

*August 2015*

*MDARDLEA Ref:  
1/3/1/16/1E-11*

# **BASIC ASSESSMENT REPORT**

**NSIKAZI NORTH BULK WATER SUPPLY  
SCHEME UPGRADE**

**CONSTRUCTION & MAINTENANCE OF NEW  
LINE & ASSOCIATED INFRASTRUCTURE**



**ENPACT ENVIRONMENTAL  
CONSULTANTS CC**

REG. 2004/051532/23

**I. PROJECT INFORMATION**

PROJECT DETAILS																																																																					
<b>TITLE:</b>	Nsikazi North Bulk Water Supply Scheme Upgrade – Construction and Maintenance of Associated Infrastructure																																																																				
<b>REPORT STATUS:</b>	Basic Impact Assessment Report (submission)																																																																				
<b>LOCATION:</b>	The bulk water pump line will start south of Sabie River pumpstation, north of the R536 Kruger gate road with an alignment through Nyongane up to the existing Numbi reservoir just north of the Numbi township area. This project is located in the Nsikazi North area, Mbombela Local Municipality, Mpumalanga.																																																																				
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	End	25°	06'	36.66"	31°	10'	30.73"																																																														
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<b>REPORT PREPARED FOR SUBMISSION TO:</b>	<b>Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs: DARDLEA</b> Ehlanzeni District Offices The Directorate: Environmental Impact Management Jones Street Nelspruit, 1200																																																																				
<b>DATE OF COMPILATION:</b>	<b>August 2015</b>																																																																				
<b>ACTIVITIES APPLIED FOR:</b>	Notice no. R 983, 2014: Activity 9, 12 & 19 Notice no. R985, 2014: Activity 2 & 14																																																																				
<b>MDARDLEA REFERENCE NUMBER:</b>	1/3/1/16/1E-11																																																																				

## EAP Declaration

I hereby affirm/confirm:

- The correctness of the information provided in the report;
- I will ensure compliance with the EIA Regulations 2014;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- I will take into account, to the extent possible, the matters listed in regulation **18** of the regulations when preparing the application and any report, plan or document relating to the application;
- I will disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



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Signature of the environmental assessment practitioner

26/08/2015

## Executive Summary

Submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) in terms of the requirements of Government Notices no. R982, R983 and R985 for the Basic Environmental Impact Assessment (BA) process in terms of the 2014 EIA Regulations, National Environmental Management Act, 1998 (Act No. 107 of 1998).

### Application Summary

**Project:** Nsikazi North Bulk Water Supply Scheme Upgrade

**Location:** The pipeline will start south of the Sabie River pumpstation, north of the R536 Kruger gate road and will go to the Nyongane Waterworks. From the waterworks it will traverse through the Nyongane Township to the existing Numbi reservoir, just north of the Numbi township area. A new reservoir is proposed at this site. This project is located in the Nsikazi North area, Mbombela Local Municipality, Mpumalanga. Refer to report and maps for more detail.

**Activities:**

Activities published in the EIA regulations in the Government Notice No. R983 and R985 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) requires environmental authorisation:

<p>R.983, 2014: Activity 9 - The development of infrastructure exceeding <u>1000 metres in length for the bulk transportation of water or storm water-</u> (i) with an <u>internal diameter of 0,36 metres or more</u>; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or (b) where such development will occur within an urban area.</p>	<ul style="list-style-type: none"> <li>▪ The construction of a bulk water pipeline 11km in length with an internal diameter of approx. 800-850 mm (900 mm external) and associated infrastructure.</li> </ul>
<p>R.983, Activity 12 - The construction of: (xi) infrastructure or structures with a physical footprint of 100 square metres or more where such construction occurs (a) within a watercourse (b) in front of a development setback or (c) if no development setback exists within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<ul style="list-style-type: none"> <li>▪ The construction and traversing of a water pipeline that will exceed 100 m<sup>2</sup> within 32 m of and over six water resources between the following points:             <ol style="list-style-type: none"> <li>1. S25°03'09.1" E31°11'35.7" and S25°03'09.8" E31°11'35.0"</li> <li>2. S25°03'16.2" E31°11'13.7" and S25°03'16.9" E31°11'10.7"</li> <li>3. S25°04'16.0" E31°10'46.2" and S25°04'16.7" E31°10'46.7"</li> <li>4. S25°04'33.9" E31°10'46.3" and S25°04'35.1" E31°10'45.5"</li> <li>5. S25°05'35.0" E31°10'38.5" and S25°05'36.3" E31°10'38.3"</li> <li>6. S25°05'49.7" E31°10'36.7" and S25°05'50.4" E31°10'36.4"</li> </ol> </li> </ul>

	<ul style="list-style-type: none"> <li>▪ The construction of a water pipeline that will exceed 100 m<sup>2</sup> and will be located within 32 m of a drainage line between points             <ul style="list-style-type: none"> <li>- S25°03'16.7" E31°11'11.8" and S25°03'16.4" E31°11'13.2"</li> <li>- S25°04'44.4" E31°10'45.8" and S25°04'47.9" E31°10'44.5"</li> </ul> </li> </ul>
<p>R.983, Activity 19 - The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from (i) a watercourse - but excluding where such infilling, depositing, dredging, excavation, removal or moving a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or c) falls within the ambit of activity 21 in this Notice in which case that activity applies.</p>	<ul style="list-style-type: none"> <li>▪ The infilling or excavation of more than 5 cubic metres of soil, sand, rock from six identified water resources at the following points will be required for the pipeline to traverse these streams/drainage lines:             <ol style="list-style-type: none"> <li>1. S25°03'09.1" E31°11'35.7" and S25°03'09.8" E31°11'35.0"</li> <li>2. S25°03'16.2" E31°11'13.7" and S25°03'16.9" E31°11'10.7"</li> <li>3. S25°04'16.0" E31°10'46.2" and S25°04'16.7" E31°10'46.7"</li> <li>4. S25°04'33.9" E31°10'46.3" and S25°04'35.1" E31°10'45.5"</li> <li>5. S25°05'35.0" E31°10'38.5" and S25°05'36.3" E31°10'38.3"</li> <li>6. S25°05'49.7" E31°10'36.7" and S25°05'50.4" E31°10'36.4"</li> </ol> </li> </ul>
<p>R.985, 2014: Activity 2 - The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres, outside urban areas in Mpumalanga within (ff) <u>Areas within 10 kilometres from national parks</u> or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.</p>	<ul style="list-style-type: none"> <li>▪ A new 15MI reservoir will be located adjacent southwest of the existing Numbi reservoir within 10km from the Kruger National Park, west of the Nkambeni - Phabeni area of the park.</li> </ul>
<p>R.985, 2014: Activity 14 - The development of- (xii) infrastructure or structures with a physical footprint of 10 square metres or more, where such construction occurs (a) within a watercourse (b) in front of a development setback or (c) if no development setback exists within 32 metres of a watercourse, measured from the edge of a watercourse, outside urban areas in Mpumalanga within (ff) <u>Critical biodiversity areas</u> or <u>ecosystem service areas</u> as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) <u>Areas within 10</u></p>	<ul style="list-style-type: none"> <li>▪ The 11km pipeline and 15MI reservoir will have a physical footprint of more than 10 m<sup>2</sup> and is located within 10km of the Kruger National Park.</li> <li>▪ The construction and traversing of a water pipeline that will exceed 10 m<sup>2</sup> within 32 m of and over six water resources between the following points:             <ol style="list-style-type: none"> <li>1. S25°03'09.1" E31°11'35.7" and S25°03'09.8" E31°11'35.0"</li> <li>2. S25°03'16.2" E31°11'13.7" and S25°03'16.9" E31°11'10.7"</li> </ol> </li> </ul>

<p>kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA.</p>	<p>3. S25°04'16.0" E31°10'46.2" and S25°04'16.7" E31°10'46.7"</p> <p>4. S25°04'33.9" E31°10'46.3" and S25°04'35.1" E31°10'45.5"</p> <p>5. S25°05'35.0" E31°10'38.5" and S25°05'36.3" E31°10'38.3"</p> <p>6. S25°05'49.7" E31°10'36.7" and S25°05'50.4" E31°10'36.4"</p> <ul style="list-style-type: none"> <li>▪ The construction of a water pipeline that will exceed 10m<sup>2</sup> within 32 m of a drainage line between points             <ul style="list-style-type: none"> <li>- S25°03'16.7" E31°11'11.8" and S25°03'16.4" E31°11'13.2"</li> <li>- S25°04'44.4" E31°10'45.8" and S25°04'47.9" E31°10'44.5"</li> </ul> </li> </ul>
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**Project description:**

It is proposed to upgrade the Nsikazi North Bulk Water Scheme with the installation of a new 800mm internal diameter pipeline and a new 15ML reservoir.

The new pipeline will be installed from the Sabie River Pump station to Nyongane (3km) and from Nyongane to a new reservoir at Numbi (8km), Nsikazi North area, Mbombela Local Municipality, Mpumalanga.

The upgrading of the Hoxani Treatment works is a separate project. The proposed pipeline and reservoir will increase the capacity of the existing bulk water network

The Mbombela Local Municipality is the applicant and Rand Water is the implementing agent for the project.

The new pipeline will be installed alongside the existing pipeline and the alignment mostly follows the dirt road from the Sabie River to the R536 Kruger road. There it will traverse the road and be aligned adjacent east of the D2965 Nyongane tar road up to the Nyongane Water Treatment Works. From the south of the Nyongane Township it will follow the track for the existing bulk water pipeline up to the existing Numbi reservoir. Refer to the attached locality map and report for more detail.

**Process followed:**

An application with relevant documentation was submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA) and a reference number for the Basic Assessment process was obtained in July 2015 (Ref: 1/3/1/16/1E-11).

Three site notices were placed along the alignment of the pipeline in the Nyongane township and at the Numbi reservoir on 24 June 2015. The notices informed the public and potentially affected parties of the project, EIA process and opportunity to register. A notice in the prescribed format was placed in the Mpumalanga News of 16 July 2015. The notice gave information on the project, EIA process and of the availability of the Basic Assessment Report.

The Basic Assessment Report was made available for a commenting period of 30 days. The list of Interested and Affected Parties included state departments as well as the competent authority and identified parties. No response was received to any of newspaper or site notices.

No comments were received on the report content. The only comments received were from the Mpumalanga Park and tourism Agency indicating no objection as long as impacts are minimised and alien plants controlled. Rand Water as implementer commented on the report and their points of concern of which one was the inclusion of a Heritage Impact Assessment. A representative of the Kruger National Park indicated that they are of the opinion that the water authorities must be informed, which was done. Refer to Appendix 5C for the correspondence and letters.

**Key findings and recommendations:**

The proposed project is an expansion of existing infrastructure to distribute higher volumes of treated water from the Hoxani Treatment Works into the distribution network and to the communities. The necessary applications will be submitted to the Department of Water and Sanitation and Inkomati Usuthu Catchment Management Agency for the water uses related to the upgrade.

Although it is an upgrade of the system and increase of capacity, the water pipeline and reservoir will be new structures and it therefore constitutes construction activities in terms of the definitions of the EIA regulations.

**Alternatives:**

The proposed activities are set to the locality as is it is the proposed expansion of existing infrastructure servicing a specific area.

Two alignment alternatives were identified to minimise the potential ecological and social impacts associated with the alignment of the pipeline. One alternative is between the Sabie River Pump Station and the R536 Kruger road to avoid a rocky outcrop. The other is on the second section of the pipeline to avoid more significant social impacts on Nyongane residents and to provide sufficient working space for the contractor.

For stream crossings the only alternative would be to find new localities for the crossings but this is would be unnecessary as the proposed crossings adjacent the existing pipeline is preferred and environmentally acceptable.

**Key potential impacts:**

- Geology and soil conditions: The existing line has a number of leaks that in some places, especially at stream crossings cause permanent flow and soil erosion. The construction activities will entail earthworks in and around sensitive environments and slopes. Erosion can have indirect impacts and extend into other areas over time and result in the modification of terrestrial as well as aquatic habitats. Impacts are of medium significance and mitigation is important and necessary.
- Surface water and aquatic ecology – The new pipeline alignment will entail six stream crossings. All the water features that will be affected by the proposed alignment was identified and all six sites were assessed to be *Largely modified* (PES) and of *Low* sensitivity (EIS).

A number of the construction related impacts are expected to affect the morphology, hydrology and vegetation of the water resources. Impacts were assessed to be of a medium to high significance before mitigation.

Some of the crossings have been adversely affected by the construction of the existing pipeline. The conclusion from the specialist report was that the construction and completed sites will have a relatively small footprint and although the watercourses will be negatively affected at site level during the construction of the pipe line (short term) it is not anticipated that any impacts will have long term consequences. Mitigation is proposed.

- Terrestrial Ecology – The activities (construction of the pipeline and reservoir) will entail the removal of indigenous vegetation and potential fragmentation of and impoverishment of the terrestrial ecological habitat. Impacts were assessed to be of a medium to high significance before mitigation. A section of the pipeline alignment was changed to avoid a sensitive rocky outcrop.

The specialist study summarises the impact as follows: The single most important impact on biodiversity is the loss and fragmentation of natural habitats which has already occurred on a large extent of the study area site as result of the establishment of residential areas and farming practices. This impact leads to the loss of living space (habitat) for animals and natural vegetation alike. Furthermore, the integrity and size of the ecological corridors and support areas represented on the affected area may be negatively affected. However, it is apparent that the route for the pipeline has already been subject to vegetation clearing since the establishment of the existing pipeline and furthermore, the relative small ecological footprint of the linear activity will limit the loss of additional vegetation to an acceptable level. It can be mitigated to a medium level if appropriate planning and management principles are practised by the engineering team and contractor. The activity will not have a significant impact on ecological support areas, corridors or the KNP if the proposed mitigations given are implemented.

- Aesthetic impact – The proposed water pipeline will be installed underground and it is only during the construction period that the trenching and earthworks would result in a visual impact. Small structures for the scour valves and vents can be expected. The impact is of a low significance and is reversible.

The reservoir will however be constructed on a high point and due to the surrounding terrain it will likely result in a visual impact. The reservoir may be visible to a number of tourist camps and areas in the Kruger National Park that are located close to the western boundary of the Park. The existing reservoir and telecommunication mast already permanently changed the aesthetics of the area and is very likely visible from areas within the KNP. Numbi Townships, specifically the outskirts is located on the eastern slope of the mountain and should be visible from most areas within the KNP if one faces westward.

The new reservoir may also be visible to some of the residents on the outskirts of the Numbi Township but this is a built up area and the impact will not be significant.

The impact cannot be avoided and will be permanent but is likely to be of a low significance after mitigation although mitigation is limited. No comments were received from any of the potentially affected parties within the KNP.

- Heritage resources - On request of the Rand Water, a Phase 1 Heritage Impact Assessment was conducted and the findings of the survey and report indicated no



heritage resources on the proposed route of the pipeline. The mitigation measures were added to the EMP. Refer to Appendix 8 for the HIA report.

Other impacts include:

- Air quality;
- Noise and vibration;
- Traffic impact;
- Social and socio-economic impact and
- Health and Safety.

The linear activity and construction of the reservoir is expected to result in a relatively small ecological footprint with mainly impacts of medium significance before mitigation. The alignment can mostly follow the existing pipeline and this minimises the ecological footprint. Mitigation can be successfully implemented. No environmental fatal flaws were identified with the proposed alignment of the water pipeline or the new reservoir site.

## Project Team

**Environmental Assessment Practitioner:**

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**Expertise:**

Heinrich Kammeyer is the owner of Enpact Environmental Consultants CC. Qualifications include a degree in Chemical Engineering, MBL and a Masters Environmental Engineering (Cum laude). The Environmental Consulting Business which was started in 2004 has completed more than 150 Environmental Impact Assessment Applications to date. Experience in Environmental Impact Assessments, over the past 11 years, spans a wide range including residential and business developments, tourism developments, roads, water and sewer, renewable power generation, concentrate farming and waste management facilities. In addition he also has extensive experience in waste management licences as well as water use licence applications.

Maryke Relling has 8 years' experience in the EIA consulting business with this company. Qualifications include a Btech Nature Conservation degree. Experience in Environmental Impact Assessments spans a wide range of projects including residential and business developments, tourism developments, infrastructure projects (roads, water, sewer and renewable power generation), concentrate farming and waste management facilities. She also deals extensively with the compilation of waste management and water use licence applications.

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\*\*\* For the Terms of References and methodologies please refer to the attached Specialist reports

## **Nsikazi North Bulk Water Supply Scheme Upgrade**

### **1. Introduction and Motivation**

#### **1.1 Background**

The Mbombela Local Municipality in conjunction with Rand Water is in a process of upgrading the bulk water distribution network in the Nsikazi North area, Mbombela Local Municipality, Mpumalanga.

Mbombela Local Municipality is the applicant and Rand Water was appointed as the project coordinators and the implementing agent for this project.

The projects include a new water pipeline and reservoir and environmental authorisation needs to be obtained before the construction activities can commence.

This Basic Assessment Report was compiled in terms of the National Environmental Act, 1998 and Environmental Impact Assessment Regulations, 2014. The environmental impact assessment evaluates the aspects and potential impacts of the proposed development on the natural and social environment. Information for the evaluation was obtained from the applicant, professional team, environmental specialists and the interested and affected parties.

The Basic Assessment Report contains the following information:

- Detail description of the proposed activity;
- Description of the property on which the activity is to be undertaken;
- Description of the environment that may be affected by the activity;
- Details of the public participation process;
- The need and desirability of the proposed activity;
- Evaluation of alternatives;
- Specialist reports and findings;
- Description of environmental issues that were identified;
- Assessment of environmental issues;
- Environmental impact statement with key findings of the environmental impact assessment;
- Environmental Management Programme.

The Basic Assessment Report is made available for comment to Interested and Affected Parties which includes State Departments and relevant authorities. Any comments received are then included in the report before it will be submitted to the Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) for consideration and possible authorisation.

#### **1.2 Description of activity**

The Hoxani Water Treatment Works north of the Sabie River is currently being upgraded to have an average treatment capacity of 30 MI for Nsikazi North.

As a part of the upgrade it is proposed to expand the Nsikazi North Bulk Water Scheme with the installation of a new 800-850mm internal diameter pipeline from the Sabie River Pump station to the existing Numbi Reservoir where a new and additional 15MI reservoir will be constructed. The proposed activities will take place within the Nsikazi North area and the upgrade is proposed to expand the distribution and storage capacity.

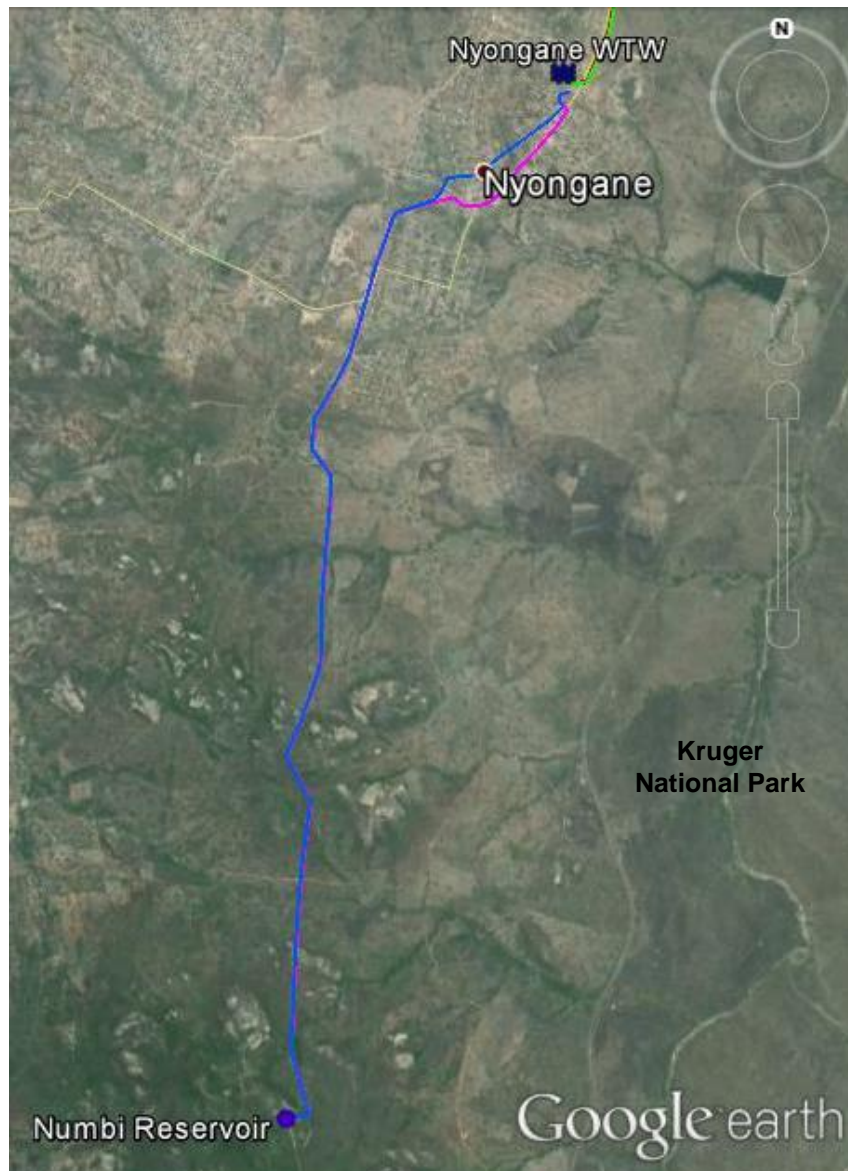
The line will be 11 km in total and will be constructed and installed just east of and alongside the existing pipeline for the entire route with associated infrastructure such as scour valves

and vents. The existing line will not be decommissioned and both lines will be used to pump purified water from Hoxani into the distribution network. The upgrade of the Hoxani Treatment Works is a separate from the distribution network upgrade.



**Figure 1: Google image of the alignment of the first section of proposed pipeline**

A 3km section pipeline will be constructed from the Sabie River Pump station to the Nyongane Water Treatment Works in the Nyongane Township. From there an 8km section will go up to the existing Numbi reservoir where the new reservoir will be constructed.



**Figure 2: Google image of the alignment of the second section of the proposed pipeline**

The new 15MI reservoir will be constructed adjacent southwest of the existing reservoir and the telecommunication mast.

The alignment of the pipeline will follow existing roads and tracks. The alignment entails the crossing of the provincial R536 Kruger road and the D2965 Nyongane road twice (to and from the Nyongane Water Treatment Works).

The alignment includes 6 drainage line/stream crossings of which one is across a perennial flowing stream and another over a second order seasonal stream that does have flow in the winter months.

Two sections of the pipeline will also be aligned within 32 meters of drainage lines without traversing at these points. One location is at streamcrossing 02, the Kalehuhuze stream, and the other along a drainage line that joins into the Kathlothlomo stream near crossing 04.

Refer to the attached locality and layout map and the rest of the report for more detail.



**Method statement:**

General:

The pipeline will be a spigot and socket steel pipe with a nominal diameter of 900mm and a varying internal diameter of 800-850mm.

The pipe will be underground and excavations of 3 m deep will be required. Backfilling will take place on a progressive basis. The pipe will have approximately 2m cover on top of it.

The trenches will be backfilled with the removed soil and will be compacted to the same density as the surrounding environment. The affected areas will be ripped or rehabilitated. All excess soil and concrete will be removed from the sites.

Road crossings:

The pipeline will include the crossing of the provincial R536 Kruger road and two crossings over the D2965 Nyongane road. Both are tarred roads.

Trenches of 1,8m wide will be made across the roads and the pipe will be placed and secured within a 1200mm diameter sleeve underneath the road surfaces at a depth of 3 meters. The engineers will obtain the necessary way leaves from the Mpumalanga Department of Roads and Transport and Mbombela Local Municipality.

Stream crossings:

Four of the six stream crossings only have seasonal flow during the summer months and are mostly without waterflow.

Where no waterflow is present, the following method will be followed:

- The pipeline will be installed underground.
- A Trench of 1,8m to 2 m wide will be made across the streambed.
- Mostly soft excavations are expected and will be 3m deep.
- The pipe will be encased in reinforced concrete where it crosses the streams.
- The excavations will be backfilled.

Stream crossings with water flow:

- The pipeline will be installed underground. The pipeline centre line will be set out across the streams. Excavating trenches will be made on either side of the water course and will be approximately 2m wide and 3m deep.
- Where water flow is present temporary coffer dams will be created upstream of the pipeline using sand bags to block water. Sandbags will be positioned on the natural streambed level and will not involve excavation or disturbance to the streambed. The cofferdam will be constructed wide and high enough to retain the water for the period required. Alternatively a pipe will be placed into the wall of the coffer dam to temporarily divert the flow downstream for the duration of the construction activities.
- Excavation and pipe-laying will then take place in the stream bed.
- Soft material will be excavated and stockpiled next to the trench. The bedding will be engineered and the pipe will be encased with concrete.
- Concrete bedding will be casted below the stream bed level, laying steel pipes and casting concrete encasing on the top to match the stream bed.
- Where available rocks will be spread as protection against erosion on top of the concrete. When the concrete encasing has dried adequately, the sand bags will be removed and the water allowed to flow back on the original course and above

the pipeline.

The crossings would generally include the construction of scour valves and vents which entails very small concrete structure above ground within close proximity of the crossings.

**Table 1: Water crossing timetable**

Item	Description	Commencement Day	Estimate Time
1	Marking out the centre lines and land clearing	Day 1	1 day
2	Excavation	Day 1	1 day
3	Bedding	Day 2	2 days
4	Pipe laying	Day 3	1 day
5	Concrete Encasing	Day 4	7 day
6	Back Filling and Land Rehabilitation	Day 9	1 day

## **2. Need and desirability of the activity**

### **2.1 Need and Desirability**

There is an existing bulk water distribution network from the Hoxani Water Treatment Works transporting untreated (only chlorinated) water through the existing pipeline to the network reservoirs and distribution points which supplies the Nsikazi North townships. The planning provides that this distribution network will eventually expand as far south as Kabokweni.

The Hoxani Water Treatment Works is currently undergoing the necessary upgrades to include water treatment and purification as well as to expand the treatment capacity.

There is a need to provide the Nsikazi North area not only with treated but also sufficient volumes of water. Currently the areas serviced only receive water intermittently and it is only chlorinated and not fully treated. Quality of the water is poor during the high rainfall periods. Once the new line is operational and the upgrades of the water treatment system completed, both pipelines will be utilized.

The project was prioritised by Provincial Government, the Mbombela Local Municipality and Rand Water who is the new services provider of the project area.

There is an approved budget for the proposed activities and it falls within the planning of the local municipality.

The new pipeline will be alongside the existing line and existing roads and tracks. The footprint will be within an already disturbed area although the activities may still result in environmental disturbances. The proposed alignment of the pipeline and location of the reservoir will not result in the sterilisation of any agricultural land.

The activities may result in potentially synergistic cumulative impacts on the more sensitive environments but it is not expected to result in unacceptable opportunity costs.

Please refer to Sections 3, 4, 8 and 9 of the report where more aspects pertaining to the need and desirability is further discussed. Specifically refer to the impact assessment.

## **2.2 Benefit to society**

The expansion will entail better services delivery to the communities serviced by the bulk distribution network and that a higher assurance of treated water will be available for distribution. It is a high priority project with very high social benefit.

During the construction period the activities will create a number of job opportunities which is always positive as these can be filled by people from the local community.

## **3. Consideration of alternatives**

Alternatives should include a consideration of the possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity.

The reasonable and feasible alternatives that may be considered during the process are location alternatives, layout alternatives and the No-go alternative.

### **3.1 Locality alternatives**

The proposed activities are set to the locality as is it is the proposed expansion of existing infrastructure servicing a specific area. There is an existing pipeline as well as an existing reservoir. There are no locality alternatives.

### **3.2 Layout alternatives**

There are not many layout alternatives due to the fact that this project is the expansion of existing infrastructure and the pipeline needs to follow a set route to the existing Numbi reservoir where a new one has to be constructed.

For stream crossings the only alternative would be to find new localities for the crossings. The proposed sites have already resulted in vegetation clearance for the installation of the existing pipeline. New sites would entail additional vegetation clearing and the impacts will be significantly higher as the habitat traversed by the existing pipeline and proposed route have already been impacted.

There are two sections where the planned alignment was changed to have a lower impact either socially or environmentally.

Sabie River to Nyongane WTW: The preferred and proposed alignment of the new pipeline from the Sabie River pump station to the Nyongane Water Treatment Works is adjacent west of the existing line. There is not enough space on the eastern side of the existing line and it would also entail the traversing of a very rocky area. This would impact on the rocky outcrop as a terrestrial habitat. Refer to impact assessment – to be referred to as Sabie River Nyongane alternative.

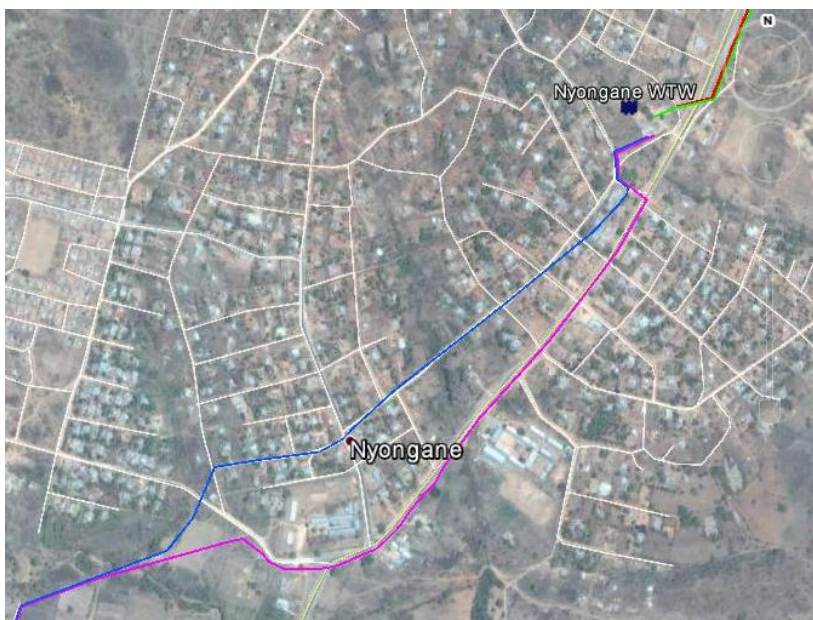


Red line = preferred proposed alternative  
Green line = existing  
Blue line = not preferred alternative

**Figure 3: Alternative alignment from Sabie River towards Nyongane WTW**

Nyongane WTW through Nyongane Township: The section of the pipeline through the Nyongane township from the Nyongane Treatment Works to the Numbi reservoir was first proposed to be aligned west of the D2965 Nyongane tar road straight from the treatment works to where the track goes up to the Numbi reservoir. This would entail working in the very narrow dirt road that provides access to the residents and would entail the blocking of the road entirely. This would not be feasible and have a social impact. Refer to impact assessment.

The preferred alternative is for the pipeline to be aligned from the treatment works back across to the east of the Nyongane road where there is more space. It will traverse the road again to join up with the existing pipeline's alignment further south.



Pink line = preferred alignment  
Blue line = initial alignment

**Figure 4: Nyongane Water Treatment Works**

### 3.3 No-go alternative

The “no-go” alternative would entail that the new pipeline and reservoir is not constructed. The bulk water scheme would not be able to be upgraded and this is not the preferred alternative. The existing infrastructure would however continue to operate.

## 4. Site Specifications

### 4.1 Locality of proposed activity

The line will start south of the Sabie River at the pump station, north of the R536 Kruger gate road. From there it will traverse unalienated stateland to just before the town of Nyongane. This area is east of Hazyview and the Shabalala township areas. A small section to the Nyongane Waterworks and through the Nyongane township area is located on the farm Vaalribbok 547 JU. From there the line will also traverse the farm Rooiduiker 19 JU to the newly proposed Numbi reservoir. The reservoir is located just north of the Numbi township area at the existing reservoir. This project is located in the Nsikazi North area, Mbombela Local Municipality, Mpumalanga.

### 4.2 Local authority

The development area falls under the jurisdiction of the Mbombela Local Municipality.

### 4.3 Existing and surrounding land use

The new pipeline will mostly be aligned alongside the existing line adjacent or in close proximity to existing dirt and tar roads.

The first section of the line will traverse undeveloped but transformed sections in the north as well as the provincial Kruger Gate road R536. The areas have been transformed through infrastructure, rural settlements and associated agricultural activities and grazing.

A section of the alignment goes through the Nyongane township area. The surrounding areas is also characterised by a patchwork of agricultural and grazing areas.

From there the line will traverse undeveloped rocky and mountainous areas of natural vegetation but these have also been impacted by informal cultivation, grazing and wood harvesting.

The pipeline will also traverse drainage lines with associated riparian vegetation.

The proposed alignment is parallel with and approximately 2km west of the Kruger National Park border (Nkambeni - Phabeni area). The Nkambeni Private Tented and Safari Camp is located between 3km to 4km southeast of the proposed reservoir site.

The prominent land uses within 500m from the site:

Natural area	Low density residential	Medium density residential	High density residential (rural)	Informal residential
Retail	Commercial & warehousing	Light industrial	Medium industrial	Heavy industrial
Power station	Office/consulting room	Military or police base/station/compound	Casino/entertainment complex	Hospitality facilities
Open cast mine	Underground mine	Spoil heap or slimes dam	Quarry, sand or borrow pit	Dam or reservoir
Hospital/medical center	School	Tertiary education facility	Church	Old age home
Sewage treatment plant	Train station or shunting yard	Railway line	Major road (4 lanes or more)	Airport
Harbour	Sport facilities	Golf course	Polo fields	Filling station

Landfill or waste treatment site	Plantation	Agriculture (informal)	River, stream or wetland	Nature conservation area
Mountain, koppie or ridge	Museum	Historical building	Graveyard	Archaeological site
Other land uses (describe):				

## 5. Site Assessment – Physical Characteristics

### 5.1 Climate

The site is located in the summer rainfall zone. The climate is typical to the Lowveld with seasonal summer-rainfall, warm temperatures and dry winters. Frost is infrequent.

### 5.2 Topography

The proposed pipeline will start down in the floodplain of the Sabie River from where the alignment will traverse various slopes up to the mountainous Numbi area.

The alignment traverses six watercourses and the surrounding areas is also characterised with streams and drainage lines, especially in the southern mountainous areas.

### 5.3 Geology and soil condition

The area is characterised with soils derived from granite and gneiss. The engineers are in the process of inspecting the soil conditions as the existing line is being surveyed on site.

### 5.4 Terrestrial ecology

A General Biodiversity and Ecological Status Report, June 2015 - Prepared in support of EIA Authorisation: Nsikazi North Bulk Water Scheme, Mpumalanga Province was conducted by Afrika Enviro & Biology. Following is a summary and abstracts from the report (Please refer to Appendix 3 for the report):

The study area is located parallel to the border of the KNP and stretches from the plains along the Sabie River to the mountainous topography in the Numbi area. The natural habitats in the northern area are mostly transformed due to formal and informal settlements and infrastructure. As one moves to the south, the environment along the route gradually changes from high density settlements to more random settlements where the natural vegetation has been cleared for cultivation of crops and rearing of livestock. Only solitary large indigenous trees remain along the roadside and in between the patchwork of cultivated lands. Further to the south along the route, natural vegetation and habitats are present although these have been subject to wood harvesting, overgrazing and subsequent bush encroachment (*w*). Large outcrops and wooded hills are present in the southern section. Natural vegetation remains largely natural intact on these outcrops and hills.

#### Regional Context

The study area consists of plains and mountainous bushveld typical of the eastern Lowveld adjacent to the west of the Kruger National Park.

The area falls within the two following vegetation units according to Mucina & Rutherford, 2006:

**Pretoriuskop Sour Bushveld** is found on the eastern foothills and plains of the Hazyview, Pretoriuskop areas, extending into the KNP. This veld type is characterized by the trees *Terminalia sericea* and *Dichrostachys cinerea* and under natural conditions it occurs with few

shrubs present. It is related to Legogote Sour Bushveld. It is well protected (40% formally protected) and 16% is transformed and as such it is rated as *Least threatened*.

**Legogote Sour Bushveld** is found in Mpumalanga and Limpopo Provinces along the eastern foothills of the northeastern escarpment. This veld type is not well protected (1% formally protected) and already 50% is transformed and as such is rated as Endangered (having lost more than 40% of its original extent) according to the National Spatial Biodiversity Assessment (Driver *et al*, 2004) on a regional level.

#### 5.4.1 Local Vegetation Communities

The following local communities were delineated along the alignment of the pipeline:

##### i) Riparian zones and watercourses

Of the watercourses that were assessed, only the Kalehuhuze Stream has prominent obligate riparian indicator vegetation present. These include *Ficus sycomorus*, *Diospyros mespiliformis*, *Combretum erythrophyllum*, *Dalbergia armata*, and *Acacia robusta ssp clavigera*. Smaller trees include *Acacia robusta ssp clavigera* and *Trichilia emetica*. *Acacia schweinfurthii* and *Hippobromus pauciflorus* are found on the outer edge along with a diverse weed component. Important weeds and invasive vegetation that were recorded in this habitat are *Acacia schweinfurthii*, *Lantana camara*, *Melia azedarach*, *Cardiospermum grandiflorum*, *Tecoma stans*, *Tithonia rotundifolia* and *Solanum mauritianum*. This site has been degraded due to encroaching cultivated lands, dwellings and infrastructure. The existing pipeline crosses the stream and vegetation has been removed in order to achieve this.

The smaller watercourses do not have a very distinct vegetation assemblage as consequence of the ephemeral presence of water. The vegetation structure is however denser and lush than the surrounds but still exists majorly of typical terrestrial vegetation. These habitats have very important stabilising and ecological functions and has a *High* sensitivity rating.

##### ii) Mixed mountain woodland

This community is found on the hills and outcrops in the southern section and can be described as a mosaic of bushveld trees and shrubs, forming a closed woodland community of tall shrubs and medium to tall trees. Commonly found species are: *Sclerocarya birrea*, *Faurea saligna*, *Pterocarpus angolensis*, *Pterocarpus rotundifolius*, *Lannea discolor*, *Peltophorum africanum*, *Terminalia sericea*, *Parinari curatellifolia*, *Erythrina latissima*, *Combretum collinum*, *Combretum molle*, *Strychnos madagascariensis* and many others. Shrubs are diverse and include *Euclea crispa*, *Euclea divinorum*, *Gymnosporia glaucophylla*, *Flueggia virosa* and *Ochna natalitia*. The untransformed areas consisting of this community have a significant diversity of vegetation and related faunal potential - the biodiversity significance is rated as *High*.

##### iii) Degraded plains woodland

This community is found in the northern and central section and is characteristic of the degraded environment of areas that are used by the local communities that have been reliant on the environment until recent times. For this reason most of the trees and shrubs have been destroyed for firewood and building material and the veld has been further degraded due to overgrazing by cattle and goats. Another negative impact is bush clearing for the establishment of dry agriculture lands on unsuitable terrain resulting in water- and wind erosion. However, in some areas large trees have remained intact due to their importance for fruit, shade and medicinal purposes. These include *Sclerocarya birrea*, *Philenoptera violacea* (*Lonchocarpus capassa*), *Diospyros mespiliformis* and *Schotia latifolia*.

For these reasons the environment appears as shrubland with scattered large trees. The shrubs consist of a mixture of true shrubs as well as secondary growth trees. The most commonly found are *Dichrostachys cinerea*, *Euclea natalitia*, *Euclea crispa*, *Gymnosporia spp.*, *Rhus pyrioides*, *Diospyros whyteana* and secondary growth *Terminalia sericea* as well as others. Due to these impacts, these areas are low in biodiversity and all of these areas' biodiversity rating is *Low*. Due to the degraded nature of this habitat a *Low* sensitivity rating is allocated.

#### iv) Transformed & disturbed land

These areas have been changed by human activities such as formal and informal townships and crop lands, dwelling houses, roads infrastructure and water pump stations to such extent that all natural habitats, biota and ecosystem functions have been lost and rehabilitation is not regarded as an option. These areas are usually also prone to secondary impacts such as invasive vegetation and the establishment of weeds. Only solitary large indigenous trees and small fragments of natural vegetation remain intact and regrowth of small trees and pioneer species. As result of these impacts, these areas are low in biodiversity and all of these areas' sensitivity rating is *Low*.

#### Species of conservation importance

No Red Data Listed species was recorded and three legally protected plant species were recorded.

Also of conservation importance is the occurrence of alien invasive species and weeds. Several important exotic species are present and most of the natural habitats contain alien invader species as noted in the previous subsections.

Species	National Status	Habitat preference	Recorded
<i>Acridocarpus natalitius</i>	Near threatened	Forest, thickets, outcrops, Drainage lines.	
<i>Adenia gumnifera</i>	Declining	Bushveld habitats. Outcrops.	Riparian zone
<i>Aloe kniphofioides</i>	Near threatened	Grassland habitats.	
<i>Aloe simii</i>	Critically endangered	Tall, open grassland. Above altitude 900m	
<i>Ansellia africana</i>	Declining	Bushveld, epiphyte	Riparian zone
<i>Boophane disticha</i>	Near threatened	Prefers higher altitude grassland.	
<i>Brachystelma chlorozonum</i>	Vulnerable	Bushveld habitats.	
<i>Crinum macowanii</i>	Declining	Riparian and moist areas	Riparian zone
<i>Elaeodendron transvaalense</i>	Near Threatened	Expected in natural bushveld;	
<i>Encephalartos laevifolius</i>	Critically endangered	Prefers higher altitude grassland.	
<i>Eriosema naviculare</i>	Endangered	Expected in natural bushveld;	
<i>Hypoxis hemerocallidea</i>	Declining	Prefers higher altitude grassland.	
<i>Ilex mitis</i> var. <i>mitis</i>	Declining	Forest, thicket and riparian areas.	
<i>Siphonochilus aethiopicus</i>	CR	Forests	

**Table 2: Potentially occurring National Red Data Listed plants of the study area**



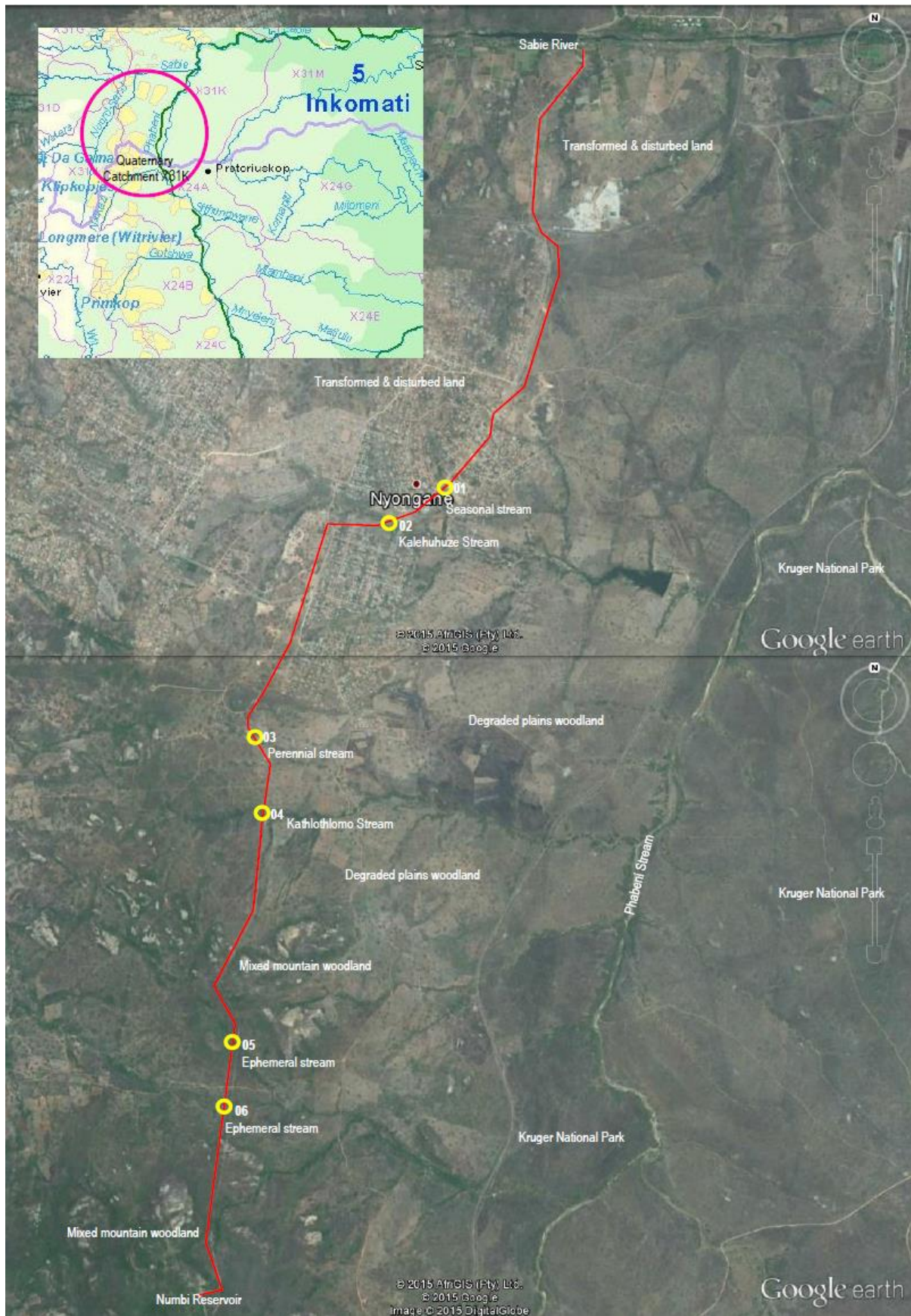


Figure 5: Vegetation communities identified within the study area

## 5.4.2 Terrestrial Fauna

The fauna investigation was not a comprehensive specialist survey but rather an overview of the available habitats and their potential to be utilised by fauna. However, the affected area was well searched for fauna actually present as well as field signs of fauna present.

\*\*\*Refer to report for tables of potentially occurring species.

### Mammals

Several species of small to medium sized mammals will utilize the natural habitats present in the study area. Thirteen mammals categorized as Red Data may be found in the study area. A further 16 species are listed as “Data Deficient” (DD).

The mobility of most mammals will ensure that they can adapt or relocate if disturbed by the activities. It is not anticipated that mammals will be significantly affected if mitigation measures are followed as the linear activity will have a very small linear ecological footprint and consequently loss of vegetation and habitat will be minimal.

### Birds

The literature review indicates that a diverse group of birds may utilise the study area (grid 2531DD). More than 200 species’ range of distribution falls within the study area and are supported by the available habitats. A total of 15 endemic and near-endemic and 42 Red Data Listed species are included for the study area. The remaining natural habitats and large trees will be important for birds. If this habitat and large trees are conserved, impacts induced as consequence of the proposed activities will be limited. However, it is not anticipated that birds will be significantly affected if mitigation measures are followed as the linear activity will have a very small linear ecological footprint and consequently loss of vegetation and habitat will be minimal.

The assemblage of important birds consists mostly of Vultures, Raptors and Storks. However, due to the historic and present land uses in the immediate study area it is unlikely that any of these will be permanent residents. These birds will be permanently present in the relative safety of the nearby KNP (Important Birding Area SA02). Birds residing in the KNP may visit the study site in search of food.

### Reptiles & Frogs

Frogs will utilise the aquatic and terrestrial habitats present for several reasons, including breeding purposes. Essential habitats for maintaining frog populations on the alignment are the streams. Frogs are rather sensitive to pollution and ecological imbalances, thus the presence of frogs indicate that the habitats where they were recorded are healthy and of good ecological integrity.

Thirty frog species’ range of distribution includes the study area, none of these have Red Data status. Only one species, the yellow-striped reed frog (*Hyperolius semidiscus*), is regarded as endemic. However, it is not anticipated that frogs will be significantly affected if mitigation measures are followed as the linear activity will have a very small linear ecological footprint and consequently loss of vegetation and habitat will be minimal.

The terrestrial and arboreal habitats present will provide habitat for a diverse group of reptiles. According to the literature research, 98 species of reptiles can potentially occur in the study area. Four RDL species have the potential to be present. Three Endemic species are expected in the study area: Haacke's Flat Gecko *Afroedura (multiporis) haackei*, (provincial Endangered status), Barberton Girdled Lizard *Cordylus warreni barbertonensis* and Wilhelm's Flat Lizard *Platysaurus wilhelmi*. All of these have a limited range of distribution roughly covering the area between Nelspruit, Barberton, Malelane and the

southerly Kruger National Park. Important reptiles that are expected are the African Rock Python, Nile Crocodile and Water Monitor.

#### 5.4.3 Invertebrates

##### i) Invertebrates - Excluding Butterfly families

Potentially, the natural habitats on site will offer refuge to all invertebrate groups with the available habitats on site. This consists of a large number of species for which field searches are too extensive to be accommodated for the present study. Picker *et al.* (2002) can be referred to so as to get an idea of the large amount of invertebrate diversity that can be expected in the study area.

##### ii) Butterflies

The habitats present have the potential to support approximately 275 species of butterflies. Cross-referenced larval host plants and prey items, a total of approximately 175 species may be present at one time or another. Due to the dynamic mobility of butterflies, any of these species has the potential to be present at a given time, although variable conditions will be a limiting factor. No Red Data Listed species are expected in the study area.

##### iii) Pollinators

Pollinators provide an essential ecosystem service that result in the out-crossing and sexual reproduction of many plants. They benefit society by increasing food security in agricultural and natural ecosystem and they play an important role in conserving biological biodiversity (Eardly *et al.* 2006). Pollinator diversity includes an immense range of fauna, ranging from the tiniest invertebrates to relatively large vertebrates. Often, pollinators form part of a highly specific niche in pollinator-plant relationships and the ecosystem integrity as a whole. The loss of a single important habitat requirement (e.g. hides and cover objects, larval hosts, availability of water, etc.) for pollinators in an ecosystem could have far reaching effects, ultimately resulting in extinction. Fragmentation of habitats will undoubtedly also have a negative impact on the occurrence and distribution of pollinators and consequently on the genetic and population integrity of ecosystems. The successful survival of pollinators is thus further motivation for the conservation of undisturbed and unimpaired, interconnected ecological corridors crossing property boundaries in local areas.

#### 5.4.4 Biodiversity Value Assessment and conservation importance

The Mpumalanga Department of Environment's Intrinsic Biodiversity Conservation Plan (MBC-plan) (Lötter, 2006) rating for the biodiversity significance of the study site and the Listing notice 3 ratings are summarised as follows:

- Terrestrial biodiversity maintenance: *No natural habitat remaining*  
*Least concern*
- Aquatic ecosystem maintenance: *Highly significant*
- MBC-plan corridors: *Terrestrial ecological corridor*  
*Aquatic ecological corridor*
- LN3 Priority Area: *Terrestrial ecological support area (corridor)*  
*Aquatic ecological support area*
- LN3 Protected Area: *Within 10km radius of National protected area*  
One of the objectives of this report is to verify these ratings and to provide detailed information regarding the site status.

The results of the biodiversity investigation indicate that the natural terrestrial habitats have been transformed to cultivated lands or have been severely disturbed or fragmented as result of human induced impacts. However, ecological functions are still maintained in the riparian zones. The sensitivity zoning (based upon natural integrity, fauna potential and ecological functions) for the different ecological habitats are delineated in Fig. 1 and summarized as follows:

Vegetation Community	Sensitivity Rating
Riparian zones and watercourses	High
Mixed mountain woodland	High
Degraded plains woodland	Low
Transformed & disturbed land	Low

**Table 3: Ecological Sensitivity Ratings**

The habitat delineation as projected in Figure. 5 correspond largely with the MBC Plan for the site of *no natural habitat remaining and least concern*.

## 5.5 Aquatic ecology - Surface and Ground Water Resources

### 5.5.1 Aquatic ecology

A Present Ecological Status Report in support of EIA and Water Use Authorisations: Nsikazi North Bulk Water Scheme, Mpumalanga Province, was conducted by Afrika Enviro & Biology (Refer to Appendix 4 for the full report).

The site falls within the quaternary catchment X31K, Mpumalanga. There are six watercourses that will be directly impacted by the alignment of the proposed waterline. No wetland areas are present that will be affected.

Following is a summary and abstracts from the report:

The watercourses that are crossed along the route vary from small ephemeral drainage lines, first order seasonal streams to a single third order perennial stream. All of these watercourses tribute to the Phabeni Stream which is located in the Kruger National Park.

The proposed new pipeline will be installed alongside an existing pipeline for most of the route and alongside the main road in the residential areas. This means that the linear site has already been disturbed in the past for the installation of the existing pipeline and additional vegetation removal and disturbance to riparian vegetation is expected to be minimal as the sites have already been subject to these impacts. Existing access roads are also available for construction and maintenance purposes and the construction of new roads will not be necessary.

**Table 4: Site and watercourse reference and classification**

Classification and location of water courses of the activity				
Site Ref no	Classification and description	Notes	Watercourse edge coordinates (Deg.min.decimal sec.)	
			North	South
01	First order seasonal stream.	Existing road crossing. New crossing to east.	S25 03 09.1 E31 11 35.7	S25 03 09.8 E31 11 35.0
02	Kalehuhuze Stream; Second order perennial stream.	Existing pipeline crossing. Proposed new crossing to east.	S25 03 16.2 E31 11 13.7	S25 03 16.9 E31 11 10.7
03	Perennial first order stream	Existing pipeline and road crossing. Proposed new	S25 04 16.0 E31 10 46.2	S25 04 16.7 E31 10 46.7

		crossing to east.		
04	Kathlothlomo Stream; Second order seasonal stream.	Existing pipeline and road crossing. Proposed new crossing to east.	S25 04 33.9 E31 10 46.3	S25 04 35.1 E31 10 45.5
05	First order ephemeral stream.	Existing pipeline and road crossing. Proposed new crossing to east.	S25 05 35.0 E31 10 38.5	S25 05 36.3 E31 10 38.3
06	First order ephemeral stream.	Existing pipeline crossing. Proposed new crossing to east.	S25 05 49.7 E31 10 36.7	S25 05 50.4 E31 10 36.4



Figure 6: Riparian delineation of streams 01 and 02



Figure 7: Riparian delineation of streams 03 and 04



Figure 8: Riparian delineation of streams 05 and 06

### 5.5.2 Present Ecological State (PES)

The PES for all the different determining factors at each site is tabulated below.

**Table 5: PES of streams to be traversed**

Site Ref no	Flow and sediment regimes	PES Rating	Water Quality	PES Rating	Morphology	PES Rating
01	<p>Prolonged seasonal flow only during and after the wet season.</p> <ul style="list-style-type: none"> <li>Flow volume is significantly increased as result of runoff from the road and residential areas directed into the water course.</li> <li>Sediment load is significantly increased as result of sediment transported from gravel roads surfaces into the water course.</li> <li>Flow is impeded/obstructed by the bridge structure.</li> </ul>	Moderately Modified	Water quality will be negatively affected as result of pollutants present in the surrounding residential areas as well as disposal of solid waste by the local population into the drainage line. During peak flow the pollutants will be diluted and water quality will improve.	Largely Modified	<p>Clearly defined stream channel &gt;3m.</p> <ul style="list-style-type: none"> <li>Sandy bed and banks.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing road crossing at this site.</li> <li>Erosion of the road lead offs and incision of the banks as result of increased flow from the road and residential areas.</li> <li>Morphology is also modified upstream and downstream of the site.</li> <li>Subsurface culvert replaces natural stream channel and result in concentrated flow which erodes the stream bank and incises the stream banks.</li> </ul>	Seriously modified
02	<p>Perennial flow is present but very low during the dry season.</p> <ul style="list-style-type: none"> <li>Sediment load is significantly increased as result of sediment transported from gravel road surfaces into the water course.</li> <li>Flow is impeded/obstructed by the existing pipeline.</li> </ul>	Moderately Modified	Water quality will be negatively affected as result of pollutants present in the surrounding residential areas as well as disposal of solid waste by the local population into the drainage line. During peak flow the pollutants will be diluted and water quality will improve.	Largely Modified	<p>Clearly defined stream channel &gt;7m.</p> <ul style="list-style-type: none"> <li>Sandy bed and banks.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing pipeline crossing at this site.</li> <li>Erosion of the road lead offs and incision of the banks as result of increased flow from the road and residential areas.</li> <li>Morphology is largely natural upstream and downstream of the site.</li> </ul>	Seriously modified
03	<p>Perennial flow is present but very low during the dry season.</p> <ul style="list-style-type: none"> <li>Sediment load is significantly increased as result of sediment transported from gravel road surface into the water course.</li> <li>Flow is significantly increased at this point as result of a continuous leak from the pump at the nearby reservoir.</li> </ul>	Largely Modified	Water quality will be largely natural as there are no nearby activities present that can affect it negatively.	Natural	<p>Clearly defined stream channel &gt;3m.</p> <ul style="list-style-type: none"> <li>Sandy bed and banks.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing pipeline crossing at this site.</li> <li>Morphology is natural upstream and downstream of the site.</li> </ul>	Largely modified
04	<p>Prolonged seasonal flow only during and after the wet season.</p> <ul style="list-style-type: none"> <li>Sediment load is moderately increased as result of sediment transported from gravel road surfaces into the water course.</li> </ul>	Moderately Modified	Water quality will be largely natural as there are no nearby activities present that can affect it negatively.	Natural	<p>Clearly defined stream channel &gt;5m.</p> <ul style="list-style-type: none"> <li>Sandy bed and banks.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing pipeline crossing at this site.</li> <li>Erosion of the road lead offs and incision of the banks as result of increased flow from the road crossing.</li> <li>Morphology is natural upstream and downstream of the site.</li> </ul>	Largely modified
05	<p>Ephemeral surface flow only after rain.</p> <ul style="list-style-type: none"> <li>All aspects related to flow are largely natural.</li> </ul>	Moderately Modified	Water quality will be largely natural as there are no nearby activities present that can affect it negatively.	Natural	<p>Ephemeral shallow drainage line without well-defined stream channel.</p> <ul style="list-style-type: none"> <li>Sandy bed and banks with intermittent bedrock in places.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing road crossing at this site.</li> <li>Morphology is natural upstream and downstream of the site.</li> </ul>	Largely modified
06	<p>Ephemeral surface flow only after rain.</p> <ul style="list-style-type: none"> <li>Flow volume is significantly increased as result of a leak in the existing pipeline at this point.</li> </ul>	Largely Modified	Water quality will be largely natural as there are no nearby activities present that can affect it negatively.	Natural	<ul style="list-style-type: none"> <li>Ephemeral shallow drainage line without well-defined stream channel.</li> <li>Sandy bed and banks.</li> <li>All aspects of the water course morphology have been extensively modified to allow for the existing road crossing at this site.</li> <li>Extensive erosion as result of leaking pipeline at this site and downstream thereof.</li> <li>Morphology is natural upstream of the site.</li> </ul>	Largely modified

Site Ref no	Vegetation	PES Rating	Fauna	PES Rating
01	The vegetation structure has been modified in the historic past as result of the construction of the road and residential area nearby. Invasive alien vegetation and weeds is dominant. <u>Riparian vegetation:</u> Only shrubs present: <i>Ludwigia, Pilostigma Trema orientalis</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara, Tecoma stans, Amaranthus viridus, Ricinus communis, Morus alba</i> <u>Sensitivity:</u> No sensitive features or taxa present.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing road crossing. Habitat is irreversibly modified on site and in the surrounding area. <u>Terrestrial:</u> Habitat is severely modified and not important to fauna. <u>Aquatic:</u> Water quality is poor and aquatic fauna assemblage will be impoverished as result thereof. <u>Sensitivity:</u> No sensitive features are present. Due to the above reasons this site is not important to fauna.	Seriously modified
02	The vegetation structure has been modified in the historic past as result of the construction of the pipeline. The vegetation has been totally removed to the extent of >10m on the banks. Riparian vegetation is intact up- and downstream of the site and includes large specimens of <i>Diospyros</i> and <i>Ficus sycomorus</i> . <u>Riparian vegetation:</u> <i>Diospyros, Ficus sycomorus, Bauhinia galpinii, Acacia schweinfurthii, Dichrostachys cinerea</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara, Psidium guajava, Tecoma stans, Amaranthus viridus, Ricinus communis</i> . <u>Sensitivity:</u> No sensitive features or taxa present.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing pipeline crossing. Habitat is irreversibly modified on site but still relatively intact up- and downstream thereof. <u>Terrestrial:</u> The riparian vegetation (large trees will be important to birds and primates but the fauna assemblage can be expected to be impoverished due to the location within the township. <u>Aquatic:</u> Water quality is poor and aquatic fauna assemblage will be impoverished as result thereof. <u>Sensitivity:</u> No sensitive features are present. Due to the above reasons this site is not important to fauna.	Seriously modified
03	The vegetation structure has been modified in the historic past as result of the construction of the pipeline. The vegetation has been totally removed to the extent of 10m on the banks. Riparian vegetation is intact up- and downstream of the site. Vegetation benefits from water leaking from the reservoir. <u>Riparian vegetation:</u> <i>Tricilia emetica, Acacia karroo, Trema orientalis</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara, Tecoma stans, Amaranthus viridus, Ricinus communis, Acacia ataxacantha</i> . <u>Sensitivity:</u> No sensitive features or taxa present. <i>Sclerocarya birrea</i> is present.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing pipeline crossing. Habitat is irreversibly modified on site but still relatively intact up- and downstream thereof. <u>Terrestrial:</u> Although the site has been cleared of vegetation the riparian zone up- and downstream of the site will still be important to terrestrial fauna. Habitat is severely modified and not important to fauna. <u>Aquatic:</u> The water level is extremely low and is not regarded to be important to fauna. <u>Sensitivity:</u> No sensitive features or taxa are present.	Moderately modified
04	The vegetation structure has been modified in the historic past as result of the construction of the pipeline. The vegetation has been totally removed to the extent of 7m on the banks. Riparian vegetation is intact up- and downstream of the site. <u>Riparian vegetation:</u> <i>Diospyros, Lannea discolor, Terminalia sericea, Peltophorum africanum, Dichrostachys cinerea</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara</i> . <u>Sensitivity:</u> No sensitive taxa were recorded. <i>Sclerocarya birrea</i> is present.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing pipeline crossing. Habitat is irreversibly modified on site but still intact up- and downstream thereof. <u>Terrestrial:</u> Although the site has been cleared of vegetation the riparian zone up- and downstream of the site will still be important to terrestrial fauna. Habitat is severely modified and not important to fauna. <u>Aquatic:</u> Habitat is limited due to the ephemeral nature of the stream. No fish or permanent invertebrate species are expected. <u>Sensitivity:</u> No sensitive features or taxa are present.	Moderately modified
05	The vegetation structure has been modified in the historic past as result of the construction of the pipeline. The vegetation has been totally removed to the extent of 7m on the banks. Riparian vegetation is intact up- and downstream of the site. <u>Riparian vegetation:</u> <i>Terminalia sericea, Dombeya rotundifolia, Dichrostachys cinerea, Albizia versicolor, Peltophorum africanum</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara</i> . <u>Sensitivity:</u> No sensitive taxa were recorded.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing pipeline crossing. Habitat is irreversibly modified on site but still intact up- and downstream thereof. <u>Terrestrial:</u> Although the site has been cleared of vegetation the riparian zone up- and downstream of the site will still be important to terrestrial fauna. Habitat is severely modified and not important to fauna. <u>Aquatic:</u> Habitat is limited due to the ephemeral nature of the stream. No fish or permanent invertebrate species are expected. <u>Sensitivity:</u> No sensitive features or taxa are present.	Moderately modified
06	The vegetation structure has been modified in the historic past as result of the construction of the pipeline. The vegetation has been totally removed to the extent of 7m on the banks. Riparian vegetation is intact up- and downstream of the site. Vegetation benefits from water leaking from the pipeline. <u>Riparian vegetation:</u> <i>Olea europeae, Terminalia sericea, Peltophorum africanum, Acacia davyi, Dichrostachys cinerea</i> . <u>Weeds &amp; Alien vegetation:</u> <i>Lantana camara, cultivated crops</i> . <u>Sensitivity:</u> No sensitive taxa were recorded. <i>Sclerocarya birrea</i> is present.	Extremely modified	Terrestrial and aquatic habitat and connectivity is affected by the existing pipeline crossing. Habitat is irreversibly modified on site but still intact up- and downstream thereof. <u>Terrestrial:</u> Although the site has been cleared of vegetation the riparian zone up- and downstream of the site will still be important to terrestrial fauna. Habitat is severely modified and not important to fauna. <u>Aquatic:</u> Habitat is limited due to the ephemeral nature of the stream. No fish or permanent invertebrate species are expected. <u>Sensitivity:</u> No sensitive features or taxa are present.	Moderately modified



The methods used to determine the PES for each component are based on DWAF's rule-based models (Kleynhans and Louw, 2006). The results of the different physical, biological, bacteriological, chemical and ecological components that were assessed in the previous sections are integrated to determine the present ecological state (PES) as well as an integrated state, the EcoStatus.

Although the total extent of the watercourses have not been assessed during this investigation the specific sites where the activities will take place are found to have been altered in the past from its natural / reference condition mainly by loss of vegetation and the loss of natural biota. The PES all of the sites is considered to be *Largely modified*.

### **5.5.3 Ecological Importance and Sensitivity (EIS) and functions**

The main function of these watercourses are erosion control as they were formed to function as the natural drainage channel for the sub catchment in order to collect the rain and storm water from the catchment surface and first and second order tributaries to form a third order stream. In their reference condition it presents a channel with stable features that can manage relatively large volumes of fast flowing water at times of heavy or continuous downpours. These watercourses are not considered to be important for any ecological purpose or maintenance of biodiversity due to its relative small size and the degraded state of the ecosystem and surrounding environment and it is of *Low ecological importance and sensitivity*.

### **Conclusion**

No sensitive environments or ecosystems were identified that will be affected by the proposed activities. Although the KNP is located a short distance to the east it is not anticipated that this protected area will be negatively affected by the activity if the necessary mitigation measures are followed.

## **5.6 Cultural and Historical Features**

No sites of cultural or historical importance were found during the site visit that was conducted. The proposed line will be alongside the existing line within or close to existing roads and/or tracks. The new reservoir is on top of a mountain that has already undergone transformation due to the existing reservoir and telecommunication mast.

If any sites of cultural significance or heritage importance or graves are discovered during the construction period, work in the vicinity must cease immediately in that area and an investigation launched.

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) states that when the construction of linear activities exceeding 300m in length is planned the responsible authority must be notified.

## **5.7 Social characteristics**

The Northern Nsikazi and surrounding area is characterised with rural settlements and vast open mountainous areas.

The areas to be serviced by the bulk distribution network are high density rural residential townships characterised by a low socio-economic level.

## **6. Public Participation Process**

### **6.1 Introduction**

In order to afford the Interested and Affected Parties (I&AP's) the opportunity to become involved and be part of the process the following public participation process was followed. During the process I&AP's are provided with the opportunity to raise issues of concern that will be recorded and included in the environmental impact assessment.

### **6.2 Identification of Interested and Affected Parties**

Effort was made to identify and register interested and affected parties before the application was submitted. This included people who may be affected by the activity e.g. adjacent or nearby landowners, downstream water users, environmental organisations as well as relevant authorities (Refer to Appendix 5A for the list of I&AP's).

### **6.3 Newspaper and Site Notices**

Three site notices were placed on 24 June 2015 along the alignment of the pipeline in the Nyongane township and at the reservoir where the project will end. The notices informed the public and potentially affected parties of the project, EIA process and opportunity to register. No responses were received.

A notice in the prescribed format was placed in the Mpumalanga News of 16 July 2015 to inform potentially interested parties of the process as well as the availability of the BA report (Refer to Appendix 5B).

Note that at the time the notices were placed the information that was provided by the engineers was that the internal diameter of the pipeline is 700mm. The information that was communicated to the public in the BA report indicated a slightly different diameter (nominal diameter of 900mm and a varying internal diameter of 800-850mm). This is not a significant issue in terms of the impact assessment that is included in the report. The information was not intentionally misleading and no comments were received from the I&AP's on the content of the report.

### **6.4 Public Participation Meeting**

A public participation meeting was not scheduled.

If the response from the I&AP's to the BA report deemed it to be necessary and issues could not be resolved through direct consultation, a meeting would be scheduled to discuss issues and concerns raised by the parties.

No such comments were received.

### **6.5 Basic Assessment Report**

The Basic Impact Assessment (BA) report comprises an overview of the assessment of the proposed project in the detail available and an outline of the identified issues and potential concerns.

The assessments and findings of the specialist studies have been included in the BA report.

The environmental impacts of the proposed development has been assessed and rated and mitigation and management measures were defined in this report.

The BA report was made available to the Interested and Affected Parties including State Departments and the Competent Authority for a commenting period of 30 days in accordance with Chapter 6 of the 2014 EIA Regulations.

No comments on the content of the report or proposed project were received. The Mpumalanga Tourism and Park Agency indicated that they have no objection. Mitigation must aim to minimise impacts and alien plants within the footprint must be controlled.

A representative of the Kruger National Park indicated that they are of the opinion that the water authorities must be informed, which was done. Refer to Appendix 5C for the correspondence and letters.

No other issues were received or raised from any of the identified parties.

If any comments resulted in substantial amendments to the contents of the BA report other than to just include the comments received, the report would have been made available for another period of review before submission to the MDARDLEA.

## **6.6 Environmental Authorisation**

On review of the information submitted the Department will either decide to grant or deny Environmental Authorisation for the proposed activities. If authorisation is granted the Environmental Authorisation would include conditions that would apply to the activities.

The Authorisation or decision will be communicated to all registered I&AP's as soon as received from MDARDLEA.

## **6.7 Authority Liaison**

An application with the relevant documentation was submitted to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs for the undertaking of a Basic Impact Assessment process in July 2015 (Ref: 1/3/1/16/1 E - 11).

A site visit with the MDARDLEA official will be conducted on request and such a visit would serve to investigate the sites, discuss the proposed concept and to identify and discuss any issues the Department would like to be addressed through the process.

## **7. Environmental Legislation and Policy applicable to this activity**

### **7.1 The National Environmental Management Act, 1998 (Act no.107 of 1998)**

The Basic Environmental Impact Assessment is undertaken in terms of the EIA regulations, R982, R983 and R985 as published under Section 24(5) 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The activities requiring a Basic Assessment Process are as follows:

R.983, 2014: Activity 9 - The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water-

(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where-

(a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or (b) where such development will occur within an urban area.

R.983, Activity 12 - The construction of: (xi) infrastructure or structures with a physical footprint of 100 square metres or more where such construction occurs (a) within a

watercourse (b) in front of a development setback or (c) if no development setback exists within 32 metres of a watercourse, measured from the edge of a watercourse.

R.983, Activity 19 - The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from (i) a watercourse - but excluding where such infilling, depositing, dredging, excavation, removal or moving a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or c) falls within the ambit of activity 21 in this Notice in which case that activity applies.

R.985, 2014: Activity 2 - The development of reservoirs for bulk water supply with a capacity of more than 250 cubic metres, outside urban areas in Mpumalanga within (ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.

R.985, 2014: Activity 14 - The development of- (xii) infrastructure or structures with a physical footprint of 10 square metres or more, where such construction occurs (a) within a watercourse (b) in front of a development setback or (c) if no development setback exists within 32 metres of a watercourse, measured from the edge of a watercourse, outside urban areas in Mpumalanga within (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA.

Consultation with the Department resulted in the expansion activities to be removed.

As required by the EIA regulations an Environmental Authorisation from the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) would be required before the activities could commence.

## **7.2 The National Water Act, 1998 (Act no. 36 of 1998)**

The stream crossings will specifically entail water use activities. In terms of the National Water Act a license would be required:

- 21(c) Impeding or diverting the flow of water in a watercourse and
- 21(i) Altering the bed, banks or characteristics of a watercourse.

A Section 21(a) application will also be submitted for the abstraction of water from the river to the water treatment works.

The report will be made available to the Department of Water and Sanitation for their review and comment. A separate application must be submitted to the Department of Water and Sanitation for the licencing of all relevant water uses.

## **7.3 Other relevant legislation**

### **Legislation aimed at the protection of natural resources:**

- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)
- Conservation of Agricultural Resources Act (Act No. 43 of 1983)
- The Environment Conservation Act, 1989 (Act No. 73 of 1989)
- The National Water Act, 1998 (Act No. 36 of 1998)
- The Mpumalanga Conservation Act, 1998 (Act No. 10 of 1998)

- The National Heritage Resources Act, 1999 (Act no.25 of 1999)
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- National Environment Management: Waste Act, 2008 (Act No. 59 of 2008)

The main objective of the legislation listed above is to ensure a safe and healthy environment as well as the sustainable use of natural resources.

The activity can comply with the mentioned legislation by means of the applicant having to apply for the necessary licences authorisations and permits in terms of the applicable legislation.

The Mpumalanga Conservation Act, 1998 and NEMBA, 2004 pertaining to biodiversity were also taken into consideration by the specialist that conducted the biodiversity assessment. The site is however impoverished and no species of conservation importance was confirmed to occur on the site. The potential species have however been listed and the impact assessment prescribes mitigation measures.

On request of the Rand Water, a Phase 1 Heritage Impact Assessment was conducted and the findings of the survey and report indicated no heritage resources on the proposed route of the pipeline. The mitigation measures were added to the EMP. Refer to Appendix 8 for the HIA report.

**Other legislation that may in general be relevant to the proposed activity includes:**

- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965)
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)
- The Constitution, 1996 (Act No. 108 of 1996)
- The Water Services Act, 1997 (Act No. 108 of 1997)
- Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
- National Environment Management: Waste Act, 2008 (Act No. 59 of 2008)

## **8. Infrastructure Requirements**

The proposed project is an expansion of existing infrastructure. There is a small service road along the existing line. The proposed line will not tap off to any reservoirs between the points from the Sabie River pumpstation, Nyongane Water Treatment Works and the Numbi reservoir. There are existing roads, dirt roads or tracks in the close vicinity of the existing line and proposed alignment. The southern section of the line from after the Nyongane Township to the reservoir may require the widening of the existing track to make the area accessible.

There is a current water use licence to withdraw 22MI of water from the Sabie River. Additional water is being applied for in order to increase the volume of treated water that will come from the Hoxani Water Treatment Works. The applicant and project implementer, Rand Water already met with the Dept. of Water and Sanitation and it was indicated that if needed, water could be released from the Nyaka Dam. The necessary applications will be submitted to the DWS.

The proposed activities will involve the use of cement and concrete. The removal of any solid waste generated during and as a result of the construction period would be the responsibility of the contractors. It should be removed to the nearest landfill site in a responsible manner and on a regular basis.

## 9. Environmental Issues and Potential Impacts

### 9.1 Assessment Methodology

The activities associated with the project will bring about certain aspects for example dust emissions, effluent etc. Aspects in turn interact with and have negative impacts on the receiving environment (e.g. air, water, soil, fauna and flora, heritage, society, economy).

Impacts have certain consequences on the receiving environment and these needs to be identified and mitigated to ensure that the effects are prevented, minimised and/or controlled.

The potential impacts are assessed under the different receiving environments.

The following criteria and rating mechanism is used for the evaluation of significance of potential environmental impacts.

**Table 6: Impact Assessment Rating Criteria**

Nature of Potential Impact	Rating or Category	Description of Impact on the Environment
<b>Extent</b>	Site	Limited to the site and its immediate surroundings
	Local	Up to 5km from the project site
	Regional	Beyond 5km of site. Up to 20km radius from the project site
	Provincial/National	Will affect beyond 20km from the site
<b>Duration</b>	Short term	0 - 5 years. Construction and early operation.
	Medium term	Operational phase or up to 25 years
	Long term	Operational phase and longer than 25 years
	Permanent	Impact will continue after the operational phase
<b>Intensity</b>	Very low	Limited damage to a small area. Natural, cultural or social functions or processes are not affected/negligible.
	Low	Where the affected environment is altered but natural, cultural or social functions or processes are only marginally affected.
	Medium	Natural, cultural or social functions or processes is notably altered but can continue although in a modified way.
	High	Where the natural, cultural or social functions or processes are severely altered to the extent that they temporarily/permanently cease.
	Very high	Where the natural, cultural or social functions or processes are altered in such a way that they will permanently cease. Irreparable damage.
<b>Probability</b>	Unlikely	Less than 20% probability that impact may occur.
	Probable	There is a good chance that the impact may occur.
	High Probability	It is most likely that the impact will occur, more than 50% probability that impact may occur.
	Definite	More than 90% probability that impact may occur.
<b>Significance</b>	Very low	Impact likely to be very low and mitigation is not required.
	Low	Impact likely to have little real effect OR Mitigation is easily achieved or little will be required.
	Medium	Moderate impact and could influence decision if not mitigated OR Mitigation is both feasible and fairly easily possible. Modification of the project design or alternative action may be required.
	High	Mitigation essential to reduce to acceptable level OR Mitigation difficult, time-consuming and/expensive and it may affect the decision to continue or approve.

	Very High	No possible mitigation or mitigation is extremely difficult, time consuming and/or expensive OR the Decision to approve will be affected.
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Environmental impacts are assessed with reference to the nature, extent, duration, intensity and probability of identified impacts. The significance of the potential impact is a qualitative assessment based on the rating of the different criteria. The significance of impacts before and after mitigation will be indicated in the report. The assessment also needs to make mention of the reversibility of identified potential impacts and

## 9.2 Environmental Concerns and Potential Impacts

This section identifies and assesses the environmental issues and potential impacts of the proposed activities.

No impacts are expected during the operation of the infrastructure and decommissioning of any of the infrastructure related to the distribution network is not foreseen in the near future. Where such impacts may potentially occur it will be addressed under the specific impact.

Table 7: Impact summary

Impact description	Period	Extent	Duration	Intensity	Probability	Significance pre-mitigation	Significance post mitigation
Air (dust) pollution	Construction	Local	Short	Low	Probable	Low	Very Low
Erosion and sedimentation	Construction	Local	Short	Medium	Probable	Medium	Low
Soil contamination	Construction	Local	Short	Medium	Probable	Medium	Low
Erosion and sedimentation	Operation	Local	Long	Medium	Unlikely	Medium	Low
Changes in morphology, loss of function	Construction	Local	Long	Medium	High	Medium	Low
Changes in hydrology, water quality, quantity	Construction	Local and downstream	Long	Medium	Probable	Medium-High	Low
Pollution of riparian zone and streams	Construction	Local	Short	Medium	High	Medium	Low
Loss of habitats and biodiversity	Construction	Local and downstream	Long	Medium	Probable	Medium	Low
Loss of vegetation	Planning and design, construction	Site	Medium	Low	Definitely	Medium	Medium
Reduction of threatened vegetation type	Planning and design	Regional	Medium	Low	Probable	Medium	Low
Loss of important floral species	Planning, construction	Site	Permanent	Medium	High	Medium	Low
Invasion of weeds and alien vegetation	Construction	Site	Long	High	High	Medium	Low
Changes to and fragmentation/loss of habitat and connectivity	Planning and Construction	Site	Medium	Medium	High	High	Low
Loss of conservation important plants /animals through illegal harvesting	Construction	Site	Permanent	Medium	Probable	Medium	Low
Impoverishment of ecological support areas and KNP	Construction	Regional	Long	Medium	Unlikely	Medium	Low
Sabie River – Nyongane alternative:							
Loss of important floral species	Planning, construction	Site	Permanent	Medium	High	Medium	Medium

Changes to and fragmentation/loss of habitat and connectivity	Planning and Construction	Site	Permanent	Medium	Definitely	High	Medium
Impoverishment of ecological support areas	Construction	Regional	Long	Medium	Unlikely	Medium	Low
Visual impact (pipeline)	Construction	Local	Short	Low	Probable	Low	Very Low
Visual impact (reservoir)	Construction	Regional	Long	Low	High	Medium	Low
Noise and vibration	Construction	Local	Short	Low	High	Medium	Low
Increase of traffic /disruption of traffic flow	Construction	Local	Short	Low	High	Low	Very Low
Socio-economic impact (+)	Construction	Regional	Short	Medium	High	Medium	Medium(+)
Social impact (-)	Construction	Local	Short	Low	Probable	Medium	Low
Socio-economic impact (+)	Operation	Regional	Long	Medium	High	High	High (+)
Health, Safety and Security impact	Construction	Local	Short to medium	Medium	High	Medium	Low

## Biophysical impacts

### 9.2.1 Topography

The proposed activities will not change the topography of the area. The water pipeline will be underground. The new reservoir will also not change the topography. The impact is not of significance and no mitigation is proposed.

### 9.2.2 Air quality

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Air (dust) pollution	Construction	Local	Short	Low	Probable	Low	Very Low

#### **Construction:**

The clearing of vegetation and earthworks (excavations, infilling) and movement of construction vehicles during the construction of the pipeline and proposed reservoir is expected to result in dust emissions.

The impact cannot be prevented but can be mitigated. The potential for impact will be for a short duration of time only and it will not result in the irreversible loss of any resources. The impact is expected to be of low significance because it is mainly a linear activity that will traverse through only one built up area.

Mitigation measures must include:

- Accidental fires should be prevented at all cost.
- Burning of vegetation and trees that was cleared for construction is not allowed.
- Dust suppression measures must be implemented by the contractors during the construction period to reduce dust emissions, if required.
- Trenches must be backfilled progressively and compacted to the same density as the surrounding environment.
- Exposed soil surfaces must be appropriately stabilised as soon as practically possible, removed vegetation can be spread over exposed surfaces to encourage the re-establishment of natural vegetation.
- Speed limits for construction vehicles on-site must be implemented.



### 9.2.3 Geology and soil conditions

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Erosion and sedimentation	Construction	Local	Short	Medium	Probable	Medium	Low
Soil contamination	Construction	Local	Short	Medium	Probable	Medium	Low
Erosion and sedimentation	Operation	Local	Long	Medium	Unlikely	Medium	Low

#### **Existing impacts and planning:**

Some of the existing pipeline crossings over streams/drainage lines are leaking at the specific localities. This causes some erosion and at one stream crossing (06) in particular the leak has resulted in a small donga on the downstream side of the pipe. The engineer indicated that these leaks will be fixed and where severe erosion has occurred, it will be addressed. The cleared track that follows the alignment of the existing line also shows signs of erosion in some sections.

The soil may require some engineering along the bedding of the pipeline which must be incorporated into the planning and design of the infrastructure.

#### **Construction:**

The activities will entail that vegetation are removed and excavations and infilling of soil take place during construction which will create disturbed and hardened soil surfaces. This may result in erosion, specifically along the sections where hardened surfaces and/or erosion already exist due to the existing line and across water resources. This may also happen around the site of the new reservoir as it will be constructed on an area with steep slopes.

Erosion can have indirect impacts and extend into other areas over time and result in the modification of terrestrial as well as aquatic habitats.

The lack of proper onsite stormwater management practices during the construction and installation of bulk infrastructure may result in soil erosion, loss of topsoil and transportation of silt towards and into watercourses.

Oil and diesel spillages as well as uncontrolled concrete preparation and spillages may also cause soil contamination.

The impacts are of medium significance before mitigation as it may be of a cumulative impact and can result in the loss of topsoil and impacts on the downstream environment.

Mitigation measures may include:

- Limit disturbances to the demarcated construction areas.
- Corrective actions have to be taken as and when required to stop existing erosion in immediate vicinity of the alignment (caused by leaks etc. of existing pipe). The erosion currently associated with the existing alignment must be addressed.
- Maintain erosion preventative structures on a continual basis.
- Should cracking or localised blasting be required, the rock removed from the area must be used for fill in other areas where required and not spoiled in other natural areas or water resources.
- Refueling of construction vehicles/equipment, mixing of cement and/or concrete must be undertaken at dedicated areas only on impermeable and bunded surfaces.
- Stabilise disturbed soil surfaces as soon as practically possible.

### 9.2.4 Surface water and Aquatic Ecology

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Changes in morphology, loss of function	Construction	Local	Long	Medium	High	Medium	Low
Changes in hydrology, water quality, quantity	Construction	Local and downstream	Long	Medium	Probable	Medium-High	Low
Pollution of riparian zone and streams	Construction	Local	Short	Medium	High	Medium	Low
Loss of habitats and biodiversity	Construction	Local and downstream	Long	Medium	Probable	Medium	Low

#### **Existing, planning and construction:**

The proposed activities will entail disturbances to the streambeds and banks as the pipeline will be placed underground and trenching and backfilling will be required. This will also impact on the riparian zones of each stream. Concrete work will also take place within the stream banks and there is a risk that oil and diesel spillages from vehicles and construction equipment could pollute surface water. Where streamflow is present the activities may require the temporary diversion or damming of the natural streamflow. These activities may result in impacts on the morphology of the streams that could be of a high significance if not executed with care and mitigation is not implemented.



**Existing stream crossing and impact due to leakage**

These disturbances may also result in erosion and sedimentation and affect water quality and quantity of the different resources. As mentioned, the pipeline leaks at many of the existing stream crossings and artificially feeds some drainage lines that would otherwise not have as much flow. At one crossing specifically it resulted in the formation of an erosion donga.

Some of the crossings have been adversely affected by the construction of the existing pipeline and as pointed out in the specialist report it resulted in the removal and loss of riparian vegetation as far as 7-10 m in extent on the banks of the streams in the vicinity of the existing crossings. The riparian vegetation is at most streams however still intact up and downstream of the crossings. The proposed alignment is in close proximity to the existing line and it should not result in the removal of much riparian vegetation, especially not where large trees are present.

The aquatic habitats was fragmented and affected by the existing pipeline crossings and general quality of the water as well as upstream activities.

The identified impacts may further result in a loss of aquatic habitat and potentially a loss of aquatic biota although none of the sites were identified as important to aquatic fauna.

Some of the identified streams/drainage lines have a high presence of alien invader plants. The further disturbances to the stream beds and banks may result in the increase in the invader plants. The specialist identified the spreading of invasive vegetation to potentially also impact on the downstream reaches (including the KNP) of the watercourses.

As abstracted from the specialist report it was concluded that the six watercourses that were assessed are *Largely modified* and of *Low* sensitivity and the proposed installation of the additional pipeline at the existing watercourse crossings will not compromise the PES of the watercourses. It may in fact improve the PES if the mitigation measures are followed. Furthermore, the construction and completed sites will have a relatively small footprint and although the watercourses will be negatively affected at site level during the construction of the pipe line (short term) it is not anticipated that any impacts will have long term consequences. The PES and EIS of the affected water courses will not be affected negatively by the proposed activities if the recommendations and mitigation measures are followed.

The impacts are of a **medium to high significance** before mitigation but can all be mitigated to be of a low significance. As water resources are sensitive environments and already impacted by the existing infrastructure, the impacts could be of a cumulative nature. The impacts are reversible and are not expected to result in the irreplaceable loss of the identified aquatic habitats or associated environments. The existing impacts for example the loss of riparian vegetation cannot be rectified but further impacts can be avoided.

Mitigation measures must include but is not limited to at least the following:

- The pipeline must be installed underground in order not to impede any surface flows.
- Minimise the footprint of disturbances to streambeds and banks. Construction activities must be strictly controlled.
- Vegetation clearance and trenching across water resources must not take place more than a week before the construction activities in these areas commence in order to prevent unnecessary erosion and sedimentation and the collection of run-off trench water which has high sediment content.
- No riparian trees such Jackalberries or Ficus sp. may be removed. If this is required, the alignment must be amended accordingly.
- Slope/bank stabilisation measures must be implemented where necessary, to prevent erosion.
- Carefully control all on-site operations that involve the use of cement or concrete.
- Prevent spillages and the discharge of water containing polluting matter or visible suspended materials into the streams. Encourage the infiltration of unpolluted surface water into the ground where possible.
- Contain fuel, oil or chemical spills, and arrange clean up in the event of spillage.
- Prevent the creation of erosion prone construction sites which may cause sedimentation and surface water pollution. Erosion and siltation measures should be implemented (e.g. the use of temporary silt traps downstream of construction areas).
- Construction activities and associated onsite stormwater management must not result in an increased or concentrated water flow that may cause erosion.
- Surface and storm water management most appropriate for the receiving environment must be implemented from the start of construction (use energy dissipation etc.) to avoid damage to the receiving environment at the discharge point.
- Structures such as gabions or other energy dissipating structures may be required where the drainage lines already show signs of erosion and incision and to further reduce the velocity of peak flows from surface and storm water runoff.
- Engineering designs, methods and specifications should be strictly adhered to.

- Rehabilitation of affected areas around the stream crossings must be done and any alien vegetation that established during the construction period must be removed.
- The sites must be monitored after completion to identify and correct signs of erosion.
- Construction within water resources must take place during low flow periods. Where this is not possible, flows should only be partially obstructed (coffer dam with pipe). Restore flow after construction.
- The pipeline must be inspected regularly for leaks and if any are detected it must be repaired immediately.

### 9.2.5 Terrestrial ecology

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Loss of vegetation	Planning and design, construction	Site	Medium	Low	Definitely	Medium	Medium
Reduction of threatened vegetation type	Planning and design	Regional	Medium	Low	Probable	Medium	Low
Loss of important floral species	Planning, construction	Site	Permanent	Medium	High	Medium	Low
Invasion of weeds and alien vegetation	Construction	Site	Long	High	High	Medium	Low
Changes to and fragmentation/loss of habitat and connectivity	Planning and Construction	Site	Medium	Medium	High	High	Low
Loss of conservation important plants /animals through illegal harvesting	Construction	Site	Permanent	Medium	Probable	Medium	Low
Impoverishment of ecological support areas and KNP	Construction	Regional	Long	Medium	Unlikely	Medium	Low

The first section of the proposed pipeline and through the Nyongane township area will mostly traverse transformed areas. From there the line will traverse more undeveloped areas but already affected by the construction of the existing line. It will however result in the removal of indigenous vegetation including trees and shrubs. A small additional footprint to the east of the existing line can be expected.

The reservoir will result in the removal of a footprint of approximately 3000 m<sup>2</sup>. The total site will be cleared and this will entail the removal of trees which may include conservation important species.



The clearing of areas and disturbance of ground surfaces may also create more favourable conditions for the increased invasion of alien plants into the undeveloped areas.

The specialist study summarises the impact as follows: The single most important impact on biodiversity is the loss and fragmentation of natural habitats which has already occurred on a large extent of the study area site as result of the establishment of residential areas and farming practices. This impact leads to the loss of living space (habitat) for animals and natural vegetation alike. Furthermore, the integrity and size of the ecological corridors and support areas represented on the affected area may be negatively affected. However, it is apparent that the route for the pipeline has already been subject to vegetation clearing since the establishment of the existing pipeline and furthermore, the relative small ecological footprint of the linear activity will limit the loss of additional vegetation to an acceptable level. It can be mitigated to a medium level if appropriate planning and management principles are practised by the planning team and contractor. The activity will not have a significant impact on ecological support areas, corridors or the KNP if the proposed mitigations given are implemented.

The removal of vegetation would be permanent and not reversible. The proposed activities are however unlikely to result in the irreplaceable loss of any of the potentially occurring conservation important species or the identified vegetation types.

The alternative from the Nyongane Water Treatment Works through Nyongane is not expected to result in impacts with a higher significance than assessed above.

Sabie River – Nyongane alternative							
Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Loss of important floral species	Planning, construction	Site	Permanent	Medium	High	Medium	Medium
Changes to and fragmentation/loss of habitat and connectivity	Planning and Construction	Site	Permanent	Medium	Definitely	High	Medium
Impoverishment of ecological support areas	Construction	Regional	Long	Medium	Unlikely	Medium	Low

Sabie River - Nyongane alternative:

The alignment of the proposed line east of the existing line from the Sabie River to the Nyongane Water Treatment Works will result in the traversing of a rocky outcrop. This would

require blasting and high significance impacts on this specific terrestrial habitat. The footprint will also be larger than if the line is just aligned to the west of the existing line and impacts would be more difficult to mitigate.

The following mitigation measures should be implemented but is not limited to:

- The proposed pipeline must be aligned as close to the existing pipeline and already cleared or transformed areas as possible.
- Vegetation clearance should be kept to a minimum. Limit the width of clearance in order to do excavations and trenches as far as possible.
- The reservoir footprint must be clearly demarcated and clearance of vegetation must be strictly limited to the footprint. The surrounding transformed areas should be used for material laydown etc.
- Where possible, avoid the removal of large trees, especially those of conservation importance.
- Prior to vegetation clearing conservation-important plants should be identified within the impact footprints and relocated to adjacent representative habitat if possible. This should be done under the supervision of an experienced botanist/horticulturist.
- Obtain the necessary permits and licences from DAFF or MTPA for the relocation or destruction of any protected trees or plants or animals.
- Plant resources that are being destroyed through vegetation clearing during construction, such as firewood and medicinal plants, should be made available to local communities.
- Collection of firewood or any other plant resources is prohibited.
- No wild animals may under any circumstances be handled, removed, injured or killed. Contact the ECO to assist if removal is required.
- Reptiles and/or subterranean vertebrates that are unearthed during construction must be allowed to escape to the surrounds or must be relocated by a specialist.
- Evidence of poaching among construction teams should be followed up by the ECO and guilty parties should be prosecuted under the MNCA.
- The construction camp must be located in a transformed area.
- No unauthorised construction activities, development or temporary access roads must be permitted within areas other than where the alignment is approved.
- If a temporary road or widening of the track up the mountain for the last section to the reservoir site is required, the activity must be strictly monitored, the route approved by the ECO and vegetation clearance must be kept to a minimum. The area must be appropriately rehabilitated afterward.
- All reasonable steps to avoid any fires must be taken. Open fires for cooking purposes must only be permitted on site in an area demarcated for this purpose.
- Burning of cut vegetation during the site clearance should not be permitted.
- Ahead of any construction or excavation, topsoil and vegetation must be stripped and kept to be spread over effected areas on completion of construction.
- Engineering designs, methods and specifications should be strictly adhered to.
- Alien plants invading disturbed soil at construction sites must be targeted and controlled in terms of the Conservation of Agricultural Resources Act (Act No. 43 of 1983). Refer to the listed invasive exotic plants as indicated in the ecological report.
- Excavations must be inspected daily in order to rescue trapped animals. Barrier fencing must be erected as per health and safety regulations.
- The pipeline must be inspected regularly in order to detect and repair leaks to prevent erosion and the potential effects thereof on the terrestrial ecology.

**Socio-economic impacts**

**9.2.6 Aesthetic quality**

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance after mitigation
Visual impact (pipeline)	Construction	Local	Short	Low	Probable	Low	Very Low
Visual impact (reservoir)	Construction	Regional	Long	Low	High	Medium	Low

**Construction:**

The proposed water pipeline will be installed underground and it is only during the construction period that the trenching and earthworks would result in a visual impact. Above ground structures (scour valve and vents) are very small.

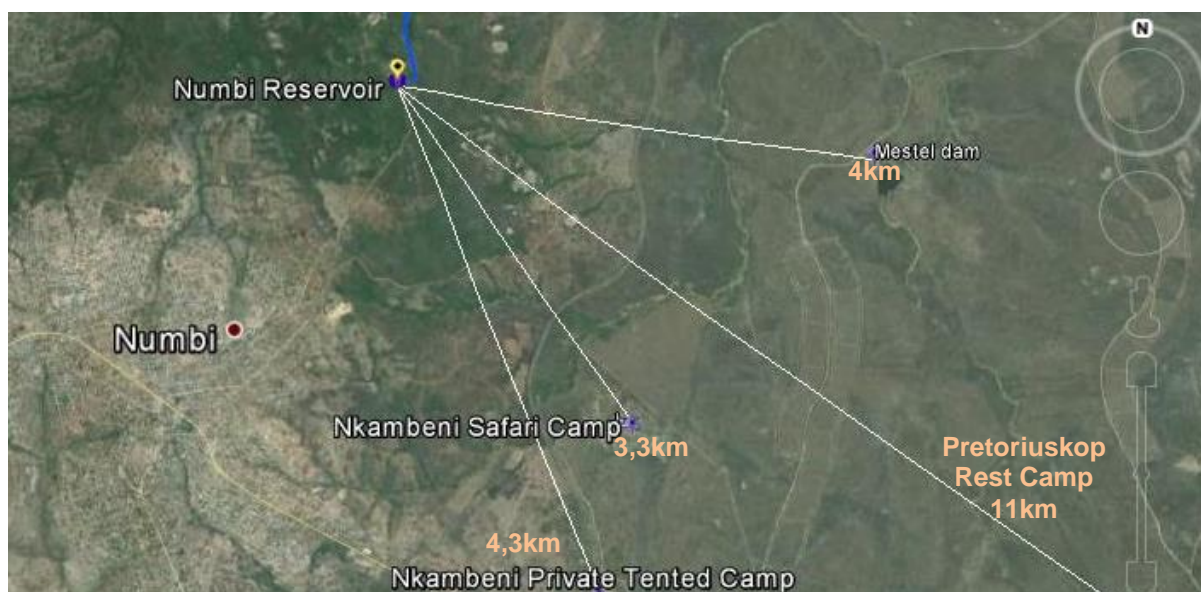
The alignment is through built up and or transformed environments and will be for a short duration of time. During construction the lack of proper site keeping and the inappropriate storage of waste may have a negative visual impact on the surrounding area.

The impact is of a low significance and is reversible.

The reservoir will however be constructed on a high point (elevated area) and due to the surrounding terrain it will likely result in a visual impact. This need to be considered as the Kruger National Park is a protected area with private rest camps located to the east of the proposed reservoir. The new reservoir may also be visible to some of the residents on the outskirts of the Numbi Township but this is a built up area and the impact will not be significant.

The entrance gate, rest camps as well as the one dam is located close to the western boundary of the Kruger National Park and one cannot expect that there would be no visual impacts from the area surrounding the park.

Four areas within the KNP were considered to form an idea of what the visual impact of the additional reservoir could be on these areas.



The existing reservoir and telecommunication mast already permanently changed the aesthetics of the area and is very likely visible from areas within the KNP. Numbi Townships,

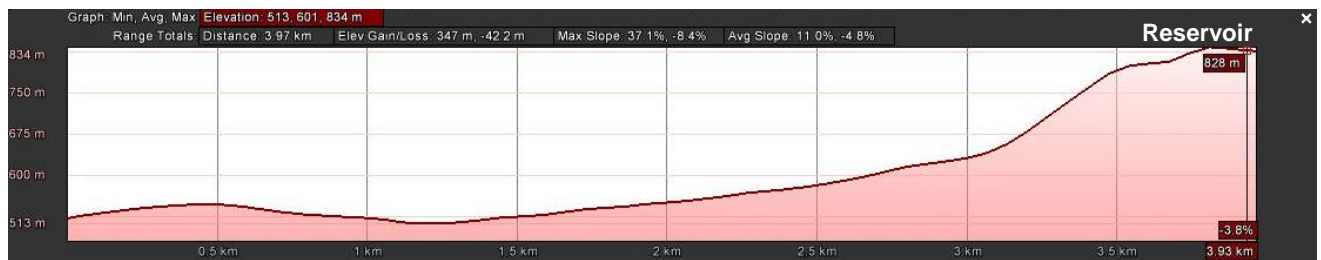
specifically the outskirts is located on the eastern slope of the mountain and should be visible from most areas within the KNP if one faces westward.

The identified areas in the KNP are mostly visitor's accommodation and it is likely already screened by natural vegetation. It is also expected that people will mostly focus on the immediate natural surrounds. The remaining vegetation which includes large trees outside of the reservoir footprint should also partly screen the structure.

The impact cannot be avoided and will be permanent but is likely to be of a low significance after mitigation although mitigation is limited.

Pretoriuskop is located 11 km southeast and the reservoir is not expected to affect any visitor's viewing from this distance.

Mestel dam is located approximately 4km east of the reservoir site and it is likely that the reservoir will be visible from this point. When tourists/visitors visit this view point they would however likely be focussed on the dam and the reservoir is expected to have little real effect on this point.



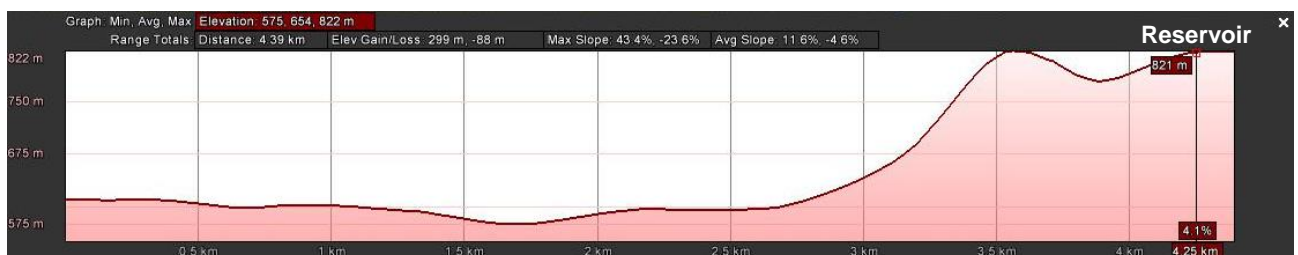
**Figure 9: Elevation profile from Mestel dam to new reservoir over distance of 4 km**

Nkambeni Safari Camp is located approximately 3,3km to the southeast of the new reservoir site and it is likely that the reservoir will be visible from this point to a degree. The landscape may lessen the significance of the potential impact.



**Figure 10: Elevation profile from Nkambeni Safari Camp to new reservoir over distance of 3 km**

Nkambeni Private Tented Camp is located approximately 4,3km to the south of the new reservoir site and it is likely that the reservoir may be visible from this point. The landscape may likely also lower the significance of the impact.



**Figure 11: Elevation profile from Nkambeni Private Tented Camp over distance of 4.3 km**



The following mitigation measures are proposed:

- The reservoir footprint must be clearly demarcated and clearance of vegetation must be strictly limited to the footprint. The surrounding transformed areas should be used for material laydown etc.
- Where possible also avoid the removal of large trees specifically surrounding the proposed reservoir site.
- The contractor/s must undertake “good housekeeping” practices during the construction phase.
- Construction sites and site ablution facilities must be screened where required.
- Appropriate site ablution facilities and waste bins must be provided for construction workers. Contractors must be forced to monitor these areas and ensure good use of such facilities.
- During the construction period all waste must be stored at demarcated areas and removed to a registered landfill site on a regular basis.
- Litter must be stored in such a manner that it does not attract animals.
- Ensure that no uncontrolled dumping or spillage of wastes of any nature take place.
- Areas affected by construction activities must be stabilised after construction. Removed vegetation must be spread over affected areas to stabilise and encourage regrowth. This includes temporary roads. Only a single track should be left along the pipeline alignment for monitoring purposes.

### 9.2.7 Noise and Vibration

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance After mitigation
Noise and vibration	Construction	Local	Short	Low	High	Medium	Low

#### **Construction:**

Noise from the construction activities during the construction period may impact on the ambient noise level of the surrounding area. The increase in people movement and the construction activities may contribute to the noise factor. The activities will be for a short duration of time and the impact is of low significance. It is difficult to mitigate noise of construction vehicles and equipment and the main mitigation measure will be allowable construction hours.

Mitigation measures are however still proposed and may include that:

- Noise should be controlled at the source. Equipment control must be used to reduce the potential impact.
- The construction activities must take place during day-time hours from 06:00 – 18:00.
- Only security personnel should be allowed on the construction site during night times. Construction workers should not stay in the construction camp but should commute on a daily basis.
- Complaints regarding noise during the construction phase must be addressed and practical measures implemented to reduce noise levels should it be required.

### 9.2.8 Traffic

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance After mitigation
Increase of traffic /disruption of traffic flow	Construction	Local	Short	Low	High	Low	Very Low

#### **Construction:**

During the proposed the construction period the flow of traffic in the immediate area of construction will increase and may impact other road users and the condition of the roads, especially as there is only one main road through Nyongane.

The construction period will be for a short duration of time and the impacts of a low significance to other road users.

Mitigation measures:

- Speed limits for construction vehicles must be enforced.
- The dirt roads and any temporary roads should be maintained.
- Heavy vehicles may not cause unnecessary obstructions on any of the public roads.

### 9.2.9 Social and Socio-economic impact

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance After mitigation
Socio-economic impact (+)	Construction	Regional	Short	Medium	High	Medium	Medium(+)
Social impact (-)	Construction	Local	Short	Low	Probable	Medium	Low
Socio-economic impact (+)	Operation	Regional	Long	Medium	High	High	High (+)

#### **Planning and Construction:**

The project will have an overall positive socio-economic impact and the activities will ensure better services delivery and high quality of potable water to the communities. It will likely result in the creation of temporary and permanent job opportunities during the construction and operational phases of the infrastructure. The consideration of using local contractors, workers and suppliers will also have a positive impact. This impact is of a high positive significance.

There are potentially negative impacts associated with the proposed construction activities such as safety, surface water pollution, impacts on ecology and visual impacts that may result in potentially negative social impacts. Impacts are of medium significance before mitigation.

Nyongane Treatment Works: A layout alternative was to align the pipeline through the township west of the tar road. This would result in direct impacts on the adjacent residents and the space to work in is limited and would have resulted in great inconvenience for people who would need to access their stands. The specific impact is of medium significance.

The preferred alignment of the pipeline is from the treatment works back across to the east of the Nyongane road where there is sufficient space to work. The pipeline will traverse the road again to the west of the road to join up with the existing pipeline alignment further south.

The following mitigation measures are proposed:

- With the implementation of the mitigation measures proposed for the assessed impacts, the social impact can be minimised to acceptable levels.
- The alignment of the pipeline must be planned to have the minimum impact on the affected and surrounding social and natural environment.
- Appoint local contractors and workers.

### 9.2.10 Health, Safety and Security

Nature of Impact	Period	Extent	Duration	Intensity	Probability	Significance before mitigation	Significance After mitigation
Health, Safety and Security impact	Construction	Local	Short to medium	Medium	High	Medium	Low

#### **Construction:**

There may be safety risks involved with the construction activities due to vehicle movements, general earthworks and excavations. In some areas construction will take place in close proximity to residents. Unauthorised access to the construction sites and specifically excavations may pose a high safety risk to the public. Construction activities may also pose a safety risk to contract workers. The on-site storage of wastes could create health, fire and safety hazards if not removed on a regular basis.

The impacts are of low significance after mitigation and with proper mitigation of the potential impacts.

During the operation there will be no potential health or safety impacts associated with the pipeline.

Mitigation may include the following:

- The restriction of movement of construction staff must be made a condition of the contractor.
- Contract labourers should not be allowed to overnight on site.
- Develop and implement a “clean construction site” programme.
- Waste must be collected in demarcated areas and regularly disposed of at the appropriate waste disposal site.
- Ensure that no on site dumping of wastes or dumping onto adjacent areas take place.
- Waste must under no circumstances be burnt on the construction site.
- Appropriate safety measures including but not limited to on- and off-site signage must be implemented and displayed during the construction period.
- Barrier fencing must be erected around excavated trenches to prevent the accidental fall of people or animals into the trenches.
- The contractors must comply with the Occupational Health and Safety Act, 1993 (Act no. 85 of 1993) during construction.
- Adequate provision should be made for ablution facilities and water for the construction staff. Placement of these facilities must be well planned. Contractors must be forced to ensure the appropriate use and maintenance of these facilities
- Engineering supervision should ensure that environmental, health and safety aspects are observed by the contractors during the construction activities on the site.

## **10. Environmental Statement and Findings**

Various potential environmental impacts were identified and considered in the BA Report.

### **10.1 The key environmental impacts identified**

- Water resources and aquatic ecology;
- Terrestrial ecology;
- Soil and erosion potential;
- Aesthetics;
- Noise and Vibration;
- Health, safety and security;
- Socio-economic.

### **10.2 Primary positive and negative impacts**

#### Positive aspects of the proposed activities:

- The proposed upgrade will positively impact on the receiving communities.
- Engineering designs will be implemented and leaks in the existing system will be fixed.
- Existing infrastructure is in place and it is possible to align the new pipeline alongside the existing line where vegetation removal, specifically at stream crossings, already took place. Further vegetation removal will result in a relatively small ecological footprint.
- The reservoir will be located on a site where the aesthetics have already been changed.
- The engineers confirmed that there will be enough space to construct the reservoir at the proposed site.
- The alignment of the water pipeline can be implemented to avoid the removal of large indigenous trees. It is a linear activity and the footprint is small.
- The pipeline will be underground and most of the potentially negative impacts are expected during construction for a short duration of time.
- Potentially negative impacts can be mitigated.

#### Negative aspects of the proposed activities:

- Temporary tracks may be required to access the areas, specifically the southern section and this would entail additional vegetation removal.
- There are six crossing proposed over streams/drainage lines which are sensitive environments already impacted by the existing infrastructure.

### **10.3 Assumptions and uncertainties**

The environmental assessment practitioner accepts that the information contained in this report as provided by the applicant and professional consultants is true and accurate.

To make an assessment of the potential impacts the EAP took into account the findings of the specialists. The EAP also depends on the opinions and feedback from the Interested and Affected Parties and State Departments during the commenting period provided.

There are no major gaps in knowledge regarding the description of the current state of the environment including the potential impacts on water resources and other environmental aspects. All sensitive environments were identified and appropriate mitigation measures were identified. The recommendations of the specialist study was incorporated into the assessment were applicable.

There is a high level of confidence that the most significant potential negative impacts can be appropriately minimised with the implementation of mitigation measures as proposed.

#### **10.4 Indication of management and monitoring**

An Environmental Management Programme (EMPr) has been compiled to ensure that the biophysical and social environments receive due consideration and that it is protected during the construction of the proposed township development (Refer to Appendix 6 for the EMPr).

An Environmental Management Programme (EMPr) was compiled to ensure that the biophysical and social environments receive due consideration and that it is protected during the undertaking of the activities.

The EMPr is a guideline document that will provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment. The measures prescribed must aim to result in a cautious approach being applied to on-site environmental management to ensure prevention, minimising and remediation of potential impacts.

### **11. Conclusion and Recommendations**

The linear activity and construction of the reservoir is expected to result in a relatively small ecological footprint with mainly impacts of medium significance before mitigation. The alignment can mostly follow the existing pipeline and this minimises the ecological footprint. Mitigation can be successfully implemented. No environmental fatal flaws were identified with the proposed alignment of the water pipeline or the new reservoir site.

The proposed alignment of the pipeline is the preferred alignment and was amended to avoid two areas where construction could have resulted in higher negative social and ecological impacts.

No comments were received on the BA report or content thereof that required further consultation or amendments to the content of the report.

The Rand Water requested that a heritage assessment be conducted after they reviewed the BA report that was available for comment. The findings of this assessment were that there are no heritage resources within the pipeline route.

Another concern of Rand Water was that the internal diameter of the pipeline communicated in the newspaper and site notices differed from what was indicated in the BAR. This did not result in activities other than what was identified to be triggered. It also did not change the impact assessment which was done on the slightly bigger diameter line.

It is the recommendation of the EAP that if the application is considered favourably by the CA, the authorisation should be valid for a period of at least 5 years as the activities can be successfully completed during such a time.

The applicant wishes to commence with activities on the application properties as soon as authorisation is received.

Heinrich Kammeyer  
Enpact Environmental Consultants CC

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