

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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1. INTRODUCTION

The applicant, **Department of Human Settlement**, is proposing the establishment of a 4Ml reservoir, sewer and water pipelines to supply the new establishment of Tekwane South Extension 2 and Extension 3 Residential Township developments.

The purpose of this Impact Assessment Report is to identify and assess all impacts that will be triggered by the application for the EA Amendment of the Bulk Sewer Pipeline.

The proposed **bulk sewer pipeline (600mm)** will start at the proposed Tekwane South Extension 3 Township, at GPS Co-ordinates: 25° 28' 42.23"S, 31° 07' 35.59"E, towards the existing Waste Water Treatment Works at GPS Co-ordinates: 25° 28' 58.71"S, 31° 08' 48.58"E. The **sewer pump station** will be located on GPS Co-ordinates: 25° 29' 5.13"S, 31° 09' 34.37"E.

The project will entail the following:

- Construction of a Bulk Sewer Pipeline (600mm in diameter).
- Construction of a Sewer Pump Station

2. DESCRIPTION OF THE ENVIRONMENT

Location

The proposed activities will be located on Portion 7 of the Farm Tekwane 573 JU, Mbombela Local Municipality, Mpumalanga Province.

The proposed **bulk sewer pipeline (600mm)** will start at the new Tekwane South Extension 3 Township development, situated to the north and parallel to the Crocodile River, and past the Tekwane South Extension 1 Residential Township towards the existing Waste Water Treatment Works at GPS Co-ordinates 25° 28' 58.71"S, 31° 08' 48.58"E. The **sewer pump station** will be situated at GPS Co-ordinates: 25° 29' 5.13"S, 31° 09' 34.37"E.

Affected Environment

The natural environment, where the proposed **bulk sewer pipeline** and **sewer pump station** is to be located, consists of a section of the Crocodile River and its tributaries situated in the Tekwane area. The starting point of the sewer pipeline is located in an area where the natural environment has been transformed and the site is located on old agricultural land that is of low ecological significance.

The general study area consists of plains Bushveld typical of the eastern Lowveld. A typical Lowveld climate prevails with seasonal summer rainfall, warm summer temperatures and dry winters. Map ranging between 550 and 800mm (increasing with altitude). Frost is infrequent. The most serious transformation of the natural environment consists of cultivation of crops and formal and informal settlements which have transformed significant areas of natural land in the past few years.

Geology and Soils

The geology is granite and gneiss, mostly of the Nelspruit suite, forming hills with large boulders. Soils are shallow, coarse litosols, comprised of Glenrosa or Mispah soil types.

Flora

Nationally, the site is situated within the Lowveld Sour Bushveld (A9) veld type according to Acocks (1988), or Sour Lowveld Bushveld according to Low & Rebelo (1998) and Schmidt *et al* (2002). The habitats of the general study area are:

Natural Woodland - Due to the diversity present in this habitat it has a **Medium - High** ecological importance rating.

Riparian Areas – The riparian zone has very important stabilizing and ecological functions and has a **High** sensitivity rating.

Transformed and Seriously Disturbed Land - These areas are of **Low** sensitivity and biodiversity value.

Fauna

The watercourse forms the backbone of the aquatic ecology of the region and is very important for aquatic fauna. Macro invertebrate and fish sampling were not conducted but due to the prevailing impacts it can be assumed that the aquatic fauna assemblage is not in a natural state and is continuing in a negative trend and will be at least in a class C (moderately modified). Terrestrial fauna associated with the riparian habitat will also be negatively affected due to the degraded habitat status and encroaching human settlement in the nearby terrestrial and riparian areas.

Water Quality

Water quality will be negatively affected by agriculture chemicals as well as untreated sewage and litter from the residential areas to the north and east. This will be especially evident during the low flow. These pollutants will be diluted during high flow and the effect on water quality will be less pronounced. It is not anticipated that the proposed activity will affect water quality negatively if the site is adequately rehabilitated upon completion of construction and maintained to prevent leaks.

3. IDENTIFICATION OF IMPACTS

The procedures to identify possible impacts are as follows:

- Identify the current environmental conditions (i.e. baseline) against which to assess impacts;
- Identify the future changes in the receiving environment baseline if the project does not proceed;
- An understanding of the proposed activity in sufficient detail; and
- Assessed documents, previous and adjusted layout plan was taken into account to predict possible impacts and mitigation measures.

The classification of an issue as a '**key issue**' was done after the assessment of the specialist reports and does not necessarily imply that an impact of high significance will result. After mitigation measures, it is possible that a **key issue** may turn out to have an impact of **low** or **no** significance.

4. ASSESSMENT OF IMPACTS

The methodology for assessing impacts and assigning significance to the key issues is according to “Guideline 5: Assessment of alternatives and Impacts in support of the Environmental Impact Assessment Regulations, 2006” published by DEAT in June 2006.

The description and prediction of the impacts are summarized in the Tables below.

CONSTRUCTION IMPACTS

Table 1:

Potential impact on physical aspects	
Nature of the impact:	<p>The proposed project will have a potential to encourage avenues for erosion in the footprint during the construction and post construction phases. Intensive utilisation of service and access roads by construction machinery may cause loss of stability of road surfaces which will result in soil erosion especially through surface water run-off. Occasional deviation from the access and service roads by heavy machinery might result in most of the road-side vegetation being trampled thereby disabling the roots in their binding effect on the soil. This will enable surface run-off to cut the edges of the roads into undesired and uneven slopes.</p> <p>Newly created access roads might encourage erosion if not properly designed especially if located on steep slopes.</p>
Soil erosion	
Extent	Site (limited to the site boundaries)
Duration	Medium term (limited to the lifespan of the project and reversible over time if mitigated)
Intensity / Severity	Low (will have small negative impacts)
Probability / Certainty	Probable
Significance	Medium
Proposed mitigation:	
<p>It is imperative that movement of equipment and machinery be restricted to designated roads to access the site. Newly established access roads during the construction phase should be designed in such a way that steep slopes are avoided. If unavoidable, surface run-off humps should be made to direct the flow into vegetated surfaces in mitigation against soil erosion.</p> <p>Unused/abandoned roads or disturbed terrains should be tilled and reseeded with local vegetation during rehabilitation. Excavated areas should be backfilled to avoid unnecessary accumulation of surface water and high velocity overflow. Excavations might pose a hazard to local residents especially children. Disturbed steep slopes should be supported with surface rock gladding or vegetation. Appropriate soil erosion and control procedures must be applied to all embankments that are disturbed and destabilized. Occurrence of erosion has to be monitored during construction and operational phases and corrective measures and aftercare processes be undertaken if necessary.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 2:

Potential impacts on biodiversity and sensitive species	
Nature of impact	Vegetation removal will be required on the sewer pipeline route and sewer pump station site. Impacts on both fauna and flora will be inevitable and this will result in habitat fragmentation and ultimate loss of a fair amount of vegetation and displacement of faunal and floral species surviving in that particular habitat. Sensitive species may abandon nests and foraging areas if disturbed by construction activities. Species of concern are mainly the grassland and nesting species.
Disturbance of fauna and flora	
Extent	Site
Duration	Short term/ once off
Intensity / Severity	High
Probability / Certainty	Probable
Significance	High
<p>Proposed mitigation:</p> <p>The recommendations from the Biodiversity and Riparian Assessment should be strictly adhered to. The contractor should stick to the sewer pipeline route and pumpstation boundary and recommendations by the consultant. Care should be taken during the planning and construction phases to restrict the development to areas of lower biodiversity sensitivity. Vegetation removal should be restricted to areas where the development is to take place and undesired tree felling or grass cutting should be avoided at all costs. Construction workers should be discouraged from killing of animals and birds for relish as this might interfere with livelihood of the ecosystem and will encourage poaching. Activities associated with the construction should have an element of conservation through avoiding undesired destruction of wildlife within the site.</p> <p>The recommendations submitted in the Biodiversity Reports (Appendix 4) and the Environmental Management Program (Appendix 7) must be adhered to. Prior to vegetation clearing, the development footprint must be surveyed for plant species of conservation concern. Protected plants occurring within the footprint should be relocated in consultation with an approved specialist after obtaining the necessary permits from authorities.</p> <p>Where alien invasive plants occur they must be uprooted, cut and /or chemically treated by the use of only approved chemicals. The contractor or work crew must avoid injury to or death of wild animals by reducing speed of construction vehicles. Any encounter with wounded or dead animal should be reported to site manager or the ECO. Trenches must be inspected daily to monitor for trapped animals or be covered after hours. Vegetation clearance must be kept to a minimum. Construction must be respectful of the environment and must be confined to pre-selected sites.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 3:

Potential impacts on the atmosphere	
Nature of impact	As much as access roads will mostly be gravel, dust emissions will be experienced during the movement of construction material and machinery onto site. Dust can also be generated during excavation due to possible hard rock encounters. With the movement of these equipments, there will be noise stemming from the roar of engines and loose items on the trucks. Noise from the workers can also be experienced by locals as they travel to and from site. Construction sites are commonly known for generating waste, if not properly mitigated, it creates an untidy and unsightly environment and triggers health issues for both the construction crew and the public.
Generation of dust, waste and noise	
Extent	Site
Duration	Short term/ once off
Intensity / Severity	Low
Probability / Certainty	Probable
Significance	Low
Proposed mitigation:	
<p>Access roads to the sewer pipeline route and sewer pump station should be provided with a water tanker lorry, equipped with a mounted water pump engine that will be used to sprinkle water on the road surface and suppress dust. Loading of equipment should be done in such a manner that items are placed tightly against each other so that they do not collide against each other as the truck rocks through unstable surfaces of the access roads. High speeding should be discouraged at all times as dust is generated the most with high speed. Construction vehicles should be kept in good condition at all times. Vehicles in good condition are not likely to generate high pitched roars especially if operated properly. Loading bins of vehicles should be rubberised as that reduces rattling sounds. Unnecessary hooting of construction vehicles should be avoided as much as possible.</p> <p>Speed limit must be enforced in all areas to limit the levels of dust pollution and noise. Air pollution caused during construction can be limited by using dust suppression methods such as water spraying, water used for this purpose must be in quantities that will not result in the generation of run-off. The contractor's representative or environmental officer must notify all people living within 100m of the construction site of proposed activities. In the event of serious levels of dust pollution, the implementation of constant dust monitoring by qualified consultants must be undertaken. Vehicles used on, or entering the site must be serviced regularly to ensure that they do not emit excessive smoke or fumes. No refuse waste is to be burned on the premises or on surrounding premises.</p> <p>Noise control measures must be implemented. All noise levels must be controlled at the source. All employees must be given the necessary ear protection gear if the noise levels exceed 70dB. Interested & Affected parties must be informed about impending excessive noise. Generators and pumps must be housed in casings to help reduce any noises in operation. No loud music or excessive noise generated by employees is allowed on site and in construction camps.</p> <p>Littering on site and the surroundings areas is prohibited. Clearly marked litterbins must be provided on site. The contractor's representative must monitor the presence of litter on the work sites as well as the construction campsite. All bins must be cleaned. Waste must be disposed, as soon as possible and not be allowed to stand on to decay, resulting in bad odours and attracting vermin. All waste removed from site must be disposed at the municipal/permitted waste disposal site. The contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. The contractor must clean up and restore all disturbed areas and implement rehabilitation measures as required by ECO.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 4:

Potential impacts on soil and water quality	
Nature of impact	The use of heavy construction machinery is associated with possible leaks, spillages of hydraulic oils, diesel fuels and grease. Such spillages can contaminate the soil, surface and underground water if in larger quantities. Such spillages are detrimental to biodiversity as they strange elements with the ecosystem and obviously poisonous. Signs of the impact can be seen as grass starts dying and drying. With this, all life forms depending on the grass material for food and shelter will be affected. In this case, the soil is regarded as dead. Smaller insects that survive on the water surface will be affected as diesel and oil create a layer on the water surface thereby disturbing them as they swim and suffocating as they get covered within a layer of oil.
Pollution and spillages of hazardous waste	Disinfectants used in mobile toilets can also be detrimental to surface water and soil if not handled with care. Careless handling of full toilets during loading and transportation to sewerage treatment plant can result in spillages which might contaminate the ground and obviously surface water. Obnoxious smell of such spillage can attract flies which are capable spreading diseases.
Extent	Site
Duration	Medium term
Intensity / Severity	Low
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation:	
<p>Machinery with hydraulic equipments like hydraulic jacks and lifts should be inspected and maintained on daily basis to guard against possible leakages and malfunctioning of such equipments. Refuelling of machinery and trucks should be done at a designated site and such site should be paved with a concrete slab to avoid soaking of oils into the ground in the event of accidental spillages. Storage facilities fuels and related liquids should be located away from the vicinity of surface water. A concrete slab will be easy to clean prior to overflow further contamination. Fuel container should be inspected for possible leaks at all times. Used and empty drums that contained grease, diesel, hydraulic oil and petrol should be disposed of at a registered and licensed facility to avoid pollution and contamination of soil and water. The contractor must avoid contamination of soil with oil, grease, diesel, petrol, waste or any other foreign matter, which may impact on the capability of the soil as a growth medium. Surfaces where plant/equipment is stored/parked should be paved with a reinforced concrete slab with 200mm elevated edges. Contaminated soil has to be removed up to depth 300mm below the saturation mark and disposed at permitted landfill site.</p> <p>Mobile toilets on site should be handled by experienced people during loading and transportation. Toilets should be inspected for leaks routinely. Antiseptic liquids should be handled and stored in a safe place in sealed containers.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 5:

Potential impact on neighbourhood (social) and site	
Nature of impact	Experience has proven that undisciplined contract workers pose a serious problem with the surroundings where they travel, work and live. Littering is one of the major challenges experienced in and around construction sites. Food packaging material is normally discarded wherever construction workers might be having their lunch and left lying all over. As they travel along access roads, smokers will discard cigarette buds which would still be on fire which normally ignites veld fires, hence the grassland environment along the site.
Undisciplined contract workers	Interference with families located along construction sites where construction workers start relationships with married women is very common. Disputes between construction workers and families erupt in this instances resulting in social instability in individual families. Prostitution comes along with such relationships where construction workers spend their monies for such services and deprive their own families of the benefits from their work which impacts on families at remote distances. The result of this state of affairs has serious impacts on work performance on the part of the workers themselves.
Extent	Local
Duration	Short term
Intensity / Severity	Low
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation:	
<p>The contractor should have a code of conduct documented to address the required standards in terms of team member's behaviour. Workers should be allocated a site where they can have their lunch. It should be strictly noted that smokers should not discard life cigarette buds anywhere else other than a designated smoking area where the risk of veld fire is not eminent or such be placed in ashtrays. Workers should be warned not to insult the public and respect whoever they come across. Befriending locals especially women should be prohibited at all costs. In the event where a camp site is allocated, resident security guard should be deployed for the purpose of access control and monitoring. This will help in protecting property and equipment from theft and possible damage. Through the employee wellness programme, workers should be advised to take care of their benefits in order to see growth in their socio-economic conditions of their respective families. This will encourage them to perform better in their workplace.</p> <p>Fires on campsites will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a firebreak shall be cleared around the perimeter of the camp, storage facility and office sites. Construction & maintenance activities must be of such a nature as not to disturb the livelihood of adjacent property owners, in cases where disruption is unavoidable, residents must be notified 7 days in advance of disruptions to services. A designated place for food preparation and eating must be established at the construction site. Dry chemical toilets must be made available at a ration of 1 toilet per 10 staff, within the campsite and construction site perimeter and must be cleaned and serviced as requested by the service provider. Workers movements must be limited to the construction area only and must be enforced in terms of the contracts of appointment. Any complaints must be addressed with the Community Liaison Officer and Site Manager accordingly and a record must be kept thereof. The applicant must ensure that measures are in place to prevent/mitigate disruption of services as result of construction.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 6:

Potential impacts on regional environment and downstream	
Nature of impact	Spillages of diesel, hydraulic oil, grease and other volatile fuels can be carried away with surface water run-off into rivers and neighbouring properties. This can result in water bodies being contaminated and aquatic life threatened downstream. Spillages can soak into ground water and into wetlands thereby impacting on the wetland ecosystem which might be eminent over time especially downstream. If in excess, this can pollute underground water and render it unusable for therefore not suitable for consumption.
Pollution and littering	Litter can be carried away through wind and surface run-off to neighbouring properties away from the site. This might end up in storm water drainage lines and causing blockages. Some litter might be deposited along the banks of water courses due to overflow and reduction in velocity of the flow. Litter deposited on drainage sites and scattered all over is unsightly and have a serious visual impact.
Extent	Local
Duration	Medium term
Intensity / Severity	Medium
Probability / Certainty	Unsure
Significance	Low
Proposed mitigation:	
<p>Storage facilities of fuels and related liquids should be locked and containers tightly closed to avoid accidental spillages in the event the container falls over. All surfaces where these liquids are stored should be paved with reinforced concrete slab to avoid cracks through which spillages can leak into the ground. Inspections should be conducted at all times to guard against hidden impacts occurring due to leaks.</p> <p>Construction methods must be respectful of the environment – no unnecessary vegetation clearing, excavations or untidiness. Concrete mixing will be done on pre-designed slabs underlined by PVC lining, on an area previously disturbed. Alternatively, maintain one mixing site and transport the concrete to the construction site. Any concrete spillage must be cleaned immediately. Littering on site and the surroundings areas is prohibited. Clearly marked litterbins with lid must be provided on sewer pipeline route and sewer pump station site. The contractor’s representative must monitor the presence of litter on the work sites as well as the construction campsite. All bins must be cleaned regularly. Waste must be disposed, as soon as possible and not be allowed to stand on to decay, resulting in bad odours and attracting vermin. All waste removed from site must be disposed at the municipal/permitted waste disposal site. The contractor must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. The contractor must clean up and restore all disturbed areas and implement rehabilitation measures as required by ECO.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 7:

Potential impact on Heritage	
Nature of impact	The Heritage survey did not encounter any sites of high significance. This means that no archaeological sites, material and/or historical features (structures or foundations) were found during the survey. With regards to archaeological or historical heritage resources, the site is considered to be of no significance. (See Appendix 9: Letter of Exemption from SAHRA)
Heritage	
Extent	
Duration	
Intensity / Severity	
Probability / Certainty	
Significance	
Proposed mitigation:	
Work in areas where artefacts are found must cease immediately. The excavation must be examined by an archaeologist as soon as possible.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

GENERAL OPERATIONAL IMPACTS

Table 1:

Potential impacts on Site clean up and Rehabilitation	
Nature of impact	To some extent, the construction of the sewer pump station will have some impacts on the landscape during land preparations/earthworks and foundation excavations. The landscape of the site will lose its aesthetic value and ultimately environmentally damaged.
Landscape and environmental damage	
Extent	Local
Duration	Permanent
Intensity / Severity	Low
Probability / Certainty	Definite
Significance	Medium
<p>Proposed mitigation:</p> <p>The Environmental Control Officer must ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. Also, upon completion of the construction period, the ECO will ensure that any/all temporary access roads are returned to a state no worse than prior to construction commencing. Once heavy machinery has cleared the bulk of these material stockpiles, the disturbed areas will be levelled and cleared of any foreign material manually. The contractor will fully rehabilitate all disturbed areas and protect them from erosion by propagating vegetation through reseeding with local plant and grass species.</p> <p>All slopes must be designed according to predefined specifications, aimed at the prevention of soil erosion, of efficient storm water control, of the eventual re-establishment of vegetation and of ultimately achieving aesthetically acceptable landscapes. In general, no slopes steeper than 1:3(V:H) must be allowed. Cut slopes must not be steeper than 1:2(V:H) and rounded off on the top edge.</p> <p>Bulk and fine shaping must be executed according to design, aimed at the prevention of soil erosion, efficient storm water control, the eventual re-establishment of vegetation and ultimately achieving aesthetically acceptable landscapes. On all man-made slopes, the following rehabilitation methods must be applied:</p> <ul style="list-style-type: none"> ➤ replacing and redistribution of stripped topsoil to a minimum depth of 200 mm; ➤ ripping at 300 mm but not more than 400 mm apart and parallel to contours, through the placed topsoil, to a depth of 100 mm at least, into the sub base soil below; and ➤ sowing of specified grass seed mixture and fertilizer, if required. <p>Any materials obviously left behind during the construction phase to be noted and removed immediately.</p> <p>Any erosion to be reported and rehabilitated immediately.</p> <p>The ECO must audit the rehabilitation process.</p>	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

Table 2:

Potential impacts on Sewer Line and Pump Station Maintenance	
Nature of impact	During operational phase, the sewer pipeline may be subjected to leakages thus impacting on the vegetation and river habitat. Strict measures should be in place to urgently attend to such events when they occur.
Maintenance activities	
Extent	Local
Duration	Permanent
Intensity / Severity	Low
Probability / Certainty	Definite
Significance	Medium
Proposed mitigation:	
No new tracks to be created by vehicles during maintenance and inspection visits. Inspection vehicles to remain on existing tracks.	
No inspection vehicles may drive through any watercourse, even dry drainage lines.	
The sewer pipeline must be regularly monitored for leaks. If leaks are identified or reported by the public, immediate actions must be taken to repair these leaks.	
Cumulative impacts post mitigation:	Low
Significance rating of impact after mitigation:	Low

1. POTENTIAL IMPACTS DURING CONSTRUCTION

Table 1: Assessment of predicted impacts before mitigation measurements are applied in the construction phase.

ISSUE	NATURE OF IMPACT	EXTENT / LOCATION	DURATION	MAGNITUDE / INTENSITY	PROBABILITY	SIGNIFICANCE	DIRECT / INDIRECT / CUMULATIVE	STATUS
Topography & Geology	Flat – Moderate. Erosion.	Local	Short term	Low	Probable	Low	Direct	Negative
Surface & Ground water quality	Possible leaks, spillage of hydraulic oils, diesel and grease.	Site	Short term	Medium	Definite	Medium	Direct	Negative
Waste management	Construction material created by the construction of the sewer line and pump station.	Site	Short term	Low	Definite	Medium	Direct	Negative
Air quality	Dust during construction by construction vehicles.	Site	Short term	Low	Probable	Low	Direct	Negative
Noise pollution	Malfunction of vehicles. Noisy workforce.	Site	Short term	Low	Unsure	Low	Indirect	Negative
Visual	Construction of the sewer line and pump station.	Local	Short term	Medium	Definite	Low	Indirect	Negative
Socio-economic	Job creation and local economic impact.	Local	Long term	High	Definite	High	Direct	Positive
	Undisciplined workers.	Local	Short term	Low	Definite	Medium	Indirect	Negative
	Traffic and neighbourhood disruptions.	Site	Short term	Medium	Probable	Medium	Direct	Negative

Table 2: Suggested management actions to mitigate possible negative impacts during construction phase.

ISSUE	POTENTIAL IMPACT	MANAGEMENT ACTIONS	MONITORING OF IMPACTS
Surface & Ground Water quality	<ul style="list-style-type: none"> Possible leaks, spillage of hydraulic oils, diesel and grease from heavy machinery. 	<ul style="list-style-type: none"> Inspect machinery and equipment for possible leaks and malfunction. Refuelling should be designated to a specific concrete site. Refuelling site has to be more than 200m from a stream, drainage line or wetland. Empty grease, diesel, hydraulic oil and petrol should be disposed of at a licensed hazardous facility. 	<ul style="list-style-type: none"> Inspect and maintain equipment on a daily basis. Regular checking of diesel tanks. Regular removal of empty drums.
	<ul style="list-style-type: none"> Disinfectants used for mobile toilets. 	<ul style="list-style-type: none"> Experienced people should empty or remove mobile toilets. Antiseptic liquids should be handled and stored in a safe place. 	Weekly inspections of leaking toilets
Waste management	<ul style="list-style-type: none"> Waste can be created during the construction phase in the form of excess concrete, cement bags. Workers can litter during lunch times. 	<ul style="list-style-type: none"> After construction, all waste has to be removed to a registered landfill site. Workers have to take all their waste with them after lunch. All waste to be removed on a daily basis. 	Inspection by the Applicant and the ECO.
Air quality	<ul style="list-style-type: none"> Access roads are mostly gravel roads, dust will be experienced. Dust can be generated during excavation due to hard rock. 	<ul style="list-style-type: none"> Access roads should be sprinkled with water from water tanks. Vehicles have to drive slowly to create less dust. Workers should wear designated Personal Protective Equipment (PPE). 	Daily monitoring of covered areas. Adherence to PPE by the workforce.
Noise pollution	<ul style="list-style-type: none"> Movement of equipment and inspection by management. 	<ul style="list-style-type: none"> Regular servicing of vehicles to prevent high pitched roars 	Daily monitoring of vehicles.
	<ul style="list-style-type: none"> Noise created by workers when travelling to and from sites. 	<ul style="list-style-type: none"> Construction workers should be alerted not to scream or hoot at the public or near residential areas. 	No monitoring needed
Visual	<ul style="list-style-type: none"> The establishment of the pump station and related infrastructure will be visually exposed and can have a possible negative impact on the environment. 	<ul style="list-style-type: none"> Alignment of structures should be compatible with the natural contours. Built structures should, as far as is practicable, not break the horizon. Make use of existing access roads where possible. 	Inspection by the Applicant and the ECO.
Socio-economic	<ul style="list-style-type: none"> Job creation and local economic impact. 	<ul style="list-style-type: none"> First preference to be given to locals where possible. 	No monitoring needed.
	<ul style="list-style-type: none"> Undisciplined Workers 	<ul style="list-style-type: none"> Workers have to be provided with a code of conduct to address the required standards in terms of team member's behaviour and not to insult the public. Workers should have an allocated site for lunch. Smokers should not discard life cigarette buds to prevent fire risk. Access control at camp site to protect equipment and property. 	No monitoring needed.

POTENTIAL IMPACTS DURING THE OPERATIONAL PHASE

Table 3: Assessment of predicted impacts before mitigation measurements are applied in the operational phase.

ISSUE	NATURE OF IMPACT	EXTENT / LOCATION	DURATION	MAGNITUDE / INTENSITY	PROBABILITY	SIGNIFICANCE	DIRECT / INDIRECT / CUMULATIVE	STATUS
Surface or Ground water quality	Possible occurrence of erosion and silt generation.	downstream	Long term	Low	Unsure	Low	Indirect	Negative
Waste management	Minimum waste will be created during inspections/surveys.	Local	Long term	Low	Unsure	Low	Direct	Negative
Visual	The establishment of the pump station and related infrastructure.	Local	Long term	High	Definite	Medium	Direct	Negative
Social Impacts	Undisciplined workers	Site	Long term	Medium	Definite	Medium	Direct	Negative
	The quality of life of the residents will improve dramatically due to provision of bulk services for the township developments.	Local	Long term	High	Definite	High	Direct	Positive

Table 4: Suggested management actions to mitigate possible negative impacts during operational phase.

ISSUE	POTENTIAL IMPACT	MANAGEMENT ACTIONS	MONITORING OF IMPACTS
Surface & Ground Water quality	<ul style="list-style-type: none"> Possible occurrence of erosion and silt generation. 	<ul style="list-style-type: none"> All fuel, chemicals, oil, etc. must be confined to areas where the drainage of water can be controlled. Use appropriate structures and methods for storage and handling. No dumping of foreign material in streams, rivers and/or wetland areas is allowed. 	Inspect and maintain equipments at all times.
Waste management	<ul style="list-style-type: none"> Waste can be created during the operational phase. 	<ul style="list-style-type: none"> All possible waste has to be removed from the site after a maintenance survey. Workers have to take all their waste with them after lunch. 	Inspection by the Applicant after maintenance team was on site.
Visual	The establishment of the sewer pump station and related infrastructure.	<ul style="list-style-type: none"> Rehabilitate all disturbed areas. Service roads should be maintained and inspected regularly. 	Inspection by the Applicant and the ECO.

5. ENVIRONMENTAL IMPACT STATEMENT

Environmental Impact Statement

PREFERRED SITE							
Phase	Nature of Impact	Extent	Duration	Intensity/ Severity	Probability/ Certainty	Significance	
						Before	After mitigation
Planning							
	Land use	Site	Long term	Low	Definite	Low	Low
	Locality	Site	Long term	Low	Definite	Low	Low
Construction							
	Surface & groundwater quality	Site	Short term	Medium	Definite	Medium	Low
	Waste management	Site	Short term	Low	Definite	Medium	Low
	Loss of Fauna & Flora	Site	Long term	Medium	Probable	Low	Low
	Air quality	Site	Short term	Low	Probable	Low	Low
	Noise	Site	Short term	Medium	Definite	Medium	Low
	Visual impacts	Local	Short term	Low	Definite	Low	Low
Social Impact	Local	Short term	Medium	Definite	High-Medium	Low	
Operational							
	Surface & groundwater quality	downstream	Long term	Low	Unsure	Low	Low
	Waste management	Local	Long term	Low	Unsure	Low	Low
	Visual impacts	Local	Long term	High	Definite	Medium	Low
	Social impact: Work force	Site	Short term	Medium	Definite	Medium	Low
	Social Impacts: available bulk services for the township developments.	Local	Long term	High	Definite	High(+)	High