

BASIC ASSESSMENT REPORT FOR THE ROCKY DRIFT BULK WASTEWATER SYSTEM UPGRADE AND EXPANSION OF THE WASTEWATER TREATMENT WORKS AND MSHOLOZI SEWER OUTFALL

Basic Assessment Report

Prepared for: Nathoo Mbenyane Engineers (Pty) Ltd on
behalf of:
The City of Mbombela Municipality



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BASIS OF REPORT

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BASIC ASSESSMENT REPORT FOR THE ROCKY DRIFT BULK WASTEWATER SYSTEM UPGRADE AND EXPANSION OF THE WASTEWATER TREATMENT WORKS AND MSHOLOZI SEWER OUTFALL

EXECUTIVE SUMMARY

Introduction

This Executive Summary provides a summary of the Basic Assessment Report (BAR) prepared for the City of Mbombela (CoM) Municipality for the proposed upgrade and expansion of the Rocky Drift wastewater treatment works (WWTW) and Msholozzi sewer outfall.

The project is located within the CoM Local Municipality, Mpumalanga Province (Figure 0-1 depicts the regional setting of the project). The project is located on the farm Dingwell 276 which is situated 1 km to the west of the Town Rocky Drift, Mpumalanga province. The proposed Rocky Drift WWTW system upgrade and expansion of the WWTW and Msholozzi sewer outfall. The proposed project will be located on the farm Dingwell 278 portion 8 and Remaining Extent (RE).

SLR Consulting (South Africa) (Pty) Ltd (SLR) has been appointed as the independent environmental consultant by Nathoo Mbenyane Engineers (Pty) Ltd (NME) to undertake the Basic Assessment and (WUL) authorisation processes for the proposed project.

Project Overview

The existing Rocky Drift wastewater treatment works (WWTW) receives effluent from the town Rocky Drift, consisting of an industrial area, the formalized residential area of Phumlani. The town of Phumlani is provided with water supply via metered house connections and the existing industries within Rocky Drift and the Phumlani township are already served by a waterborne sewerage system

Recently, the residential area of Msholozzi has been developed alongside Phumlani and while Phumlani is serviced by formalized waterborne sanitation, Msholozzi is not serviced.

Recently town planning Msholozzi received town planning approval for the formalization of the residential area. As part of this process, the CoM has proposed the provision of formalized water and sanitation services for Msholozzi.

The existing 160 mm \emptyset bulk sewer pipeline from Phumlani to the existing Rocky's Drift WWTW is the only current residential sewer outfall supplying the works. This pipeline will however be too small to cater for the increased sewage flows once the Msholozzi waterborne sewerage system commences operations. The CoM therefore propose the upgrade and expansion of the Rocky Drift WWTW and installation of a Msholozzi sewer outfall to increase the current operational capacity of the WWTW and to provide Msholozzi with access to formalised water and sanitation services. The proposed the upgrade and expansion of the Rocky's Drift WWTW and installation of a Msholozzi sewer outfall involves the following:

- **Upgrading of Bulk Sewer Pipeline from Msholozzi to the Rocky's Drift WWTW:** A new 500 mm \emptyset bulk sewer pipeline will be installed to connect Msholozzi to the Rocky's Drift WWTW. The existing 160 mm \emptyset pipeline from Phumlani will be retained up to the tie in point with the new pipeline from Msholozzi.
- **Upgrade of the Rocky's Drift WWTW:** Upgrade and expansion of the existing Rocky's Drift WWTW to accommodate the increase in the treatment capacity as a result of the Msholozzi sewer outfall connection. The Rocky's Drift WWTW has capacity to treat between 1.5 and 2 Ml/day of effluent with

the proposed expansion adding an additional 3Ml/day of capacity. The upgrade of the WWTW will involve construction of a new WWTW alongside the existing facility, allowing for the uninterrupted, continuous use of the existing WWTW while increasing treatment capacity.

Project Activities

The proposed project activities involves the following:

- Clearance of vegetation to accommodate the Phumlani bulk sewer pipeline, the new bulk pipeline and future WWTW infrastructure.
- Excavation, laying, jointing, bedding and backfilling of proposed 1 730 m long 500 mm Ø uPVC UG Class 34 bulk sewer pipeline.
- Construction of pipeline ancillary items such as manholes.
- Connection of existing Phumlani bulk sewer pipeline to the new bulk pipeline.
- Tie-in of bulk sewer pipeline to the new inlet works of the Rocky's Drift WWTW.

Project Objectives

The primary objective of the proposed project is to provide bulk sewer infrastructure capable of handling effluent produced by the existing waterborne sewerage system serving Phumlani and the new waterborne system that will serve the Msholozzi township. The project is aligned to the CoM's latest Water and Sanitation Masterplan (WSMP), compiled by GLS Consulting in 2016. There are numerous sanitation projects currently being implemented within the CoM, however, no other existing projects are known to overlap with the scope of this project.

Secondary objectives of the project are outlined as follows:

- Improve the standard of living of the inhabitants of the project area;
- Create job opportunities for the local community during the construction phase of the project;
- Build capacity by allowing community participation in certain aspects of the project as well as providing skills training; and
- Create an awareness of the local environment and the importance of protecting the installed infrastructure.

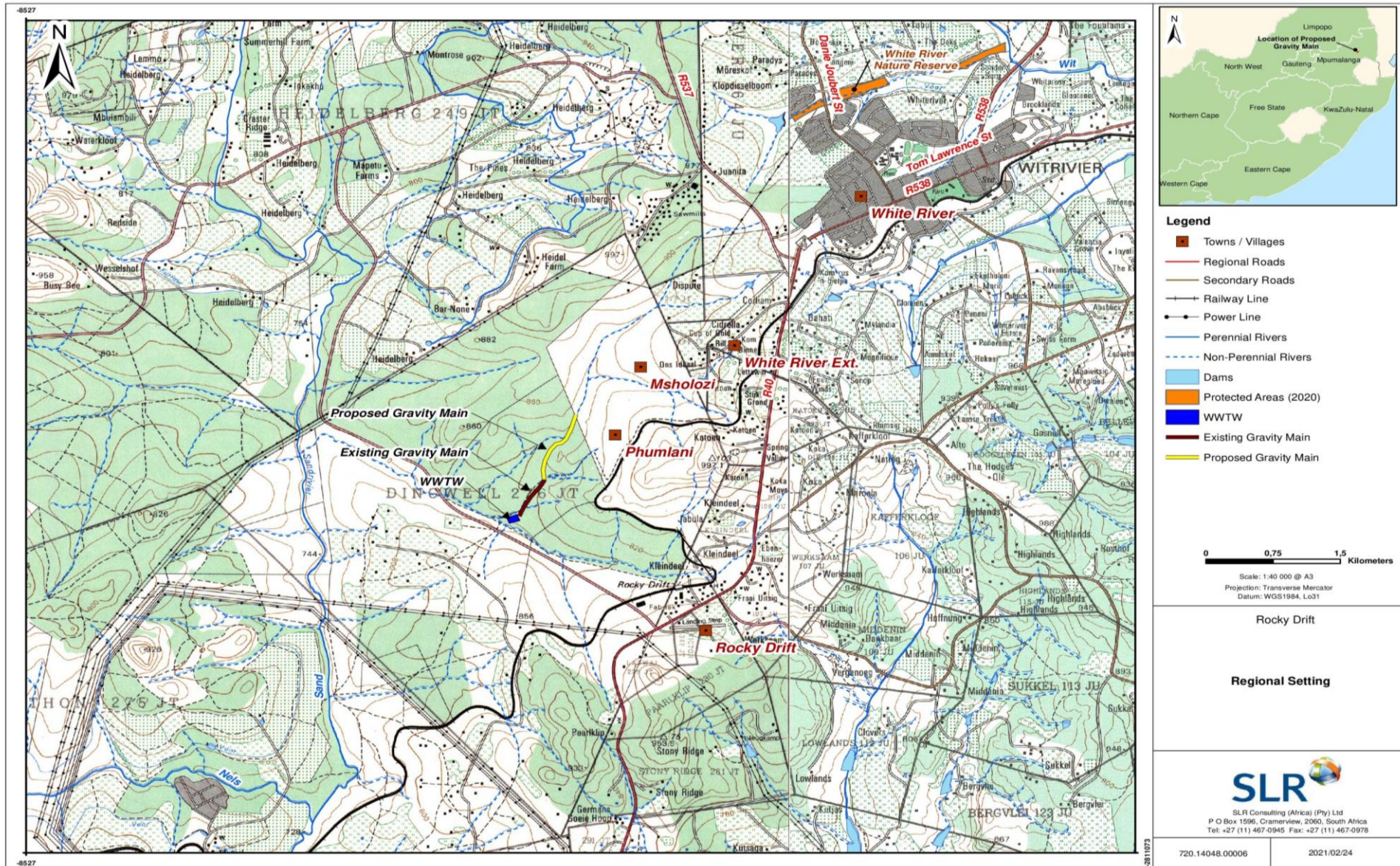


FIGURE 0-1: REGIONAL LOCALITY MAP

Summary of authorisation requirements and project timeline

The proposed project includes activities listed under the Environmental Impact Assessment (EIA) Regulations 2014, promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA). Such listed activities are prohibited from commencing until environmental authorisation is obtained from the competent authority, which in this case are the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA).

The activities that are triggered require a Basic Assessment (BA) process to inform the DARDLEA's decision on the application for environmental authorisation. In addition, the proposed project also requires authorisation from the Department of Water and Sanitation (DWS) for specific water uses listed under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA).

The following steps have been undertaken as part of the BA process:

- An interested and affected party (I&AP) database has been compiled using information obtained during a social scan of the project area, a deed search of adjacent landowners, responses to the advertisements, site notices and notification letter.
- Written notification was circulated to I&APs informing of them of the application for environmental authorisation and BA process.
- Press advertisements were placed in one local newspaper (namely the Lowvelder) on 22 April 2021. Site notices were placed at conspicuous locations along the pipeline routes in 2017 and 2020.
- An application form was submitted to DARDLEA on 19 April 2021.
- Specialist input was provided on the likely impact of the proposed project on the biophysical, aquatic and cultural aspects of the environment.
- Draft BAR has been made available to I&APs for a 30-day comment period. A copy of the executive summary was enclosed with the notification letter sent to all I&APs registered on the project database.

The remaining steps which will be undertaken as part of this BA process are:

- Inclusion of all comments received during the review period, into the BAR which will be submitted to DARDLEA for decision-making; and
- After DARDLEA has reached a decision, all I&APs on the project database will be notified of the outcome of the application and the reasons for the decision and the statutory appeal period.

Should environmental authorisation be granted, it is anticipated that construction of the pipeline would take approximately three (3) years to complete. The intended timing is to start with construction in the third quarter of 2021. Construction activities are expected to take place during normal business hours during the week. Construction facilities would be removed at the end of the construction phase. The upgrade of the Rocky Drift WWTW will be undertaken at a later stage.

Summary of potential impacts

Potential impacts associated with the project have been identified by the BA project team with input from specialists and I&APs. The range of environmental issues considered in the BA was given specific context and focus through consultation with authorities and I&APs. All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together. The impacts assessed include the development footprint of the bulk sewer pipeline and the Rocky Drift WWTW footprint.

A summary of the potential impacts in the unmitigated and mitigated scenarios are provided in the table below.

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Loss of agricultural soil resources through physical disturbance	M	L
Loss of agricultural soil resources through contamination	M	VL
Loss of terrestrial habitat and biodiversity through physical disturbance	VL	Insignificant

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L	VL
Alteration of drainage patterns affecting the flow of water in downstream systems	L	VL
Contamination of surface water resources	L	VL
Increase in disturbing noise levels affecting potential human receptors	L	VL
Economic impact	M+	H+
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact.

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the Environmental Management Plan (EMP) would be included in the detailed design and implemented when the construction commences. As a result, the majority of potential biophysical impacts associated with the proposed pipeline would be short term and limited either to the site or neighbouring land. These include impacts on soils, terrestrial habitats and biodiversity, drainage patterns and surface water quality. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

Proceeding with the project attracts potential economic and socio-economic benefits which are considered to have a **Moderate** to **High** significance.

Not proceeding with the project retains the status quo. This would mean the benefits of the project will not materialise (i.e. no job creation, no accessibility of formal sanitation in Msholozzi etc.). Local short-term employment opportunities would not be generated and the CoM mandate to provide local formalised water and sanitation to Msholozzi would not be met.

Opportunity to Comment

This Basic Assessment Report has been distributed for a 30-day comment period from **22 April 2021 to 24 May 2021** in order to provide interested and affected parties (I&APs) with an opportunity to comment on any aspect of the proposed project and the findings of the BA process to date. A copy of the executive summary was enclosed with the notification letter sent to all I&APs registered on the project database. Copies of the full report have been made available on the SLR website (at <https://slrconsulting.com/za/slr-documents>) and upon request from SLR.

Any comments should be forwarded to SLR at the address, telephone/fax numbers or e-mail address shown below. For comments to be included in the updated BAR, comments should reach SLR by **no later than 24 May 2021**.

SLR Consulting (South Africa) (Pty) Ltd
 Attention: Amishka Mothilal
 68 on Main, Old Main Road, Kloof, 3640 (if using post please call SLR to notify us of your submission)
 Tel: (011) 467 0945
 E-mail: amothilal@slrconsulting.com

Conclusion and Recommendation

It is the opinion of SLR that in terms the key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice that there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the Environmental Management Programmes for implementation during construction.

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ACRONYMS AND ABBREVIATIONS

Acronym / Abbreviation	Definition
BA	Basic Assessment
BAR	Basic Assessment Report
CARA	Conservation of Agricultural Resources Act (No. 43 of 1983)
CBS	Critical Biodiversity Areas
DARDLEA	Department of Agriculture, Rural Development, Land and Environmental Affairs
DM	District Municipality
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIA Regulations, 2014	Environmental Impact Assessment Regulations, 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017)
EO	Environmental Officer
EMP	Environmental Monitoring Plan
GA	General Authorization
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environment Management
LM	Local Municipality
MAP	Mean Annual Precipitation
mamsl	Metres above mean sea level
NEMA	National Environmental Management Act, 1998 (No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (No. 25 of 1999)
NWA	National Water Act, 1998 (No. 36 of 1998)
PES	Present Ecological Status
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SLR	SLR Consulting (South Africa) (Pty) Ltd
uPVC	Unplasticized polyvinyl chloride
WMA	Water Management Area
WWTW	Wastewater Treatment Works

1 INTRODUCTION

This chapter describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the study terms of reference, describes the structure of the report, and outlines the opportunity for comment.

1.1 PURPOSE OF THIS REPORT

This Basic Assessment Report (BAR) has been compiled and distributed for review and comment as part of a Basic Assessment (BA) process that is being undertaken for the proposed Rocky Drift project. This BAR provides a description of the proposed project and the affected environment; summarises the BA process followed to date; identifies and assesses the key project impacts and presents management and mitigation measures that are recommended to enhance positive and limit negative impacts.

Interested and Affected Parties (I&APs) are asked to comment on the BAR (see Section 1.6). The document will then be updated into a final report, giving due consideration to the comments received. The BAR will be submitted to the Mpumalanga Department: Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA) for consideration as part of the application for Environmental Authorisation in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA).

SLR Consulting (South Africa) (Pty) Ltd (SLR) has been appointed as the independent environmental assessment practitioner to undertake the BA process for the proposed Rocky Drift project.

1.2 PROJECT OVERVIEW

Nathoo Mbenyane Engineers (Pty) Ltd (NME) were appointed by the City of Mbombela (CoM) to provide professional engineering services for the Rocky Drift project located 1 km to the west of the Town Rocky Drift in the Mbombela local Municipality, Mpumalanga province (Refer to Figure 1-2 and Figure 1-3). The proposed Rocky Drift project will focus on the farm Dingwell 276 portion 8 and Remaining Extent (RE) (Refer to Figure 1-4).

The existing Rocky Drift wastewater treatment works (WWTW) receives effluent from the town Rocky Drift, consisting of an industrial area, the formalized residential area of Phumlani. The town of Phumlani is provided with water supply via metered house connections and the existing industries within Rocky Drift and the Phumlani township are already served by a waterborne sewerage system

Recently, the residential area of Msholozzi has been developed alongside Phumlani and while Phumlani is serviced by formalized waterborne sanitation, Msholozzi is not serviced.

Recently town planning Msholozzi received town planning approval for the formalization of the residential area. As part of this process, the CoM has proposed the provision of formalized water and sanitation services for Msholozzi.

The existing 160 mm \emptyset bulk sewer pipeline from Phumlani to the existing Rocky's Drift WWTW is the only current residential sewer outfall supplying the works. This pipeline will however be too small to cater for the increased sewage flows once the Msholozzi waterborne sewerage system commences operations. The CoM therefore propose the upgrade and expansion of the Rocky Drift WWTW and installation of a Msholozzi sewer outfall to increase the current operational capacity of the WWTW and to provide Msholozzi with access to formalised water and sanitation services. The proposed the upgrade and expansion of the Rocky Drift WWTW and installation of a Msholozzi sewer outfall involves the following:

- **Upgrading of Bulk Sewer Pipeline from Msholozzi to the Rocky's Drift WWTW:** A new 500 mm \emptyset bulk sewer pipeline will be installed to connect Msholozzi to the Rocky's Drift WWTW. The existing 160 mm \emptyset pipeline from Phumlani will be retained up to the tie in point with the new pipeline from Msholozzi.

- Upgrade of the Rocky Drift WWTW:** Upgrade and expansion of the existing Rocky Drift WWTW to accommodate the increase in the treatment capacity as a result of the Msholozzi sewer outfall connection. The Rocky Drift WWTW has capacity to treat between 1.5 and 2 Ml/day of effluent with the proposed expansion adding an additional 3Ml/day of capacity. The upgrade of the WWTW will involve construction of a new WWTW alongside the existing facility, allowing for the uninterrupted, continuous use of the existing WWTW while increasing treatment capacity.

1.3 SUMMARY OF AUTHORISATION REQUIREMENTS

The proposed Rocky Drift project includes activities listed under the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017), promulgated in terms of the National Environmental Management Act No. 107 of 1998, as amended (NEMA). These listed activities are prohibited from commencing until written environmental authorisation is obtained from the competent authority, which in this case is the Mpumalanga DARDLEA. The specific project activities require that a BA process in terms of the NEMA EIA Regulations (GNR 985 of 2014, as amended) is undertaken. The BA process is required to inform the competent authority’s decision-making on the environmental authorisation application. Further detail is included in Section 2.1.

In addition, the proposed project requires authorisation from the competent authority, which in this case is the Inkomati-Usuthu Catchment Management Agency (CMA), for specific water uses listed under Section 21 of the National Water Act No. 36 of 1998 (NWA). Further detail is included in Section 2.1.2. The WUL process will be undertaken once environmental authorisation has been received for the project.

This BA process does not cover occupational health and safety legislation requirements.

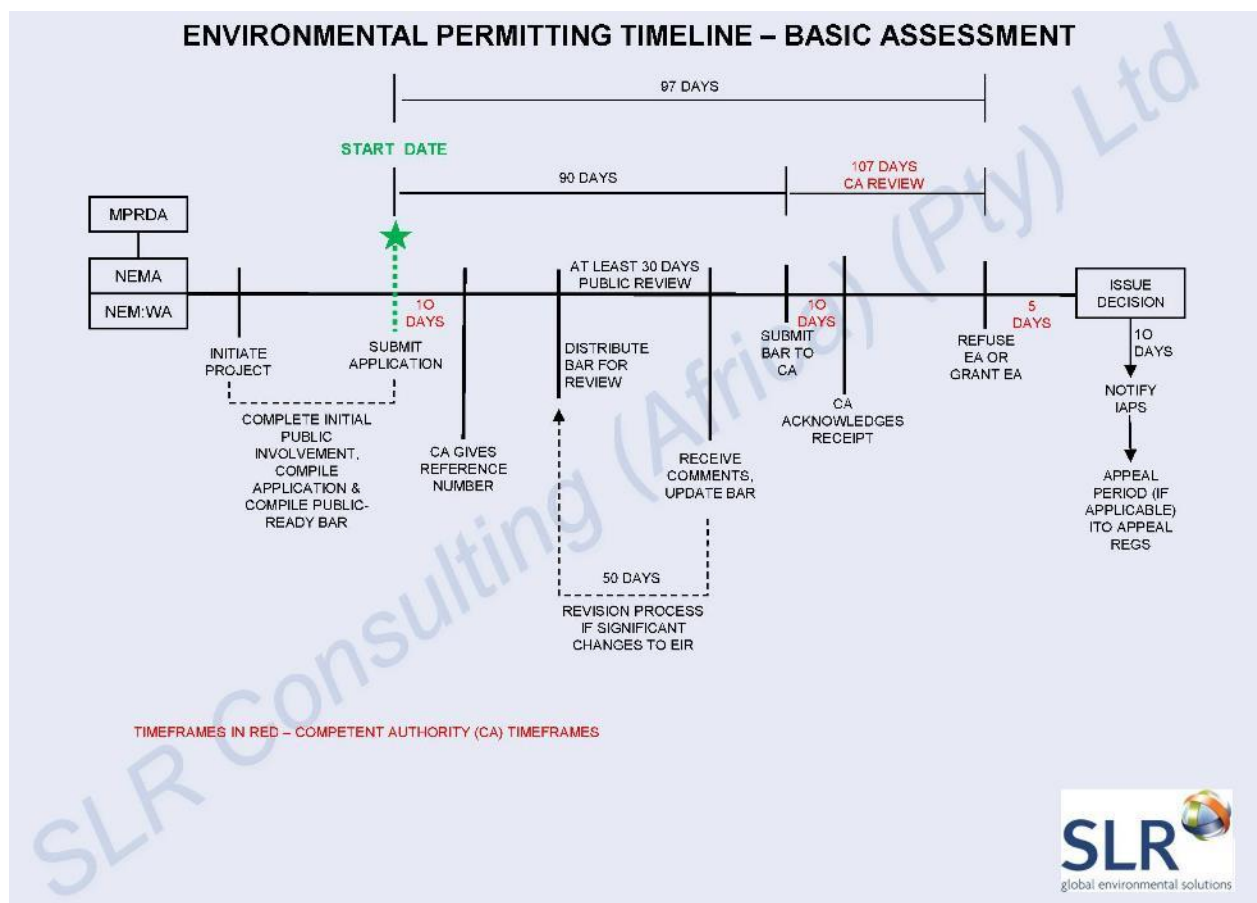


FIGURE 1-1: DIAGRAMATIC REPRESENTATION OF THE BA PROCESS



FIGURE 1-2: LOCAL SETTING OF THE PROJECT

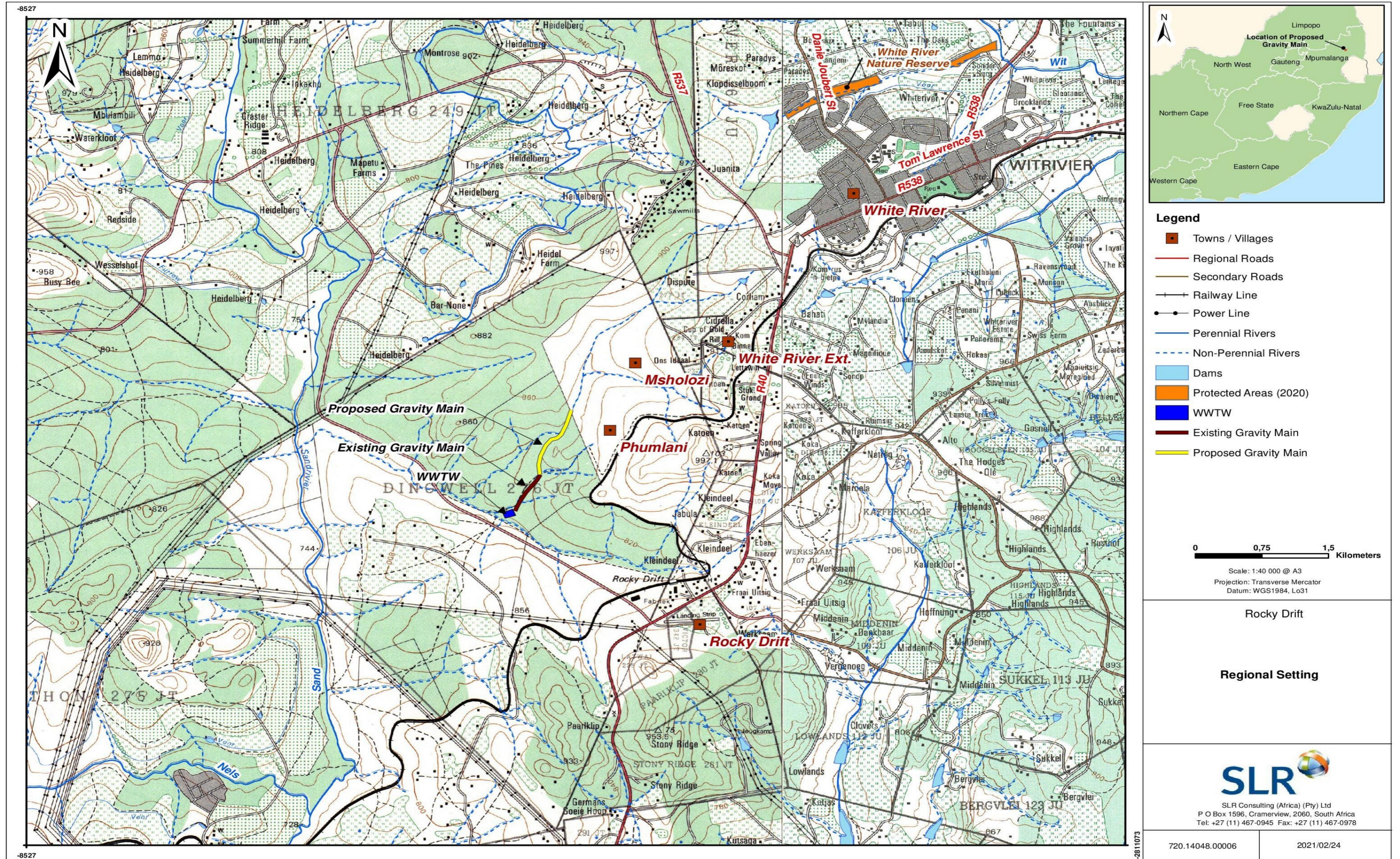


FIGURE 1-3: REGIONAL SETTING OF THE PROJECT

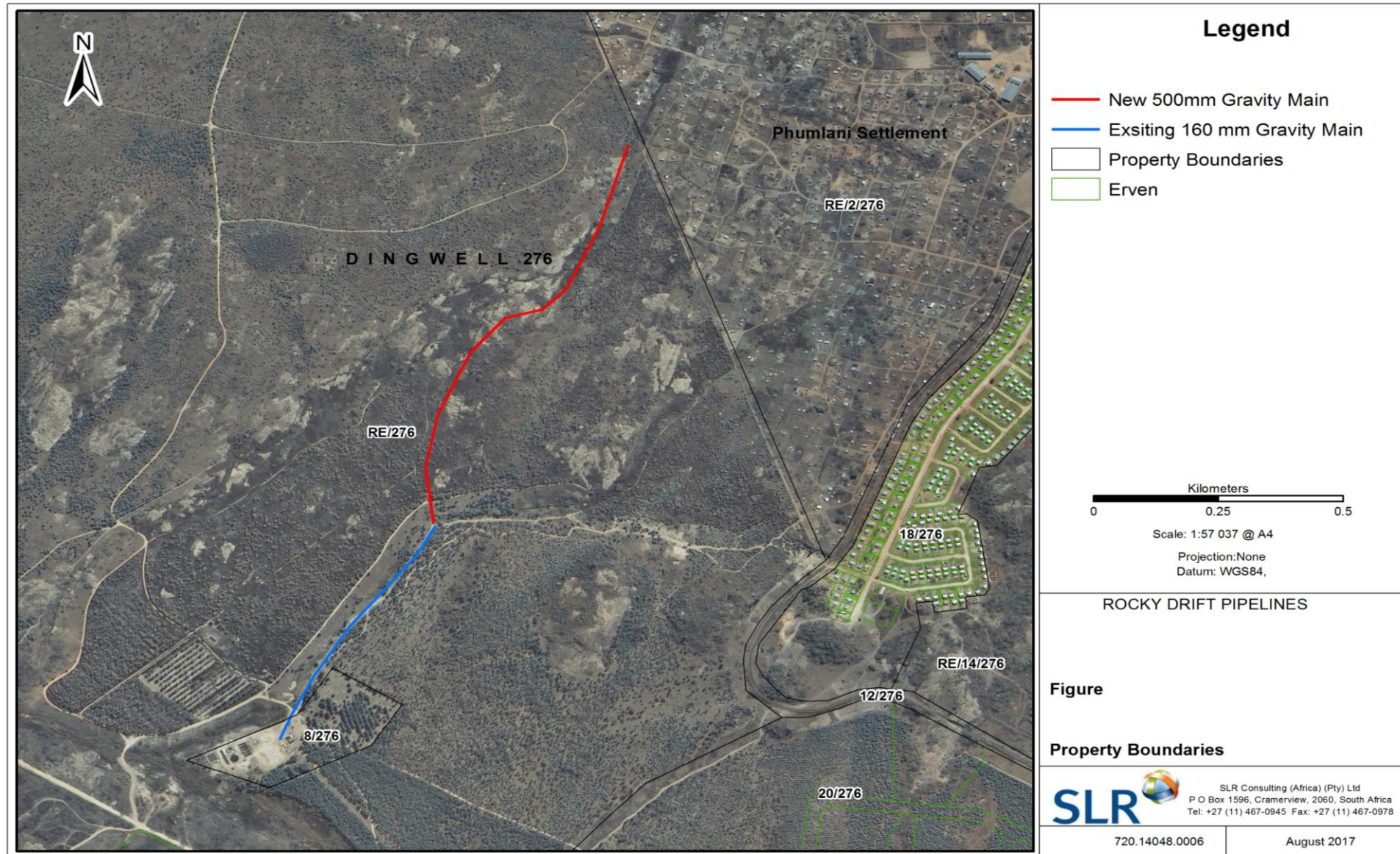


FIGURE 1-4 LOCAL FARMS AND PROPERTIES BORDERING THE PROPOSED PIPELINE ROUTES

1.4 TERMS OF REFERENCE

SLR, as the independent environmental assessment practitioner (EAP), is responsible for undertaking the required environmental regulatory process and conducting the public participation process. The terms of reference for the environmental regulatory process are to:

- make application for Environmental Authorisation of the project in terms of NEMA;
- ensure the BA is undertaken in accordance with the requirements of NEMA and the EIA Regulations, 2014;
- ensure the BA is undertaken in an open, participatory manner to ensure that all potential impacts are identified;
- undertake a formal public participation process, which includes the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns/issues, as well as an opportunity to comment on all BA documentation; and
- integrate all information, including the findings of the specialist studies and other relevant information, into a BAR to allow an informed decision to be taken on the proposed project.

1.5 STRUCTURE OF THIS REPORT

This BAR has been prepared in compliance with Appendix 1 of the EIA Regulations, 2014 and is divided into various chapters and appendices, the contents of which are outlined below.

Section	Contents
Executive Summary	Provides a summary of the Basic Assessment Report.
Chapter 1	Introduction Describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the terms of reference, describes the structure of the report and outlines the opportunity for comment.
Chapter 2	Legislative context Outlines the key legislative context applicable to the proposed project.
Chapter 3	BA methodology Details and expertise of the EAP who prepared the report Outlines the methodology for the assessment and consultation process undertaken in the BA. Also includes a summary of the public participation process undertaken to date and the results thereof.
Chapter 4	Project description Provides general project information which includes: <ul style="list-style-type: none"> • The location of the activity • Description of the proposed project; and • Description of the project alternatives
Chapter 5	Need and desirability Provides an overview of the need and desirability for the proposed project by considering how the project is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning, as appropriate.
Chapter 6	Description of the affected environment Describes the existing biophysical and social environment that could potentially be affected by the proposed project. Includes information obtained from the following specialist studies: <ul style="list-style-type: none"> • Heritage specialist report • Geohydrology specialist report • Floodline Delineation • Terrestrial Ecology Specialist Study
Chapter 7	Key project issues and impacts Describes key issues and impacts associated with the proposed project. Provides measures to mitigate impacts associated with the proposed project

Section	Contents
Chapter 8	Conclusions and Recommendations Presents the conclusions and recommendations for the project.
Chapter 9	References Provides a list of the references used in compiling this report.
Appendices	Appendix A: EAP undertaking Appendix B: Curricula vitae (including registrations) of the project team Appendix C: Public participation process Appendix D: Heritage specialist report Appendix E: Geohydrology specialist report Appendix F: Floodline Delineation Appendix G: Terrestrial Ecology Specialist Study Appendix H: EMPr

1.6 OPPORTUNITY TO COMMENT

This Basic Assessment Report has been distributed for a 30-day comment period from **22 April 2021 – 24 May 2021** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process to date. A copy of the executive summary was enclosed with the notification letter sent to all I&APs registered on the project database. Copies of the full report have been made available on the SLR website (at <https://slrconsulting.com/za/slr-documents>) and upon request from SLR.

Any comments should be forwarded to SLR at the address, telephone/fax numbers or e-mail address shown below. For comments to be included in the updated BAR, comments should reach SLR by **no later than 24 May 2021**.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Amishka Mothilal
68 on Main, Old Main Road, Kloof, 3640 (if using post please call SLR to notify us of your submission)
Tel: (011) 467 0945
Fax: (011) 467 0978
E-mail: amothilal@slrconsulting.com

2 POLICY AND LEGISLATIVE CONTEXT

This chapter outlines the key legislative requirements applicable to the project and outlines the guidelines, policies and plans that have been considered during the BA process.

2.1 LEGISLATION CONSIDERED IN THE PREPARATION OF THE BASIC ASSESSMENT REPORT

In accordance with the EIA Regulations 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017), all legislation and guidelines that have been considered in the BA process must be documented. Table 2-1 below provides a summary of the applicable legislative context.

TABLE 2-1: LEGAL FRAMEWORK

Applicable legislation	Relevance or reference
National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA) and EIA Regulations (GNR 982 of 2014, as amended)	An outline of the legislation is presented in Section 2.1.1. The project will need to comply with the principles of NEMA. The project triggers listed activities requiring a BA process and requires environmental authorisation.
National Water Act, 1998 (No. 36 of 1989) (NWA)	An outline of the legislation is presented in Section 2.1.2. The project includes water uses requiring general authorisation.
National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA)	An outline of the legislation is presented in Section 2.1.3. The project includes development activities which requires authorisation.
National Environmental Management: Protected Areas Act, 2003 (No. 57 of 2003)	This Act provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The proposed project footprint does not overlap with any existing protected areas or any areas identified for protected area expansion (see Section 6.1.4 for further information on protected areas).
National Environmental Management Biodiversity Act, 2004 (No. 10 of 2004).	This Act provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. It regulates the carrying out of restricted activities, without a permit, that may harm listed threatened or protected species or activities that encourage the spread of alien or invasive species and makes provision for the publication of bioregional plans and the listing of ecosystems and species that are threatened or in need of protection. Bioregional plans should be considered by competent authorities in their decision-making regarding an application for Environmental Authorisation. The proposed linear pipeline activities do border and/or cross critical biodiversity areas (CBAs) which can potentially host listed threatened or protected species (see Section 6.1.4 for further information). Alien and Invasive Species Regulations (GN. 598 of 2014) as well as the Alien and Invasive Species List (GN. 864 of 2016) have been published to regulate the monitoring, control and eradication of listed invasive species. All landowners on whose land alien and invasive species occur must ensure that they are compliant with these Regulations. These regulations were used to inform the environmental management Plan for the proposed project.
National Forests Act, 1998 (No. 84 of 1998)	This Act provides for the sustainable management and development of forests for the benefit of all, including providing special measures for the protection of certain forests and trees. Licensing is required for the destruction of certain indigenous trees. The proposed project does not entail any activities to which the Act applies.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA) and the Conservation of Agricultural Resources	The CARA provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, water sources, vegetation and the combating of weeds and invader plants.

Applicable legislation	Relevance or reference
Act Regulations, 1984 (GN. 1048 of 1984)	Landowners on whose land declared weed species occur must ensure that they are compliant with the CARA Regulations.

2.1.1 National Environmental Management Act, 1998

The National Environmental Management Act, 1998 (No. 107 of 1998) as amended (NEMA), establishes principles and provides a regulatory framework for decision-making on matters affecting the environment. All organs of state must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. The participation of I&APs is stipulated, as is that decisions must take into account the interests, needs and values of all I&APs.

Chapter 5 of NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management and communication of the potential impacts.

In terms of the management of impacts on the environment, Section 24N details the requirements for an Environmental Management Plan (EMPr).

a. NEMA EIA Regulations (GNR 982 of 2014, as amended by GN No. 326 of 7 April 2017)

The EIA Regulations, 2014 (as amended by GN No. 326 of 7 April 2017) promulgated in terms of Chapter 5 of NEMA provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1 (as amended by GN No. 327 of 7 April 2017), Listing Notice 2 (as amended by GN No. 325 of 7 April 2017) and Listing Notice 3 (as amended by GN No. 324 of 7 April 2017). The undertaking of activities specified in the Listing Notices is prohibited until Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, 2014.

The NEMA EIA Regulations (GNR 982 of 2014, as amended) set out the procedures and documentation that need to be complied with when applying for Environmental Authorisation. A Basic Assessment process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

The proposed project triggers activities specified in Listing Notice 1 and 3 (see Table 2-2) and therefore a BA process is required in order for DARDLEA to consider the application in terms of NEMA.

TABLE 2-2: NEMA LISTED ACTIVITIES APPLIED FOR AS PART OF THE PROPOSED PROJECT

No.	Activity description	Description of activity in relation to the proposed project
Listing Notice 1		
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes –	The proposed bulk sewer pipeline from Msholozzi to the Rocky Drift WWTW is as follows: <ul style="list-style-type: none"> • Installation of a 500 mm Ø (1 730 m) uPVC UG Class 34 bulk sewer pipeline from Msholozzi to the Rocky Drift WWTW.

No.	Activity description	Description of activity in relation to the proposed project
	<p>(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 -</p> <p>(a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.</p>	<ul style="list-style-type: none"> The proposed pipeline extension is in excess of 1 000 m and will be used for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes etc as well as has an internal diameter in excess of 0.36 m.
12	<p>The development of -</p> <p>(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs -</p> <p>(a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; -</p> <p>excluding -</p> <p>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</p>	<p>The proposed project involves the development of infrastructure (pipeline and foundations) with a physical footprint of approximately 120 m² within a watercourse.</p>
19	<p>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving -</p> <p>(a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p>	<p>To construct the pipeline crossings and foundations it is estimated that 60 m³ of material will need to be excavated.</p>

No.	Activity description	Description of activity in relation to the proposed project
	<p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies</p>	
27	<p>The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for -</p> <ul style="list-style-type: none"> (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. 	<p>The upgrading of the existing WWTW will require the clearance of an area of ~2.5 ha of indigenous vegetation.</p> <p>The entire project area is located within the Legogote Sour Bushveld, a vegetation type defined by the South African National Biodiversity Institute and Mpumalanga Parks and Tourism as endangered. The expansion of the WWTW will require the clearance of this vegetation to allow for construction.</p>
Listing Notice 3		
12	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <ul style="list-style-type: none"> i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; or iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA. 	<p>The upgrading of the existing WWTW will require the clearance of an area of ~2.5 ha of indigenous vegetation and the construction of the pipeline will require the clearance of a construction servitude of ~ 0.5 ha.</p> <p>The entire project area is located within the Legogote Sour Bushveld, a vegetation type defined by the South African National Biodiversity Institute and Mpumalanga Parks and Tourism as endangered. The expansion of the WWTW and construction of the pipeline will require the clearance of this vegetation to allow for construction.</p>
14	<p>The development of –</p> <ul style="list-style-type: none"> ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs - (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. <p>f. Mpumalanga</p> <ul style="list-style-type: none"> i. Outside urban areas (dd) Sensitive areas as identified in an environmental management framework as 	<p>The proposed bulk sewer line will traverse a tributary of the Sand River.</p> <p>To do so, it is necessary to contract a concrete foundation approximately 120 m² which will encase the pipeline and protect it against erosion and flood damage.</p> <p>Construction will occur within the Legogote Sour Bushveld, a vegetation type defined by the South African National Biodiversity Institute Mpumalanga Parks and Tourism as endangered.</p>

No.	Activity description	Description of activity in relation to the proposed project
	contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	

2.1.2 National Water Act, 1998

The National Water Act, 1998 (No. 36 of 1998) (NWA) provides a legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders. This Act also provides national norms and standards, and the requirement for authorisation (either a WUL or General Authorisation) of water uses listed in Section 21 of the Act. The competent authority is the Inkomati-Usuthu Catchment Management Agency.

The Section 21 water use activities relevant to the proposed project include (See Table 2-3):

TABLE 2-3: WATER USES APPLICABLE TO THE PROPOSED PROJECT

No.	Water use	Description of activity in relation to the proposed project
21(c)	Impeding or diverting the flow of water in a watercourse;	The proposed pipeline expansion will cross and/or pass through the regulated areas of watercourses with the potential to impede or divert the flow of a watercourse.
21 (f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;	Following treatment, treated waste water will be discharged to the environment
21(i)	Altering the bed, banks, course or characteristics of a watercourse;	The proposed pipeline expansion will cross and/or pass through the regulated areas of watercourses with the potential to alter the banks or characteristics of a watercourse.

2.1.3 National Heritage Resources Act, 1999

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the identification, assessment and management of the heritage resources of South Africa. Section 38(1) of the NHRA lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include:

- *The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;*
- *Any development or other activity which will change the character of a site involving three or more existing erven or subdivisions thereof.*

The NHRA requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account in its decision-making any comments and recommendations made by the relevant heritage resources authority.

In light of the above, a HIA was commissioned and uploaded to South African Heritage Resources Association (SAHRA) on 18 December 2020. Findings from the HIA is discussed in section 6.3.

2.2 GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

The guidelines, policies, plans and frameworks listed in Table 2-4 have been taken into account during the BA process and as part of specialist studies, where applicable.

TABLE 2-4: GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

Guideline	Governing body	Relevance
Public participation guideline in terms of NEMA (2017)	Department of Forestry, Fisheries and the Environment (DFFE) [Formerly Department of Environmental Affairs (DEA)]	The purpose of this guideline is to ensure that an adequate public participation process is undertaken during the BA process.
Guideline on need and desirability (2017)	DEFF	This guideline informs the consideration of the need and desirability aspects of the proposed project.

3 BASIC ASSESSMENT APPROACH AND METHODOLOGY

This chapter outlines the assessment methodology and I&AP consultation process followed in the BA process.

3.1 THE PROJECT TEAM

As noted in Chapter 1, SLR has been appointed as the independent EAP to undertake the BA for the proposed PIPELINE. The details of the EAP project team that are undertaking this BA are provided in Table 3-1.

SLR has no vested interest in the proposed project other than fair payment for consulting services rendered as part of the BA process and has declared its independence as required by the EIA Regulations, 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017). An undertaking by the EAP is provided in Appendix A.

TABLE 3-1: DETAILS OF THE BA PROJECT TEAM

General		
Organisation	SLR Consulting (South Africa) (Pty) Ltd	
Postal address	PO Box 1596, Cramerview, 2060	
Tel No.	(011) 467 0945	
Fax No.	(011) 467 0978	
Name	Tasks and roles	Email
Matthew Hemming	Report and process reviewers	mhemming@slrconsulting.com
Theo Wicks	Management of the BA process, including public consultation, process review, specialist study review and report compilation	twicks@slrconsulting.com
Amishka Mothilal	Report compilation, specialist study review	amothilal@slrconsulting.com

3.2 QUALIFICATIONS AND EXPERIENCE OF THE EAPS

Matthew Hemming is a Senior Environmental Consultant with SLR and has over 14 years’ experience as an Environmental Assessment Practitioner within the environmental consulting field. Matthew is well versed in the authorisation and compliance requirements of all South African environmental legislation. He is currently the Technical Discipline Manager for SLR’s Environmental & Social Impact Assessment team in Africa. Matthew is also SLR’s lead for the Infrastructure Sector. Matthew is a Registered Professional Natural Scientist (Environmental Science).

Theo is an EAP and Project Manager with SLR. He has 10 years’ experience in civil infrastructure development, waste management, private sector commercial development and the mining sector. He holds a Master’s Degree in Environmental Management. He is also a member of the International Association of Impact Assessment South Africa (IAIASa).

Amishka is an environmental consultant with SLR. She has 5 years’ experience in the oil & gas, infrastructure and power sectors. She holds an Honours Degree in Environmental Management and is also a member of the IAIASa.

Relevant curricula vitae (including proof of registrations) are attached in Appendix B.

3.3 QUALIFICATIONS, ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations pertaining to this BAR are presented in the table below.

TABLE 3-2: QUALIFICATIONS, ASSUMPTIONS AND LIMITATIONS

Aspect	Qualifications, assumptions and limitations
General	<ul style="list-style-type: none"> It is assumed that SLR has been provided with all relevant project information and that it was correct and valid at the time it was provided, There will be no significant changes to the project description or surrounding environment between the completion of the BA process and implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management. Specialists assessed potential impacts from the construction and operational phases separately. These have been assessed collectively in the BAR by the EAP, using the information provided by specialists. This provides an assessment of the overall project.
Cumulative assessment	<ul style="list-style-type: none"> All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.
Climate data	<ul style="list-style-type: none"> No on-site weather station exists in the area and therefore climatic and meteorological data was sourced from nearby stations. Given the relatively flat nature and absence of significant topographical features, this is considered suitable for this study.
Ecology	<ul style="list-style-type: none"> The development proposal used in this assessment is limited to the pipelines and infrastructure proposed by Nathoo Mbenyane Engineers. The assessment is based on a single site visit conducted by NatureStamp on 20 October 2020. The timing of the visit was for peak flowering season to maximise the number of plant species identified.
Floodline Assessment	<ul style="list-style-type: none"> The assessment is based on a site visit conducted by NatureStamp on 19 October 2020. The vegetation characteristics of the watercourse were assessed for the determination of the Manning's n-values; The presence and dimensions of any crossings, such as culverts and bridges, that would act as a barrier to a flood event and that may be damaged during the occurrence of such an event were noted; The overall state of drainage channels, streams and rivers was assessed; The slope of the study site as well as evidence of flood damage and erosion around the site were noted; The state of existing gauging stations (nearby) was assessed to determine if the structure is accurately recording streamflow (e.g. evidence of under cutting or damaged features); and The elevation was assessed at the channel level and property level in order to verify contour data.
Heritage	<ul style="list-style-type: none"> The assessment is based on a site visit conducted by J.A van Schalkwyk on 04 December 2020 No subsurface investigations (i.e. excavations or sampling) were undertaken; A paleontological screening was conducted using the South African Heritage Resource Agency sensitivity screening map (https://sahris.sahra.org.za/map/palaeo). The findings from the site indicates that the project area has an insignificant to zero sensitivity of fossil remains to be found and therefore a paleontological assessment is not required
Demographic data	<ul style="list-style-type: none"> Demographic data was sourced from the Census 2011 and 2016 data and is assumed to reflect the current socio-economic situation.

3.4 BASIC ASSESSMENT

3.4.1 Objectives

In accordance with Appendix 1 of the EIA Regulations, 2014, the objectives of a BA process are to:

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives;

- through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine -
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring;
 - (ii) the degree to which these impacts can be reversed, may cause irreplaceable loss of resources; and can be avoided, managed or mitigated;
- through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to:
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

This BA process consists of a series of steps to ensure compliance with these objectives and the EIA Regulations, 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017). The process involves an open, participatory approach to ensure that all impacts are identified and that decision-making takes place in an informed, transparent and accountable manner. A flowchart indicating the generic BA process is presented in Figure 1-1.

3.4.2 Pre-application authority consultation

A telecom meeting took place with regulatory authorities to inform the project plan and any related authorisation processes. These are outlined below. Meeting notes are included in Appendix C.

- SLR held two pre-application telecoms with DARDLEA on 07 December 2020 and on 19 January 2021. The purpose of the telecoms were to provide notification and introduce the project to the competent authority; provide an overview of the environmental-legal context; discuss key procedural aspects with the competent authority and provide an opportunity to raise any initial comments in relation to the project and environmental authorisation process.

3.4.3 Public participation process

A public participation process is being undertaken to inform the BA process. A record of the public participation process undertaken to date is outlined in Table 3-3. The purpose of the public participation process was to notify landowners, land users and other key stakeholders of the proposed project and to provide them with an opportunity to raise any initial issues or concerns regarding the proposed project.

TABLE 3-3: TASKS UNDERTAKEN TO DATE DURING THE PUBLIC PARTICIPATION PROCESS

Steps	Details
I&AP identification	<p>A preliminary I&AP database has been compiled using information obtained during a social scan of the project area and a deed search of adjacent landowners. Additional I&APs will be added to the database following responses to the advertisements, site notices and notification letter.</p> <p>It is recorded that the following State Departments/Organs of State/Service providers have been notified and afforded the opportunity to participate in the pre-application public participation process:</p> <ul style="list-style-type: none"> - Mpumalanga Provincial Government (MPG): DARDLEA; - COM Local Municipality; - Ehlanzeni District Municipality; - South African Heritage Resource Association; - Department of Water and Sanitation; - MPG: Department of Forestry, Fisheries and Environment (DFFE); - MPG: Department of Transport; - MPG: Department of Agriculture and Rural Development <p>The preliminary I&AP database is included in Appendix C.</p>
Written notification	<p>All identified I&APs were provided with written notification of the proposed project. The purpose of the notice was to convey information on the proposed project and environmental regulatory process,</p>

	to invite potential I&APs to register on the project database, to notify them of the availability of the BAR and provide comments. Proof of written communication will be included in the final BAR.
Site notices and adverts	A press advertisement was placed in the Lowvelder on 22 April 2021 in English. Proof of advertisement will be included in the final BAR. Site notices were placed at conspicuous locations along the route alignments in 2017 and 2020. Proof of placement of the site notices are included in Appendix C.

At the time of compiling this BAR, no comments were received from I&APs. Comments received through the circulation of this BAR will be collated and responded to in the Comments and Responses Report that will be included in the final BAR.

3.4.4 Compilation of the BAR

This BAR and the attached EMPr in Appendix H have been prepared in compliance with Appendices 1 and 4 of the EIA Regulations, 2014 (GN R 982 of 2014, as amended by GN R 326 of 2017) (see Table 3-4).

TABLE 3-4: REQUIREMENTS OF A BASIC ASSESSMENT REPORT IN TERMS OF THE EIA REGULATIONS, 2014 (GN R 982 OF 2014, AS AMENDED BY GN R 326 OF 2017)

Section	Requirements	Location in report
Appendix 1: Content of Basic Assessment Report		
3(1)(a)	<i>(i & ii) Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report, including a CV.</i>	Section 3 and Appendix B
(b)	<i>The location of the activity, including: (i) the 21 digit Surveyor General code of each cadastral land parcel; or (ii) where available, the physical address and farm name; or (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</i>	Section 4
(c)	<i>A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is: (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</i>	Section 4
(d)	<i>A description of the scope of the proposed activity, including: (i) all listed and specified activities triggered; (ii) a description of the activities to be undertaken, including associated structures and infrastructure.</i>	Sections 2.1 and 4
(e)	<i>A description of the policy and legislative context within which the development is proposed including (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process, and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments.</i>	Section 2
(f)	<i>A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.</i>	Section 5
(h)	<i>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:</i>	-
	<i>(i) details of all the alternatives considered;</i>	Section 4
	<i>(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs;</i>	Section 3.4
	<i>(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</i>	Section 3.4.3 and Appendix C
	<i>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>	Section 6
	<i>(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated.</i>	Section 7

Section	Requirements	Location in report
	<i>(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</i>	Section 3.4.6
	<i>(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>	Section 7
	<i>(viii) the possible mitigation measures that could be applied and level of residual risk;</i>	Section 8
	<i>(ix) the outcome of the site selection matrix;</i>	Section 4.3
	<i>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</i>	Section 4.3
	<i>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity.</i>	Section 4.3
<i>(i)</i>	<i>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity , including:- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</i>	Section 7
<i>(j)</i>	<i>An assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;</i>	Section 7
<i>(k)</i>	<i>Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;</i>	Sections 6 and 7
<i>(l)</i>	<i>An environmental impact statement which contains -(i) a summary of the key findings of the environmental impact assessment (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives ;</i>	Section 8
<i>(m)</i>	<i>Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr ;</i>	Section 8
<i>(n)</i>	<i>Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;</i>	Section 8
<i>(o)</i>	<i>A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;</i>	Section 3.3
<i>(p)</i>	<i>A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;</i>	Section 8
<i>(q)</i>	<i>where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;</i>	Not applicable
<i>(r)</i>	<i>An undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties;</i>	Appendix A
<i>(s)</i>	<i>Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;</i>	Not applicable
<i>(t)</i>	<i>Any specific information that may be required by the competent authority; and</i>	Not applicable
<i>(u)</i>	<i>Any other matters required in terms of section 24(4) (a) and (b) of the Act.</i>	Not applicable

Section	Requirements	Location in report
Appendix 4: Content of the EMPr		
1	<i>An EMPr must comply with section 24N of the Act and include -</i>	
(a)	<i>Details of: (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr , including a curriculum vitae;</i>	Appendix B and Appendix H.
(b)	<i>a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;</i>	Appendix H.
(c)	<i>a map at an appropriate scale which superimposes the proposed activity , its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;</i>	Appendix H.
(d)	<i>a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including - (i) planning and design; (ii) pre-construction activities, (iii) construction activities, (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities.</i>	Appendix H.
(e)	<i>deleted</i>	-
(f)	<i>a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to -</i>	Appendix H.
	<i>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</i>	
	<i>(ii) comply with any prescribed environmental management standards or practices;</i>	
	<i>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</i>	
	<i>(iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</i>	Not applicable
(g)	<i>the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	Appendix H.
(h)	<i>the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</i>	Appendix H.
(i)	<i>an indication of the persons who will be responsible for the implementation of the impact management actions;</i>	Appendix H.
(j)	<i>the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</i>	Appendix H.
(k)	<i>the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</i>	Appendix H.
(l)	<i>a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</i>	Appendix H.
(m)	<i>an environmental awareness plan describing the manner in which - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment</i>	Appendix H.
(n)	<i>any specific information that may be required by the competent authority</i>	Not applicable
(2)	<i>Where a government notice gazetted by the Minister provides for a generic EMPr such generic EMPr as indicated in such notice will apply.</i>	Not applicable

3.4.5 Specialist studies

Heritage, geohydrological, floodline delineation and terrestrial ecology specialist studies have been undertaken to inform the BA process. The specialist studies involved the gathering of data (desktop and site visit, where applicable) relevant to identifying and assessing environmental impacts that may occur as a result of the proposed project. These impacts have been assessed according to pre-defined rating scales (see Section 3.4.6 below). Specialist studies included recommended mitigation measures to minimise potential impacts or optimisation measures to enhance potential benefits as well as monitoring requirements, where required.

These have been incorporated into the EMPr. The methodologies applied to each specialist study are included in the specialist reports attached as appendices to this BAR.

Specialists who provided input to the BA process are listed in the table below (Table 3-5).

TABLE 3-5: SPECIALIST STUDIES

Specialist field	Name and Surname	Company	Expertise
Terrestrial Ecology	Bruce Scott-Shaw Ross Goode	NatureStamp Vegetation Ecologist	Hydrologist Vegetation Ecologist
Floodline Delineation	Bruce Scott-Shaw Nick Davis	NatureStamp Isikhungusethu Environmental Services	Hydrologist Hydrologist
Geohydrological Assessment	Bruce Scott-Shaw Nick Davis	NatureStamp Isikhungusethu Environmental Services	Hydrologist Hydrologist
Heritage	Johan. A van Schalkwyk	Heritage Consultant	Archaeologist

3.4.6 Integration and assessment

The specialist information and other relevant information has been be integrated into the BAR, which includes an Impact Assessment and EMPr.

The criteria used to assess the impacts and the method of determining the significance of the impacts are outlined in Table 3-6. This method complies with the method provided in the EIA guideline document. Part A provides the approach for determining impact consequence (combining intensity, extent and duration). Impact consequence and significance are determined from Part B and C. The consequence rating is considered together with the probability of occurrence in order to determine the overall significance of each impact. The interpretation of the impact significance is given in Part D.

TABLE 3-6: CRITERIA FOR ASSESSING IMPACTS

PART A: DEFINITIONS AND CRITERIA*		
Definition of SIGNIFICANCE		Significance = consequence x probability
Definition of CONSEQUENCE		Consequence is a function of intensity, spatial extent and duration
Criteria for ranking of the INTENSITY of environmental impacts	VH	Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs.
	H	Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place.
	M	Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected.
	L	Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected.
	VL	Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated.
	VL+	Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range.
	L+	Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits.

	M+	Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits.
	H+	Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support.
	VH+	Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected.
Criteria for ranking the DURATION of impacts	VL	Very short, always less than a year. Quickly reversible
	L	Short-term, occurs for more than 1 but less than 5 years. Reversible over time.
	M	Medium-term, 5 to 10 years.
	H	Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity)
	VH	Very long, permanent, +20 years (Irreversible. Beyond closure)
Criteria for ranking the EXTENT of impacts	VL	A part of the site/property.
	L	Whole site.
	M	Beyond the site boundary, affecting immediate neighbours
	H	Local area, extending far beyond site boundary.
	VH	Regional/National

PART B: DETERMINING CONSEQUENCE							
INTENSITY = VL							
DURATION	Very long	VH	Low	Low	Medium	Medium	High
	Long term	H	Low	Low	Low	Medium	Medium
	Medium term	M	Very Low	Low	Low	Low	Medium
	Short term	L	Very low	Very Low	Low	Low	Low
	Very short	VL	Very low	Very Low	Very Low	Low	Low
INTENSITY = L							
DURATION	Very long	VH	Medium	Medium	Medium	High	High
	Long term	H	Low	Medium	Medium	Medium	High
	Medium term	M	Low	Low	Medium	Medium	Medium
	Short term	L	Low	Low	Low	Medium	Medium
	Very short	VL	Very low	Low	Low	Low	Medium
INTENSITY = M							
DURATION	Very long	VH	Medium	High	High	High	Very High
	Long term	H	Medium	Medium	Medium	High	High
	Medium term	M	Medium	Medium	Medium	High	High
	Short term	L	Low	Medium	Medium	Medium	High
	Very short	VL	Low	Low	Low	Medium	Medium
INTENSITY = H							
DURATION	Very long	VH	High	High	High	Very High	Very High
	Long term	H	Medium	High	High	High	Very High
	Medium term	M	Medium	Medium	High	High	High
	Short term	L	Medium	Medium	Medium	High	High
	Very short	VL	Low	Medium	Medium	Medium	High
INTENSITY = VH							
DURATION	Very long	VH	High	High	Very High	Very High	Very High
	Long term	H	High	High	High	Very High	Very High
	Medium term	M	Medium	High	High	High	Very High
	Short term	L	Medium	Medium	High	High	High
	Very short	VL	Low	Medium	Medium	High	High
			VL	L	M	H	VH
			A part of the site/ property	Whole site	Beyond the site, affecting neighbours	Extending far beyond site but localised	Regional/ National
EXTENT							

PART C: DETERMINING SIGNIFICANCE							
PROBABILITY (of exposure to impacts)	Definite/ Continuous	VH	Very Low	Low	Medium	High	Very High
	Probable	H	Very Low	Low	Medium	High	Very High

	Possible/frequent	M	Very Low	Very Low	Low	Medium	High
	Conceivable	L	Insignificant	Very Low	Low	Medium	High
	Unlikely/improbable	VL	Insignificant	Insignificant	Very Low	Low	Medium
			VL	L	M	H	VH
CONSEQUENCE							

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	Decision guideline
Very High	Potential fatal flaw unless mitigated to lower significance.
High	It must have an influence on the decision. Substantial mitigation will be required.
Medium	It should have an influence on the decision. Mitigation will be required.
Low	Unlikely that it will have a real influence on the decision. Limited mitigation is likely required.
Very Low	It will not have an influence on the decision. Does not require any mitigation
Insignificant	Inconsequential, not requiring any consideration.

*VH = very high, H = high, M= medium, L= low and VL= very low and + denotes a positive impact.

3.4.7 Completion of the BAR

Following closure of the BAR commenting period, all comments received will be incorporated and responded to in a Comments and Responses Report. Where required the BAR will be updated to address comments received. The final report including I&AP comments will be submitted to DARDLEA for consideration and decision-making. Registered I&APs will receive notification of the final submission to DARDLEA.

After the DARDLEA has reached a decision registered I&APs will be notified of the outcome of the application, the reasons for the decision and details of the appeal process.

4 PROJECT DESCRIPTION

This chapter provides general information on the proposed project, a description of the proposed upgrade activities and a description of alternatives considered.

4.1 PROJECT OBJECTIVES

The primary objective of the project is to provide bulk sewer infrastructure capable of handling effluent produced by the existing waterborne sewerage system serving Phumlani and the new waterborne system that will serve the Msholozzi township.

Secondary objectives of the project are:

- Improve the standard of living of the inhabitants of the project area;
- Create job opportunities for the local community during the construction phase of the project;
- Build capacity by allowing community participation in certain aspects of the project as well as providing skills training; and
- Create an awareness of the local environment and the importance of protecting the installed infrastructure.

4.2 GENERAL PROJECT INFORMATION

4.2.1 Applicant details

The applicant for the proposed project is the COM LM. Details are provided below.

TABLE 4-1: APPLICANT DETAILS

Name:	City of Mbombela Local Municipality
Address:	PO Box 45 Nelspruit
Responsible person:	Theo Botha
Tel:	013 759 9111

4.2.2 Project locality

The project is located within the CoM Local Municipality, Mpumalanga Province (Figure 1-2 and Figure 1-3 respectively depict the local and regional setting of the project). The proposed pipeline will border and/or cross approximately 4 properties or farms as per Table 4-2. The CoM is located in the south-western portion of the Ehlanzeni District Municipality (EDM) and in the north-eastern part of Mpumalanga Province, abutting Swaziland and approximately 300 km west of Pretoria. The municipality is strategically placed between Gauteng, Swaziland and Mozambique and is linked by various national roads and railway lines. The Rocky Drift WWTW is located on the farm Dingwell 276.

The CoM has an area of 5 394 km² in extent, which equates to 19.3 % of the EDM area. The CoM is bounded by Nkomazi Local Municipality to the east, Bushbuckridge Local Municipality to the north, Thaba Chweu Local Municipality and Nkangala District Municipality to the west and Gert Sibande District Municipality and Swaziland to the south.

The project area itself falls on the outskirts of the town of White River which is located approximately 20 km north of Nelspruit. The project area is made up of Rocky Drift, consisting of an industrial area, the formalised township of Phumlani and the informal settlement of Msholozì. The project area is accessed from the R40 national road between Nelspruit and White River. Land within the project footprint is zoned for agriculture.

As mentioned previously, this project deals specifically with the upgrading and expansion of the Rocky Drift WWTW pipeline in order to accommodate the increased sewage flows resulting from the new waterborne sewerage system to be provided within Msholozì.

The Rocky Drift industrial area is situated to the south-east of the Rocky Drift WWTW whilst Phumlani and Msholozì are located to the north-east of the works. The topography of the area slopes predominantly in a westerly direction towards the Rocky Drift WWTW. Elevations across the project area range from approximately 977 m at a localised high point on the south-eastern boundary of Msholozì to approximately 780 m at the works itself.

TABLE 4-2 PROJECT LOCALITY

No	Farm Name	Farm/ No	Erf	Portion	Latitude	Longitude	Property Type
1	DINGWELL	276	0		25°21'46.71S	30°58'6.92E	Farm
2	DINGWELL	276	8		25°22'2.63S	30°58'13.74E	Farm Portion
3	DINGWELL	276	0		25°22'35.93S	30°57'50.51E	Farm Portion
4	DINGWELL	276	6		25°21'49.91S	30°57'36.41E	Farm Portion

4.2.1 Affected Properties

Details of the land owner and adjacent landowners are included in Table 4-3 and Table 4-4 respectively.

TABLE 4-3: LAND OWNERSHIP

Portion	Landowner	Title Deed Number
Dingwell 276: Portion 8	White River Municipality (Now City of Mbombela Municipality)	T1108/993

Adjacent landowner details are provided below. Note the entire site is within the farm Dingwell 276 RE.

TABLE 4-4: ADJACENT LANDOWNERS

Portion	Landowner	Title Deed Number
Dingwell 276: RE	Matsafeni Trust	T168907/2003

4.2.2 Project Timeline

Should environmental authorisation be granted, it is anticipated that construction of the pipeline would take approximately three (3) years to complete. The intended timing is to start with construction in the third quarter of 2021. Construction activities are expected to take place during normal business hours during the week. Construction facilities would be removed at the end of the construction phase. The upgrade of the Rocky Drift WWTW will be undertaken at a later stage.

4.3 PROJECT OVERVIEW

The Rocky Drift WWTW receives effluent from the town Rocky Drift, consisting of an industrial area, the formalised township of Phumlani and the informal settlement of Msholozzi. There are currently no water services available within the Msholozzi informal settlement although town planning approval has been obtained for the establishment and formalisation of the township. This process will include the provision of formalised water and sanitation services for Msholozzi. The town of Phumlani is provided with water supply via metered house connections and the existing industries within Rocky Drift and the Phumlani township are already served by a waterborne sewerage system.

There are numerous sanitation projects currently being implemented within the CoM. However, no other current projects are known to overlap with the scope of this project. The project is also in accordance with the CoM’s latest Water and Sanitation Masterplan (WSMP), compiled by GLS Consulting in 2016.

The existing 160 mm Ø bulk sewer pipeline from Phumlani to the existing Rocky’s Drift WWTW is the only current residential sewer outfall supplying the works. This pipeline will however be too small to cater for the increased sewage flows once the Msholozzi waterborne sewerage system commences operations. The CoM therefore propose the upgrade and expansion of the Rocky Drift WWTW and installation of a Msholozzi sewer outfall to increase the current operational capacity of the WWTW and to provide Msholozzi with access to formalised water and sanitation services. The proposed the upgrade and expansion of the Rocky Drift WWTW and installation of a Msholozzi sewer outfall involves the following:

- **Upgrading of Bulk Sewer Pipeline from Msholozzi to the Rocky’s Drift WWTW:** A new 500 mm Ø bulk sewer pipeline will be installed to connect Msholozzi to the Rocky’s Drift WWTW. The existing 160 mm Ø pipeline from Phumlani will be retained up to the tie in point with the new pipeline from Msholozzi.
- **Upgrade of the Rocky Drift WWTW:** Upgrade and expansion of the existing Rocky Drift WWTW to accommodate the increase in the treatment capacity as a result of the Msholozzi sewer outfall connection. The Rocky Drift WWTW has capacity to treat between 1.5 and 2 MI/day of effluent with the proposed expansion adding an additional 3MI/day of capacity. The upgrade of the WWTW will involve construction of a new WWTW alongside the existing facility, allowing for the uninterrupted, continuous use of the existing WWTW while increasing treatment capacity. The upgrade of the WWTW will be undertaken at a later stage.

4.4 PROJECT ACTIVITIES

The proposed project activities involves the following:

- Clearance of vegetation to accommodate the bulk sewer pipeline and the footprint of the WWTW infrastructure.

- Excavation, laying, jointing, bedding and backfilling of proposed 1 730 m long 500 mm Ø uPVC UG Class 34 bulk sewer pipeline.
- Construction of pipeline ancillary items such as manholes.
- Connection of existing Phumlani bulk sewer pipeline to the new bulk pipeline.
- Tie-in of bulk sewer pipeline to the new inlet works of the Rocky's Drift WWTW.
- Construction of WWTW including the construction and installation of:
 - A new inlet works.
 - Activated sludge reactor (x1 anaerobic chamber and x2 aerobic chambers).
 - Claifiers (x2)
 - Sludge thickeners (x2).
 - Six new sludge drying beds
 - Chlorine dosing and contact chambers (x2).
 - Emergency storage tank (x1)
 - Ancillary works such as:
 - Construction of a new office / control room.
 - Construction of new internal roads to enable access to the new sections of the works including attending to stormwater management issues on the site.
 - Erection of concrete palisade fencing around the entire site of the works.

A layout showing the existing and proposed expansion of the WWTW is provided as Figure 4-1.

4.5 CONSIDERATION OF ALTERNATIVES

The alignment of the proposed bulk sewer pipeline was developed through an iterative process where engineers considered the existing start and end points, the mountainous/ hilly terrain and access to the existing Rocky Drift WWTW. The route of the bulk sewer pipeline will be designed as far as reasonably and functionally possible to not cross or be within the 32 m buffer of the surrounding unnamed watercourses. The construction of the new bulk sewer pipeline to tie in with the existing bulk sewer pipeline is limited to topography to allow for gravity assisted drainage, by allowing the effluent to flow downhill.

The preferred route takes cognisance of findings of the specialist reports as far as possible as well as the route constraints to allow for connection to the existing bulk sewer pipeline. As such, no layout alternatives have been proposed for the project.

In addition to this, operational and technology alternatives are not applicable to the project.

4.5.1 Consideration of the “No-Go” alternative

The No-Go alternative represents the option not to proceed with the proposed project and requires a comparison between the options of proceeding with the project with that of not proceeding with the project. The No-go Alternative refers to the current status quo and the risks and impacts associated with it. This would mean the benefits of the project will not materialise (i.e. no job creation, no accessibility of formal sanitation in Msholozzi etc.).

The environment will remain relatively undisturbed, there would be no improvement in the formal water and sanitation system. Local short-term employment opportunities would not be generated and the CoM mandate to provide local formalised water and sanitation to Msholozzi would not be met.



FIGURE 4-1: LAYOUT OF THE EXISTING AND PROPOSED WWTW EXPANSION

5 NEED AND DESIRABILITY

The DFEE guideline on need and desirability (GN 891, 20 October 2017) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. Thus, the overarching framework for considering the need and desirability of development in general is taken at the policy level through the identification and promotion of activities / industries / developments required by civil society as a whole. The DEFF guideline further notes that at a project level (as part of a BA process), the need and desirability of the project should take into consideration the content of regional and local plans, frameworks and strategies.

In light of the above, this section aims to provide an overview of the need and desirability of the proposed project by firstly, highlighting potable water provision in the South African context and, secondly, how this industry is aligned with the strategic context of national development policy and planning, broader societal needs and regional and local planning, as appropriate.

5.1 PROVINCIAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the regional and local policy and planning context relating to the proposed project.

5.1.1 Mpumalanga Vision 2030

The primary overarching strategic frameworks for development in Mpumalanga is the Mpumalanga Vision 2030 and the Spatial Development Framework (SDF). The Mpumalanga Vision 2030 was designed to be aligned to and in synergy with the National Development Plan, Mpumalanga Medium Term Strategic Framework (MTSF) and other plans such as the infrastructure plan, human settlement strategy, Comprehensive Rural Development Plan (CRDP) etc. The MTSF highlights the expansion of access to water, sanitation and electricity as a key area in respect of service delivery. The Mpumalanga Vision 2030 drives growth and development in the Province until the year 2030 and aims at addressing issues and challenges of unemployment, inequality, poverty, creating a more inclusive society and an integrated strategy for accelerating growth (Mpumalanga SDF, 2020/2021).

Mpumalanga SDF identified strategic integrated projects (SIPs) in accordance with the National Infrastructure Plan (NIP). The proposed project is in support of SIP 18 of the Mpumalanga SDF which states:

“SIP 18: Water and sanitation infrastructure in the form of addressing water backlogs and the provision of sustainable supply of water and sanitation services to meet social needs and support economic growth.”

5.1.2 Regional and Local Policy and Planning Framework

This section aims to provide an overview of the regional and local policy and planning context relating to the proposed development.

a. Ehlanzeni District Municipality

The Ehlanzeni District Municipality SDF sets out the key spatial challenges faced by the Province and the objectives and development priorities, which have been formulated to address these challenges. Most importantly, the SDF is intended to facilitate development of a spatial structure that promotes integrated development and enables an efficient delivery of services.

The following spatial development themes are based on the developmental key drivers of the Mpumalanga Vision 2030:

- Corridor and Nodal Development
- Economic Development

- Tourism and Forestry Development
- Agricultural Development
- Mining and Energy Related Development
- Urban Development
- Rural Development
- Environmental Management and Conservation

The Ehlanzeni SDF acknowledges that upgrading of services and facilities as a focus area under the urban development theme.

b. City of Mbombela Local Municipality Integrated Development Plan (2020 – 2021)

This project falls under the City of Mbombela (COM)’s approved Integrated Development Plan (IDP); the purpose of which being to access funding for the implementation of sanitation infrastructure upgrades which will in turn assist the COM to improve service delivery within these sectors. The COM’s IDP highlights that sanitation is a community priority development area for the 2020-2021 financial year.

5.2 CONSISTENCY WITH POLICY AND PLANNING CONTEXT

COM municipality is mandated in terms of Section 152 of the South African Constitution to ensure the provision of basic services to communities in a sustainable manner. The basic services that a municipality must provide include water, sanitation, electricity, refuse removal and municipal roads. The NIP as well as The Mpumalanga Vision 2030 highlight the need to improve access to basic services.

The proposed project is considered to be consistent with and in support of the policy framework for the development and upgrade of sanitation infrastructure. Access to sanitation is one of the key challenges facing COM Municipality. The MTSF highlights the expansion of access to water, sanitation and electricity as a key area in respect of service delivery in line with the Mpumalanga Vision 2030.

5.3 CONSISTENCY WITH NEMA PRINCIPLES

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles are taken into account during the BA process is provided in Table 5-1 below.

TABLE 5-1: CONSIDERATION OF THE NEMA PRINCIPLES IN RELATION TO THE PROPOSED PROJECT

National Environmental Management Principles	Comment
<i>(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.</i>	The upgrade and development of wastewater treatment infrastructure plays a pivotal role in not only the provision of access to sanitation facilities but also allowing for economic investment into the region. This BA process also serves to identify the needs and interests of potentially affected parties and to address issues and concerns raised through the course of the study.
<i>(3) Development must be socially, environmentally and economically sustainable.</i>	The WWTW will allow for an increase in the efficiency in treatment of effluent and sewage. The provision of sanitation facilities is a basic human right and essential for maintaining social cohesion, thus the proposed development is deemed acceptable in principle. The specific sustainability of the proposed project has been assessed in the BA process.
<i>(4)(a) Sustainable development requires the consideration of all relevant factors including the following: (i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</i>	The BA process considers potential social, economic, biophysical impacts that could result through the implementation of the proposed WWTW. Measures have been identified to avoid, minimise and/or remedy potential pollution and/or degradation of

National Environmental Management Principles	Comment
<p><i>(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</i></p> <p><i>(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</i></p> <p><i>(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;</i></p> <p><i>(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;</i></p> <p><i>(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;</i></p>	<p>the environment that may occur as a result of the proposed project.</p>
<p><i>(4)(a)(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and</i></p>	<p>Assumptions, uncertainties and limitations associated with the compilation of the BA Report are discussed in Section 3.3.</p> <p>Compliance with the various legislative requirements is presented in Section 2.</p>
<p><i>(4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.</i></p>	<p>The BA process considers and assesses the identified potential social, economic and biophysical impacts of the project (refer to Section 7). The EMPr provides the recommended management measures to mitigate the significance of identified impacts (refer to Appendix H).</p>
<p><i>(4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.</i></p>	<p>The BA process that is being followed recognises that all elements of the environment are linked and interrelated. Mpumalanga DARDLEA, as the decision-making authority, will be responsible for taking all aspects of the environment, including whether or not the potential impacts of the project would unfairly discriminate against any person, into consideration when making a decision regarding the proposed project.</p>
<p><i>(4)(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.</i></p>	
<p><i>(4)(d) Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.</i></p>	<p>The proposed WWTW is not anticipated to limit access to environmental resources that meet basic human needs, but rather improve access to water to meet basic human needs.</p>
<p><i>(4)(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.</i></p>	<p>The applicant is committed to comply with environmental health and safety consequences of its existing operations and will continue to do so in relation to the proposed WWTW</p>
<p><i>(4)(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.</i></p>	<p>The public participation process has been undertaken in accordance with the requirements of the EIA Regulations 2014 (see Section 3.4.3).</p>
<p><i>(4)(g) Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge.</i></p>	<p>The BA process will take into the account the interests, needs and values of all I&APs, through the submission of comments on the proposed project. Thus, the decision-makers will have all the necessary information before them on which to base an informed decision.</p>
<p><i>(4)(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.</i></p>	<p>The BAR prepared for the proposed project will be made available to communities for review and comment (see Section 1.6).</p>
<p><i>(4)(i) The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered,</i></p>	<p>The BA process considers identified potential social, economic, biophysical impacts of the project in an</p>

National Environmental Management Principles	Comment
<i>assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.</i>	integrated manner. The significance of these impacts has been assessed (see Section 7).
<i>(4)(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.</i>	The owners and managers of the project would be required to comply with the requirements of the Occupational Health and Safety Act (No. 85 of 1993).
<i>(4)(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.</i>	As mentioned previously, the public consultation process is being undertaken in accordance with the requirements of the EIA Regulations 2014 and will allow for the distribution of the BA Report for public review and comment. This information will be provided in an open and transparent manner.
<i>(4)(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment.</i>	The public participation process for the proposed project provides an opportunity for the Organs of State to provide comment on the proposed project and address any potential conflicts between policies or other developmental proposals administered by them that may be in conflict with the proposed project before decision-making.
<i>(4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures.</i>	It is not anticipated that the proposed project would result in any conflicts between organs of state.
<i>(4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest.</i>	Mpumalanga DARDLEA, as the decision-making authority, will be responsible for taking cognisance of any international obligations that could have an influence on the project.
<i>(4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.</i>	The BA process considers and assesses the identified potential social, economic, biophysical impacts of the project (refer to Section 7).
<i>(4)(p) The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.</i>	The owners and managers of the WWTW will be responsible for the implementation of the measures included in the EMPr.
<i>(4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted.</i>	The public participation process for the proposed project has been and will continue to be inclusive of women and the youth.
<i>(4)(r) Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.</i>	The BA process undertaken for the proposed project has identified relevant sensitive and/or vulnerable areas and assessed potential impacts if applicable. Appropriate mitigation measures have been proposed where required.

5.4 SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

A suite of detailed specialist investigations on the affected environment have been conducted for the proposed project and their findings incorporated into the development of the BAR. The nature of such linear developments is such that impacts on biodiversity, habitats and ecosystem services are probable. To limit such impacts it is necessary to locate such developments at sites of low sensitivity. The proposed new WWTW pipeline routes will follow existing roads and tracks where viable, with the pipeline being buried. It is anticipated that the pipeline will cross watercourses.

The findings of the specialist studies found that potential impacts associated with the proposed development can be mitigated to an acceptable level with the effective implementation of design control measures and mitigation measures. Specific mitigation measures are outlined in the EMPr (refer to Appendix G.).

5.5 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

Community/society priorities are officially expressed through public documents including the provincial and municipal growth and development strategy and spatial development framework documents. The Ehlanzeni Municipalities SDF 2020-2021 identifies that one of the COM Local Municipalities key challenges is sanitation infrastructure and treatment facilities. The proposed WWTW will receive domestic sewage from the Phumlani and Msholozhi townships. The proposed WWTW will allow for the upgrade of existing facilities at the site as well as an expansion of operations through the installation of new infrastructure to increase the treatment capacity.

The existing 160 mm Ø bulk sewer pipeline from Phumlani to the existing Rocky Drift WWTW is the only current residential sewer outfall supplying the works. This pipeline is however too small to cater for the increased sewage flows once Msholozhi is also served by a waterborne sewerage system. A new 500 mm Ø bulk sewer pipeline will therefore be installed from Msholozhi to the new section of the Rocky Drift WWTW. The existing 160 mm Ø pipeline from Phumlani will be retained up to the tie in point with the new pipeline from Msholozhi. Note that the remaining section of this pipeline, between the tie-in point to the new pipeline and the Rocky Drift WWTW, will be decommissioned once the new section of the works and the new pipeline from Msholozhi are in place. This will align to the COM Municipality IDP in terms of access to sanitation facilities as well as infrastructure development.

5.6 DEMOGRAPHICS

5.6.1 Current and Future Population Projections

The current and future population figures for this project are summarised in Table 5-2 below.

TABLE 5-2: CURRENT AND FUTURE POPULATION FIGURES FOR PROJECT AREA

Project Area	Population Figures			No. of Households		
	2020	2022	2035	2020	2022	2035
Existing Areas						
Phumlani (Low Income)	3 255	3 387	4 381	465	514	626
Subtotal – Existing Areas	3 255	3 387	4 381	465	513	626
Future Development Areas						
Msholozhi SP (Low Income)	0	24 395	31 557	0	3 485	4 508
Subtotal – Future Development Areas	3 255	24 395	31 557	0	3 485	4 508
Total – Existing and Future Areas	3 255	27 782	35 938	465	3 969	5 134

The existing low-income residential development of Phumlani consists of 465 households. However, as mentioned previously, town planning approval has been obtained for the establishment and formalisation of a township in Msholozhi.

The populations reflected above in Table 5-2 have been calculated based on the average household occupancies stated in Section 5.7.1 below. A 2 % population growth rate has also been utilised when calculating the future populations reflected in Table 5-2. It is noted that any other future proposed medium and high-income residential development areas within the project area have been excluded from the above population figures.

5.7 DEMAND / NEED PARAMETERS

5.7.1 Service Levels (Volumetric)

The following base data and design criteria have been used to determine the required capacity of the various infrastructure components to be installed under this project:

Design Period:	15 years – from 2020 to 2035 ^b
Population Growth Rate:	2 % per annum
Household Occupancies:	Low Income Households – 7 people per unit
	Middle Income Households – 6 people per unit
	High Income Households – 5 people per unit
Average Dry Weather Flow (ADWF): ^c	Low Income Households – 500 ℓ/unit/day
	Middle Income Households – 750 ℓ/unit/day
	High Income Households – 1000 ℓ/unit/day
Industrial Sewage Flows:	Flows per area provided by GLS Consulting from their work carried out on the COM’s WSMP

^b The 15 year design period is assumed to commence from the year when Version 3 of this technical report was compiled i.e. 2020.

^c These are the daily sewage flows provided in the “Design Guidelines for Waterborne Sanitation Systems” on page 28 of Chapter 10 (Sanitation), alternatively referred to as the “Red Book”. These flows have been used to determine the required capacity of the Rocky Drift WWTW to cater for the projected sewage flows in 2035.

5.7.2 Sewer Pipeline Planning Norms and Design Parameters

In accordance with COM design criteria, unplasticised polyvinyl chloride (uPVC) UG class 34 pipes will be used for all sewer reticulation pipelines and will have a minimum pipe size of 160 mm Ø. The minimum gradients for sewer reticulation pipelines will be as shown in Table 5-3.

TABLE 5-3: MINIMUM GRADIENTS FOR SEWER RETICULATION PIPELINES

Sewer Diameter (mm)	Minimum Gradients
160	1:200
200	1:300
225	1:350
250	1:400
>300	1:500

6 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter provides baseline information on relevant environmental (geographical, physical, biological, social, economic, heritage and cultural) aspects associated with the project site and has been informed by specialist studies undertaken as part of the BA process. Specialist reports are included as appendices to this report.

6.1 BIOPHYSICAL

6.1.1 Climate

The project area falls within the subtropical climatic zone. Majority of the rainfall within the region occurs between October and March. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Nelspruit. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. The mean daily temperature ranges from 10° C to a maximum of 29° C.

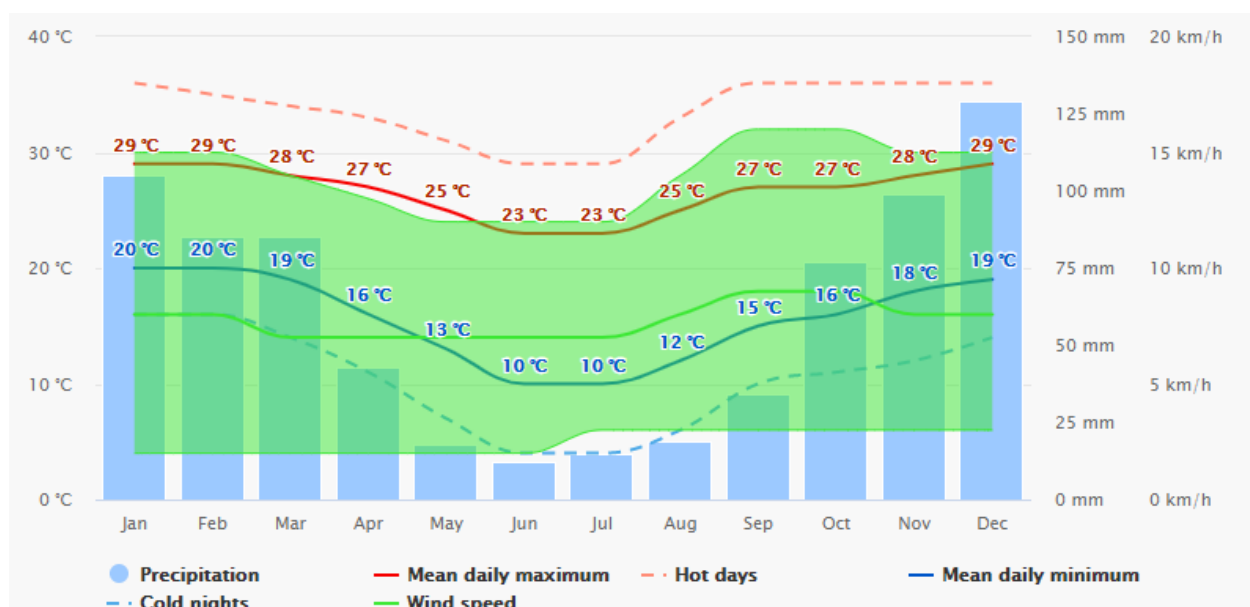


FIGURE 6-1 AVERAGE CLIMATE OF NELSPRUIT (METEOBLUE, 2020)

Rainfall

The average yearly rainfall throughout the small catchment area (9 km²) is 720 mm at the site (Table 6-1). Temperatures range from an average of 19.3 °C (41 – 9.6 °C max range) in the summer to 14 °C (30.9 – -3.3 °C min range) in the winter months.

TABLE 6-1 MEAN MONTHLY RAINFALL AND TEMPERATURE OBSERVED NEAR ROCKY DRIFT

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	139.4	107.8	88.4	41.8	15.0	7.0	9.8	7.1	21.6	60.3	100.4	121.9	720.6
Mean Temperature (°C)	23.2	23.0	22.1	19.6	16.7	14.1	14.1	15.9	18.7	20.0	21.1	22.5	19.3

6.1.1 Topography

The topography of the area slopes predominantly in a westerly direction towards the Rocky Drift WWTW. Elevations across the project area range from approximately 977 m at a localised high point on the south-eastern boundary of Msholozzi to approximately 780 m at the works itself.

6.1.2 Surface water

Surface water resources include drainage patterns and paths of preferential flow of stormwater runoff. Construction activities have the potential to alter the drainage of surface water through the establishment of infrastructure and/or result in the contamination of the surface water resources through leakages or discharge of effluent. To understand the basis of these potential impacts, a baseline situational analysis is described below.

Catchments within the context of South Africa

The proposed project is located within the Inkomati Water Management Area which forms part of the Inkomati-Usethu Water Management Area. The major rivers associated with this water management area include the Crocodile River, Komati River, Sand River and Sabie River. Figure 6-2 and Figure 6-3 depict the local hydrological features


Nearest Watercourse

The nearest watercourse to the Rocky Drift WWTW is two unnamed tributaries with the confluence located directly west of the WWTW discharge point. The unnamed tributaries feed into the Sand River approximately 2.4 km west of the site.

Surface Water Quality

Surface water quality sampling was included as part of the water resource assessment done for the proposed project (TBC, 2017). A monitoring site was selected to effectively determine the current state of the aquatic system, and to determine risks associated with the proposed upgrading of WWTW. Site photographs and GPS coordinates are presented in Table 6-2.

TABLE 6-2: PHOTOS AND CO-ORDINATES FOR SAMPLING SITES (TBC, OCTOBER 2017)

Component / Orientation	Downstream	
High Flow Photograph		
GPS co-ordinates	26°38'56.48"S 28°34'56.02"E	
Site Description	This site was slow-moving waters over mud and gravel substrate. A large amount of aquatic and marginal vegetation was present at the site. The system was characteristic of a wetland.	

Water quality results have been compared to limits stipulated in the Target Water Quality Range (TWQR) for aquatic ecosystems (DWS, 1996a). The results of the October 2017 assessment are presented in Table 6-3 below.

TABLE 6-3: SURFACE WATER QUALITY RESULTS (TBC, OCTOBER 2017)

Site	pH	Conductivity (µS/cm)	DO (mg/l)	Temperature (°C)
TWQR*	6.5-8.5**	<700*	>5.00*	5-30*
Site	7.59	320	6.56	16.3

The pH values for the site fell within the recommended guideline levels during the survey. This suggests that the pH levels did not have a limiting effect on local aquatic biota. Electrical conductivity (EC) is a measure of the ability of water to conduct an electrical current. This ability is a result of the presence in water of ions such as carbonate, bicarbonate, chloride, sulphate, nitrate, sodium, potassium, calcium and magnesium, all of which carry an electrical charge. Conductivity levels were within the recommended guideline levels during the survey.

This indicates that conductivity would not have had a limiting factor of aquatic biota at the time of the survey. The maintenance of adequate Dissolved Oxygen (DO) is critical for the survival of aquatic biota as it is required for the respiration of all aerobic organisms (DWS, 1996a). Therefore, DO concentration provides a useful measure of the health of an ecosystem (DWS, 1996a). The median guideline for DO for the protection of freshwater fish, determined by a variety of fish faunas is > 5 mg/l (Doudoroff and Shumway, 1970 and DWS, 1996). The considered site fell above the guideline values and therefore indicated natural conditions during the survey.

Water temperature plays an important role in aquatic ecosystems by affecting the rates of chemical reactions and therefore also the metabolic rates of organisms (DWS, 1996a). Temperature affects the rate of development, reproductive periods and emergence time of organisms (DWS, 2005b). Temperature varies with season and the life cycles of many aquatic macroinvertebrates are cued to temperature (DWS, 2005b). During the survey water temperatures at the site was within guideline levels during the survey (Table 3-5). Therefore, water temperature was not expected to have a negative effect on the aquatic ecosystem at the time of the surveys.

Surface Water Use

Surface water in the area is potentially used for livestock watering, subsistence agriculture and for limited domestic purposes.

Water Authority

The Rocky Drift WWTW falls within the Inkomati – Usuthu Catchment Management Agency.

Wetlands

One wetland type was identified within the 500m project assessment boundary, namely a Channelled Valley Bottom. Two hydro-geomorphic (HGM) units were considered relevant to this study, with both HGM units adjacent to the project area (HGM 1 & 2). A watercourse (channelled valley bottom wetland) was identified and delineated further downstream of the project area on the right-hand embankment. This system is not considered to be at risk and has not been investigated further for this project. The ecological assessments were only completed for the two HGM units considered to be at risk, namely HGM 1 and HGM 2. (TBC, 2017).

The wetland classification as per the South African National Biodiversity Institute (SANBI) guidelines (Ollis *et al.* 2013) is presented in Table 6-4. Photographs of the identified and delineated wetland systems are presented

in Table 6-5 with a map showing the extent of the delineated watercourses within 500 m of the site (see Figure 3-1).

TABLE 6-4: WETLAND CLASSIFICATION AS PER SANBI GUIDELINE (OLLIS ET AL., 2013)

Wetland Name	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion	NFEPA Wetland Vegetation Group	Landscape Unit	4A (HGM)	4B	4C
HGM1	Inland	North Eastern Highlands	Lowveld Group 7	Valley Floor	Channelled Valley Bottom	N/A	N/A
HGM2	Inland	North Eastern Highlands	Lowveld Group 7	Valley Floor	Channelled Valley Bottom	N/A	N/A

Channelled valley-bottom wetlands are typically found on valley-floors with a clearly defined, finite stream channel and lacks floodplain features, specifically to meanders. Channelled valley-bottom wetlands are known to undergo loss of sediment in cases where the wetlands’ slope is high and the deposition thereof in cases of low relief.

Present Ecological State (PES)

The PES for the assessed HGM unit is presented in Table 3-8. The overall wetland health for HGM1 was determined to be Moderately Modified (C) and HGM2 as Largely modified (D). This suggests that a moderate / large change in ecosystem processes and loss of natural habitats has taken place.

TABLE 6-5: PHOTOGRAPHS OF THE WETLAND SYSTEMS.

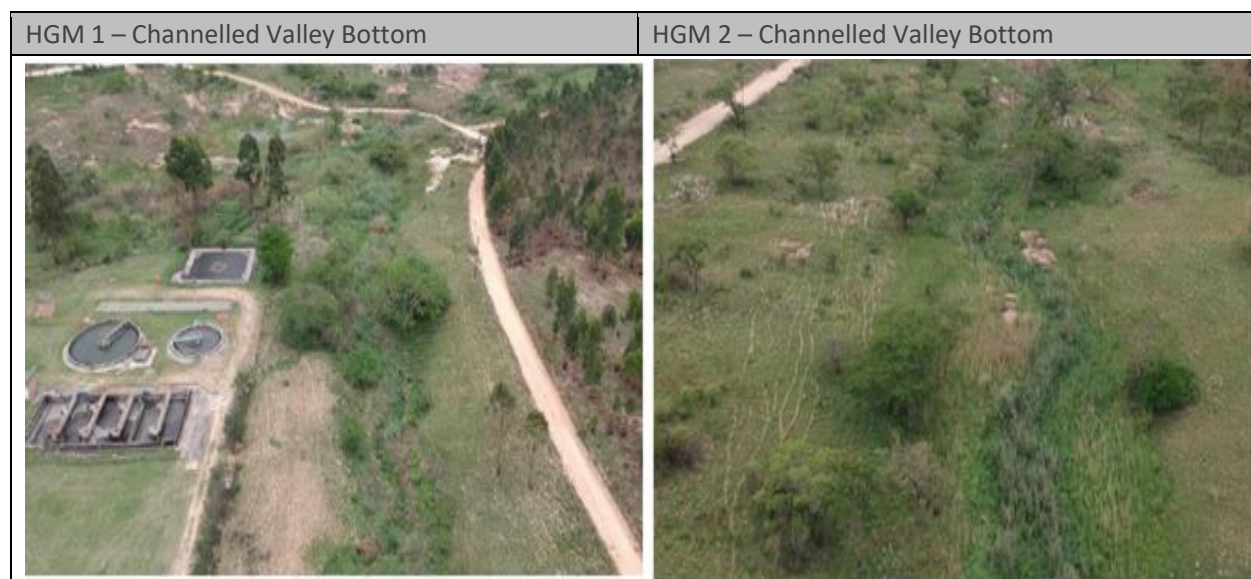


TABLE 6-6: SUMMARY OF THE SCORES FOR THE WETLAND PES (TBC, 2019)

Wetland	Area (ha)	Hydrology		Geomorphology		Vegetation	
		Rating	Score	Rating	Score	Rating	Score
HGM1	1.86	C – Moderately Modified	3.5	C – Moderately Modified	2.1	C – Moderately Modified	3.3
Overall PES Score		3.3		Overall PES Class		C – Moderately Modified	

Wetland	Area (ha)	Hydrology		Geomorphology		Vegetation	
		Rating	Score	Rating	Score	Rating	Score
HGM2	3.89	D: Largely Modified	5.1	C – Moderately Modified	3.8	D: Largely Modified	5.1
Overall PES Score		5.0		Overall PES Class		D: Largely Modified	

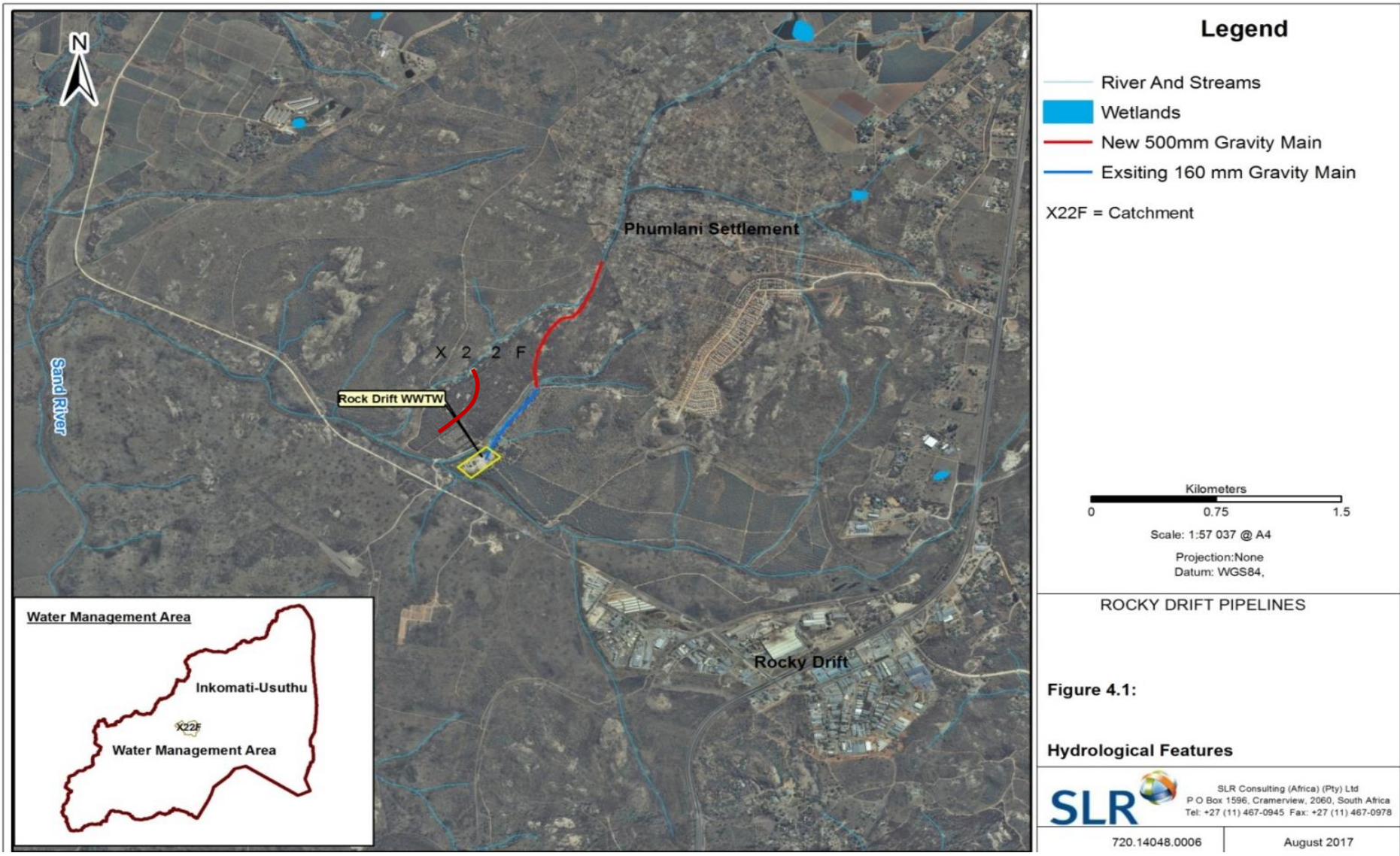


FIGURE 6-2 LOCAL HYDROLOGICAL FEATURES

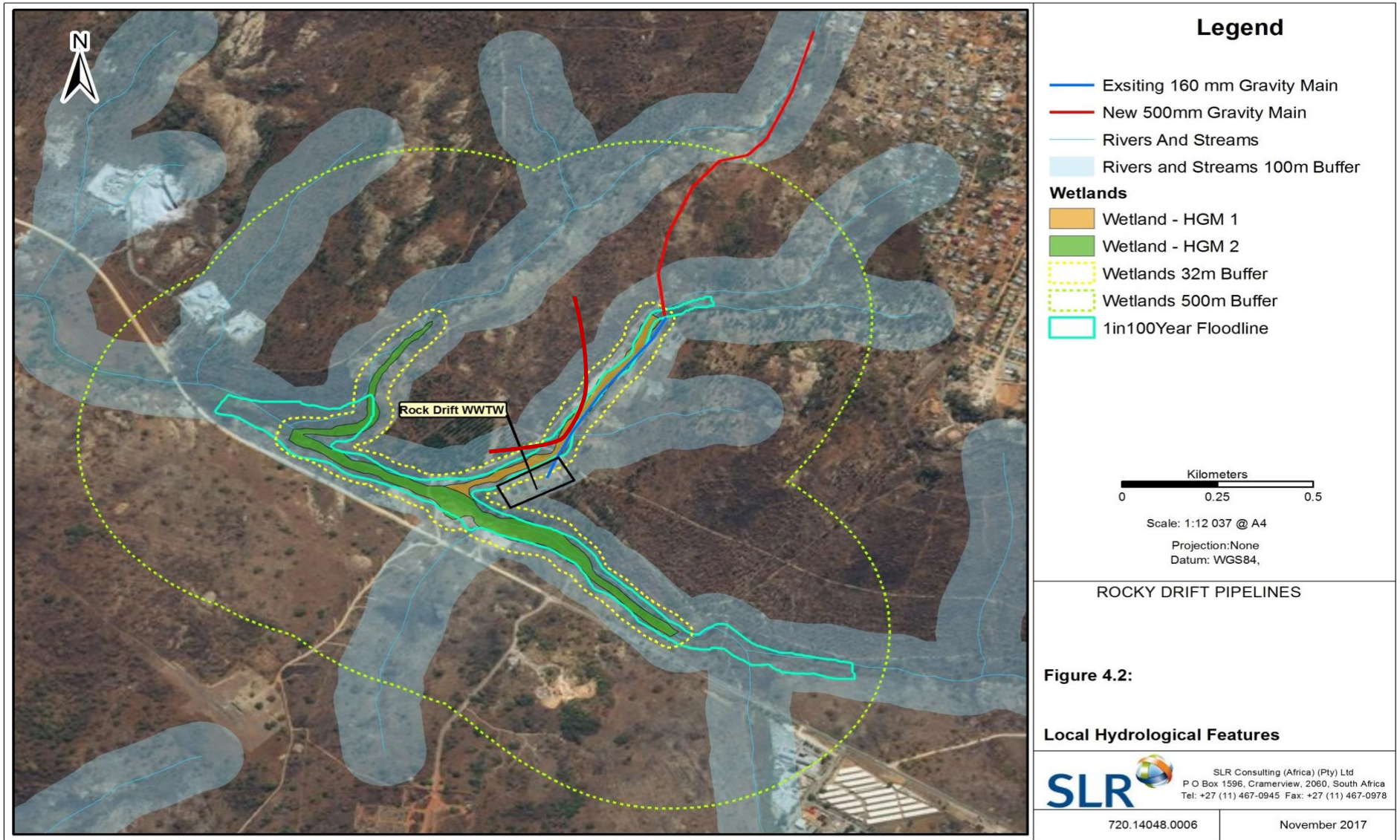


FIGURE 6-3 LOCAL HYDROLOGICAL FEATURES

6.1.3 Soils and agricultural potential

Soil Properties

Soils within the property boundary range from Mispah, to Hutton and Clovelly forms, which dominate most of the site. Some Oakleaf forms occur within the wetland edges. The underlying geological formation is intrusive Mpuluzi Granite of the Archaean Eon and the Swazian Era (NatureStamp, 2020).

Wetland Soil Properties

The Water Resource Assessment (TBC, 2017) identified two dominant wetland soil forms from the area, namely the Dundee and Katspruit forms.

Dryland Agricultural Potential

The land unit consists of a typically red, structureless and highly weathered soil (Ab42). This land type is moderately to heavily textured, commonly of the Hutton form. This land type is considered to be of high agricultural potential. However, it is typically on steeper slopes, in excess of 30° and has a high clay content, which may be a limiting factor for cultivation (NatureStamp, 2020).

Soil depths range from 600 – 1 200 mm and is usually sandy-clay. Rainfall associated with this land type is typically low to moderate.

Potential for Soil Irrigation

The soil would have a high potential for irrigation. However, it is typically on steeper slopes, in excess of 30° and has a high clay content, which may be a limiting factor for cultivation (NatureStamp, 2020).

6.1.4 Land Capability

The land capability within the site is considered to be of high agricultural potential. The land is predominantly used for livestock grazing and subsistence farming

6.1.5 Land Use

The site has been used for the Rocky Drift WWTW since pre 2004. Land use around the Rocky Drift WWTW is a combination of farming, tree plantations, and the nearby town Rocky Drift, consisting of an industrial area, the formalised township of Phumlani and the informal settlement of Msholozzi.

Farming

Land surrounding the Rocky Drift WWTW is mostly used for the following:

- communal livestock grazing; subsistence farming; and/or
- commercial scale agriculture.

Railway

The main railway line connecting Nelspruit, Rocky Drift and White River runs ± 2 km to the east of the site near the town Rocky Drift.

6.1.6 Terrestrial Ecology

A site visit was conducted on the 20 October 2020 by a terrestrial ecologist to conduct necessary in-field procedures to verify the presence of terrestrial ecology within the study area. A terrestrial ecology specialist study report for the Rocky Drift site was compiled by NatureStamp. This terrestrial ecology baseline section has been drafted in accordance with findings from the terrestrial ecology specialist study.

The site sits on a non-perennial tributary of the Sand, approximately 2.44 km to the north. The site has been significantly modified for settlements, brick/granite factories and agricultural activities. According to desktop

information (DWS, 2017), the activities in the area and local land uses have impacted the aquatic system, which have rendered the system as moderately modified. The associated watercourse is predominantly representative of a wetland system, but a site was selected for the analysis of water (in situ) and to collect a water sample. However, this study assessed the reach of the watercourse adjacent to the WWTW (JG Afrika, 2017).

According to Mucina and Rutherford (2006), the area is dominated by Legogote Sour Bushveld (SVi 9), which falls under the lowveld Savanna (SV) bioregion. The vegetation type has been classified as ‘endangered’, and 1.6 % receives formal protection. Of the remaining 50 % only a small percentage is statutorily protected in reserves.

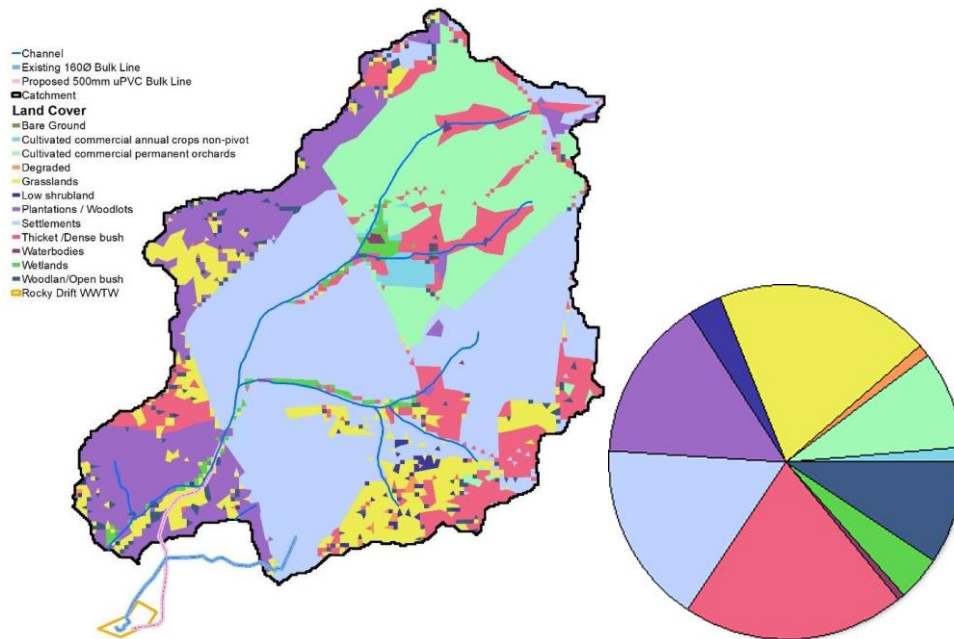


FIGURE 6-4 LAND COVER FOR THE CONTRIBUTING CATCHMENT OF ROCKY DRIFT

a. Vegetation

The site is mapped as by Legogote Sour Bushveld (SVI 9) which is endangered. There were few to no indicators of this vegetation type remaining along the proposed line. A cursory walk through the area was conducted to gain a general overview of the integrity and vegetation assemblage present within the site boundary. The extent of the site is heavily invaded by alien species, with high volumes of litter and waste from nearby settlements. A previous assessment undertaken by The Biodiversity Company (2017), indicates that more indigenous species were present during this period as much of the site has since been cleared for plots. No important or protected species were identified during the site visit (such as Aloes). It is not anticipated that the proposed activity will have major negative consequences for the natural environment or the integrity of the Critical Biodiversity area nor the aquatic Ecological Support Area. The indigenous terrestrial plant species noted on-site are listed in Table 6-7 below.

TABLE 6-7: TERRESTRIAL PLANT SPECIES OBSERVED IN THE STUDY AREA (NATURESTAMP, 2020)

Scientific Name	Common Name	Category
<i>Grasses and Sedges</i>		
<i>*Paspalum dialatatum</i>	Dallisgrass	Alien grass
<i>Imperata cylindrical</i>	Cotton wool grass	Indigenous
<i>Cyperus dives</i>	Cyperus	Indigenous
<i>Schoenoplectus corymbosus</i>	Common sedge basket grass	Indigenous

Scientific Name	Common Name	Category
<i>Cymbopogon caesius</i>	Broad leaf turpentine grass	Indigenous
<i>Hyparrhenia cymbaria</i>	Thatch grass	Indigenous
<i>Eragrostis curvula</i>	Weeping love grass	Indigenous
Herbs		
* <i>Ipomoea crassipes</i> cf.	Morning Glory	Alien Creeper (1b)
* <i>Verbena</i> sp.	Vervain	Alien (1b)
* <i>Persicaria lapathifolia</i>	Pale smartweed	Alien
<i>Dicerocaryum senecioides</i>	Boot protectors	Indigenous
<i>Zornia glochidiata</i>	#N/A	Indigenous Herb
<i>Thunbergia atriplicifolia</i>	#N/A	Indigenous
<i>Lippia javanica</i>	Lemon bush	Indigenous
<i>Hypoxis hemerocallidea</i>	Yellow Stars	Indigenous
Trees and Shrubs		
* <i>Acacia longifolia</i>	Long leaved wattle	1b
* <i>Solanum mauritianum</i> Scop.	Bugweed	1b
* <i>Eucalyptus grandis</i> (hybrid)	Gum	1b
* <i>Musa acuminata</i>	Domestic banana	Alien (cultivar)
* <i>Mangifera indica</i> L.	Mango tree	Alien
* <i>Ricinus communis</i>	Castor oil plant	Alien shrub
* <i>Lantana camara</i>	Tick berry	1b
* <i>Psidium guajava</i>	Guava tree	Alien
<i>Vachellia robusta</i> (Burch.)	Broadpod robust thorn	Indigenous
<i>Vachellia sieberiana</i> (DC.)	Paperbark thorn	Indigenous
<i>Phragmites australis</i> (Cav.) Steud.	Common reed	Indigenous
<i>Bauhinia galpinii</i>	Pride-of-De-Kaap	Indigenous
<i>Syzygium cordatum</i>	Umdoni	Indigenous

*denotes an alien species

Sensitive Areas Within the Project Area

According to the CBA database, the site is very degraded and transformed. . The overall project area, would have been Legogote Sour Bushveld which is considered endangered, however the species composition no longer is indicative of this vegetation type. The site is not within 5 km of a nature reserve. The most sensitive area within the footprint are the watercourse crossing areas (NatureStamp, 2021).

Endangered or Rare Species

No red data species are likely to occur at the site as there is currently an existing WWTW in operation. Further no species of conservation concern were identified by the Terrestrial Ecologist during the site visit on 20 October 2020. An estimated 242 bird species, 25 frog species, 304 butterfly species, 46 mammal species and 76 reptile species have been recorded in the pentad. In terms of species of conservation concern, 5 bird species, no frog species, no butterfly species, 6 mammal species and 3 reptile species have been recorded in the pentad. The DEFF Screening Tool predicts the presence of one mammal, one reptile and one insect species, with the mammal species (Rough-haired Golden Mole) potentially occurring on site (NatureStamp, 2021).

b. Faunal ecology

No species of conservation concern were identified during the site visit. An estimated 242 bird species, 25 frog species, 304 butterfly species, 46 mammal species and 76 reptile species have been recorded in the pentad. In terms of species of conservation concern, 5 bird species, no frog species, no butterfly species, 6 mammal species and 3 reptile species have been recorded in the pentad. The DEFF Screening Tool predicts the presence of one

mammal, one reptile and one insect species, with the mammal species (Rough-haired Golden Mole) potentially occurring on site.

The site potentially provides habitat for reproducing fauna, although unlikely for species of conservation concern (see probability of occurrence in Table 6-8). The linear nature of the proposed activities reduces the likelihood of affecting fauna on site, as disturbance will occur in a small corridor.

The site may act as an ecological corridor linking drainage lines and wetlands in the greater area. It must be noted that the disturbance is already in place and ecological functioning is at a low level. The Mpumalanga Biodiversity Sector Plan has highlighted this area as heavily modified, and the site assessment concurs with this assessment. If the area is functioning as an ecological corridor, the small area of disturbance of a linear activity will not substantially degrade the functioning of the system. Additionally, rehabilitation and maintenance of the vegetation would likely increase the faunal diversity on site if done correctly and in line with the EMPr.

TABLE 6-8: LIST OF ANIMAL SPECIES OBSERVED IN THE PROJECT AREA

Taxon	Scientific Name	Common Name	Conservation Status
Mammals	<i>Cephalophus natalensis</i>	Red Duiker	Near Threatened (2016)
	<i>Cercopithecus albogularis erythrarchus</i>	Samango Monkey (subsp. erythrarchus)	Near Threatened (2016)
	<i>Leptailurus serval</i>	Serval	Near Threatened (2016)
	<i>Aonyx capensis</i>	African Clawless Otter	Near Threatened (2016)
	<i>Panthera pardus</i>	Leopard	Vulnerable (2016)
	<i>Lycaon pictus</i>	African wild dog	Endangered (2016)
Birds	<i>Buteo trizonatus</i>	Forest Buzzard	LC, NT
	<i>Alcedo semitorquata</i>	Half-collared Kingfisher	NT, LC
	<i>Falco biarmicus</i>	Lanner Falcon	VU, LC
	<i>Podica senegalensis</i>	African Finfoot	VU, LC
	<i>Gorsachius leuconotus</i>	White-backed Night-Heron	VU, LC
Reptiles	<i>Chamaesaura macrolepis</i>	Large-scaled Grass Lizard	Near Threatened (SARCA 2014)
	<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	Near Threatened (SARCA 2014)
	<i>Crocodylus niloticus</i>	Nile Crocodile	VU (SARCA 2014); LC (global, IUCN)

Mpumalanga Biodiversity Sector Plan (BSP) (2014)

The site has been classified as heavily modified according to the Mpumalanga Biodiversity Sector Plan (2014). This includes areas that are significantly modified from the natural state, and in which biodiversity pattern and ecological function has been lost to the point that it is not worth considering these areas for any kind of conservation action due to their poor ecological state. The degraded state of the study site falls in line with the CBA description from the Mpumalanga BSP.

6.1.7 Geology

The Rocky Drift site is underlain by Porphyritic Potassic Granite of the Nelspruit Suite (Zmz). This is considered intrusive of the Archaean Eon and the Swazian Era. This granite is grey to white. According to Cairncross (2004), Granite is a coarse-grained igneous rock that forms from the crystallization of molten magma rich in silica. It is composed mainly of quartz and feldspars, notably the potassium-bearing varieties orthoclase and microcline. Other minerals include mica and hornblende. Granitic outcrops were identified around the site. This is further substantiated by the Afrimat quarry which is 850 meters north west of the site (NatureStamp, 2020).

6.1.8 Groundwater

A geohydrological specialist study report for the Rocky Drift site was compiled by NatureStamp. This groundwater baseline section has been drafted in accordance with findings from the geohydrological specialist study.

Presence of Boreholes

Numerous boreholes were identified within the vicinity of the Rocky Drift WWTW as per the National Groundwater Archive (NGA). The boreholes are detailed in Figure 6-5 and presented spatially in Figure 6-5

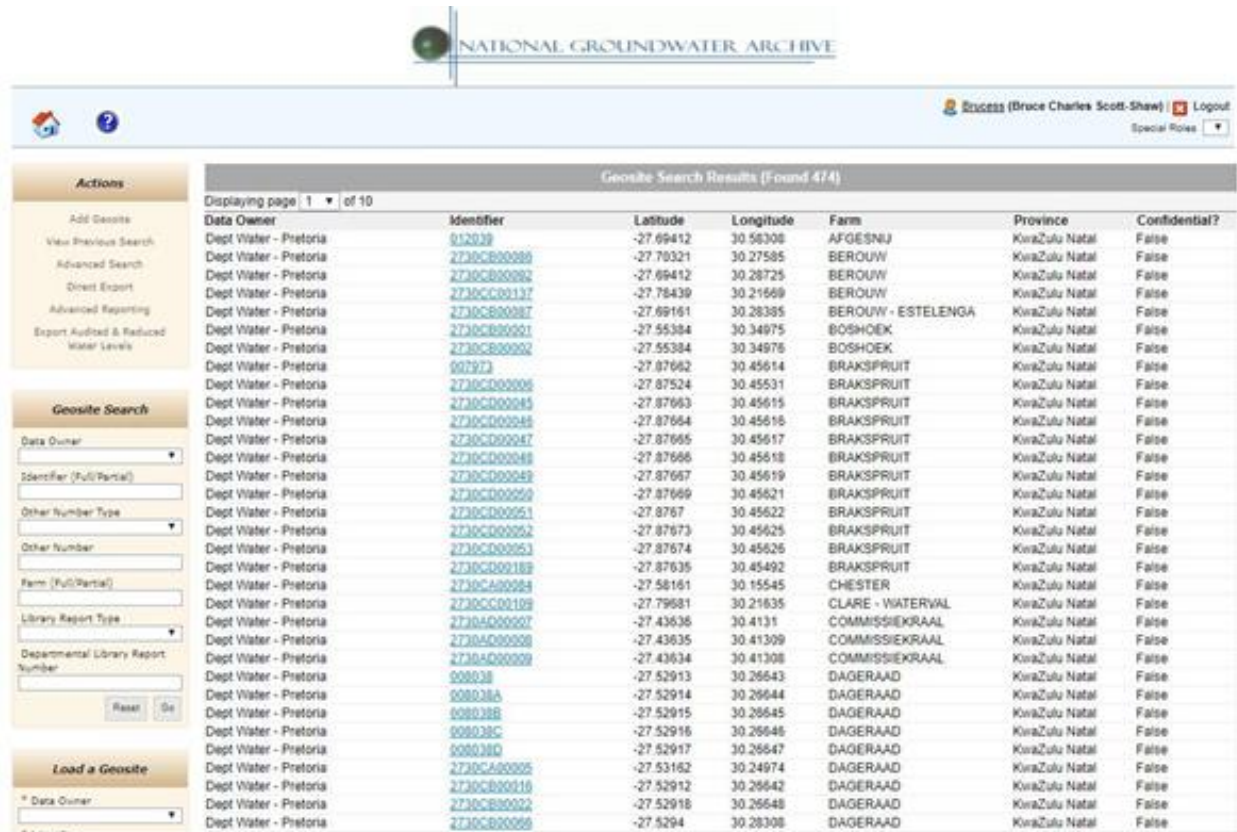


FIGURE 6-5: NATIONAL GROUNDWATER ARCHIVE

Yield of Boreholes

The groundwater yield in the area would not be adequate to meet irrigation or mining requirements. However, basic potable needs could be met on-site. Data obtained from the groundwater archives are provided in Table 6-9. Based on the information obtained from the site and desktop assessment, the expected sustainable yield would be 0.55 l/s (NatureStamp, December 2020).

TABLE 6-9: GROUNDWATER RESOURCES FOR THE X22F AQUIFER (NATURESTAMP, DECEMBER 2020)

Aquifer Yield (Mm3/a)	Allocable (Mm3/a)	Firm Yield (l/s/km2)	Existing Use (9l/s)	GW Level (mbgl)	Recharge (%)	Baseflow / EWR (Mm3/a)
Unknown	Unknown	0.009	0.5	17.9	7.9	46.1

Groundwater Use

The majority of the groundwater within the vicinity of the Rocky Drift WWTW is used to supply drinking water for livestock, commercial agriculture and in some instances supply water for domestic use. The site is a suitable

distance away from any active boreholes to have any direct impacts. There are no groundwater users down gradient of the site (NatureStamp, December 2020).

Groundwater Quality

From a groundwater quality perspective, nearby groundwater users will not be affected by the construction of the bulk sewer pipeline. This is based on the following findings/reasons (NatureStamp, December 2020):

- The proposed site is already transformed and is subject to continual effluent discharge from the nearby Phumlani settlement;
- The connection of this area will result in a net gain as less untreated effluent will be discharged throughout the site;
- The site is a suitable distance away from any active boreholes to have any direct impacts. There are no groundwater users down gradient of the site; and
- The infiltration rate is low.

From a groundwater quality perspective, the downstream users will not be affected by the operation of the bulk line. This is based on the following findings/reasons:

- The connection of this area will result in a net gain as less untreated effluent will be discharged throughout the site;
- The site is a suitable distance away from any active boreholes to have any direct impacts. There are no groundwater users down gradient of the site;
- The development would follow suitable contamination measures to ensure no contamination occurs;
- From a groundwater quantity perspective, the downstream users will not be affected by the construction or operation of the bulk line as the construction requires very little water and the operation does not require water.

It is unnecessary for an observation borehole to be installed to monitor the groundwater quality. There is already a borehole on-site adjacent to the WWTW (NatureStamp, December 2020). This borehole should be tested every 6 months for the WWTW (not the bulk line), to ensure that groundwater contamination does not occur with the addition of more effluent. Focus should also be placed on ensuring the integrity of sensitive surface water resources.

6.1.9 Noise

The greater area is generally defined by urban features and is subjected to elevated noise levels. Existing noise within the vicinity of the Rocky Drift WWTW pipeline is mainly caused by surrounding farming activities and localised traffic.

6.1.10 Air quality

Existing sources of emissions in the region are listed below:

- fugitive sources including vehicle entrainment of dust from local paved and unpaved roads, veld fires, wind erosion from open areas and dust generated by agricultural and mining activities;
- vehicle tailpipe emissions from public roads;
- household fuel combustion (particularly wood and paraffin); and
- odour from the WWTW ponds.

6.2 SOCIO-ECONOMIC

The consumers residing within Phumlani are provided with a water supply via metered house connections. There are currently no water services available within Msholozzi although town planning approval has been obtained for the establishment and formalisation of the township which would include the provision of formalised water services.

With regards to sanitation services, the existing industries within Rocky Drift and the Phumlani township are already served by a waterborne sewerage system whilst the Msholozzi area has no sanitation services at present. Sanitation services in Msholozzi will however be provided as part of the township formalisation process. The future development areas are applications for proposed land developments (residential and industrial) that have been currently submitted to the COM for approval. It is noted that the exact details of the types of industries that will be developed within the designated industrial areas has not yet been determined. As such, assumptions were made regarding which areas are to be zoned as “light industry” and “heavy industry”. Table 6-10 below provides centrally located coordinates and sizes (in km²) for the various existing and future residential and industrial areas falling within the project area.

TABLE 6-10 EXISTING AND FUTURE DEVELOPMENT AREAS FALLING WITHIN THE PROJECT AREA

Project Areas	Land Use	Area (ha)
Existing Areas		
Phumlani	Low Income Households	37.0
Light Industrial Areas	Light industrial	45.0
Heavy Industrial Areas	Heavy industrial	43.0
Business / Commercial	Commercial	3.0
Subtotal – Existing Areas		128.0
Future Development Areas		
Msholozzi	Low Income Households	344.0
Rocky Drift X29	Medium Income Households	15.4
White River X75	High Income Households	3.1
Rocky Drift X35	Commercial	21.8
White River X64	Light Industry	1.6
Rocky Drift X17	Light Industry	6.0
Rocky Drift X18	Light Industry	0.5
Rocky Drift X19	Light Industry	2.6
Rocky Drift X31	Light Industry	8.0
Rocky Drift X34	Light Industry	34.5
Rocky Drift X36	Light Industry	17.3
Rocky Drift X42	Light Industry	6.4
White River X40	Light Industry	3.4
Rocky Drift X28	Light Industry	14.2
Rocky Drift X30	Light Industry	11.3
Rocky Drift X33	Light Industry	6.3
Rocky Drift X38	Light Industry	74.5
Subtotal – Future Development Areas		570.9
Total – Existing and Future Areas		698.9

6.2.1 Land Use and Socio-Economic Profile

The COM has experienced significant economic growth in recent years as a result of commercial and industrial development linked to the Maputo Corridor. The tourism potential of the area has also contributed significantly to this growth as a result of having the Kruger National Park (part thereof) and other world-class nature conservation areas located within the COM’s area of jurisdiction.

The economy consists of divergent sub economics as follows:

- Government and public service: Public spending (infrastructure spending, salaries) is an important source of capital for the area.
- Services and retail: Numerous shopping centres exist in the major towns of Nelspruit and White River as well as within the other smaller towns throughout the COM.

- Agriculture: Extensive irrigated agriculture takes place throughout the COM, especially in the areas around the major towns of Nelspruit and White River, with related agro-industries found within the towns.
- Tourism: There are numerous world-class game reserves and nature conservation areas located within the area such as the Kruger National Park. These reserves not only provide a significant contribution to the economy of the area but also provide an important source of employment.
- Informal: Arts and crafts traders are found on access roads to the game reserves within the COM.

There has been a major increase in population growth within the COM in the past, particularly in the towns of Nelspruit and White River which can be partly attributed to the influx of foreign nationals from Mozambique and Swaziland seeking employment. However, this growth is likely to be partly offset by health issues (particularly HIV / AIDS).

According to the COM's Water Services Development Plan (WSDP), 65 % of the COM's population earns less than R 800 / month. This pattern is likely to follow the same trend within the project area with large numbers of people depending on social grants.

In dealing with economic challenges like employment creation, skills etc., the COM still has a high indigent profile which is significantly impacted by the high rates of unemployment, the high dependency on social grants and the prevailing health conditions as a result of HIV / AIDS. This equates to a structural unemployment problem in the areas where highly skilled labour is required.

6.3 HERITAGE AND CULTURAL RESOURCES

A heritage impact assessment (HIA) for the Rocky Drift site was compiled by Johan A. van Schalkwyk. This heritage and cultural baseline section has been drafted in accordance with findings from HIA. The project area is dominated by commercial farms with cultivated fields and grassland cover as well as some coal mining activities. Existing databases indicate that some historical and archaeological sites do occur within the greater project area however, none of these occur closer than 2 km from the proposed pipeline trajectory. The ground survey as per the HIA indicates that no heritage sites were identified within a 50 m of the project footprint. The area is also not part of any known cultural landscape.

A paleontological screening was conducted using the South African Heritage Resource Agency sensitivity screening map (<https://sahris.sahra.org.za/map/palaeo>). The findings from the site (refer to Figure 6-6) indicates that the project area has an insignificant to zero sensitivity of fossil remains to be found and therefore a paleontological assessment is not required.

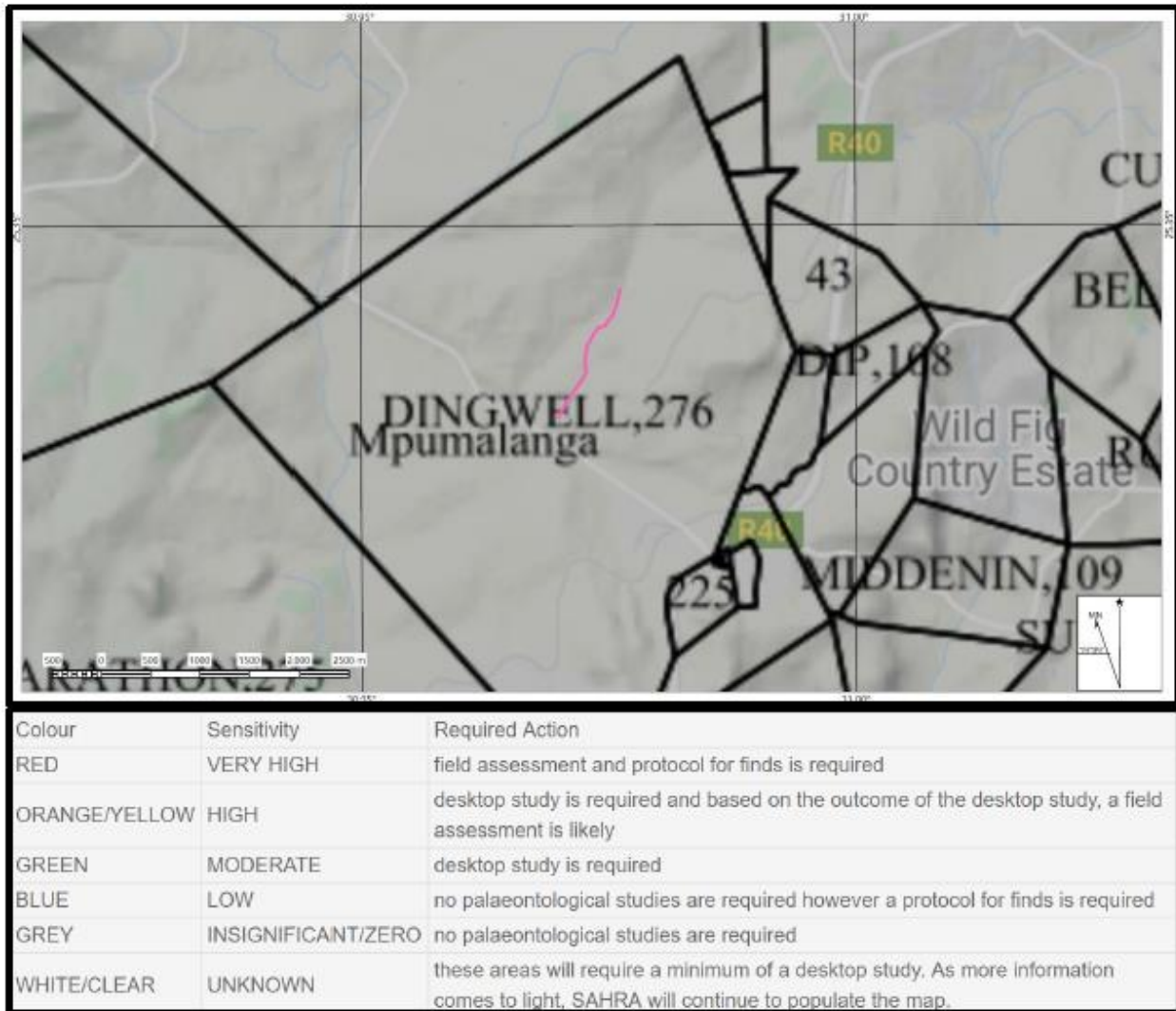


FIGURE 6-6 THE PALAEOLOGICAL SENSITIVITY OF THE PROJECT AREA

7 IMPACT DESCRIPTION AND ASSESSMENT

The potential impacts described in this chapter have been identified by the BA project team with input from specialists and I&APs. The sequence in which these issues are listed are in no order of priority or importance. The assessment and rating of potential impacts has been informed by specialist studies. These are attached as appendices to the BAR.

All identified impacts are considered in a cumulative manner such that the impacts of the current baseline conditions on and surrounding the site and those potentially associated with the project are discussed and assessed together.

The mitigated assessment assumes that technical design controls, as included in the project scope (see Section 4), would be included in the detailed design of the pipelines and associated water infrastructure and implemented accordingly.

7.1 IMPACT ON BIOPHYSICAL ENVIRONMENT

7.1.1 Issue: Loss of agricultural soil resources through physical disturbance

Description of impact

Construction and operation of the infrastructure and related services has the potential to damage soil resources through physical disturbance including removal, compaction and/or erosion.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable.

Impact assessment

Site preparation and earthworks will require the removal and stockpiling of soil. Improper recovery and separation of soils could result in topsoil being left under infrastructure (such as the clear water storage tanks) or mixed with fill and spoil material and thus lost. Improper handling of the soils could compromise the soil structure and functionality. Vehicle movement and machinery could result in the compaction of soils. In the case of compaction the soils' functionality would firstly be compromised through a lack of rooting ability and aeration, and secondly the compacted soils are likely to erode because with less inherent functionality there would be little chance for the establishment of vegetation and other matter that naturally protects the soils from erosion. Disturbed and exposed soils are susceptible to erosion (through action of wind or water) as a result of the lack of vegetative cover and friability of the soil structure. Eroded soils would be lost from the area of disturbance.

The above impacts are expected to occur during the construction phase. It is expected that a site/servitude boundary would be established at the start of construction and that impacts would therefore be limited to the project site and servitude. During operations, once landscaping has taken place, no further physical disturbance of soils is expected.

Stripping and handling of soils would affect the inherent functionality of the soil. However the soil will not be permanently lost from the area as soil will be replaced once pipelines have been laid down. The loss of agricultural soil resources through physical disturbance is considered to be of **MEDIUM** significance without mitigation and **LOW** significance with mitigation (see Table 7-1 below).

Mitigation

The following measures are recommended (see EMPr in Appendix H):

- Establish the site boundary/servitude (as presented in this report) at the start of construction and keep all activities within this boundary/servitude (maximum working servitude to remain < 8 m).
- Restrict vehicle and machinery movement to designated areas.
- Strip, store and maintain soils in line with the soil management plan (this includes measures for erosion control).
- Soil from the pipeline trenches must be carefully excavated with the subsoils being stockpiled separately from the topsoil. When the trench is refilled, the subsoils must go back first, and then the topsoil. Gentle compaction must be done. If there is to be surplus soil as a result of the volume of the pipe and bedding, then the quantity of subsoil returned must be reduced. All topsoil must be used as it will contain seeds of indigenous plants. The surplus subsoil may be scattered thinly in the area.
- Ensure that the duration for which soils are stripped and stored is kept to a minimum with soils utilized to rehabilitate the pipeline footprint as construction progresses.
- Rehabilitate and landscape disturbed areas not occupied by infrastructure.

Monitoring

The following monitoring is recommended (see EMPr in Appendix H):

- Visual inspections of disturbed areas for erosion and rehabilitation status.

TABLE 7-1: IMPACT SUMMARY – PHYSICAL DISTURBANCE OF SOIL RESOURCES

Issue: Loss of agricultural soil resources through physical disturbance		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minimal change or disturbance
Duration	Long-term	Short-term
Extent	Whole site	A part of the site
Consequence	Medium	Low
Probability	Definite	Definite
Significance	Medium	Low
Nature of cumulative impacts	Loss of soils due to other developments within the same area could contribute to cumulative impacts.	
Degree to which impact can be reversed	The loss of <i>in-situ</i> soils is reversible, with the majority of removed soils replaced within a short timeframe	
Degree to which impact may cause irreplaceable loss of resources	Low	
Degree to which impact can be mitigated	High	
Residual impacts	Once soil is removed from <i>in situ</i> , handled, and then replaced <i>in situ</i> during rehabilitation, the natural soil functionality would be temporarily reduced.	

7.1.2 Issue: Loss of agricultural soil resources through contamination

Description of impact

Construction of the pipeline has the potential to damage soil resources through contamination.

Soil, and more specifically topsoil, is considered a valuable resource that supports a variety of ecological systems including providing a growth medium for most vegetation. Its disturbance and loss should be prevented wherever this is avoidable.

Impact assessment

Contamination of soil resources could occur through potential spillages from the use and handling of fuels, lubricants and other potential contaminants. Additionally, dirty surface water runoff or effluent from activity areas (such as leaking portable latrines) and poor waste management practices could result in soil contamination. This could alter the soil composition, negatively impacting on the chemistry of the soils such that current growth conditions are impaired. Contamination of soils also has the potential to indirectly (through runoff and seepage) impact surface and groundwater resources.

Contamination of soil resources is considered to be of **MEDIUM** significance without mitigation and **VERY LOW** with mitigation (see Table 7-2 below).

Mitigation:

The following measures are recommended (see EMPr in Appendix H):

- Prevent and manage spills.
- Manage waste generated on site.
- Handle major spillage incidents in accordance with the emergency response procedure.

Monitoring

The following monitoring is recommended (see EMPr in Appendix H):

- Visual inspections of disturbed areas for signs of contamination.

TABLE 7-2: IMPACT SUMMARY – CONTAMINATION OF SOIL RESOURCES

Issue: Loss of agricultural soil resources through contamination		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Moderate change or disturbance
Duration	Medium term	Short term
Extent	A part of the site	A part of the site
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	Medium	Very Low
Nature of cumulative impacts	Contamination incidents from surrounding land uses could add to the loss of resources if not mitigated.	
Degree to which impact can be reversed	Partially reversible where bioremediation of soils takes place.	
Degree to which impact may cause irreplaceable loss of resources	High	
Degree to which impact can be mitigated	High	
Residual impacts	With mitigation, no residual impacts are expected.	

7.1.3 Issue: Loss of terrestrial habitat and biodiversity through physical disturbance

Description of impact

Construction of the pipeline has the potential to damage soils and vegetation and the biodiversity these support through physical removal and disturbances, both direct and indirect.

Natural habitat and biodiversity are considered important natural resources that support sustainable ecological systems and ultimately provide ecosystem services that add value to human life. The indigenous vegetation in the area is dominated by Legogote Sour Bushveld (SVi 9), which falls under the lowveld Savanna (SV) bioregion.

The vegetation type has been classified as ‘endangered’ and is considered to be “Vulnerable” as a result of areas lost to urban development, agriculture, bush encroachment, and large state dams. There were few to no indicators of this vegetation type remaining along the proposed line during the site walkover.

The vulnerable nature of the vegetation combined with development in surrounding areas near towns and villages has resulted in limited species diversity and a habitat that is considered to be of moderately low to low ecological importance and sensitivity.

Impact assessment

Site preparation and earthworks would result in removal of vegetation and soils. The development of infrastructure over these areas would temporarily transform the site, rendering it unavailable as habitat for flora and fauna. Vehicle and machinery movement, material storage and handling and other construction activities are likely to result in trampling of vegetation and compaction of soils in the adjacent areas. This would reduce the habitat quality and alter biodiversity. Such areas can be fully restored during landscaping and rehabilitation such that certain naturally occurring flora and fauna occupy the site.

The increased level of activity (the presence of people, vehicles, machinery and related noise) would render the site and adjacent surrounds temporarily less suitable as habitat for faunal species, except those adapted to high levels of anthropogenic activities. The establishment and spread of alien invasive floral species as a result of disturbances could further degrade habitat and limit food availability of various faunal species.

The above impacts are expected to mainly occur during the construction phase. It is expected that a site / servitude boundary would be established at the start of construction and that direct impacts would therefore be limited to the project site / servitude. Once landscaping and rehabilitation of project footprints has taken place, no further physical disturbance of vegetation is expected. The impact on the terrestrial biodiversity resources is considered to be of **VERY LOW** significance without mitigation and **INSIGNIFICANT** significance with mitigation during construction (see Table 7-3 below).

Mitigation

The following measures are recommended (see EMPr in Appendix H):

- Implement soil mitigation measures.
- Manage waste.
- The soil on top of the trench must be reseeded with a mix of appropriate grass species but, if any grass clumps which were removed still remain viable, they may be replanted.
- Manage alien invasive plant species.
- The trench must be monitored for failure of the vegetation to recover and for other problems such as invasion of weed species or development of erosion gullies.
- Handle major spillage incidents in accordance with the emergency response procedure.
- At the completion of work the site must be cleaned and all waste materials or litter must be removed to an approved site for disposal.

TABLE 7-3: IMPACT SUMMARY – LOSS OF TERRESTRIAL HABITAT AND BIODIVERSITY

Issue: Loss of terrestrial habitat and biodiversity through physical disturbance		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor (Slight) change or disturbance
Duration	Short Term. Will reverse itself in time	Short Term. Will reverse itself in time
Extent	Whole Site	A part of the site
Consequence	Low	Very low
Probability	Unlikely	Unlikely

Significance	Very Low	Insignificant
Nature of cumulative impacts	Despite the vegetation along most of the pipeline routes already having been degraded or lost, the impact of the pipelines is not a cumulative threat since the footprint will be able to repair itself within the space of a few years.	
Degree to which impact can be reversed	Mitigatory measures have been put forward. If they are properly implemented, then the impacts will become insignificant.	
Degree to which impact may cause irreplaceable loss of resources	The pipeline routes do not contain any known species of conservation concern or other irreplaceable resources.	
Degree to which impact can be mitigated	Moderate.	
Residual impacts	There should be no residual impacts.	

7.1.4 Issue: Alteration of drainage patterns affecting the flow of water in downstream systems

Description of impact

Water for the project will be sourced from the City of Mbombela Local Municipality and therefore no water will be abstracted from the site or from nearby water resources.

The project will potentially negatively affect drainage patterns whilst trenching is being done. If not mitigated, this can potentially alter drainage patterns. No discharges are expected to take place as part of the project activities.

Impact assessment

Alterations to drainage patterns would commence at the start of the construction phase as the pipelines are laid down. Without considering the flood-lines and in the absence of storm water controls, this could result in a change in drainage patterns. With planned construction methods and mitigation, only storm events greater than 1:50 would likely result in noticeable increases in runoff. This would, however, be for short periods of time, during/following a storm event.

An alteration of drainage patterns affecting the flow of water in downstream systems is assessed to be of **LOW** significance without mitigation and **VERY LOW** with mitigation (see Table 7-4 below).

Mitigation

The following measures are recommended (see EMPr in Appendix H):

- Undertake regular inspections of trenches to ensure trench digging ahead of pipeline installation does not outpace rehabilitation.

TABLE 7-4: IMPACT SUMMARY – ALTERATION OF DRAINAGE PATTERNS

Issue: Alteration of drainage patterns affecting the flow of water in downstream systems		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Minor change or disturbance	Negligible change or disturbance
Duration	Very Short	Very Short
Extent	Beyond the site boundary, affecting immediate neighbours	A part of the property
Consequence	Low	Very Low
Probability	Probable	Possible

Significance	Low	Very Low
Nature of cumulative impacts	The limited scope of surface activities whilst constructing the underground pipelines ensures that there will be no cumulative impact once the site has been rehabilitated.	
Degree to which impact can be reversed	Fully on completion of rehabilitation prior to commencement of operations.	
Degree to which impact may cause irreplaceable loss of resources	Unlikely.	
Degree to which impact can be mitigated	High with the implementation of appropriate engineering design.	
Residual impacts	None expected.	

7.1.5 Issue: Contamination of surface water resources

Surface water is a valuable resource and is defined as water on the surface of continents such as in a river, lake, or wetland. Construction activities within the confines of these watercourses and within close proximity present a risk of surface water contamination. During construction there is the potential for contaminated stormwater runoff to affect watercourses.

Impact assessment

Excavation and earthworks within the close proximity to watercourses and the clearing of vegetation within the surrounds could increase sediment loads deposited into the watercourses increasing turbidity which impacts on photosynthetic processes and sedimentation which results in habitats being inundated with sediments.

Operation of earth moving machinery within the riparian areas could present a source of potential hydrocarbon contamination.

Without mitigation, the significance of the impacts is **Medium** largely as a result of the low ecological functionality of the existing environment. Employing mitigation measures would reduce the intensity of impacts resulting in a **Very Low** significance should they occur (see Table 7-5 below).

Mitigation

The following measures are recommended (see EMPr in Appendix H):

- Implement spill prevention and waste design controls measures.
- Implement soil mitigation measures.

TABLE 7-5: IMPACT SUMMARY – CONTAMINATION OF SURFACE WATER

Issue: Contamination of surface water quality		
Phases: Planning and Design, Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change or disturbance	Minor (Slight) change or disturbance
Duration	Short term	Short term
Extent	Whole site	A part of the site boundary
Consequence	Medium	Low
Probability	Possible	Conceivable
Significance	Low	Very Low
Nature of cumulative impacts	Developments within the area could contribute to surface water impacts depending on the type of development and if it is associated with any potential surface water contamination sources.	

Degree to which impact can be reversed	Possible with filtration and treatment.
Degree to which impact may cause irreplaceable loss of resources	Unlikely, with mitigation.
Degree to which impact can be mitigated	High
Residual impacts	Once soil is removed from <i>in situ</i> and handled, the area of land and natural soil functionality would be permanently lost.

7.1.6 Issue: Increase in disturbing noise levels affecting potential human receptors

Description of impact

Construction activities as well as project-related traffic present activities that would contribute to current ambient noise levels. Project activities have the potential to cause a noise disturbance and/or nuisance at potentially sensitive receptors. Noise pollution will have different impacts on different receptors because some are very sensitive to noise and others are not. It is expected that towns and residential areas would be most vulnerable to noise disturbances from the proposed project.

Impact assessment

Noise impacts are likely to be temporary and localised. It is anticipated that as the pipeline construction progress, so too shall the construction equipment (plant) move to cater for linear construction of the pipelines. No construction activities will take place during the night time.

When considering material handling and vehicle movement on site, these will make use, to varying degrees, of reverse alarms and hooters. If unmitigated these could result in numerous noise complaints.

The impact on noise receptors during the construction phase is considered to be of **LOW** significance without mitigation and **VERY LOW** significance with design controls and mitigation (see Table 7-6 below).

Mitigation

The following measures are recommended (see EMPr in Section Appendix H):

- Keep all equipment and machinery in proper working order.
- Minimise vehicle-related noise emissions.
- Implement an equipment and vehicle maintenance programme.
- Register and address any noise complaints.

TABLE 7-6: IMPACT SUMMARY – INCREASE IN DISTURBING NOISE

Issue: Increase in disturbing noise levels affecting potential receptors		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change, disturbance or discomfort	Negligible change, disturbance or nuisance
Duration	Very short, until end of construction	Very short, until end of construction
Extent	Beyond the site boundary, affecting immediate neighbours	A part of the site
Consequence	Low	Very low
Probability	Probable	Probable
Significance	Low	Very low

Nature of cumulative impacts	Due to the temporary generation of noise during construction phase only, no cumulative impacts are anticipated.
Degree to which impact can be reversed	High
Degree to which impact may cause irreplaceable loss of resources	Not applicable.
Degree to which impact can be mitigated	High.
Residual impacts	With mitigation it is unlikely that noise induced stress and related health issues would be felt beyond the construction phase.

7.2 IMPACT ON SOCIO-ECONOMIC ENVIRONMENT

7.2.1 Issue: Economic impact (positive)

Description of the impact

The development of a project of this nature has the potential to impact on the local and regional economy positively by freeing up rural people to use time for other social and economic activities rather than travelling long distances to collect water from rivers or hand pumps. Supplying the population with safe and reliable potable water will also help slow the rate of rural emigration to urban centres through the provision of essential services in the rural areas. Many of the built-up areas support retail and tourism industries. These sectors require a safe and reliable potable water supply and will in turn contribute to the maintenance of water infrastructure through water tariffs and municipal rates.

Impact assessment

There is predicted to be a direct positive economic impact on the local, regional and national economies in both the construction and operational phases. Approximately 286 temporary jobs would be created in the construction phase only.

The impact would occur from the start of the construction phase through to the operational phase. The overall significance is likely to be a **MEDIUM positive** without mitigation increasing to a **HIGH positive** with mitigation (see Table 7-7 below).

Mitigation

The following measures are recommended (see EMPr in Appendix H):

- Implement local recruitment and procurement policies and procedures
- Implement health management plan for employees.

TABLE 7-7: IMPACT SUMMARY – ECONOMIC IMPACT (POSITIVE)

Issue: Economic impact (positive)		
Phases: All		
Criteria	Without Mitigation	With Mitigation
Intensity	Moderate change	Prominent change
Duration	Short-term	Short-term
Extent	Local area, extending far beyond the site boundary	Local area, extending far beyond the site boundary
Consequence	Medium	High
Probability	Definite	Definite
Significance	Medium (positive)	High (positive)

Nature of cumulative impacts	Any other feasible developments within the area would contribute to a positive economic impact.
Degree to which impact can be reversed	Not applicable
Degree to which impact may cause irreplaceable loss of resources	Not applicable
Degree to which impact can be mitigated	High
Residual impacts	Positive economic impacts could extend beyond the construction phase through training and skills development.

7.3 IMPACT ON HERITAGE RESOURCES

7.3.1 Issue: Disturbance of ground resulting in damage to heritage resources

Description of impact

Construction of the pipeline has the potential to damage or uncover heritage resources through direct physical disturbance.

Heritage resources are places or objects of cultural significance and are protected by the National Heritage Resources Act, 1999. The Heritage Impact Assessment undertaken for the site did not identify any heritage resources on the site.

Impact assessment

As per the HIA, no heritage resources, of the type and range outlined in Section 3 of the National Heritage Resources Act, 1999 occur on the site. Therefore, no impact is anticipated during the construction phase. Once excavations commence it is, however, possible that heritage resources may be exposed by project activities, and in such cases a chance Find Protocol must be implemented. A paleontological screening was conducted using the South African Heritage Resource Agency (SAHRA) sensitivity screening map (<https://sahris.sahra.org.za/map/palaeo>). The findings from the site indicates that the project area has an insignificant to zero sensitivity of fossil remains to be found and therefore a paleontological assessment is not required.

Mitigation

No mitigation measures are recommended, except in the case of the uncovering of a heritage resource:

- Implement Chance Find Protocol.

Issue: Disturbance of ground resulting in damage to heritage resources		
Phases: Construction		
Criteria	Without Mitigation	With Mitigation
Intensity	Low	Low
Duration	Long-term	Long-Term
Extent	Whole site	Whole site
Consequence	Low	Low
Probability	Very Improbable	Very Improbable
Significance	Low	Low
Nature of cumulative impacts	No cumulative impacts are anticipated.	
Degree to which impact can be reversed	N/A	

Degree to which impact may cause irreplaceable loss of resources	N/A
Degree to which impact can be mitigated	Very high.
Residual impacts	None
Mitigated outcome	Impact to heritage resources is minimised.

8 CONCLUSIONS AND RECOMMENDATIONS

This chapter summarises the key findings of the study.

8.1 ENVIRONMENTAL IMPACT STATEMENT AND SUMMARY

The applicant, the City of Mbombela Local Municipality, is proposing the upgrade and expansion of the Rocky Drift wastewater treatment works (WWTW) and Msholozzi sewer outfall project in order to address the water and sanitation requirements of the areas of Msholozzi and Phumlani.

The proposed project includes activities listed under the EIA Regulations 2014, promulgated in terms of Chapter 5 of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA). In addition, the proposed project also requires authorisation from the Mpumalanga Department of Human Settlement, Water and Sanitation for specific water uses under Section 21 of the National Water Act, 1998 (No. 36 of 1998) (NWA).

Specialist input was provided on the likely impact of the proposed project on the biophysical, socio-economic and cultural aspects of the environment. The findings of the specialist input and other relevant information have been integrated and synthesised into this draft BAR. The two main objectives of this draft BAR are, firstly, to assess the environmental significance of impacts resulting from the proposed pipeline activities and to suggest ways of mitigating negative impacts and enhancing benefits, and secondly to provide I&APs with an opportunity to comment on the proposed project.

A summary of the assessment of potential environmental impacts associated with the proposed project is provided in Table 8-1.

TABLE 8-1: SUMMARY OF THE SIGNIFICANCE OF THE POTENTIAL IMPACTS ASSOCIATED WITH THE PROPOSED PROJECT

Potential impact	Significance of impacts	
	Without mitigation	With mitigation
Loss of agricultural soil resources through physical disturbance	M	L
Loss of agricultural soil resources through contamination	M	VL
Loss of terrestrial habitat and biodiversity through physical disturbance	VL	Insignificant
Disturbances of aquatic habitat and related biodiversity through changes in flow and water quality	L	VL
Alteration of drainage patterns affecting the flow of water in downstream systems	L	VL
Contamination of surface water resources	L	VL
Increase in disturbing noise levels affecting potential human receptors	L	VL
Economic impact	M+	H+
Disturbance of ground resulting in damage to heritage resources	No impact	

VH – Very High; H – High; M- Medium; L – Low; VL – Very Low; + denotes a positive impact.

The mitigated assessment assumes that technical design controls, as included in the project scope, together with mitigation measures included in the EMP would be included in the detailed design of the pipelines and

associated water storage infrastructure and implemented when the plant is constructed and operated. As a result, the majority of potential biophysical impacts associated with the proposed PIPELINE would be short term and limited either to the site or neighbouring land. These include impacts on soils, terrestrial habitats and biodiversity, aquatic habitats and wetlands, drainage patterns, groundwater aquifers and the visual environment. The potential impacts on biophysical aspects are considered to be of **LOW** or **VERY LOW** significance with mitigation.

Economic impacts associated with employment and economic development is considered to be of **MEDIUM** significance even without mitigation. With mitigation this is considered to be of **HIGH** significance. The project would generate significantly more time for locals who can better utilise the available time for employment and other socio-economic opportunities. These factors would contribute to economic growth and socio-economic development in the area. The related social benefits are also considered to be positive in nature.

No impacts on heritage and cultural resources are expected as no heritage resources occur on the project site.

Proceeding with the project attracts potentially significant economic benefits and potential negative environmental and social impacts of moderate or lower significance. Not proceeding with the project retains the status quo, but with a loss in employment opportunities, revenue generation and related social benefits, which could potentially be generated by the development.

8.2 IMPACT MANAGEMENT OUTCOMES FOR THE DEVELOPMENT FOR INCLUSION IN THE EMPR

The assessment of environmental impacts in Section 7 is based on the implementation of reasonable mitigation actions in order to arrive at an outcome considered reasonable to arrive at outcomes considered acceptable. These impacts and outcomes are listed in Table 8-2.

TABLE 8-2: ENVIRONMENTAL IMPACTS AND OUTCOMES

	Potential impact	Outcome
i.	Loss of soil resources through physical disturbance	The area in which soils are disturbed by development activities is minimised. The potential for soil contamination from exposure to fuels, chemicals and other hazardous materials is minimised.
ii.	Loss of agricultural soil resources through contamination	The area in which soils are disturbed by development activities is minimised. The potential for soil contamination from exposure to fuels, chemicals and other hazardous materials is minimised.
iii.	Loss of terrestrial habitat and biodiversity through physical disturbance	Areas disturbed during construction are required to be rehabilitated and re-vegetated on a progressive basis ensuring a coverage equal to 75% of the neighbouring vegetative cover.
iv.	Disturbances of aquatic habitat and related biodiversity	Construction is prohibited from further degrading the ecological functionality of the affected watercourses.
v.	Increase in ambient air concentrations	Emissions from the construction site are required to comply with the NAAQS.
vi.	Increase in disturbing noise levels affecting potential human receptors	Dust emissions are required to remain within the limits defined in the SANS 10103: 2008.
vii.	Economic impact	Municipal procurement objectives are met.
viii.	Social benefits associated with improved infrastructure	Improved infrastructure longevity and functionality.
ix.	Disturbance of ground resulting in damage to heritage resources	Impact to heritage resources is minimised.

8.3 OPINION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER

The key principles of sustainability, including ecological integrity, economic efficiency, and equity and social justice, are integrated below as part of the supporting rationale for recommending an opinion on whether the proposed project should be approved.

Ecological integrity

Based on the specialist findings used to inform this BAR, the proposed project will not further detrimentally impact on the ecological functionality of the receiving environment. Identified impacts are considered to have a low significance and are not considered a risk to ecological integrity.

Economic efficiency

The proposed alignment follows the shortest routing thus reducing construction duration and material procurement expenses.

Equity and social justice

The primary motivation for the proposed development of the bulk sewer pipeline is to provide the historically areas of Msholozzi and Phumlani with access to formalised water and sanitation services. Project spend by CoM in order to implement the proposed project will be administered in accordance with South Africa's BBBEE objectives. The implication is that significant financial benefit will be afforded to local enterprises and service providers. This is expected to have a wider reaching positive trickledown effect on the wider community in a region regarded as being one of the poorer and more marginalised in South Africa.

Conclusion and Recommendation

It is the opinion of SLR that in terms the sustainability criteria sustainability criteria described above there is no reason why the proposed project, with implementation of the proposed mitigation measures, should not receive a favourable decision. The management and mitigation measures recommended for the proposed project are detailed in the EMP for construction (see Appendix H).

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APPENDIX A: EAP UNDERTAKING

APPENDIX B: CURRICULA VITAE OF THE PROJECT TEAM

APPENDIX C: PUBLIC PARTICIPATION PROCESS

Appendix C.1: I&AP database

Appendix C.2: DARDLEA pre-application meeting

Appendix C 3: Proof of Site notices

Appendix C 4: SAHRA Correspondence

APPENDIX D: HERITAGE SPECIALIST REPORT

APPENDIX E: GEOHYDROLOGY SPECIALIST REPORT

APPENDIX F: FLOODLINE DELINEATION REPORT

APPENDIX G: TERRESTRIAL ECOLOGY SPECIALIST REPORT

APPENDIX H: ENVIRONMENTAL MANAGEMENT PROGRAMME

