2.1	All workers, suppliers and service providers entering the construction site to attend and undergo environmental awareness induction training session covering key environmental issues pertaining to the site and surroundings.	Upon appointment and before entering the site	Upon appointment and before entering the site
2.2	Maintain a record of all individuals attending an environmental induction session.	Ongoing	Ongoing
2.3	Individuals dealing with potential hazardous situations that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage to receive appropriate job-specific training and to be aware of the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.	Ongoing	Ongoing
2.4	Maintain a record of all individuals receiving job-specific training.	During each training session	During each training session
3	ISSUES REGISTER AND MANAGEMENT		
	Environmental Aspect / Impact Source:		
	Hazardous spills, pollution occurrences, excessive dust or other forms of environmental damage. Recurring environmental incidents. Complaints by third parties.		
	Goals and Objectives:		
	Adequately assess root cause of incidents in order to develop and implement appropriate corrective actions and prevent incidents from recurring.		
	Mitigation Measures:		

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3.1	A detailed mechanism for communities to lodge concerns, suggestions and complaints which can be dealt with by the New Kathu Cemetery in a timely manner.	Prior to construction	Prior to construction
3.2	An issues register and procedure to be implemented and kept up to date at all times.	At start of construction phase, ongoing thereafter	At start of construction phase, ongoing thereafter
3.3	Complaints to be reported in writing as per the issues procedure.	As required	As required
3.4	All complaints to be investigated and appropriate corrective actions to be implemented, including measures to prevent recurring complaints.	As required	As required
3.5	Upon completion of construction, an operations phase complaints register and procedure to be put in place and kept up to date at all times.	At end of construction, ongoing thereafter	Ongoing
4	MONITORING AND AUDITING		
	Environmental Aspect / Impact Source:		
	Continued environmental degradation due to a lack of information about environmental performance. Lack of communication may result in delays in adequately addressing pertinent environmental issues. Legal non-compliance.		
	Goals and Objectives:		
	Provide information and ensure early detection of the impact of the construction activities upon the receiving environment. Recognise environmental changes in order to enable analysis of their cause. Maintain accurate records and transparent communication with regulatory bodies. Keeping regulatory body up to date with the development.		
	Mitigation Measures:		
4.1	General compliance with the EMP to be monitored and verified through regular inspections of the construction site and surroundings.	Daily	
4.2	The Contractors' activities and their compliance with the EMP to be monitored and verified through regular inspections of areas where the Contractors operate.	Weekly when contractors are on site	Weekly when contractors are on site
4.3	Records of the timeframes and scope of monitoring and verification inspections to be kept on file.	As required	As required
4.4	Monitoring and inspections to be conducted as outlined in the individual sub-sections of the EMP (i.e. dust deposition). Records will be kept on file.	As required.	
4.5	Regular meetings to be conducted between Contractors' project manager and ECO to discuss EMP compliance and/or environmental issues and/or an environmental awareness topics and general environmental performance. Minutes of meetings will be kept on file.	Monthly	

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4.6	Written EMP instructions to be issued to Contractors to address non-compliances with the EMP or other environmental issues related to the Contractors' activities on the construction site and surroundings. All instructions and records of measures implemented to address the issues will be kept on file.	As required	
4.7	Regular environmental audits will be conducted, covering:	Quarterly, or as required	
	Compliance with environmental authorisation and license conditions.		
	Compliance with the EMP.		
	Adequacy of the EMP and level of environmental-legal compliance.		
	Recommendations for EMP amendments to address inadequacies.		
	EMP procedures to be developed and issued to the Contractors.		
	EMP instructions to be issued to the Contractors.		
4.8	Environmental monitoring during operations as per established development owner practices.		Ongoing, or as required
5	ENVIRONMENTAL RISKS AND EMERGENCIES		
	Environmental Aspect / Impact Source:		
	Negative public perception. Community mobilisation. Environmental impact		
	Goals and Objectives:		
	Ensure control measures are developed and implemented to ensure efficient and effective response to emergency incidents/ events.		
	Mitigation Measures:		
5.1	Potential significant environmental risks and emergency situations will be identified and specific emergency procedures will be developed.	At start of construction, as required thereafter	At start of construction, as required thereafter
5.2	Emergency response planning to be undertaken with input from municipal health and emergency services and local police.	At start of construction, as required thereafter	At start of construction, as required thereafter
5.3	Interactive and hands-on competency training will be provided for individuals responsible for emergency response.	Upon appointment, as required thereafter	Upon appointment, as required thereafter

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5.4	Telephone numbers of emergency services, including firefighting service, shall be available on site.	Ongoing	Ongoing
5.5	All fences will be routinely inspected and maintained.	Weekly	Weekly
6	WATER USE AND CONSUMPTION		
	Environmental Aspect / Impact Source:		
	Depletion of natural water resources.		
	Goals and Objectives:		
	Optimisation of natural resource consumption and conservation.		
	Mitigation Measures:		
6.1	Minimise water consumption, create awareness and encourage all staff to use water sparingly.	Ongoing	Ongoing
7	SOIL		
	Environmental Aspect / Impact Source:		
	Soil disturbance, loss of nutrients, loss of topsoil cover, loss of in situ structure and physical / chemical properties, soil compaction and erosion.		
	Goals and Objectives:		
	Optimise availability and viability of soil as growth medium to enable sustainable vegetation cover after rehabilitation. Maximise topsoil availability for rehabilitation of construction areas and disturbed areas at the New Kathu Cemetery.		
	Mitigation Measures:		
7.1	All soils compacted as a result of project activities should be ripped and profiled. Special attention should be paid to alien and invasive plant control within these areas.	Where applicable	Where applicable
7.2	Areas that do not need to be used at the end of construction are to be ripped and revegetated with an indigenous grass mixture.	Ongoing	
7.3	Soil stripping to only occur where soils are to be disturbed by activities that are required for construction of the ablution facilities, the new Dingleton intersection and where the fences are to be placed. Soil is to be replaced to the same layer as removed, with topsoil not being mixed with subsoil.	Ongoing	
7.4	Soils to be replaced timeously to minimise the area of disturbance.	Ongoing	
7.5	Soils to be adequately protected from wind and water erosion.	Ongoing	
7.6	Soils to be effectively covered and protected from wind (dust) and dirty water contamination.	Ongoing	

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7.7	Topsoil will be temporarily stockpiled for reuse in the immediate rehabilitation following fence erection and each grave being filled.	Ongoing	Ongoing
7.8	Stockpiles will not be located in areas prone to flooding or where the flow of water could cause ponding of water or soil erosion.	Ongoing	
7.9	Soil horizons should be replaced in the correct order to allow re-establishment of vegetation where possible.	Ongoing	Ongoing
7.10	Equipment movement on top of the exposed soil will be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank.	Ongoing	
7.11	Soils that are compacted as a result of construction activities outside of the development footprint to be ripped and profiled, special attention to be paid to alien invasive control within these areas.	Ongoing	
7.12	Vehicles should be restricted to travelling on the access roads.	Ongoing	Ongoing
7.13	The activities of contractors or employees are to be restricted to the project areas.	Ongoing	Ongoing
7.14	Monitoring of erosion must take place in the floodplain, in order to prevent the formation of erosion gullies as a result of altered flow paths, and the possible sedimentation of the floodplain	Annually	Annually
7.15	Temporary soil stockpiles to be protected with hessian sheeting or a similar product to prevent windblown sedimentation / erosion.	Ongoing	
8	STORMWATER, EROSION AND SEDIMENTATION		
	Environmental Aspect / Impact Source:		
	Degradation of floodplain Loss of growth medium.		
	Goals and Objectives:		
	Adhere to applicable effluent discharge standards. Minimise impacts on downstream wetland pan ecosystems. Limit the loss of growth medium (soil) and prevent sedimentation of downstream drainage systems.		
	Mitigation Measures:		
8.1	Exposed areas associated with topsoil stripping and vegetation removal in advance of fence construction will be kept to a minimum.	Ongoing	
8.2	Water used for dust suppression shall be in quantities small enough not to generate significant run-off that could result in erosion.	Ongoing	
8.3	The Contractor to take reasonable measures to control the erosive effects of storm water runoff, especially where grave excavation and construction activities form temporary pits.	Prior to construction, ongoing	Prior to construction, ongoing

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8.4	Berms to be constructed where required to slow down stormwater movement and ensure excess sediment is not deposited into the floodplain or fresh water resource.	Prior to construction, ongoing	Prior to construction, ongoing
8.5	Stormwater controls are to be implemented around stockpile areas.	Ongoing	Ongoing
9	HERITAGE RESOURCES		
	Environmental Aspect / Impact Source:		
	Damage or loss of cultural, historical sites, artefacts or graves if such sites are unearthed during site operations.		
	Goals and Objectives:		
	Implement measures to avoid disturbance or loss of important heritage sites and artefacts, including graves. Due to the fact that subterranean Stone Age material is known from the surroundings of the study area, the following general recommendations are required.		
	Mitigation Measures:		
9.1	It is recommended that KC1 be sampled and a geological trench be put in to test for any stratigraphic layering of artefacts. The intention here will be to assess whether artefacts do occur under the current land surface, and if so, at what density. This is the only site within the proposed area and it is not felt the sites in the perimeter zone require mitigation unless they are to be impacted by development;	Prior to construction	
9.2	It is recommended that a set of test excavations be done to determine presence and extent of an archaeological deposit in and around the main site (KC1). This can be performed as part of the mitigation and would provide a finer-resolution understanding of what items of heritage significance can be found within the site.	Prior to construction	
9.3	If a deposit is identified a controlled sampling of the material found should be done	Prior to construction	
9.4	This work must be done in such a way as to augment the current research questions and field work such as the excavations at the Kathu Townlands Site and Kathu Pan	Prior to construction	
9.5	These test excavations and sampling must be done after a permit has been granted under Section 35 of the NHRA (Act 25 of 1999) to a qualified and experienced Stone Age archaeologist	Prior to construction	
9.6	In the event that substantive material is uncovered, it is recommended that a display at the cemetery of the material found at KC1 is considered	As required	As required
9.7	An archaeologist suitably qualified in Stone Age fieldwork and research must be appointed to undertake an Archaeological Watching Brief during the Construction Phase of the project. The appointed archaeologist will be responsible for the following:	On-going	
	Provide training to the project Environmental Control Office (ECO) in Stone Age archaeology and the identification of Stone Age artefacts and sites. The ECO will be responsible for daily on-site monitoring during the Construction Phase with the appointed archaeologist visiting the site every two weeks.	On-going for ECO Every 2 weeks for archaeologist	

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
	Conduct an archaeological monitoring program whereby the construction site is visited once every two weeks for at least the first three months of the project.	Every 2 weeks for archaeologist for first 3 months	
	On-site assessment of any Stone Age material exposed during construction and the provision of recommendations for the way in which the exposed material must be mitigated.	On-going	
	Compile and submit an archaeological monitoring report at the end of the monitoring process.	End of monitoring	
9.8	During the monitoring undertaken everyday on-site by the ECO and once every two weeks by the appointed archaeologist, all construction work must be closely monitored. Should any Stone Age material or any archaeological material be identified, all construction work in that area must immediately stop and the ECO or archaeologist (if already present on site) must demarcate a construction free area around the discovery. If the ECO made the discovery, the archaeologist must be contacted immediately to visit the construction site to assess the exposed material. After assessing the exposed material, the archaeologist would provide recommendations for the exposed material which may range from destruction without mitigation (if the exposed material is found to be of little significance) to archaeological mitigation (if the exposed material is found to be significant)	As required	
9.9	If any heritage resources of significance is exposed during the operation phase SAHRA should be notified immediately, all development activities must be stopped and an archaeologist should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorization (permits) from SAHRA to conduct the mitigation measures.	As required	As required
10	PALAEONTOLOGICAL RESOURCES		
	Environmental Aspect / Impact Source:		
	Damage or loss of cultural, historical sites, artefacts or graves if such sites are unearthed during site operations.		
	Goals and Objectives:		
	Implement measures to avoid disturbance or loss of significant fossil assemblages Due to the fact that the New Kathu Cemetery area is underlain by the Ghaap Group and Stromatolites.		
	Mitigation Measures:		
10.1	People digging the graves must be alert of the possibility of finding fossils. They must be trained in the skill of identifying a fossil, if present. Should fossil remains be discovered during any phase of construction, either on the surface or exposed by fresh excavations, the ECO (during construction) or the site supervisor/manager (during operation) responsible for these developments, should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the responsible ECO/person should alert the South African Heritage Research Agency (SAHRA) so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist.	If and when required	If and when required

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
10.2	The specialist involved would require a collection permit from SAHRA. Fossil material must be curated in an approved collection (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.	If and when required	If and when required
11	DUST AND AIR QUALITY		
	Environmental Aspect / Impact Source:		
	Fugitive dust emissions due to low rainfall figures, material composition and particle sizes, and impacts to surrounding fauna and flora and adjacent Kathu cemetery visitors and personnel.		
	Goals and Objectives:		
	Develop and implement appropriate dust control measures according to the risk profile of the project.		
	Mitigation Measures:		
11.1	Speed limits on unsealed roads will be limited to a maximum speed consistent with the minimisation of dust generation. Nominal speed limit of 30 km/h applies unless otherwise marked.	ongoing	ongoing
11.2	Rehabilitate disturbed area no longer required for construction. Natural vegetation cover needs to be restored at impacted areas, as far as possible.	ongoing	
11.3	Control measures will be applied at the construction area such as dust suppression using water and chemicals (if required).	If and when required	
11.4	Control measures will be applied at the site and on roads during operation such as dust suppression using water and chemicals (if required).		If and when required
11.5	Maintain machinery, vehicles and equipment in good condition to prevent unnecessary emissions.	ongoing	ongoing
11.6	Construction activities are only to occur in designated areas.	ongoing	
11.7	The development footprint it to be kept as small as possible.	ongoing	
12	BIODIVERSITY		
	Environmental Aspect / Impact Source:		
	Destruction of natural floral and faunal habitats due to site clearing, earthworks, and movement of vehicles through the veld. Impacts on floral and faunal diversity. Impacts on floral and faunal Species of Conservation Concern (SCC) and protected species.		
	Goals and Objectives:		
	Prevent the alteration of natural ecological systems and processes. Minimise impacts on protected and SCC species and other areas identified as sensitive.		

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	Preserve the floral and faunal diversity.		
	Mitigation Measures:		
12.1	Harvesting of wood or plants is prohibited.	Ongoing	Ongoing
12.2	No trapping or hunting of any faunal species is to take place.	Ongoing	Ongoing
12.3	The activities of any workers are to be restricted to the planned areas.	Ongoing	Ongoing
12.4	Natural vegetation cover needs to be maintained as far as possible and vegetation clearing is to be phased to prevent long-term exposure of soils.	Ongoing	Ongoing
12.5	Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced, where required.	After construction	
12.6	Establishment of any revegetated areas must be monitored during the operational phase on a bi-monthly basis for a period of one year.	Bi-monthly	Bi-monthly
12.7	All exposed grave sites are to be revegetated with an indigenous grass seed mix.		Ongoing
12.8	The construction footprint to be clearly demarcated by fencing in order to contain all activities within designated areas.	Prior to construction.	
12.9	No areas to be cleared outside the development footprint area.	Ongoing	Ongoing
12.10	The necessary permits need to be acquired pertaining to the removal of floral species of conservation concern (SCC) that are located within the study area prior to the construction phase, and the following should be ensured: <ul style="list-style-type: none"> • Effective relocation of individuals to suitable similar habitat in the vicinity of the study area • All rescue and relocation plans should be overseen by a suitably qualified specialist. 	Prior to construction.	
12.11	A 5m buffer is to be applied around all known protected floral species that will be retained along the access road and within the cemetery site	Prior to construction.	
12.12	A walkdown of the construction footprint is to be undertaken prior to vegetation clearing activities in order to assess the site for any possible burrows of Pterinochilus (Golden-brown baboon spider). Faunal SCC encountered within the study area are to be relocated by a suitably qualified specialist to suitable habitat in the vicinity of the study area.	Prior to construction	
12.13	Site clearing takes is to take place in a phased manner, in a uniform direction from one side to the other of the study area, so as to ensure that as far as possible faunal species can naturally disperse out of the area ahead of clearing activities.	Ongoing	Ongoing
12.14	Where possible, utilise the current indigenous vegetation as part of the landscape plans, with special emphasis on the larger Vachallia erioloba and Vachellia haematoxylon species.	Ongoing	Ongoing
12.15	Landscape planning should take cognisance of habitat connectivity, ensuring that areas of natural vegetation remain within the development to create areas of refuge and corridors of movement.	Ongoing	Ongoing

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12.16	The construction and operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment.	Ongoing	Ongoing
12.17	Edge effects of construction and operational activities need to be actively managed to minimise further impacts to the receiving environment, with specific consideration to erosion control and alien floral species management.	Ongoing	Ongoing
12.18	Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities.	Ongoing	Ongoing
12.19	Vegetation is to be cleared systematically and only when necessary to avoid exposed soil surfaces for prolonged periods of time.	Ongoing	Ongoing
12.20	Strict supervision of all construction activities to ensure no construction related activities are conducted outside of the marked footprint.	Ongoing	Ongoing
12.21	Necessary signs are to be placed around the site to inform visitors of rules regarding harvesting, poaching and speed limits.	Ongoing	Ongoing
12.22	The site is to be inspected quarterly to identify any exposed areas needing to be re-vegetated.	Ongoing	Ongoing
12.23	Maximise the number of graves within the project footprint, while retaining as many protected trees as possible, to maximise the life of the cemetery.		Ongoing
13	ALIEN AND INVASIVE SPECIES		
	Environmental Aspect / Impact Source:		
	Disruption of ecological synergy.		
	Goals and Objectives:		
	Prevent the alteration of natural ecological systems and processes.		
	Mitigation Measures:		
13.1	Alien vegetation must be removed from the study area during both the construction and operational phases, in line with the National Environmental Management Biodiversity Act, Alien and Invasive Species Regulations (2016).	Ongoing	Ongoing
13.2	All alien plants within the study area should be cleared, with follow up activities running concurrently for one year.	Ongoing	Ongoing
13.3	Strategies to control the spread of alien and invasive species will be developed and implemented based on the specific species and scale of the infestation.	As required	As required
13.4	Care to be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used, with special mention of areas in close proximity to species of conservation concern.	Ongoing	Ongoing
13.5	The footprint areas to be kept as small as possible when removing alien plant species.	Ongoing	Ongoing
13.6	The proliferation of alien invasive species is to be monitored quarterly for one year following any area cleared.	Quarterly	Quarterly

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14	FIRES		
	Environmental Aspect / Impact Source:		
	Fire damage to natural habitats, adjacent property and buildings.		
	Goals and Objectives:		
	Preserve natural habitats. Protect adjacent property.		
	Mitigation Measures:		
14.1	Fires on site are to be prohibited.	Ongoing	Ongoing
14.2	Suitable and sufficient fire extinguishing equipment to be available at strategic locations and maintained in good working order and to be inspected as per Occupational Health and Safety Act Regulations (No. 85 of 1993), particularly in areas prone to fires or in areas where flammable substances are being handled, and during winter months.	Ongoing	Ongoing
14.3	Training on the use of fire extinguishers is to be provided.	Prior to construction and prior to operation and as required thereafter	Prior to construction and prior to operation and as required thereafter
14.4	Smoking to be prohibited on site and appropriate no-smoking signs will be provided.	Ongoing	Ongoing
14.5	A trained fire response team will be in place to control fires as and when required.	Ongoing	Ongoing
14.6	Regular and appropriate maintenance of footprint area.	Ongoing	Ongoing
14.7	Any fires to be reported to the fire response team or relevant authority immediately.	Ongoing	Ongoing
14.8	The fire response team to advise the relevant authority of a fire immediately and not to wait until it can no longer be controlled.	As required	As required
15	MACHINERY, EQUIPMENT, VEHICLE MOVEMENT AND ROADS		
	Environmental Aspect / Impact Source:		
	Noise, dust and other nuisances due to presence and use of machinery, equipment and vehicles. Public safety risks.		
	Goals and Objectives:		
	Minimise disturbances and public safety risks during construction and operation and use of machinery, equipment and vehicles.		

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
	Mitigation Measures:		
15.1	Maintain machinery, vehicles and equipment in good condition to prevent unnecessary noise output, emissions, and risks of hydrocarbon spills (fuels and lubricants).	Ongoing	Ongoing
15.2	All vehicles utilising public roads should be roadworthy, and should thus meet applicable maximum noise output requirements. Records will be kept on file.	Ongoing	Ongoing
15.3	All vehicles to adhere to prescribed speed limits as indicated on road signage and/or specific instructions or procedures issued by the ECO (during construction) or the site supervisor / manager (during operation).	Ongoing	Ongoing
15.4	Vehicles to remain on existing roads and tracks and will not be permitted to drive off-road and in the veld, unless strictly necessitated by an emergency situation or with the approval of the ECO.	Ongoing	
16	NOISE		
	Environmental Aspect / Impact Source:		
	Movement of vehicles and equipment. Use of machinery and equipment. Traffic.		
	Goals and Objectives:		
	Develop and implement appropriate noise control measures according to risk profile of construction site.		
	Mitigation Measures:		
16.2	Site induction programme and site rules to include details of good working practices to minimise noise emissions. Information sheet for contractors to outline the requirement for good site practices and good neighbour practice.	Ongoing	Ongoing
16.3	It is to be ensured that workers do not create unnecessary noise such as hooting or shouting.	Ongoing	Ongoing
16.4	Necessary signs are to be placed around the site to inform employees and visitors of noise control measures.	Ongoing	Ongoing
17	INCIDENT REPORTING AND MANAGEMENT		
	Environmental Aspect / Impact Source:		
	Hazardous spills, pollution occurrences, excessive dust or other forms of environmental damage. Recurring environmental incidents. Complaints by third parties.		
	Goals and Objectives:		
	Adequately assess root cause of incidents in order to develop and implement appropriate corrective actions and prevent incidents from recurring.		

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
	Mitigation Measures:		
17.1	An incident reporting procedure to be put in place and kept up to date.	At start of construction phase, ongoing thereafter.	
17.2	Environmental incidents (including complaints by third parties) to be reported in writing as per the incident reporting procedure.	As soon as possible, but at least within 48 hours.	
17.3	Emergency incidents to be reported as soon as possible and in person to the ECO (construction) or site manager / supervisor (operation), but should be reported in writing as per the incident reporting procedure thereafter.	As soon as possible, but at least within 12 hours.	
17.4	Register environmental incidents, and ensure investigation, follow-up and close out of all incidents.	As required	
17.5	All incidents to be investigated and appropriate corrective actions to be implemented, including measures to prevent recurring incidents.	As required	
17.6	Report a major incident (where the incident constitutes a breach of permit or licence condition) to the competent authority.	Within 48 hours	
17.7	Upon completion of construction, an operational phase issues report register and procedure to be put in place and kept up to date at all times.		At end of construction phase, ongoing thereafter
18	WASTE MANAGEMENT		
	Pollution or health impacts caused by inappropriate waste management practices.		
	Goals and Objectives:		
	Manage all waste types through the use of the waste minimisation hierarchy:		
	1. Waste Avoidance and Reduction of the generation of waste.		
	2. Recovery, Re-use and Recycling of the amount of waste generated.		
	3. If waste does not apply to the abovementioned, disposal (as a last resort) applies, using licensed contractors, transporters and disposal facilities which are permitted to handle and test the various waste streams.		
	Define and implement control measures to prevent inappropriate storage, treatment and disposal of waste.		
	Implement appropriate waste management procedures for all waste streams.		
	Prevent pollution or health impacts caused by inappropriate waste management practices.		
	Mitigation Measures:		
18.1	A waste management procedure to be put in place and kept up to date as per the specific requirements of the construction and operation phases.	At start of construction, as required thereafter	At start of construction, as

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
			required thereafter
18.2	The waste management procedure to cover collection, transport and disposal of waste. The procedure will address the following waste management principles:	Ongoing	
	Identify waste streams generated and document the selected methods for handling, treatment and off-site disposal.	As required	
	Ensure appropriate location and design of waste handling, storage and treatment facilities.	As required	
	Provide designated waste collection points and ensure that these have adequate capacity and that they are serviced frequently.	As required	
	Ensure appropriate temporary storage of waste earmarked for off-site disposal.	As required	
	Ensure appropriate off-site disposal at a waste disposal facility in order to minimise the risk of soil, water and air pollution.	As required	
	Maintain records of the type and volume of waste leaving the construction site and balance with records of the type and volume of off-sited disposal at waste facilities.	As required	
	Ensure appropriate management of specific hazardous wastes such as chemical toilet contents, etc.	As required	
	Control of litter on an ongoing basis.	As required	As required
	Ensure regular inspections of waste handling and storage facilities.	As required	
18.3	All waste generated on site to be disposed of in a suitable manner to not cause any surface water pollution or health hazard.	Ongoing	
18.4	No littering by construction workers to be allowed. During the construction period, the facilities to be maintained in a neat and tidy condition and the site and surroundings to be kept free of litter.	Ongoing	
18.5	Measures to be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. The Contractor to provide litter collection facilities for later safe disposal at approved sites.	Ongoing	Ongoing
18.6	The burning and burying of waste at or on site is strictly prohibited.	Ongoing	Ongoing
18.7	Waste to be stored in an appointed area in covered, tip proof metal drums/ skips for collection and disposal.	Ongoing	
18.8	Ensure that the quantities of general waste management activities (storage, handling and recycling) on site falls below the legislated thresholds of the National Environmental Management Act, 2008 (NEM:WA, No 59 of 2008). Exceedance of these thresholds to be approved as part of a waste management license.	Ongoing	
18.9	A refuse control system to be established for the collection and removal of refuse to the satisfaction of the ECO.	Ongoing	
18.10	Bins are to be provided on site in designated areas for temporary waste disposal, prior to waste being taken to a licenced landfill site.	Ongoing	Ongoing
18.11	Waste to be disposed of at registered landfill sites. There is no final disposal of general or hazardous waste to land within the New Kathu Cemetery footprint.	Ongoing	

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
18.12	All hazardous waste will only be taken to a permitted hazardous waste disposal site.	As required	
18.13	Safe disposal certificates from a permitted waste disposal site to be kept on hand.	Ongoing	
18.14	Upon completion of construction, an operational phase waste management procedure to be put in place and kept up to date at all times.		Ongoing
18.15	Dumping of refuse are not to be allowed within the surrounding environment.	Ongoing	Ongoing
18.16	No dumping of waste should take place. If any spills occur, they should be immediately cleaned up.		Ongoing
18.17	Construction waste must not be stored within the regulated zone, and must be removed and disposed of in accordance with existing approved waste management policies.	Ongoing	
18.18	Construction waste must not be stored within the floodplain, and must be removed and disposed of at a registered waste disposal site.	Ongoing	
19	SPILL PREVENTION, RESPONSE AND CLEAN-UP		
	Environmental Aspect / Impact Source:		
	Substances such as fuels, lubrication oils, hydraulic and brake fluid, solvents, insecticides and pesticides, as well as the by-products and waste associated with use of these products will be present on site. The release of these hazardous substances into the receiving environment that could result in air, soil and water pollution and may affect the health and well-being of people, plants and animals.		
	Goals and Objectives:		
	Define and implement control measures for hazardous spill prevention, and ensure adequate response and clean-up measures are put in place.		
	Mitigation Measures:		
19.1	A spill prevention and response procedure to be put in place and kept up to date as per the specific requirements of construction and operation and will be based on the following principles:	Ongoing	Ongoing
	Identify activities and areas where there are risks for spills.	Annually	Annually
	Ensure appropriate maintenance of vehicles and equipment to prevent spills. Records to be kept on file.	Ongoing	Ongoing
	Drip trays are to be placed under stationary construction vehicles and equipment which leak oil or lubricants.	Ongoing	Ongoing
	Identify and train people responsible to respond to spills and to provide assistance and instructions for immediate actions required to stop the spill, prevent further spreading of the hazardous substance and to obtain specialist input where required.	Ongoing	Ongoing
	Ensure appropriate inspections are conducted to ensure early detection of spills.	Ongoing	Ongoing
	Investigate and assess spills, as per the incident reporting procedure, and identify and implement immediate appropriate	Ongoing	Ongoing

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
	corrective actions required to stop the spill and prevent further spreading of the hazardous substance.		
	Determine appropriate measures to remove, treat and/or dispose of the hazardous substance and contaminated soil and/or water.	Ongoing	Ongoing
	Determine appropriate measures to clean up the area affected by the spill, with specialist input where required.	Ongoing	Ongoing
	No storage of fuel or lubricants on site. Should these need to be stored on site, they will need to be kept on an appropriately surfaced and bunded area.	Ongoing	
	No maintenance of vehicles is to take place on site. Should it be necessary to do maintenance must take place on an appropriately surfaced and bunded area.	Ongoing	
19.2	Mixing of concrete is only to take place in designated areas. All concrete mixing areas need to be removed once construction is complete.	Ongoing	
19.3	Construction materials are to be stored only in designated areas.	Ongoing	
19.4	The ECO (during construction) and the site manager / supervisor (during operation) to investigate and implement appropriate measures to collect, handle, store and treat contaminated soil. The aim of treatment is to contain contaminants and rehabilitate soils for later use in rehabilitation.	Ongoing	Ongoing
19.5	Contractor responsible to collect, handle, store and treat contaminated soil as per procedures developed by the ECO.	As required	As required
19.6	Special care to be taken to avoid spillage of hazardous products to avoid water-soluble contaminants from entering the ground.	Ongoing	Ongoing
19.7	In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced to prevent the ingress of hydrocarbons into the topsoil.	Ongoing	Ongoing
19.8	There must be immediate cleaning up of areas or spillages of potentially contaminating liquids and solids after any spill occurs. Affected areas to be promptly reinstated to the satisfaction of the ECO.	Ongoing	Ongoing
19.9	If soil is polluted, the first management priority should be to treat the pollution by means of in situ bioremediation. The acceptability of this option must be verified by an appropriate soils expert and by the local water authority on a case by case basis, before it is implemented.	Ongoing	Ongoing
19.10	If in situ soil treatment (bio-remediation) is not possible or acceptable then the polluted soil to be removed and disposed at an appropriate, permitted, off-site waste facility.	Ongoing	Ongoing
20	HAZARDOUS SUBSTANCES STORAGE AND HANDLING		
	Environmental Aspect / Impact Source:		
	Substances such as fuels, lubrication oils, hydraulic and brake fluid, insecticides and pesticides, as well as the by-products and waste associated with use of these products will be present on the site. The release of these hazardous substances into the receiving environment could result in air, soil and water pollution and may affect the health and well-being of people, plants and animals.		

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
	Goals and Objectives:		
	Ensure appropriate storage and handling of hazardous substances to prevent pollution and health risks.		
	Mitigation Measures:		
20.1	Prevent mixing of dirty and clean stormwater by providing appropriately bunded areas.	Ongoing	
20.2	Staff dealing with these hazardous materials / substances to be aware of their potential impacts and follow the appropriate safety measures.	Ongoing	
20.3	Ensure that the quantities of hazardous waste management activities (storage, handling and recycling) on site falls below the legislated thresholds of the NEM:WA. Exceedance of these thresholds to be approved as part of a waste management licence.	Ongoing	
21	AESTHETICS, HOUSEKEEPING AND VISUAL IMPACTS		
	Environmental Aspect / Impact Source:		
	Alteration of the visual and landscape character of the immediate surroundings.		
	Goals and Objectives:		
	Maintain the visual quality and appeal of construction site and surroundings.		
	Mitigation Measures:		
21.1	Natural vegetation cover needs to be restored at impacted areas, where possible.	Ongoing	Ongoing
21.2	Ensure good housekeeping and control litter and general site cleanliness.	Ongoing	Ongoing
22	REHABILITATION		
	Environmental Aspect / Impact Source:		
	Long-term environmental degradation due to incomplete site clean-up and rehabilitation.		
	Goals and Objectives:		
	Minimise residual impacts and ensure physical and chemical stability of site. Ensure human safety.		
	Mitigation Measures:		
22.1	Identify disturbed areas for rehabilitation (all areas disturbed during construction and operation).	Ongoing	Ongoing
22.2	Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface.	Ongoing	Ongoing
22.3	Soils that have been compacted because of the construction must be ripped and profiled in line with the surrounding area.	Ongoing	

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
22.4	Any natural areas beyond the development footprint which have been affected by the development activities to be rehabilitated using indigenous grass species.	Prior to operation	Prior to operation
22.5	Disturbed areas should be rehabilitated as soon as possible.	As required	As required
23	PROCUREMENT		
	Environmental Aspect / Impact Source:		
	Job creation during construction. Construction and operation impact on local economy.		
	Goals and Objectives:		
	Maintain transparent communication with project affected community. Create as much as possible local procurement and development.		
	Mitigation Measures:		
23.1	Preference should be given to people in the local area for employment.	Ongoing	Ongoing
23.2	The recruitment strategy to be communicated to the key stakeholders.	Prior to construction	Prior to construction
23.3	Local goods and services to be procured wherever reasonably possible.	Ongoing, as required	Ongoing, as required
23.4	Quotas for local procurement to be set in the specification for contractors.	Ongoing, as required	Ongoing, as required
23.5	Local sub-contractors to be used wherever reasonably possible.	Ongoing, as required	Ongoing, as required
24	ABLUTION FACILITIES AND SEWAGE TREATMENT		
	Environmental Aspect / Impact Source:		
	Spread of biological contamination into the receiving environment. Health risks due to unhygienic conditions.		
	Goals and Objectives:		
	Define and implement control measures to ensure adequate treatment and disposal of sewage waste.		
	Mitigation Measures:		
24.1	Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility.	Ongoing	
24.2	Temporary ablation facilities shall be provided for construction personnel, whereby at least one portable toilet will be provided per ten personnel and must be emptied regularly.	Ongoing	
24.3	The positioning of the temporary ablation facilities shall be done in consultation with the ECO.	Ongoing	
24.4	Temporary ablation facilities will be easily accessible and will be provided within easy walking distance from where employees are working.	Ongoing	
24.5	Temporary ablation facilities will be maintained to ensure hygienic conditions and will be provided with locks and doors.	Ongoing	

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
24.6	Temporary ablution facilities will be secured to prevent them from blowing over.	Ongoing	
24.7	The waste material generated from the temporary ablution facilities shall be serviced on a regular basis.	Ongoing, as required	
24.8	Disposal of waste from temporary ablution facilities to be in accordance with the waste management procedure to be issued by the ECO.	Ongoing	
24.9	Use of open areas for this purpose shall not, under any circumstances, be allowed.	Ongoing	
24.10	The construction of "long drop" toilets is forbidden.	Ongoing	Ongoing
24.1	The permanent ablution facilities established are to be regularly maintained.		Ongoing
25	FLOODPLAIN / WATERCOURSES		
	Environmental Aspect / Impact Source:		
	Impacts to floodplain		
	Goals and Objectives:		
	Minimise impacts to drainage lines		
	Mitigation Measures:		
25.1	Limit the footprint area of any development to what is absolutely essential in order to minimise environmental damage	Ongoing	
25.2	The Dingleton road access falls within the 1:100-year floodline, and as such any activities taking place within this regulated zone will require authorisation in terms of the National Water Act (NWA; No. 36 of 1998).	Prior to construction	
25.3	As much protection of the watercourse and floodline must be afforded during construction activities.	Ongoing	Ongoing
25.4	Construction is to take place in the dry season, as far as possible.	Ongoing	
26	PUBLIC HEALTH, SAFETY AND SECURITY		
	Environmental Aspect / Impact Source:		
	Injury of people and livestock due to unauthorised access onto construction area. Construction related health, safety and nuisance impacts.		
	Goals and Objectives:		
	Implementation of adequate access control in order to prevent harm.		
	Mitigation Measures:		
26.1	All construction areas will be fenced to prevent unauthorised people and animals accessing the area.	Ongoing	

No.	Technical and Management Commitments	Project Phase	
		Construction	Operation
26.2	Appropriate signs shall be erected around the construction area in Afrikaans, English and Tswana to warn people of potential dangers of moving vehicles and fence construction, specifically at points where people on foot are likely to move about e.g. near the existing Kathu cemetery.	Ongoing	
26.3	Bodies that are to be buried must not be left aboveground and are to be buried as soon as reasonably possible, to minimise odour nuisance and health issues for the surrounding area.		Ongoing
27	TRAFFIC		
	Environmental Aspect / Impact Source:		
	Road and traffic safety risks		
	Goals and Objectives:		
	Implementation of adequate access control in order to prevent harm.		
	Mitigation Measures:		
27.1	Obtain approvals from the relevant roads department for the intersection development and construct in line with approval requirements.	Prior to construction	
27.2	Intersection design to the Dingleton Road is to be implemented as per the traffic specialist report; Siyazi, 2017.	At the start of construction	
27.3	Provide a dedicated right-turn lane on the Dingleton Road (southern approach).	At the start of construction	
27.4	Speed limit signs should be erected along the relevant section of the Dingleton Road. The speed limit should be limited to 40 km/h at the new intersection and enforced by the relevant road authority for the relevant section.	Ongoing	Ongoing
27.5	Road markings (highway paint), reflective road studs (LED) and road traffic signs should be provided and maintained (and replaced as required) at strategic points of the access intersection to the proposed development to ensure visibility during night time, proper visibility of intersection lane geometry, sufficient information to road users and pedestrian safety.	At completion of the intersection establishment	
27.6	Monitoring of the state of road markings, traffic signs and reflective road studs to be conducted bi-annually. Any maintenance issues noted are to be raised with the relevant traffic department for their maintaining and replacing as required.	Bi-annually	Bi-annually
27.7	Laydown areas for the road upgrade are to be fenced off to prevent entry by unauthorised people.	Ongoing	Ongoing
27.8	Materials are to be stored in designated areas on impervious surfaces and bunded.	Ongoing	Ongoing
27.9	Warning signs are to be placed at the laydown areas to warn against trespassing.	Ongoing	Ongoing