DRAFT BASIC ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF PORTABLE WATER PIPELINES IN NOENIEPUT, NORTHERN CAPE PROVINCE.

APPENDIX F: IMPACT ASSESSMENT

Prepared for:

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Abbreviations:

AIS - Alien and Invasive Species

BA - Basic Assessment

ECO - Environmental Compliance Officer

EIA - Environmental Impact Assessment

ESA - Environmental Site Agent

EMP'r - Environmental Management Programme Report

GPS - Global Positioning System

IA - Impact Assessment

VIA - Visual Impact Assessment

Impact Assessment Methodology

For each potential impact, the **EXTENT** (Spatial scale), **MAGNITUDE** (degree of the impact), **DURATION** (time scale), **PROBABILITY** (occurrence), **IRREPLACEABILITY** (loss of resources) and the **REVERSIBILITY** (degree to which the proposed impact can be reversed) will be assessed by the EAP as well as the Specialists. The assessment of the above criteria will be used to determine the significance of each impact, with and without the implementation of the proposed mitigation measures. The scale to be used to assess these variables and to define the rating categories are tabulated in **Table 1** and **Table 2** below.

Evaluation component	Ranking scale and description (criteria)
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	**10 - Very high**: Bio-physical and/or social functions and/or processes might be *severely* altered. **8 - High**: Bio-physical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Bio-physical and/or social functions and/or processes might be *notably* altered. **4 - Low** : Bio-physical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Bio-physical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10 - Very high (positive)**: Bio-physical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced. **6 - Medium (positive)**: Bio-physical and/or social functions and/or processes might be *notably* enhanced. **4 - Low (positive)**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced. **2 - Very Low (positive)**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced. **0 - Zero (positive)**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5 - Permanent** **4 - Long term**: Impact ceases after operational phase/life of the activity > 60 years. **3 - Medium term**: Impact might occur during the operational phase/life of the activity – 60 years. **2 - Short term**: Impact might occur during the construction phase - < 3 years. **1 - Immediate**
EXTENT (or spatial scale/influence of impact)	**5 - International**: Beyond National boundaries. **4 - National**: Beyond Provincial boundaries and within National boundaries. **3 - Regional**: Beyond 5 km of the proposed development and within Provincial boundaries. **2 - Local**: Within 5 km of the proposed development. **1 - Site-specific**: On site or within 100 m of the site boundary. **0** - None
IRREPLACEABLE loss of resources	**5 – Definite** loss of irreplaceable resources. **4 – High** potential for loss of irreplaceable resources. **3 – Moderate** potential for loss of irreplaceable resources. **2 – Low** potential for loss of irreplaceable resources. **1 – Very low** potential for loss of irreplaceable resources. **0 - None**
REVERSIBILITY of impact	**5 –** Impact **cannot** be reversed. **4 – Low** potential that impact might be reversed. **3 – Moderate** potential that impact might be reversed. **2 – High** potential that impact might be reversed. **1 –** Impact **will be** reversible. **0 –** No impact.

PROBABILITY (of occurrence)	**5 - Definite**: >95% chance of the potential impact occurring. **4 - High probability**: 75% - 95% chance of the potential impact occurring. **3 - Medium probability**: 25% - 75% chance of the potential impact occurring **2 - Low probability**: 5% - 25% chance of the potential impact occurring. **1 - Improbable**: <5% chance of the potential impact occurring.
Evaluation component	**Ranking scale and description (criteria)**
CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Medium**: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

Table 1: Evaluation components, ranking scales and descriptions (criteria).

Significance Points	Environmental Significance	Description
125 – 150	**Very high (VH)**	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	**High (H)**	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	**Medium-high (MH)**	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	**Medium (M)**	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	**Low (L)**	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	**Positive impact (+)**	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

Table 2: Definition of significance ratings (positive and negative).

Once the evaluation components have been ranked for each potential impact, the significance of each potential impact will be assessed (or calculated) using the following formula:

- **SP (Significance Points) = (Magnitude + Duration + extent + irreplaceability + reversibility) x probability.**

The maximum value is 150 SP (Significance Points). The unmitigated and mitigated scenarios for each potential environmental impact should be rated as per **Table 2** above.

1. POTENTIAL IMPACTS DURING THE CONSTRUCTION PHASE

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON GEOGRAPHICAL AND PHYSICAL ASPECTS:			
Nature of Impact: Negative impact of haphazard placement of infrastructure on the environment.	**Activity:** The establishment of a main site office and storage site during the construction period will ensure that the poor placement of materials and infrastructure will be avoided. This could also result in the damage or pollution to surrounding areas caused by construction activities		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	2	-
Duration:	2	2	-
Extent:	2	2	-
Irreplaceable:	4	2	-
Reversibility:	4	4	-
Probability:	4	2	-
Total SP:	72	24	-
Significance Rating:	Medium	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Draw up and submit for approval a Site Layout Master Plan. This plan must show the final positions and extent of all permanent and temporary site structures and infrastructure; • The planning for layout must be done in consultation on-site with the Environmental Control Officer (ECO); • Locate all structures and storage areas, including offices, workshops and stores in approved locations as per the site layout plan; • After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and animal burrows; • The contractor may not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes; • The contractor must ensure that all construction personnel, labourers and equipment remain within the demarcated construction sites at all times; • No servicing of vehicles may be permitted on site, unless for emergency purposes; • Stockpiles should not be situated such that they obstruct pathways;		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	• Location of storage area must take into account prevailing winds, distance to water bodies and general on-site topography; • Protected Plant Species must be relocated (where possible); • Animal burrows must be monitored by the Environmental Control Officer (ECO) prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor; • Place infrastructure as far as possible on sites that have already been transformed; and, • Facilities may not be used as staff accommodation.		
Nature of Impact: Soil and Geology	**Activity**: The clearing of topsoil and excavation for the establishment of administration offices, guard rooms etc.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	4	-
Duration:	2	2	-
Extent:	2	1	-
Irreplaceable:	5	2	-
Reversibility:	5	5	-
Probability:	4	2	-
Total SP:	80	28	-
Significance Rating:	Medium – High	Low	-
Cumulative Impact:			-
Proposed Mitigation:	• Remove topsoil approximately 300mm deep from establishment area and stockpile areas; • Topsoil stockpiles to be kept free from weeds; • Topsoil stockpiles to be placed on a levelled area and measures to be implemented to safeguard the piles from being washed away in the event of heavy rain/storm water; • Topsoil need to be stored on designated areas only. This need to be planned and indicated in the site-layout plan; • Strip and stockpile herbaceous vegetation, overlying grass and fine organic matter along with the topsoil; • Ensure that topsoil is not mixed with subsoil and/or any other excavated material; • Provide containment and settlement facilities for effluents from concrete mixing and washing facilities; • Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan; • Do not strip topsoil when it is wet;		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	• Provide spill containment facilities for hazardous materials like fuel and oil; and, • Topsoil must be used in all rehabilitation activities, and may not be compacted to ensure that its plant support capacity remain of high quality.		
Nature of Impact: Soil, Surface and groundwater contamination due to construction activities such as the use of hazardous materials on site e.g. fuel and oil.	**Activity:** Construction camp site establishment, construction of stormwater infrastructure movement of vehicles and use of construction heavy machinery can cause spillages on site. And mismanagement of construction waste and hazardous substances resulting in these substances entering and polluting natural environments either directly through surface runoff, or subsurface water movement.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	8	0	-
Duration:	2	1	-
Extent:	3	1	-
Irreplaceable:	3	1	-
Reversibility:	3	2	-
Probability:	4	2	-
Total SP:	76	10	
Significance Rating:	Medium-HIGH	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Water in the stream must be diverted around the area of placement of culvert structures until they are completely set and do not pose a risk of water contamination. • No washing of concrete mixing and pouring equipment or any object that is contaminated with cement in any water resource. No concrete mixing trucks must be washed on site; they must return to the supplier for cleaning out. • Concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose (preferable where no natural vegetation occur); • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces; • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage; • All spillage must be cleaned up immediately after they have occurred;		

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	• Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site; • Do not locate any ablution facilities, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line; • Vehicles and machinery must be regularly serviced to avoid leakages; • No vehicles may be parked within 100m from a watercourse; and, • No uncontrolled discharges from the site or working area to depressions may be permitted. All discharge points will require approval from the Environmental Site Agent (ESA).		
Nature of Impact: Road safety and disturbance of traffic	**Activity:** Temporary disturbance for movement of pedestrians and vehicular traffic in the area.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	2	-
Duration:	2	2	-
Extent:	3	3	-
Irreplaceable:	2	1	-
Reversibility:	2	2	-
Probability:	2	2	-
Total SP:	23	16	-
Significance Rating:	Low	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• The necessary traffic safety warning signage must be erected during construction as per the engineers' specifications to warn motorists and pedestrians of the potential dangers of the construction site • The necessary traffic safety warning signage must be erected during construction as per the engineers' specifications to warn motorists and pedestrians of the potential dangers of the construction site • Share information prior to projects beginning. Warning commuters before the construction starts gives them an opportunity to think about alternate routes to their destination. Warning messages, a week or two prior to the start date is a good benchmark. • Advice motorists to use alternative routes, especially in the mornings and during the rush/pick up hours in the afternoon to avoid traffic congestions.		
Nature of Impact:	**Activity:** Due to the presence of construction personnel in natural areas, fires can occur if not managed correctly.		No construction phase impacts are associated with the no-go

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Uncontrollable fire outbreak			alternative thus no assessment has been undertaken.
Magnitude:	6	4	
Duration:	2	2	
Extent:	2	2	
Irreplaceable:	4	2	
Reversibility:	3	2	
Probability:	3	2	
Total SP:	51	24	
Significance Rating:	Medium	Low	
Cumulative Impact:	-	-	
Proposed Mitigation:	• The potential risk of veld fires are heightened by windy conditions in the area, specifically during the dry, windy summer months; • Ensure the work site and the contractor's camp is equipped with adequate firefighting equipment. This includes at least rubber beaters when working in veldt areas, and at least one fire extinguisher of the appropriate type irrespective of the site; • Workers must be adequately trained in the handling of firefighting equipment; • No open fires are permitted anywhere on site; • Do not store any fuel or chemicals under trees; • Do not store gas and liquid fuel in the same storage area (Hazardous substances to be stored in accordance with SANS); • The Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, heating of bitumen etc., are properly managed and confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include clearing working stations and avoid working in high wind speed conditions when the risk of fires is greater; • No smoking is allowed near any natural areas; • Do not permit any smoking within 3m of any fuel or chemical storage area, or refueling area. A designated smoking area must be established on site; and, • All construction vehicles must be fitted with at least one fire extinguisher.		

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON BIOLOGICAL ASPECTS:			
Nature of Impact: Destruction of terrestrial fauna species	**Activity:** Potential to destroy to disturb, harm or injure faunal species (especially species with limited mobility) inhabiting the sites directly, reduce habitat and species diversity and disruption of access to grazing and crop areas.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	4	-
Duration:	2	2	-
Extent:	2	2	-
Irreplaceable:	2	3	-
Reversibility:	2	3	-
Probability:	3	2	-
Total SP:	36	28	-
Significance Rating:	Low	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Selected workers must be given training on the possible fauna that may be encountered along the road under maintenance. • Site workers are to be informed of any sensitive fauna on the site prior to construction activities commencing and be informed that poaching or disturbance is strictly prohibited. • Under no circumstances shall any fauna be handled, removed, killed or interfered with by the Proponent, Project Manager, Resident Engineer, contractors, engineers, and their employees, including subcontractors or their subcontractors' employees. However, if construction activities are likely to injure, kill or interfere with any fauna encountered on the site, appropriate action must be taken to ensure their protection. • Any fauna found within the construction corridor must be moved to the closest point of natural or semi-natural vegetation outside the construction servitude. This includes those species perceived to be vermin (such as snakes and rats). The latter species may require the services of a specialist to catch and relocate dangerous/venomous species.		-
Nature of Impact: Traffic impacts associated with the movement of construction vehicles on site.	**Activity**: The movement of vehicles on site may result in the destruction of biodiversity, compaction of valuable topsoil and mortalities of fauna on site.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Magnitude:	4	0	-
Duration:	2	2	-
Extent:	2	1	-
Irreplaceable:	3	1	-
Reversibility:	2	0	-
Probability:	5	2	-
Total SP:	65	8	-
Significance Rating:	Medium	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• After the final layout has been approved, conduct a thorough footprint investigation (walk-through) to detect and map (by GPS) all protected plant species, which have to be removed and animal, burrows, present within the project site. • Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor; • During construction create designated turning areas and strictly prohibit any off-road driving or parking of vehicles and machinery outside designated areas; • Ensure that runoff from compacted or sealed surfaces is slowed down and dispersed sufficiently to prevent accelerated erosion from being initiated (storm water and erosion management plan required). • Ensure adequate drainage where roads cross drainage lines or ephemeral tributaries; • Monitor the establishment of (alien) invasive species and remove as soon as detected, before regenerative material can be formed; • Abnormal loads and machinery should avoid movement over gravel roads during and immediately after rainfall events, so as to limit destruction of road surfaces and sedimentation of downhill rivers/streams; • All vehicles must be road-worthy, be maintained to prevent fuel or oil leaks and drivers are to the licensed appropriately for the driving of their assigned vehicle. Drivers responsible for the transportation of personnel must be specifically licensed to do so; • Construction vehicles may not leave the designated roads and tracks, whilst U-Turns are prohibited on all roads; • Signage is to be placed on vehicles at all times; • All construction vehicles should adhere to construction sites and avoid off road to minimise impact on vegetation and soil; • Construction Vehicles may not be parked in the road reserve, specific parking areas must be identified prior to construction and these areas must be inspected to ensure no red data species occur;		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	• After decommissioning, if access roads or portions thereof will not be of further use to the landowner, remove all foreign material and rip area to facilitate the establishment of vegetation, followed by a suitable revegetation program; and, • Construction-related vehicles and machinery may not operate on site without reflective safety signage, car-top lights and reflective personnel gear.		
Nature of Impact: Destruction of vegetation cover	**Activity:** The construction of several permanent structures on site will result in the loss of vegetation due to foundation excavation.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	2	-
Duration:	2	2	-
Extent:	1	1	-
Irreplaceable:	4	1	-
Reversibility:	5	0	-
Probability:	5	2	-
Total SP:	90	12	-
Significance Rating:	Medium- high	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows; • Protected plant species must be relocated where possible; • Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated construction footprint area; • Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMP'r, if possible; • Indigenous vegetation unique to the area must be used during landscaping activities; • There should be a preconstruction environmental induction for all construction staff on site to ensure that basic environmental biodiversity principles are adhered to; • Where the ECO deems it necessary (e.g. sensitive, natural areas) the ecologist appointed to do the vegetation study will be utilized; • No vehicles may be parked within the road reserve, designated parking areas must be identified during the planning phases;		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	• Restoration measures will be required to reinstate functionality in the disturbed soil and vegetation; • Impacts to sensitive sites (drainage lines) should be avoided; • No vegetation may be gathered for the purpose of creating fire; and, • No fires are allowed on site.		

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON SOCIO-ECONOMIC ASPECTS:			
Nature of Impact: Employment creation during construction period	**Activity:** During the construction period of the project people will be employed especially those residing in the area of Noenieput.		• No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken. • No construction will result in no job creation within the Local Area
Magnitude:	8	10	-
Duration:	2	2	-
Extent:	3	3	-
Irreplaceable:	0	0	-
Reversibility:	0	0	-
Probability:	5	5	-
Total SP:	65	75	-
Significance Rating:	Medium +	Medium +	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Where reasonable and practical the contractors appointed by the applicant should appoint local contractors and implement a "local first" policy, especially for semi and low-skilled job categories. However; due to the low skill levels in the area, the majority of skilled posts are likely to be filled by personnel from outside the area; • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible, particularly for less labour-intensive work such as flag bearing and supervision; and, • The ongoing presence of semi and high skilled personnel involved in the project construction phase will generate sustained clientele to a portion of the guest house industry within the vicinity of the development.		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Nature of Impact: Prevent danger to trespassing of persons.	**Activity:** Keep the site secure from Local Communities and thieves in order to avoid any injuries and/or theft of equipment		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	0	-
Duration:	2	2	-
Extent:	2	2	-
Irreplaceable:	1	0	-
Reversibility:	2	0	-
Probability:	4	2	-
Total SP:	44	8	-
Significance Rating:	Medium	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Be responsive to open or closed status of gates; • New or the upkeep of fences should align to ensure safety of animals and maintain a reliable boundary area; • All equipment must be stored properly in a site camp with a lockable gate to ensure no risk to local communities at night; and, • It is recommended that a security guard be appointed to see to equipment after hours.		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON CULTURAL-HISTORICAL ASPECTS:			
Nature of Impact: Damage and destruction of vertebrate fossils during excavation activities.	**Activity:** Excavation activities can result in the discovery of cultural and historical artefacts beneath the earth surface. Damage or loss can occur if the correct procedures are not followed.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	0	-
Duration:	2	2	-
Extent:	2	2	-
Irreplaceable:	3	1	-
Reversibility:	4	0	-
Probability:	2	1	-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Total SP:	30	5	-
Significance Rating:	Low	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• Should any heritage resources (including but not limited to fossil bones, coins, indigenous and/or colonial ceramics, any articles of value or antiquity, stone artefacts or bone remains, structures and other built features, rock art and rock engravings) be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. A trained palaeontologist or heritage specialist must be notified to assess the finds, and this must then be reported to the applicable heritage authority; • Heritage remains uncovered or disturbed during earthworks must not be disturbed further until the necessary approval has been obtained from the heritage authority. A registered heritage specialist must be called to the site for inspection and removal once authority to do so, has been given; • Excavations must be limited to the footprint area and be maintained in a narrow corridor; • All operations of excavation equipment must be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures must be followed: o All construction in the immediate 50 m vicinity radius of the site must cease; o The heritage practitioner must be informed as soon as possible; o In the event of obvious human remains SAPS must be notified; o Mitigation measures (such as refilling, etc.) must not be attempted; o The area in a 50 m radius of the find must be cordoned off with hazard tape; • Public access must be limited and the area must be placed under guard; • The Furnace area must be protected and declared a no-go area until the developer appoints a suitably qualified archaeologist to conduct a Phase 2 archaeological assessment of the terrain and to draw up a heritage management plan for the site; and, The appointed archaeologist must apply for a valid permit from SAHRA to excavate the furnace for display and educational purposes.		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON VISUAL ASPECTS:			
Nature of Impact: Impact on the sense of place for surrounding users.	**Activity:** The movement of construction vehicles, machinery and personnel on site shall result in a visual impact on surrounding users. Furthermore to this, the storage of materials and excavation shall result in disturbance and an unsightly character.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	2	-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Duration:	2	2	-
Extent:	2	2	-
Irreplaceable:	1	0	-
Reversibility:	2	2	-
Probability:	5	3	-
Total SP:	65	24	-
Significance Rating:	Medium	Low	-
Cumulative Impact:	Low	Low	-
Proposed Mitigation:	• Access roads are to be kept clean and dust suppression techniques should be implemented to minimise impacts of vehicle movement; • Site offices and structures should be limited to one location and carefully situated to reduce visual intrusions. Roofs should be grey and non-reflective; • Construction camps as well as development areas should be screened with netting; • Lights within the construction camp should face directly down (angle of 90˚); • Vegetation should remain intact and development must be situated behind the vegetation screen to minimise the visual impact; • Minimum vegetation should be removed to ensure the visual absorption capacity remain high; • Litter should be strictly controlled, as the spread thereof through wind could have a very negative visual impact; and, • Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare.		-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON NOISE ASPECTS:			
Nature of Impact Noise will be generated during the construction **phase**	**Activity**: Noise levels along the road will increase during the construction activities due to the use of heavy machinery and vehicles.		No construction phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	4	-
Duration:	2	2	-
Extent:	3	2	-
Irreplaceable:	3	1	-

Planning, Design and Construction Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Reversibility:	2	1	-
Probability:	3	3	-
Total SP:	48	30	-
Significance Rating:	Medium	Low	-
Cumulative Impact:			-
Proposed Mitigation:	• All machinery must be serviced at regular intervals in order to ensure that they do not emit unnecessary noise. • Vegetation along the road servitude must not be removed unnecessarily in order to maintain a vegetative barrier which will assist with preventing noise from travelling to residents and neighbouring farms; • During construction keep noise levels within acceptable limits in compliance with all relevant guidelines and regulations; • All vehicles and machinery must be fitted with appropriate silencing technology that must be properly maintained; • The use of all plant and machinery must be appropriate to the task required in order to reduce noise levels. • Increased attention to maintenance of tools and equipment will reduce worksite noise levels. • Use light equipment or machinery such as the hand-held (“jackhammers”) and machine breakers (“woodpeckers”).		-

2. POTENTIAL IMPACTS DURING THE OPERATIONAL PHASE:

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON GEOGRAPHICAL AND PHYSICAL ASPECTS:			
Nature of Impact: Handling of general waste materials on the maintenance site	**Activity**: The presence of maintenance personnel on site will increase the likelihood of littering and dumping of solid waste.		No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Magnitude:	4	0	-
Duration:	4	4	-
Extent:	2	1	-
Irreplaceable:	3	0	-
Reversibility:	1	0	-
Probability:	4	2	-
Total SP:	56	10	-
Significance Rating:	Medium	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• An adequate number of scavenger proof litter bins are to be placed throughout the site; • Waste sorting and separation bins should be placed at all public facilities, to encourage visitors to dispose waste paper, glass and general waste separately; • Keep all work sites including storage areas, offices and workshops neat and tidy; • All domestic waste is to be removed from site and disposed of at a registered solid waste landfill site; • Care should be taken to ensure that no waste fall of disposal vehicles on-route to the landfill. If needed, a tarpaulin can be utilised; • The burning or burying of solid waste on site is prohibited. Do not burn PVC pipes or other plastic materials, as this is regarded as hazardous waste; • Minimise waste by sorting wastes into recyclable and non-recyclable waste; and, • A bi-weekly litter patrol of the entire site shall be conducted by the designated ESA.		-
Nature of Impact: Soil and ground water contamination	**Activity:** Oil spillages and other chemical from the vehicles can contaminate the soil and ground water due to run off.		No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	4	-
Duration:	4	4	-
Extent:	3	3	-
Irreplaceable:	4	2	-
Reversibility:	4	2	-
Probability:	4	2	-
Total SP:	84	30	-
Significance Rating:	Medium High	Low	-
Cumulative Impact:	Low	None	-

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Proposed Mitigation:	• Concrete can be mixed on mixing trays only and not on exposed soil. Concrete must be mixed only in areas which have been specially demarcated for this purpose (preferable where no natural vegetation occur); • Concrete mixing to be carried out away from sensitive areas and on impermeable surfaces; • Material Safety Data Sheets (MSDSs) should be available on site for all chemicals and hazardous substances to be used on-site, including information on their ecological impacts and how to minimise the impacts in case of leakage; • All spillage must be cleaned up immediately after they have occurred; • Spillage of petrochemical products must be avoided. In the case of accidental spillage, contaminated soil must be removed for bioremediation or disposed of at a facility for the substance concerned. Disturbed land must be rehabilitated and seeded with vegetation seed naturally occurring on site; • Do not locate any ablution facilities, sanitary convenience, septic tank or French drain within the 1:100 year flood line, or within a horizontal distance of 100m (whichever is greater) of a watercourse or drainage line; • Vehicles and machinery must be regularly serviced to avoid leakages; • No vehicles may be parked within 100m from a watercourse; • No uncontrolled discharges from the site or working area to depressions may be permitted. All discharge points will require approval from the Environmental Site Agent (ESA); • No water courses may be used to clean equipment, or for bathing. All cleaning operations should take place off site at a location where waste water can be disposed of correctly; • The discharge of any pollutants such as cement, concrete, lime, chemicals, etc. into the natural environment and the storm water system must strictly be prohibited; • Fuel and chemical storage should be done within a designated area only, which is properly bund and able to contain 110% of the capacity of fuel or chemicals stored within; • Construction vehicles must be inspected every morning before work commence to ensure that no leakages do occur; • All personnel must receive induction on how to report spillages, contain them and treat them accordingly; • Spill kits must be available at each working station; • Drip trays must be placed beneath all construction equipment that is stationary on site or within the site camp; and, • Hazardous waste must be stored in bins with a lid in a demarcated waste area, and must be disposed of at a hazardous treatment facility with records on file.		-

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON BIOLOGICAL ASPECTS:			
Nature of Impact: Infestation of the area with Alien and Invasive Species	**Activity:** Implementation of alien and invasive Programme to control invasive plant species.		No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	4	2	-
Duration:	4	2	-
Extent:	3	2	-
Irreplaceable:	3	1	-
Reversibility:	1	1	-
Probability:	4	3	-
Total SP:	60	24	-
Significance Rating:	Medium (M)	Low (L)	-
Cumulative Impact:	Low (L)	Low (L)	-
Proposed Mitigation:	***Clearing and Guiding Principles*** • Alien control programs are long-term management projects and should include a clearing plan which includes follow up actions for rehabilitation of the cleared area; • The lighter infested areas should be cleared first to prevent seed build-up; • Pre-existing dense areas should be left for last, as they probably will not increase in density or pose a greater threat than they are currently; and, • All clearing actions should be monitored and documented to keep track of which are due for follow-up clearing. ***Clearing Methods*** • Different species require different control methods such as manual, chemical or biological methods or a combination of the two; • Care should be taken to ensure that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, soil disturbance should be kept to a minimum. The vegetative stage of the plants should also be considered before clearing; • Fire is not a natural phenomenon in the area and should not be used in general for alien control or vegetation management at the site. • The best-practice clearing method for each species identified should be used. The preferred clearing methods for most alien species can be obtained from the Department of Water and Agricultural Affairs (DWAF) Working for Water website: http://www.dwaf.gov.za/wfw/Control/.		-

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
	Use of Herbicides for Alien Control Although it is usually preferable to use manual clearing methods where possible, such methods may create additional mechanical disturbance which may stimulate alien invasion and may also be ineffective for many woody species which resprout. Where herbicides are to be used , the impact of the eradication program on the natural environment should be minimised be observing the following: • Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control; • Care must be taken to prevent contamination of water bodies. This includes special care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures; • Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable place; • To avoid damage to indigenous or other desirable vegetation, herbicides that would have the least effect on the indigenous vegetation should be used; • Droplet nozzles with a course spray pattern should be fitted to avoid drift of herbicides onto neighbouring vegetation; and, • The appropriate health and safety precautions should be followed regarding the storage, handling and disposal of herbicides.		

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON SOCIO-ECONOMIC ASPECTS:			
Nature of Impact: Carrying capacity of the road	**Activity:** The increase in carrying capacity of the road after the improvement will improve the current traffic problem and allow free flow of vehicles in future thereby contributing to efficient utilization of the road in general. This can be considered as the positive impact of the proposed improvement.		No construction would lead to the crossings being unsafe to road users and no connection between the Local communities and free flow of traffic.
Magnitude:	8	-	
Duration:	5	-	
Extent:	3	-	
Irreplaceable:	0	-	
Reversibility:	0	-	
Probability:	5	-	
Total SP:	80	-	

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Significance Rating:	High Positive	-	
Cumulative Impact:		-	-
Proposed Mitigation:	• No proposed mitigation		-
Nature of Impact: The creation of job opportunities during the operational phase,	**Activity:** Continues maintenance of the freeway will contribute to employment opportunities for the Operational life span of the freeway.		No construction will result in no job creation within the Local Area
Magnitude:	8	8	
Duration:	4	4	
Extent:	3	3	
Irreplaceable:	0	0	
Reversibility:	0	0	
Probability:	5	5	
Total SP:	75	75	
Significance Rating:	Medium High Positive	Medium High Positive	
Cumulative Impact:	-	-	
Proposed Mitigation:	• No proposed mitigation measures.		-

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
POTENTIAL IMPACTS ON NOISE ASPECTS:			
Nature of Impact: Noise Pollution	**Activity:** The operating of vehicles and machinery on site results in the generation of noise disturbing users of the surrounding area**.**		No operational phase impacts are associated with the no-go alternative thus no assessment has been undertaken.
Magnitude:	6	4	-
Duration:	4	4	-
Extent:	3	2	-
Irreplaceable:	0	0	-
Reversibility:	0	0	-
Probability:	4	2	-
Total SP:	52	20	-

Operational Phase	Alternative 1		No-Go Alternative
	Before Mitigation	After mitigation	
Significance Rating:	Medium	Low	-
Cumulative Impact:	-	-	-
Proposed Mitigation:	• All reasonable precautions must be taken to minimize noise generated on site. • Construction vehicles must be kept in good working order so as not to generate excessive noise. • Activities which will lead to excessive noise near residential areas should be limited to take place during the day.		-

3. POTENTIAL IMPACTS DURING THE DECOMISSIONING PHASE

Decommissioning has not been included as it is not foreseen that the proposed development will be decommissioned, but rather that it will be upgraded and maintained. However, in the event that the site is decommissioned, the construction phase impact and mitigation measures will be sufficient to mitigate impacts associated with this phase.