Appendix F2. Impact Tables

CONSTRUCTION

- **Direct**
- **Indirect**
- **Cumulative**

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Construction Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
1	**Soil and land capability**														
1.1	Loss of soil resources and related land capability as a result of soil contamination through spills/leaks from vehicles, machinery, construction waste, litter and use of portable ablution facilities.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting) • Waste collection and removal • Establishing/upgrading the gravel access road, access point and use of roads.	M	H	L	M	M	L	L	L	L	L	Cemetery site and access road	Construction activities could potentially pollute soil as a result of oil and fuel spillages from vehicles and machinery as well as from construction waste, litter and the use of portable ablution facilities. Contamination of soil can negatively impact on soil chemistry and thus soil functionality. Considering there will be minimal people, vehicles and machinery on site, the severity in the unmitigated scenario is expected to be medium. The impact would be long lasting, be localised and have a medium probability of occurring. Thus, the significance is medium if unmitigated. With proper waste management and immediate clean-up, the significance can be reduced to low.	• Losses of fuel and lubricants from parked vehicles and equipment should be contained using a drip tray. • Pollution prevention through education and training of workers (temporary and permanent). • Waste is to be disposed of into bins at designated areas. • There must be immediate cleaning up of spillages of potentially contaminating liquids and solids after any spill occurs. • 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. • 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. • Regular maintenance of vehicles and equipment is to take place and records are to be kept. • Mixing of concrete is only to take place in designated areas. All concrete mixing areas need to be removed once construction is complete. • Construction materials are to be stored only in designated areas. • Temporary ablution facilities are to be regularly maintained and records are to be kept.
1.2	Loss of soil resources and related land capability as a result of soil compaction from movement of vehicles/ machinery and soil erosion.	• Site preparation including fencing and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads.	L	H	L	L	L	L	L	L	L	L	Cemetery site and access road	Movement of vehicles and machinery on site and land clearing during construction will compact soils and can lead to erosion. Soil compaction negatively impacts on plant root growth and development and erosion leads to loss of soil. Considering there will be minimal vehicles and machinery on site and that there are existing gravel tracks that will be used, the severity of soil compaction is considered low. The impact will be long lasting, be localised, will have a low probability of occurring and have a low significance in the unmitigated scenario. At the end of construction, areas that are no longer needing to be used can be ripped and revegetated thus decreasing the duration of the impact.	• The activities of construction contractors or employees are to be restricted to the planned areas. • Instructions must be included in contracts that will restrict construction work and construction workers to the clearly defined limits of the construction site. • Areas that do not need to be used at the end of construction are to be ripped and revegetated with an indigenous grass mixture.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Construction Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
2	**Biodiversity**														
2.1	Loss of habitat and related floral (including species of conservation concern) and faunal species (including species of conservation concern) through physical clearing, poaching and firewood collection.	• Site preparation (clearing of land) including fencing and access control. • Use of contractors/construction workforce	M	L	M	M-H	M	L-M	L	L	M-H	M	Cemetery site and access road	Construction activities can lead to the loss of habitat and related floral and faunal species from vegetation clearance and potential poaching and collection of firewood. Considering there are protected trees and plants on site, the severity of the impact is medium in the unmitigated scenario. It will be at a local scale for a short duration and have a medium to high probability of occurring. The high probability in the unmitigated and mitigated scenario and medium severity in the mitigated scenario is for the impact on floral species of conservation concern. In the mitigated scenario, the other aspects (changes to habitat and other floral and faunal species) have a medium probability and low severity. With mitigation the severity and spatial scale of the impact can decrease.	• 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: o Effective relocation of individuals to suitable similar habitat in the vicinity of the study area o All rescue and relocation plans should be overseen by a suitably qualified specialist; • 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. • 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. • It is recommended that site clearing takes 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. • 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. • 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. • The construction and operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment. • 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. • Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. • No uncontrolled fires whatsoever should be allowed. • Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility. • All soils compacted as a result of construction activities should be ripped and profiled. Special attention should be paid to alien and invasive plant control within these areas. • No dumping of waste should take place. If any spills occur, they should be immediately cleaned up. • 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. • No trapping or hunting of any faunal species is to take place. • Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced, where required. • Establishment of any revegetated areas must be monitored during the operational phase on a bi-monthly basis for a period of one year. <u>Rehabilitation Plan:</u> • Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface. • Soils that have been compacted because of the construction activities must be ripped and profiled in line with the surrounding area.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Construction Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
2.2	Disturbance of floral and faunal species through dust fallout and noise.	• Site preparation (clearing of land) including fencing and access control.	H	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Construction activities can disturb floral species from increased dust fallout through movement along the access road and clearing of vegetation exposing soil. If land clearing is not done in stages, there could be high air quality impacts from constantly exposed soil. Construction activities can also disturb faunal species from noise generated from vehicles, equipment and people on site, however, there will be limited vehicles, equipment and people on site and thus minimal noise. In the unmitigated scenario the severity of impacts to fauna and flora is thus collectively high. The impact to fauna and flora from dustfall and noise respectively will have a medium duration, can go beyond the site boundary and has a medium probability of occurring. Thus, the significance in the unmitigated scenario is medium. Provided that vegetation clearing occurs in stages throughout the life of the cemetery, only necessary vegetation is removed as burial sites are required, and that noise output is managed, the significance of the impact is expected to be low.	• 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. • The contractors and workers are to ensure that they do not create unnecessary noise such as hooting or shouting. • Vehicles are to be maintained in good condition to prevent unnecessary noise outputs.
2.3	Loss or changes to biodiversity in the 1:100 year floodplain from altered vegetation composition as a result of increased sedimentation in the floodplain from exposed, compacted and disturbed soils.	• Site preparation for access road and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads.	L	L	M	M	M	L	L	L	L	L	Access road only	Activities in the 1:100 year floodplain can result in temporarily exposed soils leading to increased risk of transportation of sediment to the 1:100 year floodplain. This can alter water quality and vegetation composition and biodiversity potential for faunal species. Activities within the floodplain are limited to establishing the access road, fence and upgraded intersection, therefore the severity is low in the unmitigated scenario. The impact will be for a short duration, have a medium spatial scale and a medium probability of occurring. The significance in the unmitigated scenario is medium. With the implementation of the recommended mitigation measures the impact significance can decrease to low. The assessment by the specialist for this component was done in line with the Department of Water and Sanitation water use risk assessment criteria.	• Vegetation is to be cleared systematically and only when necessary to avoid exposed soil surfaces for prolonged periods of time. • Temporary soil stockpiles to be protected with hessian sheeting or a similar product to prevent windblown sedimentation / erosion. • Construction waste must not be stored within the floodplain, and must be removed and disposed of at a registered waste disposal site. • Berms to be constructed to slow down stormwater movement and ensure excess sediment is not deposited into the floodplain or fresh water resource. • Sanitation services shall be provided for construction personnel, whereby at least one portable toilet will be provided per ten personnel and must be emptied regularly. • Strict supervision of all construction activities to ensure no construction related activities are conducted outside of the marked footprint. • 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. • Although the watercourse has been significantly modified, the ecoservice provision and hydrological function thereof is still deemed important. Therefore, as much protection of the watercourse and floodline must be afforded during construction activities. • Construction is to take place in the dry season. • The Dingleton road access falls within the 1:100-year floodline, and as such if any activities are to take place within this regulated zone, authorisation will be required in terms of the National Water Act (NWA). • It is recommended that proceeding forward, the proponent should obtain guidance from the relevant regulating authorities with regards to the development process within the associated regulated zone (NWA), and that the relevant environmental authorisations and water use authorisation processes are followed. Authorisation will be required prior to construction. • Should detailed information pertaining to the Present Ecological State and Ecological Importance and Sensitivity of the watercourse be required, further studies will need to be undertaken.

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3	**Surface water**														
3.1	Disturbance to the 1:100 year floodplain from road upgrade, construction of the access gate and access road.	• Establishing/upgrading the gravel access road, access point and use of roads.	L	H	L	L	L	L	H	L	L	L	Access road only	Activities within the 1:100 year floodplain can lead to the alteration of drainage patterns which may impede conveyance within the floodplain, altering flood levels upstream of the proposed project. The upgrade to the Dingleton road could have an impact on drainage patterns as an additional tar lane will be constructed over a length of 80 m, and thus decreasing water infiltration into an area that was previously vegetated. However, the upgrade distance is short equating an average of 0.03 square kilometers. The Danielskuil catchment (where the project area falls within) is 1598.3 square kilometers, the footprint of the upgrade is thus 0.0018% of the catchment area, making the change in flow insignificant. The construction of the access road is expected to have a low severity as the study area and flood plain are located within deep, well drained sandy soils, thus limiting the amount of surface water runoff into the flood plain areas and the Ga-mogara river system, therefore decreasing impacts that water runoff from the study area may have on the Ga-mogara river system. The access road will only cover an area of 0.216 square kilometers, which is 0.0125% of the total catchment area making the change in flow insignificant.	• None required
3.2	• Loss of surface water resource as a result of contamination through spills/leaks from vehicles and machinery travelling on the access roads within the 1:100 year floodplain. • Changes to surface water quality from increased sedimentation and runoff.	• Site preparation for access road and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads.	L	L	L	L	L	L	L	L	L	L	Access road only	Due to the topography of the study area, direct impacts arising from the construction and operations of the cemetery are unlikely to affect the Ga-mogara River to the south-east of the project area, due to the presence of raised roads and a railway line that are likely to act as buffers (silt-traps), collecting any sediment washed away along the banks and verges of these infrastructures. The study area and 1:100 year floodplain are located within deep, well drained sandy soils, thus limiting the amount of surface water runoff into the flood plain areas and the Ga-mogara river system, therefore decreasing impacts that water runoff from the study area may have on the Ga-mogara river system.	• Losses of fuel and lubricants from parked vehicles and equipment should be contained using a drip tray. • Pollution prevention through education and training of workers (temporary and permanent). • Bins are to be provided on site in designated areas for temporary waste disposal, prior to waste being taken to a licenced landfill site. • There must be immediate cleaning up of spillages of potentially contaminating liquids and solids after any spill occurs. • 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. • 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. • Regular maintenance of vehicles and equipment is to take place and records are to be kept. • Mixing of concrete is only to take place in designated areas. All concrete mixing areas need to be removed once construction is complete. • Construction materials are to be stored only in designated areas. • Temporary ablution facilities are to be regularly maintained and records are to be kept.
4	**Noise**														
	Increase in ambient noise levels as a result of construction activities and vehicles on site.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting) • Establishing/upgrading the gravel access road, access point and use of roads • Use of contractors/construction workforce	L	L	L	L	L	L	L	L	L	L	Cemetery site and access road	Construction activities are expected to generate minimal noise as there will be minimal vehicles, machinery and people on site. There are no sensitive human noise receptors present near the site, therefore the noise impact is considered insignificant.	• None

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No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
5	**Air Quality**														
	Increase in dust fallout from cleared land, soil handling, and vehicle/machinery movement.	• Site preparation including fencing and access control (clearing of land). • Establishing/upgrading the gravel access road and use of roads.	H	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Construction activities can cause an increase in dust fallout from movement along the access road and clearing of vegetation exposing soil. If land clearing is not done in stages, there could be high air quality impacts from constantly exposed soil which could have an impact of people travelling along the main roads, affecting visibility. In the unmitigated scenario, the severity is high, with the duration being medium, the impact going beyond the site boundary and a medium probability of occurring. The significance in the unmitigated scenario is medium. Provided that vegetation clearing occurs in stages throughout the life of the cemetery, and only necessary vegetation is removed as burial sites are required, the significance of the air quality impact is expected to be low.	• 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. • Dust is to be controlled using appropriate dust suppression measures. • Construction activities are only to occur in designated areas. • The development footprint it to be kept as small as possible.
6	**Visual**														
	Changes in visual character of the area and related sense of place through removal of vegetation and building of facilities.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting) • Establishing/upgrading the gravel access road, access point and use of roads.	L	L	L	L	L	L	L	L	L	L	Cemetery site and access road	The property has an existing fenceline and existing gravel tracks which run parallel to the N14 and around the game farm. The proposed fence to be established around the cemetery and the proposed internal roads and parking area are thus not expected to change the visual character of the area. The ablution facilities and night lighting will be within the fenceline and could be visible within the larger property. If the whole cemetery area was cleared of vegetation from the start and left exposed, the visual character and sense of place could change. However, considering the existing nature of the site and its surrounds, the small size of the site and that there are no sensitive human visual receptors, the significance of the impact is insignificant.	• None

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No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
7	**Heritage**														
	Loss and/or disturbance of archaeological sites through vehicle/people movement on site, the access road and building of support facilities.	• Site preparation including fencing and access control (clearing of land).	H	H	M	M	H	M+	H	M	L	M+	Cemetery site and access road	One site of heritage significance was identified within the proposed cemetery area (KC1). The possible impact of the proposed New Kathu Cemetery on the identified archaeological material is low. However, the area is a continuous cultural landscape and the occurrence of artefacts in the proposed area suggests that more artefacts may be found, especially once excavations begin. It is very likely that the development will have a permanent negative high impact on subsurface archaeological resources. The severity of the impact is therefore high in the unmitigated scenario, will have a high duration, a medium spatial scale and a medium probability of occurring. The significance is therefore high. With the implementation of mitigation measures this impact and risk can be reduced from high negative to medium positive. The mitigation measures will enable the identification of additional archaeological resources and the collection of data that could add to current research questions.	• 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; • 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; • If a deposit is identified a controlled sampling of the material found should be done; • 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; • 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; • 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; • 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: o 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. o 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. o 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. o Compile and submit an archaeological monitoring report at the end of the monitoring process. • 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).
8	**Palaeontology**														
	Loss and/or disturbance of palaeontological resources from excavation activities.	• Site preparation including fencing and access control (clearing of land).	M	H	L	L	L	L	H	L	L	L	Cemetery site and access road	The site is underlain by the Ghaap Group and Stromatolites are known to be present in the area from literature. Should palaeontological resources be impacted the impact would be a medium severity, have a high duration, a localised scale and a low probability of occurring, With mitigation, an insignificant loss of fossil resources is expected. The proposed development is unlikely to pose a substantial threat to local fossil heritage.	• It is recommended that 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. • 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.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Construction Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
9	**Land Use**														
	Change in land use from a game farm to a cemetery.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting). • Establishing/upgrading the gravel access road, access point and use of roads.	M	H	L	H	M	M	H	L	H	M	Cemetery site and access road	The proposed project area will change the land use from game farming to a cemetery. Construction activities on site can also impact on the land use from people poaching or collecting firewood/ plants, from increased noise from people, vehicles and equipment on site and increased dust fallout from travelling along the access road and exposed soil from clearing vegetation. The site and access road area will no longer be accessible to game however, the area has been allocated by the current land owner to be used for the cemetery, thus the change in land use will have medium severity. The impact will be permanent, localised and will definitely occur. The significance is thus medium in the unmitigated scenario. Mitigation for the direct transformation of land from grazing to a cemetery is not possible other than the no-go option. However, since the area has been allocated by the current land owner to be used for the cemetery, mitigation is not required. The overall impact that the cemetery has on the land use within the site can be managed with the implementation of the mitigation measures outlined in the EMP.	• Effective implementation of all mitigation measures as outlined in the EMP report to reduce the New Kathu Cemetery's overall impact on the environment.
10	**Socio-economic**														
	Provision of job opportunities (minimal) resulting in an increase in employment and related social and economic impacts.	• Use of contractors/construction workforce	L+	L	M	L	L+	L+	L	M	M	M+	Cemetery site and access road	Minimal job opportunities will be provided during the construction phase of the project, thus it will have a low positive severity. The impact will be for a short duration, will be at a local scale and have a low probability of occurring in the unmitigated scenario. The significance of the impact will be low positive in the unmitigated scenario. In the mitigated scenario, this would become medium positive with the maximisation of local procurement.	• Preference should be given to people in the local area. • The recruitment strategy to be communicated to the key stakeholders. • Local goods and services to be procured wherever reasonably possible. • Quotas for local procurement to be set in the specification for contractors. • Local sub-contractors to be used wherever reasonably possible.
11	**Traffic**														
11.1	Increased vehicle movement affecting road capacity.	• Site preparation for access road and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads. • Use of contractors/construction workforce • Waste collection and removal.	L	L	L	L	L	L	L	L	L	L	Access road only	The proposed development is anticipated to generate an insignificant volume of vehicle traffic on the road network during peak periods. No additional lanes are required from a road capacity point of view. Therefore the impact on road capacity is insignificant.	• None required

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No.	**Impact Summary**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
11.2	Increased risk to road safety from establishment of a new access point off the Dingleton road.	• Establishing/upgrading the gravel access road, access point and use of roads.	H	H	M	H	H	H+	H	M	H	H+	Access road only	The proposed access road off the Dingleton road can have increased risks to road safety. This will have a high severity, a high duration, a medium spatial scale and a high probability of occurring. In the unmitigated scenario, the significance would be high. With the implementation of mitigation measures, this significance would change to a high positive as measures would have a positive impact on the road network, providing safer access to the site.	• Intersection design is to be implemented as per the traffic specialist report; Siyazi, 2017. • Obtain approvals from the relevant roads department for the intersection development and construct in line with approval requirements. • Speed limit signs should be erected along the relevant section of the Dingleton Road. The speed limit should be limited to 60 km/h at the access point and enforced by the relevant road authority for the relevant section. • Provide a dedicated right-turn lane on the Dingleton Road (southern approach). • 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. • 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. • Laydown areas for the road upgrade are to be fenced off to prevent entry by unauthorised people. • Materials are to be stored in designated areas on appropriately surfaced and bunded areas. • Warning signs are to be placed at the laydown areas to warn against trespassing. • Stormwater controls are to be implemented around stockpile areas.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Construction Phase															
Indirect Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
1	**Biodiversity**														
1.1	Disturbance on animal movements and distribution as a result of establishing the cemetery.	• Site preparation (clearing of land) including fencing and access control. • Use of contractors/construction workforce. • Establishing/upgrading the gravel access road, access point and use of roads.	L	L	M	M	M	L	L	L	L	L	Cemetery site and access road	The construction of the site is expected to have some impact on animal movements and distribution due to the site's position within the game farm. This has been mitigated as far as possible by placing the site adjacent to the N14. The presence of people on site could also have an impact, though minimal people will be on site during construction. The severity is thus low. The impact will be of short duration, have a medium spatial scale and a medium probability of occurring. The significance is thus medium in the unmitigated scenario. With mitigation, the impact significance can decrease to low.	• Any workers are to ensure that they do not create unnecessary noise such as hooting or shouting. • Vehicles are to be maintained in good condition to prevent unnecessary noise outputs. • The activities of any workers are to be restricted to the planned areas. • The construction footprint to be clearly demarcated by fencing in order to contain all activities within designated areas. • Poaching and harvesting of wood or plants is prohibited. • Necessary signs are to be placed around the site to inform employees and visitors of noise control measures and rules regarding harvesting, poaching and speed limits.
1.2	Alien invasive encroachment through removal and/or disturbance of vegetation.	• Site preparation (clearing of land) including fencing and access control. • Establishing/upgrading the gravel access road, access point and use of roads. • Use of contractors/construction workforce.	M	H	M	M-H	H	L-M	L	L	M-H	M	Cemetery site and access road	Clearing of the area for the construction of the site can lead to proliferation of alien invasive species. This can impact the biodiversity of the area. The impact of alien invasive encroachment during the construction of the site will have a medium severity impact on biodiversity. It will be at a local scale for a long duration and have a medium to high possibility of occurring. Thus, the significance is high in the unmitigated scenario . The high probability in the unmitigated and mitigated scenario and medium severity in the mitigated scenario is for the impact on floral species of conservation concern. In the mitigated scenario, the other aspects (changes to habitat and other floral and faunal species) have a medium probability and low severity. With mitigation the significance of the impact can decrease to medium.	• 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). • All alien plants within the study area should be cleared, with follow up activities running concurrently for one year. • 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.
2	**Land use**														
	Increase in dust fallout on vegetation affecting the grazing capacity of the neighbouring game farm.	• Site preparation (clearing of land) including fencing and access control. • Establishing/upgrading the gravel access road, access point and use of roads. • Use of contractors/construction workforce.	H	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Construction activities on site can impact on the surrounding land use (game farming - grazing) from people poaching or collecting firewood/ plants, increased noise from people, vehicles and equipment on site and increased dust fallout from vehicles travelling along the access road and exposed soil from clearing vegetation. The impact on the surrounding land use will have a high severity, will have a medium duration, a medium spatial scale and medium probability of occurring. The significance is thus medium in the unmitigated scenario. The overall impact that the cemetery has on the surrounding land use can be managed with the implementation of the mitigation measures outlined in the EMP, thus decreasing the significance to low in the mitigated scenario.	• 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. • Effective implementation of all mitigation measures as outlined in this EMP report to reduce the New Kathu Cemetery's overall impact on the environment and surrounding land-uses. • Necessary signs are to be placed around the site to inform visitors of noise control measures and rules regarding harvesting, poaching and speed limits.

Alternative 1 - Site and Dingleton Access Road (only feasible option)						
Construction Phase						
Cumulative Impacts						
No.	**Impact Summary**	**Activity**	**Impact Discussion**	**Applicability to site and/ or access road**	**Significance of contribution to cumulative impact**	**Mitigation measure**
1	**Soil and land capability**					
	Increase in loss of soil resources and related land capability as a result of soil contamination through spills/leaks from vehicles, machinery, construction waste, litter and use of portable ablution facilities.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting) • Waste collection and removal • Establishing/upgrading the gravel access road, access point and use of roads.	The proposed site is surrounded by various activities that can have an impact on soil resources and the associated land capability. On a wider scale these include roads, powerlines, rail lines and mining. On a smaller scale, within the Lyleveld farm, this includes powerlines, diggings and use of access roads within the game farm. The proposed project will have a minimal additional number of vehicles and machinery on site, for a short duration. With the implementation of mitigation measures, the incremental impact expected to be low and is thus unlikely to add significantly to the cumulative loss of soil resources and associated land capability.	Cemetery site and access road	L	Mitigation as per the direct construction phase.
2	**Biodiversity**					
	Disturbance on animal movements and distribution as a result of establishing the cemetery.	• Site preparation (clearing of land) including fencing and access control. • Use of contractors/construction workforce • Establishing/upgrading the gravel access road, access point and use of roads.	Biodiversity around the proposed site has already been impacted by various activities, including alterations to the Ga-Mogara River, mining, powerlines, grazing and rail lines. On a smaller scale, within the Lyleveld farm, this includes existing fences, powerlines, diggings and use of access roads within the game farm. While the erection of fences for the site could change animal movements and distribution, it is not expected that there will be a significant incremental impact to biodiversity. The area that will be fenced off can still be utilised to an extent as smaller animals e.g. birds, small mammals and arthropods, can still access the site area through the game fence. While human presence on site could also impact on animal movements, provided mitigation measures are implemented, the construction activities on site will be of short duration and limited to the project area. with mitigation, it is expected that the incremental contribution to the cumulative biodiversity impact in the area will be low.	Cemetery site and access road	L	Mitigation as per the direct construction phase.
3	**Surface water**					
3.1	Increase in loss of surface water resource in the floodplain as a result of soil contamination through spills/leaks from vehicles and machinery travelling on the access roads, establishment of the intersection, access point and erection of the fence along the access road .	• Establishing/upgrading the gravel access road, access point and use of roads. • Waste collection and removal.	Surface water in the area can be impacted by various activities in the surrounding area, including mining, rail lines, powerlines, roads and alterations to the Ga-Mogara River. Due to the topography of the study area the increase in the number of construction vehicles and machinery are unlikely to result in changes to the Ga-mogara River, due to the presence of raised roads and a railway line that are likely to act as buffers (silt-traps), collecting any sediment washed away along the banks and verges of these infrastructures. The increase in vehicles and machinery on site for the upgrading of the road and establishing the access road and erecting the fence will also be minimal for a short duration. With the implementation of mitigation measures, it is expected that the incremental contribution to the cumulative surface water impact will be insignificant.	Access road only	Insignificant	Mitigation as per the direct construction phase.
3.2	Increase in disturbance to the floodplain from road upgrade, construction of the access gate and access road.	• Establishing/upgrading the gravel access road, access point and use of roads.	Considering that small size of the project footprint within the floodplain relative to the size of the catchment area, the possible changes in flow as a result of the project are expected to be insignificant. Thus, it is expected that the incremental contribution to the cumulative surface water impact will be insignificant.	Access road only	Insignificant	Mitigation as per the direct construction phase.

Alternative 1 - Site and Dingleton Access Road (only feasible option)						
Construction Phase						
Cumulative Impacts						
4	**Noise**					
	Increase in ambient noise levels as a result of construction activities and vehicles on site.	• Building/establishing facilities (parking area, ablution facilities, waste collection area, night time lighting) • Use of contractors/construction workforce • Establishing/upgrading the gravel access road, access point and use of roads.	The area surrounding the site has various noise generating activities, the closest being use of the N14 and Dingleton roads. The proposed project will generate minimal, short term noise through the movement of vehicles and machinery during construction. With the implementation of mitigation measures, it is expected that the incremental noise contribution to the cumulative noise impact will be insignificant.	Cemetery site and access road	Insignificant	Mitigation as per the direct construction phase.
5	**Air Quality**					
	Increase in dust fallout from cleared land, soil handling, and vehicle/machinery movement on site.	• Site preparation (clearing of land) including fencing and access control. • Establishing/upgrading the gravel access road, access point and use of roads.	Various activities in the surrounding area can impact on dust fallout, including mining on a larger scale and the use of gravel roads on a smaller scale. The project will have a minimal increase in vehicles and machinery travelling around the site and land clearing contributing to dust fallout, for a short duration. With the implementation of mitigation measures, the project is unlikely to result in noticeable incremental increases in dust emissions. It is expected that the incremental contribution to the cumulative dust fallout impact will be insignificant.	Cemetery site and access road	Insignificant	Mitigation as per the direct construction phase.
6	**Socio-economic**					
	Provision of job opportunities (minimal) resulting in an increase in employment and related social and economic impacts.	• Use of contractors/construction workforce	On a large scale there are various activities that contribute to the socio-economic profile of the area, particularly mining . Minimal jobs will be created during the construction phase of the site. It is expected that the incremental socio-economic contribution to the cumulative impact will be low.	Cemetery site and access road	L	Mitigation as per the direct construction phase.
7	**Traffic**					
7.1	Increased traffic to and from site impacting road capacity.	• Site preparation for access road and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads. • Use of contractors/construction workforce. • Waste collection and removal.	There is existing use of the Dingleton road, with it being used as access to Dingleton from the N14. The proposed development is anticipated to generate an insignificant volume of vehicle traffic on the road network during peak periods. It is expected that the incremental contribution to the cumulative traffic impact will be insignificant.	Access road only	Insignificant	Mitigation as per the direct construction phase.
7.2	Increased risk to road safety from establishment of a new access point off the N14 or the Dingleton road.	• Site preparation for access road and access control (clearing of land). • Establishing/upgrading the gravel access road, access point and use of roads. • Use of contractors/construction workforce. • Waste collection and removal.	There is existing use of the Dingleton road, with it being used as access to Dingleton from the N14. With the implementation of mitigation measures and the upgrading of the Dingleton road, the risk to road safety is expected to improve and thus the incremental contribution will add positively to the cumulative impact.	Access road only	H +	Mitigation as per the direct construction phase.

OPERATION

- **Direct**
- **Indirect**
- **Cumulative**

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Operation Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**		
1	**Soil and Land Capability**														
1.1	Loss of soil resources and related revegetation capability as a result of inappropriate removal and refilling of topsoil at graves.	• Grave establishment	M	H	L	M	M	L	L	L	L	L	Cemetery site only	There could be a disturbance to original soil profiles impacting revegetation capability when soil is removed and replaced at graves. The depths of the different soil profiles differ accross the site, thus the severity of mixing soil profiles is medium. The impact will have a high duration and will be localised to the grave areas. Without mitigation this would have a medium significance. With correct replacement of topsoil the significance can decrease to low.	• Soil horizons should be replaced in the correct order to allow re-establishment of vegetation where possible. • Topsoil is to be stockpiled and replaced at each grave site. • All exposed grave sites are to be revegetated with an indigenous grass seed mix.
1.2	Loss of soil resources and related land capability as a result of soil compaction from movement of vehicles and machinery.	• Use and maintenance of the parking area and fencing. • Use and maintenance of gravel roads (access and internal).	L	L	L	L	L	L	L	L	L	L	Cemetery site and access road	Movement of vehicles and machinery on site and vegetation clearing activities during operation can compact soils and can lead to erosion. Soil compaction negatively impacts on plant root growth and development and erosion leads to loss of soil. The compaction of the access road and the internal site roads will be long lasting, however since the site will remain a cemetery, the compaction is considered insignificant for the road areas. For other areas within the site, there will be minimal vehicle and machinery movement for establishing the graves, therefore collectively the severity will be low in the unmitigated scenario. The impact will be of a short duration, be localised, will have a low probability of occurring and have a low significance in the unmitigated and mitigated scenario.	• The activities of contractors or employees are to be restricted to the project areas. • Instructions must be included in contracts that will restrict work and workers to the clearly defined limits of the cemetery site. • Areas that have been impacted from operation activities that do not need to be used again are to be ripped and revegetated with an indigenous grass seed mix.
1.3	Loss of soil resources and related land capability as a result of soil contamination through the inappropriate management and handling of fuel, oil and ablution facilities.	• Use and maintenance of the parking area and fencing. • Use and maintenance of gravel roads (access and internal). • Use and maintenance of ablution facilities. • Waste collection and removal	M	H	L	M	M	L	H	L	L	L	Cemetery site and access road	Operation activities could potentially pollute soil as a result of oil and fuel spillages from vehicles and machinery as well as from litter and the improper maintenance of the ablution facilities. Considering there will be minimal people, vehicles and machinery on site, the severity in the unmitigated scenario is expected to be medium. The impact would be long lasting, be localised and a medium probability of occurring. The impact would have a medium significance in the unmitigated scenario. With proper waste management and immediate clean-up, the significance can be reduced to low	• Losses of fuel and lubricants from parked vehicles and equipment should be contained using a drip tray. • Pollution prevention through education and training of workers (temporary and permanent). • Bins are to be provided on site in designated areas for temporary waste disposal, prior to waste being taken to a licenced landfill site. • There must be immediate cleaning up of spillages of potentially contaminating liquids and solids immediately after any spill occurs. • No storage of fuel or lubricants on site. Should these need to be stored on site, they will need to be kept on impervious surfaces and bunded. • No maintenance of vehicles is to take place on site. Should it be necessary to do maintenance must take place on impervious surfaces and bunded. • Regular maintenance of vehicles and equipment is to take place and records are to be kept. • Ablution facilities are to be regularly maintained and records are to be kept.

Alternative 1 - Site and Dingleton Access Road (only feasible option)																
Operation Phase																
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**	
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**			
2	**Biodiversity**															
2.1	Loss of habitat and related floral (including species of conservation concern) and faunal species (including species of conservation concern) through removal of trees, poaching and firewood collection.	• Grave establishment • Use and maintenance of gravel roads (access and internal).	M	M	L	M	M	L	M	L	M-L	M-L	Cemetery site and access road	Operation activities can lead to the loss of habitat and related floral and faunal species from vegetation clearance for grave establishment and potential poaching and collection of firewood. Considering there are protected trees and plants on site, the severity of the impact is medium in the unmitigated scenario. It will be at a local scale for a short duration and have a medium probability of occurring. With the implementation of mitigation measures this can decrease to medium-low, as the probability of the impact occurring decreases. In the mitigated scenario there is a medium probability for the impact to floral species of conservation concern and low for all other aspects (changes to habitat and other floral and faunal species). Thus the significance of the impacts is medium-low in the mitigated scenario.	• 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: o Effective relocation of individuals to suitable similar habitat in the vicinity of the study area o All rescue and relocation plans should be overseen by a suitably qualified specialist; • 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. • 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. • It is recommended that site clearing takes 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. • 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. • 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. • The construction and operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment. • 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. • Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities. • No uncontrolled fires whatsoever should be allowed. • Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility. • All soils compacted as a result of construction activities should be ripped and profiled. Special attention should be paid to alien and invasive plant control within these areas. • No dumping of waste should take place. If any spills occur, they should be immediately cleaned up. • 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. • No trapping or hunting of any faunal species is to take place. • Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced. • Establishment of any revegetated areas must be monitored during the operational phase on a bi-monthly basis for a period of one year. <u>Rehabilitation Plan:</u> • Disturbed and cleared areas need to be revegetated with indigenous grass species to help stabilise the soil surface. • Soils that have been compacted because of the construction and operational activities must be ripped and profiled in line with the surrounding area.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Operation Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**		
2.2	Disturbance of floral and faunal species through dust fallout and noise.	• Site preparation (clearing of land) including fencing and access control.	H	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Operation activities can disturb floral species from increased dust fallout through movement along the access road and clearing of vegetation for grave establishment exposing soil. If land clearing is not done in stages, there could be high air quality impacts from constantly exposed soil. OPeration activities can also disturb faunal species from noise generated from vehicles, equipment and people on site, however, there will be limited vehicles, equipment and people on site and thus minimal noise. In the unmitigated scenario the severity of impacts to fauna and flora is thus collectively high. The impact to fauna and flora from noise and dustfall respectively will have a medium duration, can go beyond the site boundary and has a medium probability of occurring. Thus, the significance in the unmitigated scenario is medium. Provided that vegetation clearing occurs in stages throughout the life of the cemetery, only necessary vegetation is removed as burial sites are required, and that noise output is managed, the significance of the impact is expected to be low.	• 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. • The contractors and workers are to ensure that they do not create unnecessary noise such as hooting or shouting. • Vehicles are to be maintained in good condition to prevent unnecessary noise outputs.
2.3	Loss or changes to biodiversity in the floodplain from altered vegetation composition as a result of increased sedimentation in the floodplain from exposed, compacted and disturbed soils.	• Use and maintenance of gravel roads (access and internal).	L	L	M	M	M	L	L	L	L	L	Access road only	Activities in the floodplain can result in temporarily exposed soils leading to increased risk of transportation of sediment to the floodplain. This can alter water quality and vegetation composition and biodiversity potential for faunal species. Operation activities wihin the floodplain are limited to use of the access road, therefore the severity is low in the unmitigated scenario. The impact will be for a short duration, have a medium spatial scale and a medium probability of occurring. The significance in the unmitigated scenario is medium. With the implementation of the recommended mitigation measures the impact significance can decrease to low. The assessment by the specialist for this component was done in line with the Department of Water and Sanitation water use risk assessment criteria.	• Monitoring of erosion must take place on a yearly basis, in order to prevent the formation of erosion gullies as a result of altered flow paths, and the possible sedimentation of the floodplain • Berms are to be used to slow down the flow of stormwater.
3	**Surface water**														
	Loss of surface water resource as a result of contamination through the inappropriate management and handling of fuel and oil within the floodplain.	• Use and maintenance of gravel roads (access and internal). • Waste collection and removal.	L	L	L	L	L	L	L	L	L	L	Access road only	Due to the topography of the study area, direct impacts arising from the construction and operations of the cemetery are unlikely to affect the Ga-Mogara River to the south-east of the study area, due to the presence of raised roads and a railway line that are likely to act as buffers (silt-traps), collecting any sediment washed away along the banks and verges of these infrastructures The study area and flood plain are located within deep, well drained sandy soils, thus limiting the amount of surface water runoff into the flood plain areas and the Ga-Mogara river system, therefore decreasing impacts that water runoff from the study area may have on the Ga-Mogara river system.	• Losses of fuel and lubricants from parked vehicles and equipment should be contained using a drip tray. • Pollution prevention through education and training of workers (temporary and permanent). • Waste is to be disposed of into bins at designated areas. • There must be immediate cleaning up areas of spillages of potentially contaminating liquids and solids after any spill occurs.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Operation Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**		
4	**Groundwater**														
	Contamination of groundwater through the inappropriate management of ablution facilities. Contamination from coffins.	• Use and maintenance of ablution facilities, parking area. • Grave establishment	L	L	L	L	L	L	L	L	L	L	Cemetery site only	Because of dewatering at the Sishen Iron Ore Mine, groundwater levels in the vicinity of the cemetery area are indicated to be very deep, at approximately 120 meters below ground level (mbgl). Therefore it is unlikely that any contamination on surface from ablution facilities will reach the groundwater. Contamination to the groundwater from coffins (material used for the coffin, natural human decomposition and changes to ammonia and nitrate levels in groundwater) are also not expected with coffins being buried at only approximately 2 mbgl. This impact is considered insignificant.	• None required
5	**Noise**														
	Increase in ambient noise levels as a result of grave digging equipment and vehicles on site	• Grave establishment • Use and maintenance of the parking area and fencing. • Use and maintenance of gravel roads (access and internal).	L	L	L	L	L	L	L	L	L	L	Cemetery site and access road	Operation activities are expected to generate minimal noise as there will be minimal vehicles, machinery and people on site. There are no sensitive human noise receptors present near the site, therefore the noise impact is considered insignificant.	• The contractors and workers are to ensure that they do not create unnecessary noise such as hooting or shouting. • Vehicles are to be maintained in good condition to prevent unnecessary noise outputs.
6	**Air Quality**														
	Increase in dust fallout from soil handling and vehicle movement along unsurfaced roads	• Use and maintenance of the parking area and fencing. • Use and maintenance of gravel roads (access and internal).	M	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Operating activities can cause an increase in dust fallout from movement along the access road and clearing of vegetation for grave establishment exposing soil. If land clearing is not done in stages, there could be high air quality impacts from constantly exposed soil which could have an impact of people travelling along the main roads, affecting visibility. In the unmitigated scenario, the severity is high, with the duration being medium, the impact going beyond the site boundary and a medium probability of occurring. The significance in the unmitigated scenario is medium. Provided that vegetation clearing occurs in stages throughout the life of the cemetery, and only necessary vegetation is removed as burial sites are required, the significance of the air quality impact is expected to be low.	• Natural vegetation cover needs to be restored at impacted areas, as far as possible. • Dust is to be controlled using appropriate dust suppression measures.

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Operation Phase															
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**		
7	**Visual**														
	Changes in visual character of the area and sense of place from erection of grave stones	• Grave establishment	L	L	L	L	L	L	L	L	L	L	Cemetery site and access road	The property has an existing fenceline and existing gravel tracks which run parallel to the N14 and around the game farm. The proposed fence to be established around the cemetery and the proposed internal roads and parking area are thus not expected to change the visual character of the area. The ablution facilities and night lighting will be within the fenceline and could be visible within the larger property. If the whole cemetery area was cleared of vegetation from the start and left exposed, the visual character and sense of place could change. However, considering the existing nature of the site and its surrounds, the small size of the site and that there are no sensitive human visual receptors, the significance of the impact is insignificant.	• Natural vegetation cover needs to be restored at impacted areas, as far as possible.
8	**Heritage resources**														
	Loss and/or disturbance of archaeological sites through vehicle/people movement on site and excavation activities.	• Grave establishment	H	H	M	M	H	M+	H	M	L	M+	Cemetery site and access road	One site of heritage significance was identified within the proposed cemetery area (KC1). The possible impact of the proposed New Kathu Cemetery on the identified archaeological material is low. However, the area is a continuous cultural landscape and the occurrence of artefacts in the proposed area suggests that more artefacts may be found, especially once excavations begin. It is very likely that the development will have a permanent negative high impact on subsurface archaeological resources. The severity of the impact is therefore high in the unmitigated scenario, will have a high duration, a medium spatial scale and a medium probability of occurring. The significance is therefore high. With the implementation of mitigation measures this impact and risk can be reduced from high negative to medium positive. The mitigation measures will enable the identification of additional archaeological resources and the collection of data that could add to current research questions.	• 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; • 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; • If a deposit is identified a controlled sampling of the material found should be done; • 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; • 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; • 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; • 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: o 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. o 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. o 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. o Compile and submit an archaeological monitoring report at the end of the monitoring process. • 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).
9	**Palaeontological resources**														
	Loss and/or disturbance of palaeontological resources from excavation activities.	• Grave establishment	M	H	L	L	L	L	H	L	L	L	Cemetery site and access road	The site is underlain by the Ghaap Group and Stromatolites are known to be present in the area from literature. Should palaeontological resources be impacted the impact would be a medium severity, have a high duration, a localised scale and a low probability of occurring, With mitigation, an insignificant loss of fossil resources is expected. The proposed development is unlikely to pose a substantial threat to local fossil heritage.	• It is recommended that 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 Environmental Control Officer (ECO) responsible for these developments (or somebody in management) 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. • 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.

Alternative 1 - Site and Dingleton Access Road (only feasible option)																
Operation Phase																
Direct Impacts			**Unmitigated**					**Mitigated**					**Applicability**	**Discussion**	**Mitigation measure**	
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**to site and/ or access road**			
10	**Socio-economic**															
10.1	Provision of job opportunities (minimal) resulting in an increase in employment and related social and economic impacts.	• Limited employment of municipal employees	L+	L	M	L	L+	L+	L	M	M	M+	Cemetery site and access road	Minimal job opportunities will be provided during the operations phase of the project. This will be for maintenance of the site and digging graves, the impact will be at a local scale. The significance of the impact will be low in the unmitigated scenario. In the mitigated scenario, this would become medium with the maximisation of local procurement.	• Preference should be given to people in the local area. • The recruitment strategy to be communicated to the key stakeholders. • Local goods and services to be procured wherever reasonably possible. • Quotas for local procurement to be set in the specification for contractors. • Local sub-contractors to be used wherever reasonably possible.	
10.2	Provision of additional burial space for residents of Kathu and surrounding areas.	• Grave establishment	H+	M	M	H	M+	H+	H	M	H	H+	Cemetery site and access road	The current cemetery near Kathu is reaching capacity. The New Kathu Cemetery will provide the needed additional space for graves for the residents of Kathu and the surrounding areas. Maximising the number of graves within the footprint will allow for maximising the life of the cemetery, thus decreasing the need to find additional cemetery space sooner.	• Maximise the number of graves within the project footprint, while retaining as many protected trees as possible, to maximise the life of the cemetery.	
11	**Traffic**															
11.1	Increased vehicle movement affecting road capacity.	• Use and maintenance of gravel roads (access and internal).	L	L	L	L	L	L	L	L	L	L	Access road only	The proposed development is anticipated to generate an insignificant volume of vehicle traffic on the road network during peak periods. No additional lanes are required from a road capacity point of view. Therefore the impact on road capacity is insignificant.	• None required	
11.2	Increased risk to road safety from establishment of a new access point off the Dingleton road.	• Use and maintenance of gravel roads (access and internal).	H	H	M	H	H	H+	H	M	H	H+	Access road only	The proposed access road off the Dingleton road can have increased risks to road safety. This will have a high severity, a high duration, a medium spatial scale and a high probability of occurring. In the unmitigated scenario, the significance would be high. With the implementation of mitigation measures, this significance would change to a high positive as measures would have a positive impact on the road network, providing safer access to the site.	• Intersection design is to be implemented as per the traffic specialist report; Siyazi, 2017. • Obtain approvals from the relevant roads department for the intersection development and construct in line with approval requirements. • Speed limit signs should be erected along the relevant section of the Dingleton Road. The speed limit should be limited to 60 km/h at the access point and enforced by the relevant road authority for the relevant section. • Provide a dedicated right-turn lane on the Dingleton Road (southern approach). • 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. • Laydown areas for the road upgrade are to be fenced off to prevent entry by unauthorised people. • Materials are to be stored in designated areas on impervious surfaces and bunded. • Warning signs are to be placed at the laydown areas to warn against trespassing. • Stormwater controls are to be implemented around stockpile areas.	

Alternative 1 - Site and Dingleton Access Road (only feasible option)															
Operation Phase															
Indirect Impacts			**Unmitigated**					**Mitigated**					**Applicability to site and/ or access road**	**Discussion**	**Mitigation measure**
No.	**Impact Description**	**Activity**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**	**Sev**	**Dur**	**Spa**	**Pro**	**Sig**			
1	**Biodiversity**														
	Disturbance on animal movements and distribution as a result of establishing the cemetery.	• Limited employment of municipal employees • Use and maintenance of the parking area and fencing. • Grave establishment • Use and maintenance of gravel roads (access and internal).	L	L	M	M	M	L	L	L	L	L	Cemetery site and access road	The operation of the site is expected to have some impact on animal movements and distribution due to the site's position within the game farm. This has been mitigated as far as possible by placing the site adjacent to the N14. The presence of people on site could also have an impact, though minimal people will be on site during operation. The severity is thus low. The impact will be intermittent, have a medium spatial scale and a medium probability of occurring. The significance is thus medium in the unmitigated scenario. With mitigation, the impact significance can decrease to low.	• Any workers are to ensure that they do not create unnecessary noise such as hooting or shouting. • Vehicles are to be maintained in good condition to prevent unnecessary noise outputs. • Poaching and harvesting of wood or plants is prohibited. • Necessary signs are to be placed around the site to inform visitors of noise control measures and rules regarding harvesting, poaching and speed limits.
	Alien invasive encroachment through removal and/or disturbance of vegetation.	• Grave establishment	M	H	M	M-H	H	L-M	L	L	M-H	M	Cemetery site only	Clearing of vegetation during the operation of the site for grave establishment can lead to proliferation of alien invasive species. This can impact the biodiversity of the area. The impact of alien invasive encroachment during the operation of the site will have a medium severity impact on biodiversity. It will be at a local scale for a long duration and have a medium to high possibility of occurring. Thus, the significance is high in the unmitigated scenario. The high probability in the unmitigated and mitigated scenario and medium severity in the mitigated scenario is for the impact on floral species of conservation concern. In the mitigated scenario, the other aspects (changes to habitat and other floral and faunal species) have a medium probability and low severity. With mitigation the significance of the impact can decrease to medium.	• 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). • All alien plants within the study area should be cleared, with follow up activities running concurrently for one year. • 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.
2	**Land use**														
	Increase in dust fallout on vegetation affecting the grazing capacity of the neighbouring game farm.	• Use and maintenance of the parking area and fencing. • Waste collection and removal. • Use and maintenance of ablution facilities. • Use and maintenance of gravel roads (access and internal).	H	M	M	M	M	L	L	L	L	L	Cemetery site and access road	Operation activities on site can impact on the surrounding land use (game farming - grazing) from people poaching or collecting firewood/ plants, increased noise from people, vehicles and equipment on site and increased dust fallout from vehicles travelling along the access road and exposed soil from grave establishment. The impact on the surrounding land use will have a high severity, will have a medium duration, a medium spatial scale and medium probability of occurring. The significance is thus medium in the unmitigated scenario. The overall impact that the cemetery has on the surrounding land use can be managed with the implementation of the mitigation measures outlined in the EMP, thus decreasing the significance to low in the mitigated scenario.	• 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. • Effective implementation of all mitigation measures as outlined in the EMP report to reduce the New Kathu Cemetery's overall impact on the environment and surrounding land-uses. • Poaching and harvesting of wood or plants is prohibited. • Necessary signs are to be placed around the site to inform visitors of noise control measures and rules regarding harvesting, poaching and speed limits.

Alternative 1 - Site and Dingleton Access Road (only feasible option)						
Operation Phase						
Cumulative Impacts						
No.	**Impact Description**	**Activity**	**Impact Discussion**	**Applicability to site and/ or access road**	**Significance of contribution to cumulative impact**	**Mitigation measure**
1	**Soil and land capability**					
	Increase in loss of soil resources and related land capability as a result of the inappropriate management and handling of fuel, oil and ablution facilities.	• Use and maintenance of parking area and fencing. • Waste collection and removal • Use and maintenance of ablution facilities. • Use and maintenance of gravel roads (access and internal).	The proposed site is surrounded by various activities that can have an impact on soil resources and the associated land capability. On a wider scale these include roads, powerlines, rail lines and mining. On a smaller scale, within the Lyleveld farm, this includes powerlines, diggings and use of access roads within the game farm. The operations phase will have a minimal additional number of vehicles and machinery on site, for a short duration. With the implementation of mitigation measures, the incremental impact is expected to be low and is thus unlikely to add significantly to the cumulative loss of soil resources and associated land capability.	Cemetery site and access road	L	Mitigation as per the direct operation phase.
2	**Biodiversity**					
	Disturbance on animal movements and distribution as a result of establishing the cemetery.	• Use and maintenance of parking area and fencing. • Use and maintenance of ablution facilities. • Use and maintenance of gravel roads (access and internal).	Biodiversity around the proposed site has aready been impacted by various activities, including alterations to the Ga-Mogara River, mining, powerlines, grazing and rail lines. On a smaller scale, within the Lyleveld farm, this includes existing fences, powerlines, diggings and use of access roads within the game farm. While the presence of fences for the site could change animal movements and distribution, it is not expected that there will be a significant incremental impact to biodiversity. The area that will be fenced off can still be utilised to an extent as smaller animals e.g. birds, small mamamals and arthropods, can still access the site area through the game fence. While human presence on site could also impact on animal movements, provided mitigation measures are implemented, the operating activities on site will be limited to the project area and intermittent. With mitigation, it is expected that the incremental contribution to the cumulative biodiversity impact in the area will be low.	Cemetery site and access road	L	Mitigation as per the direct operation phase.
3	**Surface water**					
3.1	Increase in loss of surface water resource in the floodplain as a result of soil contamination through the inappropriate management and handling of fuel and oil.	• Use and maintenance of gravel roads (access and internal). • Waste collection and removal.	Surface water in the area can be impacted by various activities in the surrounding area, including mining, rail lines, powerlines, roads and alterations to the Ga-Mogara River. Due to the topography of the study area the increase in the number of construction vehicles and machinery are unlikely to result in changes to the Ga-mogara River, due to the presence of raised roads and a railway line that are likely to act as buffers (silt-traps), collecting any sediment washed away along the banks and verges of these infrastructures. The increase in vehicles and machinery on the Dingleton road and access road for accessing the cemetery site will also be minimal for a short duration. With the implementation of mitigation measures, it is expected that the incremental contribution to the cumulative surface water impact will be insignificant.	Access road only	Low	Mitigation as per the direct operation phase.
3.2	Increase in disturbance to the floodplain from vehicles travelling on the access road.	• Use and maintenance of gravel roads (access and internal).	Considering that small size of the project footprint within the floodplain relative to the size of the catchment area, the possible changes in flow as a result of the project are expected to be insignificant. Thus, it is expected that the incremental contribution to the cumulative surface water impact will be insignificant.	Access road only	L	Mitigation as per the direct operation phase.
4	**Groundwater**					
	Increase in groundwater contamination through the inappropriate management of ablution facilities.	• Use and maintenance of parking area and fencing. • Use and maintenance of ablution facilities. • Grave establishment	The project is unlikely to impact on groundwater quality, with the groundwater being very deep below ground level. Therefore, no cumulative impact is expected.	Cemetery site only	Not Applicable	Mitigation as per the direct operation phase.

Alternative 1 - Site and Dingleton Access Road (only feasible option)						
Operation Phase						
Cumulative Impacts						
5	**Noise**					
	Increase in ambient noise levels as a result of operational activities.	• Use and maintenance of parking area and fencing. • Use and maintenance of ablution facilities.	The area surrounding the site has various noise generating activities, the closest being use of the N14 and Dingleton roads. The proposed project will generate minimal, short term noise through the movement of vehicles and machinery and people on site during operation. It is expected that the incremental contribution to the cumulative noise impact will be insignificant, provided mitigation measures are implemented.	Cemetery site and access road	Insignificant	Mitigation as per the direct operation phase.
6	**Air Quality**					
	Increase in dust fallout from soil handling and vehicle movement along unsurfaced roads.	• Use and maintenance of parking area and fencing. • Use and maintenance of gravel roads (access and internal). • Grave establishment	Various activities in the surrounding area can impact on dust fallout, including mining on a larger scale and the use of gravel roads on a smaller scale. The project will have a minimal increase in vehicles and machinery travelling around the site and land clearing for grave establishment, contributing to dust fallout, for a short duration. Provided mitigation measures are implemented, it is expected that the incremental contribution to the cumulative air quality impact as a result of the establishment of graves and use of the site will be low.	Cemetery site and access road	L	Mitigation as per the direct operation phase.
7	**Socio-economic**					
	Provision of job opportunities (minimal) resulting in an increase in employment and related social and economic impacts.	• Limited employment of municipal employees	On a large scale there are various activities that constribute to the socio-economic profile of the area, particularly mining . Minimal jobs will be created during the operational phase of the site. It is expected that the incremental contribution to the cumulative socio-economic impact will be low.	Cemetery site and access road	L	Mitigation as per the direct operation phase.
8	**Traffic**					
8.1	Increased vehicle movement affecting road capacity.	• Use of road by visitors. • Use of contractors/construction workforce. • Waste collection and removal.	There is existing use of the Dingleton road, with it being used as access to Dingleton from the N14. The proposed development is anticipated to generate an insignificant volume of vehicle traffic on the road network during peak periods. It is expected that the incremental contribution to the cumulative traffic impact will be insignificant.	Access road only	Insignificant	Mitigation as per the direct operation phase.
8.2	Increased risk to road safety from establishment of a new access point off the N14 or the Dingleton road.	• Use of road by visitors. • Use of contractors/construction workforce. • Waste collection and removal.	There is existing use of the Dingleton road, with it being used as access to Dingleton from the N14. With the implementation of mitigation measures and the upgrading of the Dingleton road, the risk to road safety is expected to improve and thus the incremental contribution will add positively to the cumulative impact.	Access road only	H+	Mitigation as per the direct operation phase.

DECOMMISSIONING AND CLOSURE

Direct

Indirect

Cumulative

Alternative 1 - Site and Dingleton Access Road (only feasible option)		
Decommissioning and closure		
Direct Impacts		**Mitigation measure**
Impact Description	**Significance**	
The new Kathu cemetery is expected to remain on site indefinitely. Should this change in future, then the direct impacts of decommissioning and closing the site will need to be assessed at the appropriate time.	Not applicable	Not applicable

Alternative 1 - Site (only feasible option)		
Decommissioning and closure		
Indirect impacts		**Mitigation measure**
Impact Description	**Significance**	
The new Kathu cemetery is expected to remain on site indefinitely. Should this change in future, then the indirect impacts of decommissioning and closing the site will need to be assessed at the appropriate time.	Not applicable	Not applicable

Alternative 1 - Site (only feasible option)		
Decommissioning and closure		
Cumulative impacts		**Mitigation measure**
Impact Description	**Significance**	
The new Kathu cemetery is expected to remain on site indefinitely. Should this change in future, then the cumulative impacts of decommissioning and closing the site will need to be assessed at the appropriate time.	Not applicable	Not applicable

NO-GO

- **Direct**
- **Indirect**
- **Cumulative**

Impact Assessment for the project site		
Alternative 1 - Site and Dingleton Access Road (only feasible option)		
No-Go Option		**Mitigation measure**
Direct Impacts		
Discussion on no-go impact	**Significance of no-go**	
If the project does not proceed, there will not be any changes to the environment and the status quo would remain. None of the positive or negative impacts identified in this impact assessment will be realised. If the project does not go ahead, the Gamagara Local Municipality's need for the additional cemetery space will not be realised and there will not be an increase in availability of cemetery space. The residents that would have used the new cemetery would need to use a cemetery further away. When considering the benefits versus the negative impacts of the proposed project, the significance of the "no go" option is negative high. The negative impacts identified can be managed to acceptable levels, but with the lack of available and viable areas in Kathu that can be used for cemetery space, not providing the required basic service delivery cannot be easily mitigated/addressed.	H	Not applicable as the project would not proceed.

Alternative 1 - Site and Dingleton Access Road (only feasible option)		
No-Go Option		
Indirect impacts		**Mitigation measure**
Discussion on no-go impact	**Significance of no-go**	
If the project does not proceed, there will not be any changes to the environment and the status quo would remain. None of the positive or negative impacts identified in this impact assessment will be realised. If the project does not go ahead, the Gamagara Local Municipality's need for the additional cemetery space will not be realised and there will not be an increase in availability of cemetery space. The residents that would have used the new cemetery would need to use a cemetery further away. When considering the benefits versus the negative impacts of the proposed project, the significance of the "no go" option is negative high. The negative impacts identified can be managed to acceptable levels, but with the lack of available and viable areas in Kathu that can be used for cemetery space, not providing the required basic service delivery cannot be easily mitigated/addressed.	H	Not applicable as the project would not proceed.

Alternative 1 - Site and Dingleton Access Road (only feasible option)		
No-Go Option		
Cumulative impacts		**Mitigation measure**
Discussion on no-go impact	**Significance of no-go**	
If the project does not proceed, there will not be any changes to the environment and the status quo would remain. None of the positive or negative impacts identified in this impact assessment will be realised. If the project does not go ahead, the Gamagara Local Municipality's need for the additional cemetery space will not be realised and there will not be an increase in availability of cemetery space. The residents that would have used the new cemetery would need to use a cemetery further away. When considering the benefits versus the negative impacts of the proposed project, the significance of the "no go" option is negative high. The negative impacts identified can be managed to acceptable levels, but with the lack of available and viable areas in Kathu that can be used for cemetery space, not providing the required basic service delivery cannot be easily mitigated/addressed.	H	Not applicable as the project would not proceed.