

APPENDIX B - IMPACT TABLES

PLANNING AND DESIGN PHASE

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
ENVIRONMENTAL POLICY														
Legal and policy compliance	All Alternatives	During the planning and design phase, failure to adhere to existing policies and legal obligations and obtain the necessary authorisations could lead to the project conflicting with local, provincial and national policies, legislation, etc. This could result in lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.	Negative	Direct	Severe	National	Long-term	Possible	Reversible	Resource will not be lost	Achievable	HIGH -	<ul style="list-style-type: none"> All relevant legislation and policy must be consulted and the proponent must ensure that the project is compliant with such legislation and policy. These should include (but are not restricted to): NEMA and Local Municipal bylaws. All relevant permits and authorisations including Water Use Licences or General Authorisations, Building Plan Approvals and plant removal permits must be in place prior to commencement of construction. 	LOW -
BUILT ENVIRONMENT														
Infrastructure	All Alternatives	During the planning and design phase, planning and placement of structures and associated infrastructure in sensitive areas could lead to the damage and degradation of natural areas as well as to the structures themselves.	Negative	Direct	Moderate	Study area	Medium-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Planning for and placement of infrastructure must be done so as to avoid sensitive areas as far as possible. 	LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Stormwater management	All Alternatives	During the planning and design phase, inadequate planning for stormwater during the construction and operational phases within the site could result in erosion and contamination of the soil and surrounding watercourses if there are not appropriate stormwater management structures in place.	Negative	Direct, Cumulative	Moderate	Study area	Medium-term	Possible	Reversible	Resource will be partly lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> A method statement must be developed by the project manager or contractor prior to construction, including considerations for stormwater, erosion, waste and alien vegetation management, as well as site rehabilitation and maintenance considerations. This method statement must be approved by the appointed ECO. This method statement should include stormwater management considerations to control runoff prevent erosion of the site and its surroundings, and mitigate the unnecessary loss of soil and sedimentation of watercourses during all phases of the project. Regular monitoring of implementation of this method statement for the rehabilitation of disturbed areas must be conducted. Appropriate stormwater structures, in alignment with the method statement, must be designed to minimise erosion of the surrounding environment to the extent required 	LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Waste management	All Alternatives	During the planning and design phase, failure to plan for the storage, handling and disposal of general and hazardous waste during the construction and operation phase may lead to littering and pollution of the surrounding environment, unsanitary conditions and health risks.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> A method statement must be developed by the project manager or contractor prior to construction, including considerations for stormwater, erosion, waste and alien vegetation management, as well as site rehabilitation and maintenance considerations. This method statement must be approved by the appointed ECO. This method statement should include waste management considerations for handling onsite general and hazardous waste during the construction and operation phases must be developed and implemented during construction. An appropriate area must be identified where waste can be stored before disposal. All hazardous substances such as paints, diesel and cement must be stored in a secure bunded area with an impermeable surface beneath them. 	LOW -
SOCIO-ECONOMIC														
Job creation	All Alternatives	During the planning and design phase, there will be some temporary job opportunities associated with planning and design of the proposed road upgrade of the National Route R56.	Positive	Direct	Slight	Localised	Short-term	Definite	N/A	Resource will not be lost	Easily Achievable	HIGH +	N/A	HIGH +
Health and safety	All Alternatives	During the planning and design phase, failure to plan for potential health and safety risks during the construction and operation phase may result in the harm of labourers, staff, surrounding landowners and the public.	Negative	Direct, Indirect	Moderate	Study area	Short-term	Possible	Irreversible	Resource will be lost	Achievable	MODERATE -	A health and safety plan in terms of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) must be drawn up by and HSE officer prior to construction to ensure workers safety.	LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
On-site fire risk	All Alternatives	During the planning and design phase, failure to plan for accidental fires during the construction and operation phase could result in potential harm to the public and/or surrounding landowners and their property.	Negative	Direct	Moderate	Study area	Medium-term	Possible	Irreversible	Resource will be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Emergency preparedness must be in place for both the construction and operational phases and before these phases commence. This should form part of the method statement. SANRAL SOC must plan for and put measures in place to prevent and deal with fires including the provision of firefighting equipment. 	LOW -
Traffic	All Alternatives	During the planning and design phase, inadequate planning for the transportation of mast materials and specialist construction equipment to the site could cause traffic congestion.	Negative	Direct	Moderate	Regional	Short-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Consultation with the local Road Traffic Unit should be done early in the planning phase and if deemed necessary, road traffic permits should be obtained for transporting parts, containers, materials and construction equipment to the site to the extent required. Make provision for traffic accommodation where construction activities impact on existing roads. 	LOW -
REHABILITATION AND MAINTENANCE														
Inadequate rehabilitation and maintenance	All Alternatives	During the planning and design phase, inadequate planning for rehabilitation and maintenance of infrastructure could lead to degradation of the study area and surrounding areas.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will be partly lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> A rehabilitation plan must be developed by the project manager or contractor as part of the method statement and implemented during construction and operation phases. This method statement must be approved by the appointed ECO. 	LOW -
TERRESTRIAL BIODIVERSITY AND ECOLOGY														
Loss of Vegetation Communities	Preferred Alternative	The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems.	Negative	Direct	Moderate	Study area	Permanent	Probable	Reversible	Resource will be partly lost	Achievable	MODERATE -	<ul style="list-style-type: none"> All access to the proposed development must be limited to existing access roads and pathways. No ad hoc roadways should be permitted, without first being authorised by the ECO and the CA. 	MODERATE -

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Loss of Plant Species of Conservation Concern (SCC)	Preferred Alternative	During the field assessment one (1) protected plant species were recorded within the development footprint, namely Sensitive Species 1.	Negative	Direct	Moderate	Study Area	Permanent	May occur	Reversible	Resource will be partly lost	Achievable	MODERATE -	<ul style="list-style-type: none"> If any protected plant species are found within the construction footprint, permits must be received before construction commences on site. No plant species (SCC or common) must be harvested or removed from site without approval from the ECO or Applicant in writing. If any protected species die during the translocation process, specimen loss must be offset at a ratio of 1:3. 	LOW -
Fragmentation, Loss of Ecosystem Function and Edge Effects	Preferred Alternative	The project will result in the permanent habitat loss within the footprints of the proposed National Route R56 rehabilitation..	Negative	Direct	Slight	Study area	Permanent	Definite	Reversible	Resource will be partly lost	Achievable	HIGH -	Mitigation Measures: <ul style="list-style-type: none"> The proposed development footprint must be kept as small as possible and ensure that all non-operational areas are rehabilitate to a suitable condition. Rehabilitation must extent into the PAOI and not only the proposed development footprint. 	MODERATE -
		Portions of faunal habitat have already been lost due to existing buildings, roads and bare open ground and trampled field which have little to no surface roughness.	Negative	Cumulative	Slight	Study area	Long term	Definite	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.	HIGH -	MODERATE -			

CONSTRUCTION PHASE

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
ENVIRONMENTAL POLICY														
Legal and policy compliance	All Alternatives	During the construction phase, failure to adhere to existing policies and legal obligations and obtain the necessary authorisations could lead to the project conflicting with local, provincial and national policies, legislation, etc. This could result in lack of institutional support for the project, overall project failure and undue disturbance to the natural environment.	Negative	Direct	Severe	National	Long-term	Possible	Reversible	Resource will be partly lost	Achievable	HIGH -	<ul style="list-style-type: none"> All construction related conditions in the Environmental Authorisation, EMPr and other permits must be adhered to. SANRAL SOC must employ an independent Environmental Control Officer (ECO) for the construction phase to ensure that construction is implemented according to specifications in the EA and EMPr. Copies of all applicable licenses, permits and managements plans (EA, EMPr, etc.) must be available on-site at all times. Environmental Awareness Training must be included in site meetings/talks with all workers. 	LOW -
BUILT ENVIRONMENT														
Infrastructure	All Alternatives	During the construction phase, the disturbance/clearing of vegetation and construction activities within or within close proximity to sensitive areas may result in degradation of the surrounding environment.	Negative	Direct, Indirect	Severe	Study area	Long-term	Definite	Reversible	Resource will be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Vegetation clearance must be limited to the area within the footprint of the designated area. Vegetation disturbance outside of the development footprint should be minimized. 	LOW -
Stormwater management	All Alternatives	During the construction phase, failure to implement effective stormwater management measures may result in increased surface soil erosion and contamination of stormwater and resulting surrounding watercourses.	Negative	Direct, Indirect	Moderate	Study area	Long-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> The construction site must be managed in a manner that prevents pollution to downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. Berms and swaths must be placed in areas that may be prone to erosion. Temporary cut-off drains and berms may be required to capture storm water and promote infiltration. 	LOW -

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Waste management	All Alternatives	During the construction phase, poor management of handling, disposal and storage of general and hazardous waste may lead to the pollution of the surrounding environment.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> All general waste must be disposed of in bins/waste skips labelled "general waste". Sufficient waste bins must be provided throughout the construction site for collecting waste. All general waste collected on site must be disposed of at a licensed general waste disposal site. All hazardous waste generated on site must be placed in a temporary impermeable bunded containment area which must be disposed of at a hazardous landfill site or be collected by the appropriate service provider. Proof of receipt of hazardous waste by a licenced service provider must be maintained on the site. Adequate sanitary facilities must be provided for construction workers and they must be properly secured to the ground. Maintenance of the chemical toilets should be done on a regular basis to prevent any leakages. 	LOW -
		During the construction phase, the mixing of cement on site could result in ground water contamination from compounds in the cement. In addition, a large number of cement mixing stations on site could increase the presence of impermeable areas which in turn could increase rates of run-off and thereby increase the risk of localized flooding, soil erosion, silting, gully formation, etc.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Concrete and cement must take place on an impermeable surface, and dried waste concrete and cement must be disposed of with building rubble. No concrete mixing must take place within 32 m of any watercourse. 	LOW -
SOCIO-ECONOMIC														
Capital economic investment	All Alternatives	The upgrading of the R56 entails a capital investment in excess of R1 billion, which will benefit the local and national economy in the form of materials production and sales as well as the use of local SMMEs.	Positive	Direct	Slight	Localised	Short-term	Definite	N/A	Resource will not be lost	Easily Achievable	VERY HIGH +	<ul style="list-style-type: none"> N/A 	VERY HIGH +

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Job creation	All Alternatives	During the construction phase, there will be some temporary job opportunities associated with building of the proposed road upgrade of the National Route R56.	Positive	Direct	Slight	Localised	Short-term	Definite	N/A	Resource will not be lost	Easily Achievable	HIGH +	<ul style="list-style-type: none"> N/A 	HIGH +
Health and safety	All Alternatives	During the construction phase, failure to comply with health and safety policies and protocols may result in the harm of labourers, staff, surrounding landowners and the public.	Negative	Direct, Indirect	Moderate	Study area	Short-term	Possible	Irreversible	Resource will be lost	Achievable	MODERATE -	<ul style="list-style-type: none"> A health and safety plan in terms of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) must be adhered to and enforced by a HSE officer to ensure workers safety. 	LOW -
Air quality and dust control	All Alternatives	During the construction phase, dust generated by construction vehicles and construction activities could result in significant dust during windy conditions.	Negative	Direct	Moderate	Study area	Short-term	Definite	Reversible	Resource will not be lost	Achievable	MODERATE -	<ul style="list-style-type: none"> During windy periods un-surfaced and un-vegetated areas must be dampened down. Vegetation must be retained where possible as this will reduce dust travel. Any complaints or claims emanating from dust issues must be attended to immediately and noted in the complaints register. Vehicles and construction plant must be serviced regularly so as to reduce excessive vehicle emissions. 	LOW -
	All Alternatives	During the construction phase poor maintenance and servicing of construction plant and vehicles may result in an increase in vehicle emissions in the areas.	Negative	Indirect	Moderate	Study area	Short-term	Probable	Reversible	Resource will not be lost	Achievable	MODERATE -		LOW -
On-site fire risk	All Alternatives	During the construction phase inadequate attention to fire safety awareness and fire safety equipment could result in uncontrolled fires, posing a threat to animals, vegetation and the surrounding landowners.	Negative	Direct	Moderate	Study area	Long-term	Possible	Irreversible	Resource will be lost	Easily Achievable	MODERATE -	<p>In order to reduce the risk of fires:</p> <ul style="list-style-type: none"> All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. Smoking must not be permitted near flammable substances. All cooking must be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. No open fires must be allowed on site. Fire extinguishers must be available onsite. 	LOW -
REHABILITATION AND MAINTENANCE														

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Inadequate rehabilitation and maintenance	All Alternatives	During the construction phase inadequate provision and implementation of rehabilitation measures may lead to the degradation of the surrounding environment.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will be partly lost	Easily Achievable	MODERATE -	The rehabilitation plan must be implemented during and after the construction has been completed.	LOW -
TERRESTRIAL BIODIVERSITY AND ECOLOGY														
Loss of Plant Species of Conservation Concern	Preferred Alternative	During the field assessment one (1) protected plant species were recorded within the development footprint, namely Sensitive Species 1.	Negative	Direct	Moderate	Study Area	Permanent	May occur	Reversible	Resource will be partly lost	Achievable	MODERATE -	<ul style="list-style-type: none"> An Erosion Management Plan / Method Statement should be compiled and implemented during the Construction Phase. If any protected species die during the translocation process, specimen loss must be offset at a ratio of 1:3. Disturbed areas impacted during construction which do not form part of the road upgrade must be rehabilitated as soon as possible. The site should be monitored regularly for signs of erosion. Remedial action must be taken at the first signs of erosion. 	LOW -
Loss of faunal species of conservation concern	Preferred Alternative	<p>During the field assessment evidence was observed that several mammal species occur within the study area. One of these species are Species of Conservation Concern (SCC) was observed, namely Sensitive Species 2.</p> <p>According to Stuarts' Field Guide to Mammals of Southern Africa (2015), forty-eight (48) mammal species have a known distribution within the project area. Of the species listed, five (5) are considered Near Threatened, four (4) are considered Threatened, and one (1) is Data Deficient.</p>	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource could be partly lost	Achievable	LOW -	<p>Species-specific mitigations have therefore been proposed.</p> <ul style="list-style-type: none"> No killing of fauna must be tolerated. The consumption of alcohol should not be tolerated on site. Environmental awareness training must be conducted by the ECO before any new staff commence with work on site. This must include the adequate identification of the following species: <ul style="list-style-type: none"> <i>Aonyx capensis</i>; <i>Hydricis maculicollis</i>; <i>Poecilogale albinucha</i>; 	LOW -

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		<p>During the field assessment evidence was observed that several mammal species occur within the study area. One of these species are Species of Conservation Concern (SCC) was observed, namely Sensitive Species 2.</p> <p>According to Stuarts' Field Guide to Mammals of Southern Africa (2015), forty-eight (48) mammal species have a known distribution within the project area. Of the species listed, five (5) are considered Near Threatened, four (4) are considered Threatened, and one (1) is Data Deficient.</p>	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource could be partly lost	Achievable	LOW -	<ul style="list-style-type: none"> <i>Leptailurus serval</i>; <i>Redunca fulvorufula</i>; <i>Pelea capreolus</i>; <i>Otomys auratus</i>; <i>Grammomys dolichurus</i>; <i>Mystromys albicaudatus</i>; and <i>Dasymys incommutus</i>. Any recorded sightings of these species must immediately be reported to the ECO immediately (especially if breeding or nesting nearby). Any nesting activities recorded within the development footprint must result in the immediate cessation of construction activities until instructed to commence again by the ECO and when safe to do so again. Any excavations or holes must be checked regularly for fauna that may have either occupied the area or may have fallen in accidentally. The design of deep excavations should consider nearby fauna (specially reptiles). Construction should not take place during the evening and should be restricted between 07h00 and 16h30. Any lighting must not point outwards toward any natural habitat and should be focus downwards or towards the development. All medium to large burrows (>50cm in diameter) must be activity searched. Relocation activities should take place if any animal species are found within a burrow (common or SCC). 	LOW -

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Fragmentation, Loss of Ecosystem Function and Edge Effects	Preferred Alternative	The project will result in the permanent habitat loss within the footprints of the proposed Road upgrade.	Negative	Direct	Slight	Study area	Permanent	Definite	Reversible	Resource will be partly lost	Achievable	HIGH -	Mitigation Measures: <ul style="list-style-type: none"> The proposed development footprint must be kept as small as possible and ensure that all non- operational areas are rehabilitate to a suitable condition. Rehabilitation must extent into the PAOI and not only the proposed development footprint. 	MODERATE -
		Portions of faunal habitat have already been lost due to existing buildings, roads and bare open ground and trampled field which have little to no surface roughness.	Negative	Cumulative	Slight	Study area	Long term	Definite	It is difficult to implement mitigation measures specific to the cumulative impacts as the applicant only has jurisdiction over their development and not over other developments or activities in the area. However, it is imperative that the applicant implement the mitigation measures listed above for the direct impacts.			HIGH -		MODERATE -
Invasion of Alien Plant Species	Preferred Alternative	Plant trees within properties (like that of hotel or resorts and municipal properties as well as open spaces which presumable were natural but have deteriorated over the years to form alien plant communities.	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource will be partly lost	Achievable	LOW -	Mitigation Measures: <ul style="list-style-type: none"> An Alien Invasive Plant Species Control Plan must be developed by the Contractor and include both construction and operational phase requirements. No dumping of cleared alien vegetation must be allowed on site. All cleared material must be appropriately disposed of at a registered landfill. Alien invasive plant control regimes must include the entire site and PAOI. 	LOW -

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Loss of Vegetation Communities	Preferred Alternative	The removal of existing natural vegetation creates 'open' habitats which favours the establishment of undesirable vegetation in areas that are typically very difficult to eradicate and could pose a threat to surrounding ecosystems.	Negative	Direct	Moderate	Study area	Permanent	Probable	Reversible	Resource will be partly lost	Achievable	MODERATE -	Mitigation Measures: <ul style="list-style-type: none"> The construction and operational footprint of the development must not extend past the footprint demonstrated within the proposed development plan. All construction laydown areas should be placed within existing disturbed areas and not within any sensitive habitat located nearby. All access to the proposed development must be limited to existing access roads and pathways. 	MODERATE -
HERITAGE AND PALAEOLOGICAL RESOURCES														
Loss of archaeological feature	All Alternatives	The study did not identify any archaeological receptors which will be directly impacted by the proposed project and no impact on archaeological sites or features is anticipated.	Negative	Direct	Moderate	Study area	Short Term	Definite	Irreversible	Resource will not be lost	Achievable	MODERATE -	No Mitigation Required	LOW -
Loss of historically significant building and structures	All Alternatives	The study identified two historic sites which comprise an old bridge that was built in 1951 as well as an historic dwelling and church located on the western end of the town of Cedarville. For the rest of the study area, the general landscape holds varied significance in terms of the built environment as the area comprises agricultural plots, established, informal settlements and townlands. However, no impact on built environment sites is anticipated.	Negative	Direct	Slight	Study area	Short Term	Definite	Irreversible	Resource will not be lost	Achievable	LOW -	No Mitigation Required	LOW -
Alternation of cultural landscape	All Alternatives	The larger area comprises a rich cultural horizon and the natural landscape surrounding the proposed project encompasses transformed open grasslands, hills and river valleys. The cultural landscape holds Stone Age remains, Colonial Period farmsteads and Historical settlements. However, the proposed project is unlikely to result in a significant impact on the cultural landscape of this area.	Negative	Direct	Slight	Study area	Short Term	Definite	Irreversible	Resource will not be lost	Achievable	LOW -	No Mitigation Required	LOW -

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Loss of paleontological significant remains	All Alternatives	Extensive excavation of topsoil and removal of more than 1.5m of soil cover is planned in this region, these rocks can contain very significant remains of plants and animals that can contribute significantly to the understanding of the palaeo-environments in this part of the Karoo Basin.	Negative	Direct	Severe	National	Short Term	Definite	Irreversible	Resource will not be lost	Achievable	VERY HIGH -	Monitoring and subject to Phase 1 PIA assessments preferably simultaneous to the timing of initial excavations for construction of the upgrading of the road	LOW -

Disturbance to graves/human burial sites	All Alternatives	<p>No human burials were documented in the study area and no impact on human remains is foreseen. It should be noted that graves and cemeteries often occur within settlements or around homesteads in the rural areas of the Gauteng, and they are also randomly scattered around archaeological and historical settlements. The probability of informal human burials encountered during development should thus not be excluded. In addition, human remains and burials are commonly found close to archaeological sites; they may be found in "lost" graveyards, or occur sporadically anywhere as a result of prehistoric activity, victims of conflict or crime. It is often difficult to detect the presence of archaeological human remains on the landscape as these burials, in most cases, are not marked at the surface.</p> <p>Human remains are usually observed when they are exposed through erosion. In some instances, packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work, then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial, they would need to be exhumed under a permit from the SAHRA BGG Unit (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the SAHRA BGG Unit. Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.</p>	Negative	Direct	Slight	Study area	Short Term	Definite	Irreversible	Resource will not be lost	Achievable	LOW -	<p>Human remains are usually observed when they are exposed through erosion. In some instances packed stones or rocks may indicate the presence of informal pre-colonial burials. If any human bones are found during the course of construction work then they should be reported to an archaeologist and work in the immediate vicinity should cease until the appropriate actions have been carried out by the archaeologist. Where human remains are part of a burial they would need to be exhumed under a permit from SAHRA (for pre-colonial burials as well as burials later than about AD 1500). Should any unmarked human burials/remains be found during the course of construction, work in the immediate vicinity should cease and the find must immediately be reported to the archaeologist, or the South African Heritage Resources Agency (SAHRA). Under no circumstances may burials be disturbed or removed until such time as necessary statutory procedures required for grave relocation have been met.</p>	LOW -
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AQUATIC AND WETLAND IMPACTS														
Direct ecosystem destruction and modification impacts	All alternatives	Direct disturbance to river aquatic and riparian habitat for upgrade of the road crossing culverts and bridges. If rehabilitation is undertaken poorly, bank and bed medication impacts will remain with associated vegetation and alien invasive impacts, which will ultimately contribute to reduced PES and ecosystem services.	Negative	Direct	Slight	Surrounding area	Long-term	Definite	Reversible	Resource will not be lost	Achievable	MODERATE -	General rehabilitation guidelines: <ul style="list-style-type: none"> All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO. All land impacted by the proposed development must be rehabilitated by undertaking the following general tasks: <ul style="list-style-type: none"> All foreign material must be removed from site. Land must be regraded / re-shaped and topsoils must be reinstated. Compacted soils must be adequately ripped/loosened where compacted, as informed by the ECO. Re-vegetation should take place as follows: 	MODERATELY LOW -
Indirect hydrological and geomorphological impacts	All alternatives	<p>Erosion and/or sedimentation of aquatic ecosystems due to upslope catchment vegetation clearing and landcover disturbance during construction. Given the overall gentle topography of the site, the risk of erosion and sediment mobilisation can be easily reduced with proper onsite runoff, erosion and sediment management.</p> <p>Erosion and/or sedimentation of aquatic ecosystems due to the physical disturbance of river bank and bed soils and vegetations during culvert / bridge upgrades at the river crossings.</p> <p>Erosion and/or sedimentation of aquatic ecosystems due to temporary flow diversions during culvert / bridge upgrades at the river crossings.</p>	Negative	Indirect	Slight	Surrounding area	Medium-term	Highly Probable	Reversible	Resource will not be lost	Achievable	MODERATE -		MODERATELY LOW -

Water quality impacts	All alternatives	<p>Pollution of aquatic ecosystems on site and possibly also downslope, due to the mishandling of hazardous substances and/or improper maintenance of machinery during construction (e.g. oil and diesel leaks and spills).</p> <p>Pollution of aquatic ecosystems on site and possibly also downslope, due to the rupture and damaging of sewerage pipelines within the road servitude if careful consideration of the location of existing services is not undertaken.</p> <p>Any erosion leading to sedimentation of streams onsite/downslope could also lead to raised water turbidity and suspended solids concentrations, also affecting water quality.</p>	Negative	Direct, indirect	Slight	Surrounding area	Short-term	Possible	Reversible	Resource will not be lost	Achievable	MODERATELY LOW -	<ul style="list-style-type: none"> ▪ For any permanently and seasonally saturated areas - via translocation / transplanting of resecured sods and, where there are not enough rescued sods, via the translocation / transplanting of sods from the surrounding wetland as advised a wetland ecologist. ▪ For temporary and dryland areas - via hydroseeding using an appropriate indigenous seed mix as advised by a qualified ecologist. <p>Monitoring measures</p> <ul style="list-style-type: none"> • Compliance monitoring will be the responsibility of a suitably qualified/trained ECO with any additional supporting EO's having the required competency, skills and experience to ensure that monitoring is undertaken effectively and appropriately. • A photographic record of the state of the onsite wetlands prior to the commencement of clearing/construction must be kept for reference and rehabilitation monitoring purposes. • t • The ECO must undertake bi-monthly compliance monitoring audits. Freshwater ecosystem aspects that must be monitored related to monitoring freshwater ecosystem impacts include: <ul style="list-style-type: none"> ○ The condition of the demarcation fence. ○ Evidence of any no-go area incursions. ○ The condition of the temporary runoff, erosion and sediment control measures and evidence of any failures. ○ Evidence of sedimentary deposits / plumes and 	LOW -
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POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
													<p>elevated rates of sedimentation (i.e. vegetation smothering / burial).</p> <ul style="list-style-type: none"> ○ Evidence of elevated river / stream turbidity levels. ○ Evidence of gully or bed/bank erosion. ○ Visual assessment of stormwater quality and instream water quality. ○ The condition of waste bins and the presence of litter within the working area. ○ Evidence of solid waste within the no-go areas. ○ Evidence of hazardous materials spills and soil contamination. ○ Presence of alien invasive and weedy vegetation within the working area. ○ Rehabilitation and re-vegetation methods and success. <ul style="list-style-type: none"> ● Rehabilitation and re-vegetation methods and success. 	

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Fragmentation and ecological disturbance impacts	All alternatives	<p>Temporary decrease in riverine ecological connectivity at road crossing culverts / bridges to be upgraded.</p> <p>Expanded / more intense edge impacts could occur as a result of buffer zone encroachment, deterioration in vegetation quality and cover and the potential for increased alien invasive plant invasion due to disturbance causing activities near rivers. However, the majority of the riparian zones are already infested with alien vegetation. Rehabilitation may be beneficial in this regard in terms of alien vegetation removal.</p> <p>Noise pollution and vibrations associated with earthworks and the use of heavy machinery could affect local wildlife (birds, amphibians and small mammals especially). However, the study area is already highly developed and disturbed.</p>	Negative	Direct, indirect	Slight	Surrounding area	Short-term	Definite	Reversible	Resource will not be lost	Achievable	MODERATELY LOW -	<p>Avoid/prevent impact:</p> <ul style="list-style-type: none"> No concrete mixing must take place within of any watercourse. No machinery must be parked overnight within 50 m of the rivers/wetlands. All stationary machinery must be equipped with a drip tray to retain any oil leaks. Chemicals used for construction must be stored safely on bunded surfaces in the construction site camp. No ablution facilities must be located within 50 m of any river or wetland system. Chemical toilets must be regularly maintained/ serviced to prevent ground or surface water pollution. Any hazardous substances/waste must be stored in impermeable bunded areas or secondary containers 110% the volume of the contents within it. All general waste and refuse must be removed from site and disposed and windproof temporary storage area before being disposed of at a registered landfill site. <p>Remediate/rehabilitate impact:</p> <ul style="list-style-type: none"> Emergency plans must be in place in case of spillages onto bare soil or within water courses. 	LOW -

OPERATIONAL PHASE

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
ENVIRONMENTAL POLICY														
Legal and policy compliance	All Alternatives	During the operation phase, failure to adhere to all permits, authorisations and regulations may lead to financial penalties and closure of the proposed National Route R56 rehabilitation.	Negative	Direct	Severe	National	Long-term	Possible	Reversible	Resource will be partly lost	Achievable	HIGH -	<ul style="list-style-type: none"> The proponent must ensure that operations of the National Route R56 is compliant with the relevant legislation and policy. These should include (but are not restricted to): NEMA, EA, EMPr and any other permits/authorisations. 	LOW -
BUILT ENVIRONMENT														
Infrastructure	All Alternatives	During the operation phase, the National Route R56 road will improve road safety, reduce traffic congestion and road accidents.	Positive	Direct, Indirect	Moderate	Regional	Long-term	Definite	Reversible	Resource will not be lost	Easily Achievable	MODERATE +	<ul style="list-style-type: none"> Regular maintenance and inspections of all infrastructure and services must be undertaken. 	MODERATE +
Stormwater management	All Alternatives	During the operation phase, failure of the stormwater system and or lack of maintenance of the stormwater system may result in the erosion and or pollution of the surrounding environment should the stormwater be contaminated.	Negative	Direct, Indirect	Moderate	Study area	Long-term	Possible	Reversible	Resource will not be lost	Easily Achievable	MODERATE -	<ul style="list-style-type: none"> Stormwater management measures such as attenuation structures, channels, etc. must be properly maintained and monitored. If the stormwater management measures put in place are deemed insufficient, a qualified engineer must be approached to assist with additional storm water attenuation mechanisms and remediation. 	LOW -
SOCIO-ECONOMIC														
Improvement of regional and national transport route	All Alternatives	The operation of the upgraded road will improve regional and national transport routes which will benefit the local and national economy.	Positive	Direct	Slight	Localised	Short-term	Definite	N/A	Resource will not be lost	Easily Achievable	HIGH+	<ul style="list-style-type: none"> N/A 	HIGH+
Job creation	All Alternatives	During the construction phase, there will be some temporary job opportunities associated with building of the proposed road upgrade of the National Route R56.	Positive	Direct	Slight	Localised	Short-term	Definite	N/A	Resource will not be lost	Easily Achievable	HIGH+	<ul style="list-style-type: none"> N/A 	HIGH+
Health and safety	All Alternatives	During the construction phase, failure to comply with health and safety policies and protocols may result in the harm of labourers, staff, surrounding landowners and the public.	Negative	Direct, Indirect	Moderate	Study area	Short-term	Possible	Irreversible	Resource will be lost	Achievable	MODERATE -	<ul style="list-style-type: none"> A health and safety plan in terms of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) must be adhered to and enforced by a HSE officer to ensure workers safety. 	LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Air quality and dust control	All Alternatives	During the construction phase, dust generated by construction vehicles and construction activities could result in significant dust during windy conditions.	Negative	Direct	Moderate	Study area	Short-term	Definite	Reversible	Resource will not be lost	Achievable	MODERATE -	<ul style="list-style-type: none"> During windy periods un-surfaced and un-vegetated areas must be dampened down. Vegetation must be retained where possible as this will reduce dust travel. Any complaints or claims emanating from dust issues must be attended to immediately and noted in the complaints register. Vehicles and construction plant must be serviced regularly so as to reduce excessive vehicle emissions. 	LOW -
	All Alternatives	During the construction phase poor maintenance and servicing of construction plant and vehicles may result in an increase in vehicle emissions in the areas.	Negative	Indirect	Moderate	Study area	Short-term	Probable	Reversible	Resource will not be lost	Achievable	MODERATE -		LOW -
On-site fire risk	All Alternatives	During the construction phase inadequate attention to fire safety awareness and fire safety equipment could result in uncontrolled fires, posing a threat to animals, vegetation and the surrounding landowners.	Negative	Direct	Moderate	Study area	Long-term	Possible	Irreversible	Resource will be lost	Easily Achievable	MODERATE -	<p>In order to reduce the risk of fires:</p> <ul style="list-style-type: none"> All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. Smoking must not be permitted near flammable substances. All cooking must be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. No open fires must be allowed on site. Fire extinguishers must be available onsite. 	LOW -
REHABILITATION AND MAINTENANCE														
Inadequate rehabilitation and maintenance	All Alternatives	During the operation phase inadequate rehabilitation of disturbed areas and lack of maintenance of infrastructure may lead to the degradation of the surrounding environment.	Negative	Direct, Indirect	Moderate	Study area	Medium-term	Possible	Reversible	Resource will be partly lost	Easily Achievable	MODERATE -	Disturbed areas will be rehabilitated/prepared to allow natural re-vegetation.	LOW -
TERRESTRIAL BIODIVERSITY AND ECOLOGY														

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Invasion of Alien Plant Species	Preferred Alternative	Failure to rehabilitate and monitor the establishment of alien plant species during the Construction (and Operation Phase) could lead to the spread and infestation of Alien Plant Species during the Operational Phase. Alien plant species often outcompete indigenous vegetation. Therefore, their establishment and spread could result in the loss of indigenous plant species.	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource will be partly lost	Achievable	LOW -	<p>Mitigation Measures:</p> <p>The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them.</p> <ul style="list-style-type: none"> The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present. An Alien Invasive Method Statement/ Management Plan must be compiled and implemented during the Construction and Operational Phase of the proposed project. 	LOW -
Disruption of ecological processes	Preferred Alternative	Sub-Escarpment grasslands are well-adapted to fire, and this is the most important ecosystem process that can be managed to maintain biodiversity and productivity in these ecosystems (SANBI, 2013). The development and expansion of infrastructure such as roads causes the fragmentation of habitats and the disruption of important ecological processes such as seed dispersal and fire as the management focus shifts to fire protection.	Negative	Direct	Moderate	Study area	Permanent	Probable	Reversible	Resource will be partly lost	Achievable	MODERATE -	<p>Mitigation Measures:</p> <p>None identified.</p> <ul style="list-style-type: none"> The applicant only has jurisdiction over their development and not over other developments or activities in the area. As such, it is difficult to implement a fire management plan within the broader landscape to ensure the continuation of important ecological processes. 	MODERATE -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Loss of Plant Species of Conservation Concern	Preferred Alternative	During the field assessment evidence was observed that several mammal species occur near the study area. One of these species are Species of Conservation Concern (SCC) was observed, namely Sensitive Species 1.	Negative	Direct	Moderate	Study Area	Permanent	May occur	Reversible	Resource will be partly lost	Achievable	MODERATE -	<ul style="list-style-type: none"> No plant species (SCC or common) must be harvested or removed from site without approval from the ECO or Applicant in writing. If any protected species die during the translocation process, specimen loss must be offset at a ratio of 1:3. 	LOW -
Loss of faunal species of conservation concern	Preferred Alternative	During the field assessment evidence was observed that several mammal species occur within the study area. One of these species are Species of Conservation Concern (SCC), namely Sensitive Species 2.	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource could be partly lost	Achievable	LOW -	<p>Species-specific mitigations have therefore been proposed.</p> <ul style="list-style-type: none"> No killing of fauna must be tolerated. Any lighting must not point outwards toward any natural habitat and should be focus downwards or towards the development. 	LOW -
		<p>The study area was assessed using an active searching technique whereby suitable habitat such as crevices, rocks or boulders, holes in trees and riverbeds were inspected for herpetofauna. At the time of the fieldwork, only a few common species were observed.</p> <p>In addition to active searching during diurnal and nocturnal periods, a desktop assessment was conducted. Although only a few species were observed in-field the study area is still expected to have a moderate herpetofauna diversity, with one SCC, namely Sensitive Species 3 with a total of 27 individual species were recorded within the QGS</p>	Negative	Direct	Slight	Study Area	Permanent	May occur	Reversible	Resource could be partly lost	Achievable	LOW -		LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Dispersal barrier and/or road mortalities	Preferred Alternative	Operational activities associated with the proposed development (e.g., wider road and increased traffic) can act as a barrier to dispersal and/or result in increased road mortalities. The ecological impacts are dependant on, for example, the current land uses, body size, taxonomy, season etc.	Negative	Direct	Moderate	Study Area	Long-term	Probable	Irreversible	Resources may be partly lost	Difficult	HIGH-	<ul style="list-style-type: none"> Natural and semi-natural grassland areas, specifically that of East Griqualand Grassland (EN) and Mabela Sandy Grassland, must be avoided as far as feasibly possible during construction. Where possible, scheme enhancements (e.g., road verges) must be implemented for roadside habitat creation, or the relinking of severed patches and improvement of degraded habitat links. 	LOW-
WATERCOURSE AND WETLAND IMPACTS														
Direct ecosystem destruction and modification impacts	All alternatives	Accidental direct impacts to riverine habitat and buffer vegetation by heavy machinery during infrastructure repair and maintenance activities.	Negative	Direct	Slight	Study Area	Long-term	Definite	Reversible	Resource will not be lost	Achievable	MODERATELY LOW -	<p>General rehabilitation guidelines</p> <ul style="list-style-type: none"> All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated immediately to the satisfaction of the ECO. All land impacted by the proposed development must be rehabilitated by undertaking the following general tasks: <ul style="list-style-type: none"> All foreign material must be removed from site. Land must be regraded / re-shaped and topsoils must be reinstated. Compacted soils must be adequately ripped/loosened where compacted, as informed by the ECO. Re-vegetation should take place as follows: 	LOW -

POTENTIAL ISSUE	ALTERNATIVES	SOURCE OF ISSUE	NATURE	TYPE	CONSEQUENCE	EXTENT	DURATION	PROBABILITY	REVERSIBILITY	IRREPLACEABLE LOSS	MITIGATION POTENTIAL	SIGNIFICANCE WITHOUT MITIGATION	MITIGATION MEASURES	SIGNIFICANCE WITH MITIGATION
Indirect hydrological and geomorphological impacts	All Alternatives	Erosion and/or sedimentation of aquatic ecosystems as a result of the increased hardened surfaces and stormwater discharges from the upgraded stormwater system.	Negative	Indirect	Slight	Surrounding area	Long-term	Probable	Reversible	Resource will not be lost	Achievable	MODERATE -	<ul style="list-style-type: none"> ▪ For any permanently and seasonally saturated areas - via translocation / transplanting of resecured sods and, where there are not enough rescued sods, via the translocation / transplanting of sods from the surrounding wetland as advised a wetland ecologist. ▪ For temporary and dryland areas - via hydroseeding using an appropriate indigenous seed mix as advised by a qualified ecologist. <p>Maintenance and management</p> <ul style="list-style-type: none"> • It is the applicant's responsibility to ensure the proper functioning of the road stormwater system. Importantly, the drainage / stormwater management system and related infrastructure is likely to require regular on-going maintenance in the form of the silt and debris/litter clearing, and maintenance and repair of surface drains and/or outlets in order to ensure the optimal functioning of such systems. • It is the applicant's responsibility to ensure the proper functioning of infrastructure that is likely to require regular on-going maintenance. • It is important that the location and extent of the rivers in the vicinity of project activities be incorporated into all formal maintenance and repair plans for the project. 	LOW -
Water quality impacts	All Alternatives	<p>Pollution of onsite and downstream rivers due to the mishandling of hazardous substances and/or improper maintenance of machinery during repair and maintenance activities (e.g. oil and diesel leaks).</p> <p>Pollution of onsite and downstream rivers from contaminated runoff generated by the upgraded road i.e. hydrocarbons, oils and particulate matter. This is however an existing impact. The widening of the road will result in a small increase in road surface with a concomitant small increase in contaminants.</p> <p>Any erosion leading to sedimentation of rivers onsite/downstream could also lead to raised water turbidity and suspended solids concentrations, also affecting water quality.</p>	Negative	Direct	Slight	Surrounding area	Long term	Probable	Reversible	Resource may be partially lost	Achievable	MODERATELY LOW -	<ul style="list-style-type: none"> • It is the applicant's responsibility to ensure the proper functioning of the road stormwater system. Importantly, the drainage / stormwater management system and related infrastructure is likely to require regular on-going maintenance in the form of the silt and debris/litter clearing, and maintenance and repair of surface drains and/or outlets in order to ensure the optimal functioning of such systems. • It is the applicant's responsibility to ensure the proper functioning of infrastructure that is likely to require regular on-going maintenance. • It is important that the location and extent of the rivers in the vicinity of project activities be incorporated into all formal maintenance and repair plans for the project. 	LOW -

Fragmentation and ecological disturbance impacts	All Alternatives	Expanded / more intense edge impacts could occur as a result of buffer zone encroachment / reduction, deterioration in vegetation quality and cover and the potential for increased alien invasive plant invasion due to disturbance causing activities taking place near the rivers.	Negative	Direct	Slight	Surrounding area	Long term	Probable	Reversible	Resource may be partially lost	Achievable	<p style="text-align: center;">MODERATELY LOW -</p>	<ul style="list-style-type: none"> In terms of management, alien invasive plant control must be practiced on an on-going basis in line with the requirements of Section 2(2) and Section 3 (2) the National Environmental Management: Biodiversity Act (NEM:BA), which obligates the landowner/developer to control IAPs on their property. <p>Monitoring</p> <p>It will be important that long-term monitoring of the potential freshwater ecosystem impacts be undertaken to proactively identify any environmental issues and impacts that may arise as a result of the operational phase of the project. The following key aspects should be monitored:</p> <ul style="list-style-type: none"> Erosion and/or sedimentation below stormwater discharge points. Erosion and/or sedimentation below upgraded road crossing culverts / bridges. Erosion and/or sedimentation below upgraded road crossing culverts / bridges. Presence of alien invasive plants within areas directly impacted /crossed. <p>Remediation /Rehabilitation</p> <p>Where appreciable direct vegetation/habitat impacts or indirect erosion/sedimentation impacts result from the proposed activity, these impacts must be reported immediately to the relevant environmental authorities, and an independent freshwater ecologist appointed to conduct a site inspection to assess the residual impacts and determine the need for any onsite remediation or rehabilitation requirements. Following this assessment, an implementable remediation and/or watercourse rehabilitation plan may need to be compiled and implemented to the satisfaction of Gauteng Department of Agriculture and Rural Development (GDARD) and DWS..</p>	LOW -

