



BASIC ASSESSMENT PROCESS
for
**THE PROPOSED UPGRADE OF THE MOHADIM AND POORTJIE DAM BULK SEWER
LINE IN THE JB MARKS LOCAL MUNICIPALITY, NORTH WEST PROVINCE**
DRAFT BASIC ASSESSMENT REPORT

Public Review

03 February 2022 to 07 March 2022

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PROJECT DETAILS

- Reference No.** : Not assigned as yet
- Title** : Basic Assessment process for the Proposed Upgrade of the Mohadim And Poortjie Dam Bulk Sewer Line in The JB Marks Local Municipality, North West Province
- Report compiled by** : **Envirolution Consulting**
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Tel: 018 299 5111
Fax: 018 297 0477
- Status** : Draft Basic Assessment Report
- Review period** : The 30-day period for review is from
03 February 2022 to 07 March 2022

EXECUTIVE SUMMARY

INTRODUCTION

JB Marks Local Municipality (the applicant) is proposing the Upgrading of Mohadin and Poortjie Dam Bulk Sewer Line, in the Potchefstroom Region in the North West Province (Figure 1). The existing outfall sewer starts at the Mohadin Clinic and ends at the intersection of Sooliman Street with Promosa Road and this outfall sewer line primarily serve the following areas:

- Mohadin;
- Portion of Ikageng Extension 7;

The project was necessitated after the sewer line spillage after Poortjie dam, the sewer line is too small, currently 100mm diameter vitrified clay pipe, and thus the need to upgrade. The sewer line was just for the area called Mohadin, but later the council developed extension 7 to the west of it to connect the houses to the existing sewer pipe, which is the leading cause of the spillage, and it is known the area is prone to dolomite, therefore this is an emergency project.

REQUIREMENT FOR A BASIC ASSESSMENT PROCESSTRODUCTION

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant Environmental Authorisation. JB Marks Local Municipality requires an Environmental Authorisation for this project in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), and Environmental Impact Assessment Regulations, 2014 as amended in 07 April 2017 (GNR 326); a Basic Assessment (BA) Process is thus required for this project.

The report provides a description of the activity, description of property and location and a description of environment, legislation, need and desirability, significant impacts and management as well as mitigation. Comprehensive, independent environmental studies elaborated by specialists are required in accordance with the EIA Regulations to inform the EAP of its comprehensive recommendation and provide the competent authority i.e. North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT) with sufficient information in order to make an informed decision.

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. Table 1 details how the legal requirements of Appendix 1 of the 2014 EIA Regulations (as amended, GNR326) have been addressed within this report.

PROJECT NEED AND DESIRABILITY

The North West Provincial Rebranding, Repositioning and Renewal (RRR) Strategy, aims to support the successful implementation of the National Development Plan (NDP). The RRR contributes expressively to the NDP objectives and therefore strive to bring about the desired socio-economic transformation to the people within the province. The North West Spatial Development Framework needs to be conducive for sustainable development and will provide for the execution of the following objectives:

"3. Giving spatial effect to objectives set by National Government Policies on Sustainability to support the optimal integration of the aspects of social, economic, institutional, political, physical and engineering services"

Water supply to consumers are affected by the limits in bulk water treatment and storage infrastructure, however a project is currently under way to upgrade the WTW capacity. This will ensure continued water supply to current consumers and further developments in the area. Due to the increase in densification and new developments, some of the existing reticulated infrastructure is not appropriate and would need to be redesigned and replaced. The Tlokwe LM has to take into consideration the siting of developments due to the dolomitic areas within the Potchefstroom and Ikageng urban areas. Mining (gold and uranium) operations in the upper catchment could affect groundwater quality and pose a risk to the environment (decanting acid mine water) and surface water sources

Urban development is considered a challenge not only to provide for the extension of water supply services to new consumers, but also to accommodate the densification typology of housing developments. Increased costs for land and development necessitated the need to densify settlements which is a great advantage to the consumer. It brings people closer to services and their workplace. The municipalities, however, need to make provision for the increased water requirements (volume) and infrastructure (bulk and reticulation) to meet those requirements. All well-established town areas are faced with increased urban development and densification due to economic development and urbanisation.

Water sources seem to be sufficient until 2026 (All Towns Strategy, 2015), irrigation water use from the Mooi River system needs to be verified as there is potential to supplement domestic water requirements if the full irrigation allocation is not going to be utilised. Potchefstroom already has a high level of service and a very small backlog in water and sanitation services, which could ensure that the Tlokwe LM can achieve universal access for all consumers within the national target of 2019

According to the Municipality IDP 2020/2022, one of the communities needs from 2017/18 financial year for Ward 9 of outermost priority is the Upgrading of sewer system, this project will address this need as identified by the IDP for in the project area.

CONCLUSION (IMPACT STATEMENT)

Although the vegetation along the pipeline falls within the Andesite Mountain Bushveld, it is more likely that the vegetation was historically grassland representative of the Carletonville Dolomite Grassland or Rand Highveld Grassland. However, the grassland is degraded, trampled and include a high frequency of invasive plant species. It is also encroached by *Vachellia karroo*. The pipeline falls outside of the mapped remnant

patches of grassland ecosystems and will therefore not impact on targets. Therefore, upgrade of the sewer will likely have a positive impact on the vegetation. The upgrade will ensure that regular maintenance and pollution due to overflowing and spillages are negated, and the vegetation will be able to re-establish to a secondary state. Therefore, this assessment found no objection to the continuation of this project, provided mitigation measures are implemented to prevent direct and indirect impacts to the wetland area and no impacts take place south of the study area in the rocky grassland.

Having assessed the impacts of the construction of the sewer pipeline as summarised in Table 8.1, no environmental fatal flows and no significant negative impacts have been identified to be associated with the proposed development. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively mitigated to have a low significance. The significance levels of the majority of identified negative impacts can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr (Appendix E) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.. The Site investigated is considered suitable for the proposed upgrade and construction of the Mohadim Sewer Pipeline provided that the recommendations made in this report are implemented and/or adhered to.

RECOMMENDATIONS

It is therefore, the EAP opinion that the project should be authorised, the findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.

The following conditions would be required to be included within an authorisation issued for the project:

- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- An appropriate stormwater management plan must be developed and implemented to the site. Adequate measures must be put in place to prevent polluted runoff water from entering the, wetland and soil, thus preventing surface and groundwater pollution;
- The relevant authorisations and water use licenses must be obtained from Department of Water Affairs prior to the commencement of construction activities. No activities may proceed within or in proximity to watercourses without a Water Use License permitting the activity.
- The developer should **obtain all necessary permits** from relevant authorities prior to the commencement of construction i.e. water use license & plant permits
- Creation of new access roads should be minimised as far as possible.
- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring

programme in this regard is recommended. On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.

- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

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ABBREVIATIONS

BAR	Basic Assessment Report
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
Dr KKDM	Dr Kenneth Kaunda District Municipality
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ESA	Ecological Support Area
EIA	Environmental Impact Assessment
EMPr	Environmental Management Plan report
ESA	Ecological Support Area
eWULAAS	electronic Water Use Licence Application and Authorisation System
DEDECT	North West Department: Economic Development, Environment, Conservation and Tourism
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
JBLM	JB Marks Local Municipality
I & AP's	Interested and Affected Parties
IDP's	Integrated Development Plans
Km	Kilometres
m	Meters
NEMA	National Environmental Management Act
NEM: WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NGO's	Non-Governmental Organisations
NWP	North West Province
NWBSP	North West Biodiversity Sector Plan
study area	Project area of influence
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
SDF	Spatial Development Framework
SWMP	Stormwater Management Plan
WULA	Water Use License Application

INVITATION TO COMMENT ON THE DRAFT BA REPORT

The Draft Basic Assessment Report (BAR) has been prepared by Envirolution Consulting (Pty) Ltd in order to assess the potential environmental impacts associated with the Proposed Upgrade and Construction of the Mohadim Sewer Pipeline in the JB Marks Local Municipality North West Province. The report is made available for public review for 30-day review period from **03 February 2022 to 07 March 2022** at

Potchefstroom Library

44 Sol Plaatjie St
Potchefstroom
2531

Tel: 018 299 5061

In order to obtain further information or submit written comments please contact:

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The due date for comments on the Draft Basic Assessment Report is Monday 07 March 2022

1 INTRODUCTION

1.1 Project Background

JB Marks Local Municipality (the applicant) is proposing the Upgrading of Mohadin and Poortjie Dam Bulk Sewer Line, in the Potchefstroom Region in the North West Province (Figure 1). The existing outfall sewer starts at the Mohadin Clinic and ends at the intersection of Sooliman Street with Promosa Road and this outfall sewer line primarily serve the following areas:

- Mohadin;
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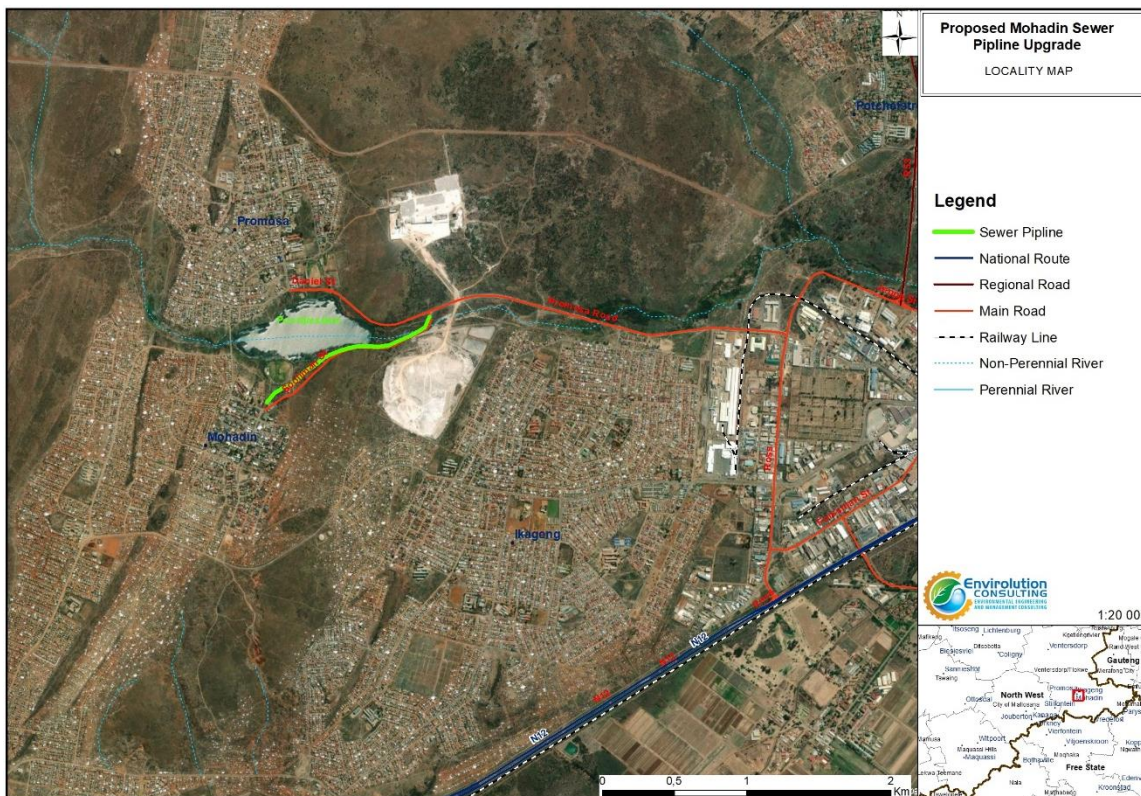


Figure 1: Locality map showing the proposed site (refer to **Appendix A** for A3 maps).

1.2 Purpose of the Study

The proposed project is subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as “listed activities”. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed

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Table 1: Legal requirements in terms of the 2014 EIA regulations

Appendix 1: CONTENT OF BASIC ASSESSMENT REPORTS	Cross-reference in this BAR report
Scope of assessment and content of basic assessment reports	
3(1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—	Appendix F1
(a) details of—	
(i) the EAP who prepared the report; and	
(ii) the expertise of the EAP, including a curriculum vitae;	
(b) the location of the activity, including:	Section 2.1
i. the 21-digit Surveyor General code of each cadastral land parcel;	
ii. where available, the physical address and farm name;	
iii. where the required information in items (i) and (ii) is not available, the coordinates of boundary of the property or properties;	
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale; or, if it is-	Appendix A & Section 2.1
i. a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	
ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d) a description of the scope of the proposed activity, including—	Section 3.1 Section 2.1
i. all listed and specified activities triggered and being applied for; and	
ii a description of the activities to be undertaken including associated structures and infrastructure;	
(e) a description of the policy and legislative context within which the development is proposed including—	Section 3.2

<ul style="list-style-type: none"> iii. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and iv. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments; 	
<p>(f) 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;</p>	Section 2.5
<p>(g) a motivation for the preferred site, activity and technology alternative;</p>	Section 2.4
<p>(h) a full description of the process followed to reach the proposed preferred alternative within the site, including—</p> <ul style="list-style-type: none"> i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; 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; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; 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— <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; 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; 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; viii. the possible mitigation measures that could be applied and level of residual risk; ix. the outcome of the site selection matrix; x. if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. a concluding statement indicating the preferred alternatives, including preferred location of the activity; 	<ul style="list-style-type: none"> i. Section 2.4 ii. Chapter 4 & Appendix D iii. Appendix D: Public Participation Process iv. Chapter 5 v. Chapter 6 vi. Chapter 7 vii. Chapter 7 viii. Chapter 7 ix. Chapter 7 x. Section 2.4 xi. Section 8.3
<p>(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—</p> <ul style="list-style-type: none"> (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; 	Chapter 6
<p>(j) an assessment of each identified potentially significant impact and risk, including—</p> <ul style="list-style-type: none"> (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; 	Chapter 7
<p>(k) 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;</p>	Chapter 8 (section 8.1)
<p>(l) an environmental impact statement which contains—</p> <ul style="list-style-type: none"> (i) a summary of the key findings of the environmental impact assessment; 	Chapter 8

(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;	
(m)	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;	Appendix E
(n)	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;	Chapter 8
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 6 (Section 6.5)
(p)	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;	Chapter 8 (Section 8.3)
(q)	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;	N/A
(r)	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 and	Appendix F1
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	any specific information that may be required by the competent authority ¹ ; and	N/A
(u)	any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(2)	Where a government notice <i>gazetted</i> by the Minister provides for the basic assessment process to be followed, the requirements as indicated in such a notice will apply	N/A

1.3 Objectives of the Basic Assessment process

According to **Appendix 1 of the 2014 EIA Regulations, 2014**, Government Notice R326, the objective of the basic assessment process is to, through a consultative process –

- (a) 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;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives;
- (d) 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 alternatives on these aspects to determine –
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) 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; and
- (e) through a ranking of the site sensitivities and possible impacts the activity and 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 alternative;
 - (ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
 - (iii) identify residual risks that need to be managed and monitored.

The main objective of the BAR and EMP is to identify and assess potential environmental impacts associated with the proposed project, and to compile appropriate mitigation measures.

1.4 Details of The Environmental Assessment Practitioner (EAP)

Environmental Assessment Practitioner

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Fax Number: (0861) 62 62 22
E-mail: sheila@envirovolution.co.za

Expertise of the EAP to carry out the EIA procedures

- Cheda Sheila Bolingo, the principle author and Environmental Assessment Practitioner (EAP) responsible for this project holds an Msc degree in Environmental Management with 10 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- Gesan Govender, the project manager and reviewer is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 16 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Curricula vitae for the project team consultants are included in **Appendix F1**.

Specialists: In order to adequately identify and assess potential environmental impacts associated with the proposed project, Envirovolution Consulting has appointed the following specialists to conduct specialist impact assessments:

- Vegetation – Antoinette Eyssell-Knox of Dimela-Eco Consulting
- Wetland- Antoinette Bootsman of Limosella Consulting
- Fauna – Barbara Kasl
- Heritage - Johan van Schalkwyk of Johan Heritage Consultant
- Palaeontology - Marion.Bamford of Marion Bamford Consulting

Specialist declarations are attached as **Appendix F2**.

2 PROJECT OVERVIEW

2.1 Location of the activity

The project is located in Mohadin, which is part of Potchefstroom, in JB Marks Local Municipality. Mohadin is approximately 7 km west of Potchefstroom, adjacent to Ikageng Extension 7 and opposite Promosa. The existing outfall starts at Mohadin Clinic (Chainage 0.00km) and transverses next to Poortjie dam and the overflow up to the intersection (T-Junction) of Sooliman Street and Promosa Road. The Global Positioning System (GPS) Coordinates are indicated on Table 1.

The properties which will be affected by the proposed development are given in **Table 1**.

Location of the proposed site	Sooliman Street		
Municipality	JB Marks Local Municipality; Dr Kenneth Kaunda District Municipality		
Length	1.3 km		
Co-ordinates:	Start (Mohadim Clinic) Lat (S): 26°42'49.15" Long (E): 27°02'03.21"	Middle: Lat (S): 26°42'41.50" Long (E): 27° 2'19.89"	End (T-Junction Promosa Road) Lat (S): 26°42'31.46" Long (E): 27° 2'43.14 "
Farm details	Portion 354 of Farm Town and Townlands of Potchefstroom, 435/IQ Portion 333 of Farm Town and Townlands of Potchefstroom, 435/IQ RE/2/ of Farm Town and Townlands of Potchefstroom, 435/IQ		
Surveyor General (SG) 21-digit code for each proposed site:	T0IQ00000000043500354 T0IQ00000000043500333 T0IQ00000000043500002		

2.2 Technical Details

During the assessment, the existing bulk sewer line from Promosa was also discovered to be installed in the wetland area. The biggest issue with the sewer line is the size (100mm Ø) and secondly is the material type, being vitrified clay. This material is not ideally suited for wetland areas as it has a high as 50% ingress of groundwater into the system, which only worsens the fact that under peak flow, the sewer overflows. The existing horizontal alignment dissects the wetland area east of Poortjie dam's overflow, which is problematic to do maintenance and cleaning during the rainy season, it would be better suited to install the sewer line adjacent to the road (Sooliman Street) for more adequate access.

The scope of work is the investigation of ±1.333km of bulk sewer pipeline that connects Mohadin's sewer to the main outfall sewer line from Promosa that flows into the Potchefstroom Industrial Area and eventually to the Wastewater Treatment Works located at GPS coordinates 26°44'52.78" S 27°05'46.85" E (see **Figure 2.1**).

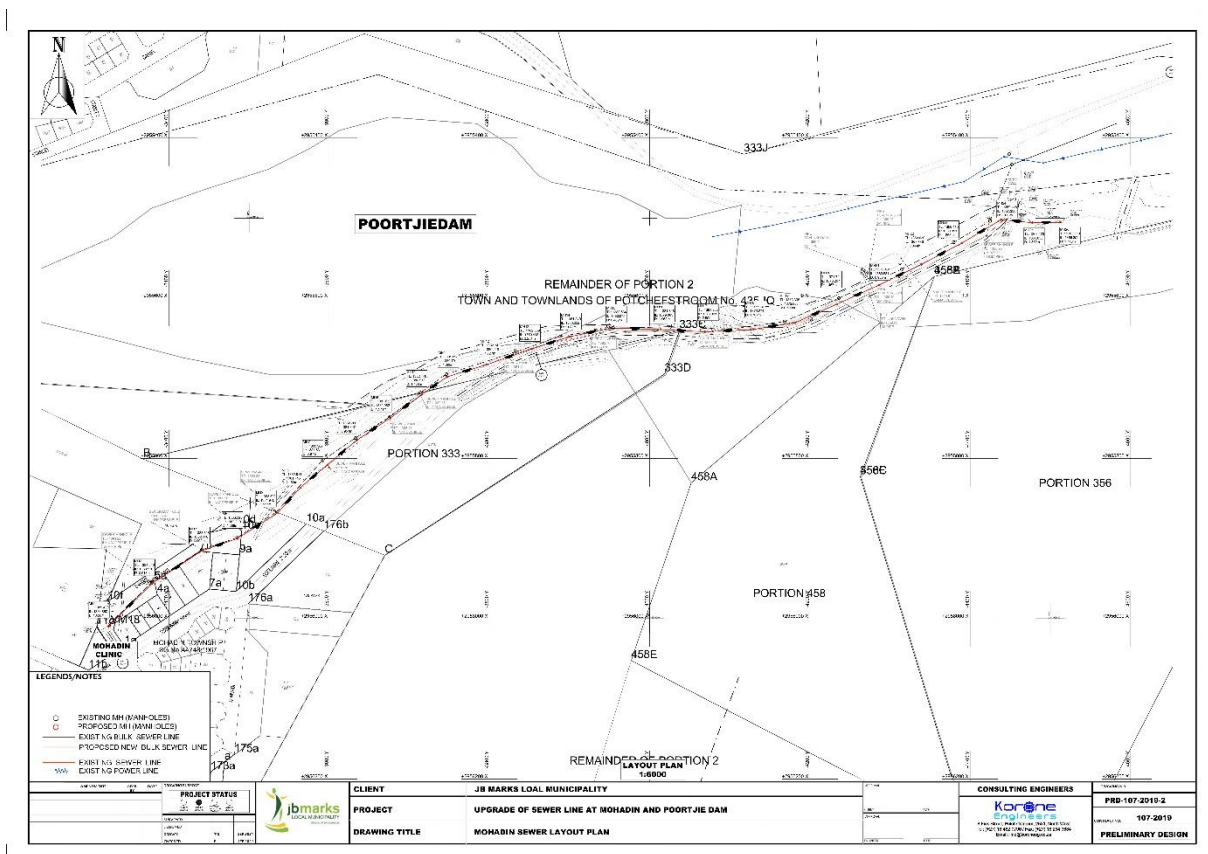


Figure 2.1: Proposed Sewer Layout Plan (refer to Appendix A for A3 maps).

2.3 Alternatives Description

Appendix 2 Section 2 (h)(i) of the EIA Regulations, 2014, requires that all S&EIR processes must identify and describe alternatives to the proposed activity that are feasible and reasonable'. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives. The 'No Go' or 'No Project' alternative must also be considered. Not all categories of alternatives are applicable to all Projects. The following describes the potential alternatives identified as well as reasons why some were not assessed.

2.3.1 Site alternatives

No site alternatives have been investigated for the proposed development for the following reasons:

The project was necessitated after the sewer line spillage after Poortjie dam, the sewer line is too small, currently 100mm diameter vitrified clay pipe, and thus the need to upgrade. The sewer line was just for the area called Mohadin, but later the council developed extension 7 to the west of it and connect the houses to the existing sewer pipe, which is the leading cause of the spillage, and it is known the area is prone to dolomite, therefore this is an emergency project..

Thus, the identified site is the only one site is deemed feasible and practicable for the proposed development.

2.3.2 Activity alternatives

The project entails the construction of a sewer line, the site is to provide a service to the residents,

Therefore, they are no reasonable or feasible alternatives in terms of the type of activity to be undertaken were therefore be investigated.

2.3.3 Technology alternatives

Consideration of such alternatives is to include the option of achieving the same goal by using a different method or process (e.g. to reduce resource demand and increase resource use efficiency.). Trenchless method and open trenches were considered as alternative Pipe installation method, these alternatives are simultaneously discussed below

- **Proposed** Pipe installation Method Open trench excavation - The open trench method entails replacing the existing Asbestos cement pipe using the conventional open trench method. The alignment of the new sewer line will, therefore, be the same as the existing sewer line, due to space limitations (see Figure 2.2)

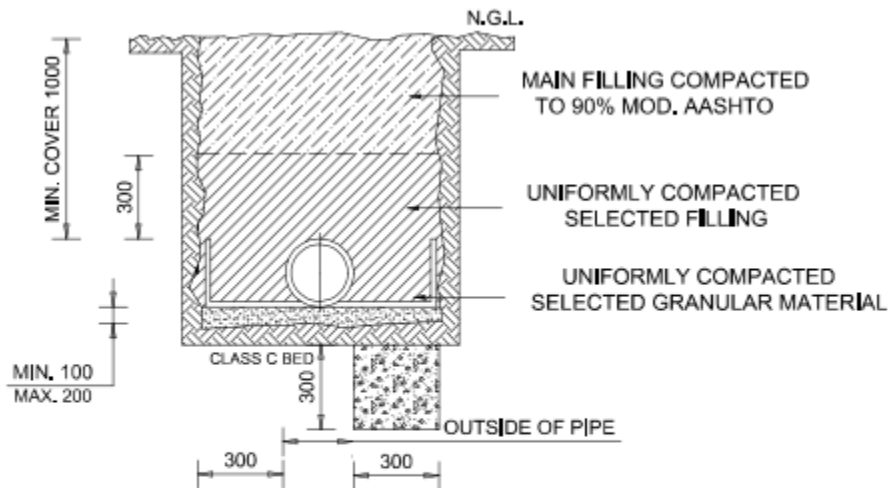


Figure 2.2: Typical Trench Cross Section

- **Alternative Method** (Trenchless Pipe installation): - Trenchless technology is a technique used to fracture an existing pipeline from the inside using a trenchless technology head. During this process the mechanical device pushes the broken pipe remains into the surrounding ground while at the same time draws a new pipe of the same or larger diameter in place behind the cracking device. Trenchless technology is also referred to as pipe bursting or pipe splitting. Maintaining the existing alignment of the pipe; the pipeline will be installed using trenchless method of construction, Trenchless technology. The pipeline will be installed under the river bed/roads whereby there will be two pits opened on either side of the stream/road for the launching and reception pits (see Figure 2.3)

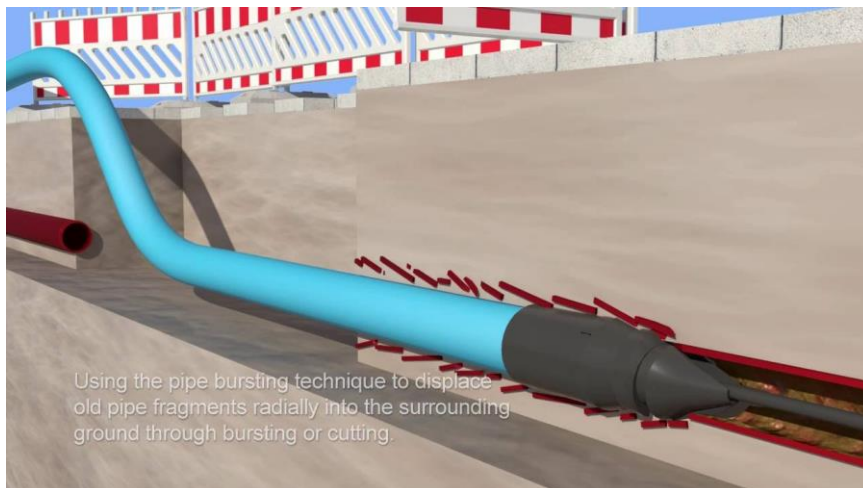


Figure 2.3: Trenchless Pipe installation Method

Preferred Alternative: the alternative method is the most preferred as it will minimize the interference with the environment. However, from a technical perspective, a combination of the alternatives will be used, i.e. both pipe upgrades and pipe replacement will be carried out by trenchless technology methods in access restricted areas and open trench construction in road servitudes.

2.3.4 No-go alternative

This is the option of not replacing the sewer pipe, this option will result in no impacts occurring on the biophysical environment (i.e. biodiversity, soils), and will result in no visual or social impact hence the project site status quo remains. The existing under-capacitated sewers are based on hydraulic analysis capacity requirements at ultimate development flows to obviate any further blockages or spillages. In summary the situation on the ground will remain the same and the `do nothing alternative` will not assist the local municipality in addressing issues that require quick emergency response as detailed above. The cost of the `do nothing alternative` are expected to outweigh the benefits and **therefore this alternative is not a preferred alternative.**

2.4 Need and Desirability

The following section motivates and explains the needs and desirability of the project (including demand for the activity) by highlighting the needs and desirability of the project in the context of various integrated and spatial plans, frameworks and other pertinent information, either Provincial or Municipal.

2.4.1 The Need for the Project at a Regional and Local level (Community Need)

The North West Provincial Rebranding, Repositioning and Renewal (RRR) Strategy, aims to support the successful implementation of the National Development Plan (NDP). The RRR contributes expressively to the NDP objectives and therefore strive to bring about the desired socio-economic transformation to the people within the province. The North West Spatial Development Framework needs to be conducive for sustainable development and will provide for the execution of the following objectives:

“

“3. Giving spatial effect to objectives set by National Government Policies on Sustainability to support the

optimal integration of the aspects of social, economic, institutional, political, physical and engineering services”

Water supply to consumers are affected by the limits in bulk water treatment and storage infrastructure, however a project is currently under way to upgrade the WTW capacity. This will ensure continued water supply to current consumers and further developments in the area. Due to the increase in densification and new developments, some of the existing reticulated infrastructure is not appropriate and would need to be redesigned and replaced. The Tlokwe LM has to take into consideration the siting of developments due to the dolomitic areas within the Potchefstroom and Ikageng urban areas. Mining (gold and uranium) operations in the upper catchment could affect groundwater quality and pose a risk to the environment (decanting acid mine water) and surface water sources

Urban development is considered a challenge not only to provide for the extension of water supply services to new consumers, but also to accommodate the densification typology of housing developments. Increased costs for land and development necessitated the need to densify settlements which is a great advantage to the consumer. It brings people closer to services and their workplace. The municipalities, however, need to make provision for the increased water requirements (volume) and infrastructure (bulk and reticulation) to meet those requirements. All well-established town areas are faced with increased urban development and densification due to economic development and urbanisation.

Water sources seem to be sufficient until 2026 (All Towns Strategy, 2015), irrigation water use from the Mooi River system needs to be verified as there is potential to supplement domestic water requirements if the full irrigation allocation is not going to be utilised. Potchefstroom already has a high level of service and a very small backlog in water and sanitation services, which could ensure that the Tlokwe LM can achieve universal access for all consumers within the national target of 2019

According to the Municipality IDP 2020/2022, one of the communities needs from 2017/18 financial year for Ward 9 of outermost priority is the Upgrading of sewer system, this project will address this need as identified by the IDP for in the project area.

2.4.2 The Desirability for the Project on the proposed Project site

The applicant is JB Marks Local Municipality is proposing the upgrade of the Mohadim Sewer Pipeline located near Potchestroom in the North West Province. The project was necessitated after the sewer line spillage after Poortjie dam, the sewer line is too small, currently 100mm diameter vitrified clay pipe, and thus the need to upgrade.

The sewer line was just for the area called Mohadin, but later the council developed extension 7 to the west of it an connect the houses to the existing sewer pipe, which is the leading cause of the spillage, and it is know the area is prone to dolomite, therefore this is an emergency project.

2.4.3 How the principles of environmental management as set out in section 2 of NEMA have been taken into account in the planning for the proposed Project

The principles of NEMA have been considered in this assessment through compliance with the requirements of the relevant legislation in undertaking the assessment of potential impacts, as well as through the implementation of the principle of sustainable development where appropriate mitigation measures have been recommended for

impacts which cannot be avoided. In addition, the successful implementation and appropriate management of this proposed Project will aid in achieving the principles of minimisation of pollution and environmental degradation.

The EIA process has been undertaken in a transparent manner and all effort has been made to involve interested and affected parties, stakeholders and relevant Organs of State such that an informed decision regarding the Project can be made by the Regulating Authority.

The general objectives of Integrated Environmental Management have been taken into account for this EIA report by means of identifying, predicting and evaluating the actual and potential impacts on the environment, socio-economic conditions and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits, and promote compliance with the principles of environmental management.

The implementation of this project will help in improving the hydraulic capacity of the sewer lines, in so doing the sewer pipeline will have sufficient capacity for future growth. This will also result in financial savings for the JB Marks Local Municipality as pipe repairs and sewer overflows will be reduced.

2.5 Service requirements

Site Access: The site is easily accessible from the N12 highway via the Inkageng Township, the pipeline infrastructure is mostly located on the road reserve, there is therefore direct road access. Where no access roads/tracks exist, the access points and roads will be negotiated with the relevant landowner, and will be established during the construction phase.

Access will be required during both the construction and operation / maintenance phases of the sewer line life cycle. Access roads will enable the transportation of construction material as well as construction teams to the site and facilitate maintenance activities once the line has been constructed.

Site office and laydown area: The Contractor will require a site office and laydown area for the duration of the contract period. The Contractor's site office and laydown area shall be located within the development footprint and on a site appropriately zoned and/or authorised for such use and approved by the Environmental Control Officer (ECO). The ECO will need to be appointed to monitor the Contractor's compliance to the site-specific Environmental Management Programme (EMPr) once EA has been obtained.

The site office and laydown area may not be located on any of the Environmentally Sensitive Areas (ESA), such as nature reserves, Critical Biodiversity Areas (CBAs) or wetlands. The site office and laydown area are to be located approximately 50 m measured from the edge of the wetland. All construction activities, materials, equipment and personnel will be restricted to within the area specified. All materials are stored at the construction camp. The space allocated for the site office and the laydown area is approximately 2 000 m². The site office and laydown area will be fenced and accessed controlled.

Storm water will be managed according to the municipality's Guidelines for Erosion Control and Vegetation Management as well as the Environmental Management Programme (EMPr), which will be compiled for the

construction phase. It must be noted that Stormwater drainage systems form part of the previously authorised scope of works.

Sewage: A negligible sewage flow is anticipated for the duration of the construction period. Chemical toilets will be utilised during construction, and the contractor will ensure regular treatment of these facilities. The toilets will be serviced regularly, as specified by the final site specific EMPr.

Solid Waste Disposal: It is anticipated that construction waste will be comprised mainly of spoil material from clearing activities as well as metal and cabling off-cuts. Spoil material excavated, such as topsoil and subsoil, will be used on site as per the management programme for the construction phase and the associated mitigation / control measures in the EMPr. Excess spoil will be removed from site and appropriately disposed of. Non-biodegradable waste will be immediately trucked to the nearest registered waste disposal facility for appropriate disposal or recycling.

Borrow Pit Material

Due to the soil type (dolomite), importation of bedding and blanket material is necessitated and thus allowance should be made for the importation from commercial sources. Total approximated volumes of soft material required from commercial sources are $\pm 624\text{m}^3$. All imported material will be evaluated in terms of grading, quality, and suitability for bedding and blanket material.

Water & Electricity: There is no challenge with regards to construction water since the Poortjie dam has water year-round. Allowances should be made with DWS for water use license and tested to check the viability for construction usage. Drinking water should be sourced from the community and the community remunerated by the contractor during the site camp establishment stage

JB Marks Local Municipality would have to obtain water use licences for construction related activities from the Department of Water and Sanitation (DWS) as required in terms of the NWA. The following water uses are being applied for:

- Section 21 (c): impeding or diverting the flow of water in a water course; and
- Section 21 (i): altering the bed, banks, course or characteristics of a water course.

Refer to the Draft EMPr (Appendix E) for recommended water use management measures. As Section 21 (a) water use will not be applied for, the Contractor will not be permitted to abstract water from any of the watercourses that are near the construction footprint. It is further understood that construction water will be sourced by the Contractor through legal means and in compliance to the NWA.

A pre- application process for water use license has been initiated with the Department of Water affairs and Sanitation (DWS).

Energy Efficiency: The activity is expected to have minimal energy requirement, as such no alternative energy sources have been identified at this time. The contractor will be advised to avoid multiples trips when transporting equipment during construction. The transportation of materials can be done simultaneously with other activities or where possible transport all construction materials at the same time

Refer to Appendix F3 - Preliminary Design Report.

3 LEGAL FRAMEWORK FOR EIA

3.1 Listed activities triggered by the proposed development

The proposed development triggers activities that require a Basic Assessment; an application is submitted in terms of Chapter 4 of the EIA Regulations to the DEDECT. **Table 3.1** contains the listed activities in terms of the EIA Regulations (as amended) and includes a description of those project activities which relate to the applicable listed activities.

Table 3.1 Listed activities triggered by the proposed development

Indicate the number and date of the relevant notice:	Activity No (s) and Activity Description (in terms of the relevant notice)	Describe each listed activity as per project description
GN.R. 327, (7 April 2017)	Activity 19: 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	The construction of the sewer line will result in infilling and depositing of more than 10m ³ into a watercourse. In addition, the excavation and removal of soil materials of more than 10 m ³ from a watercourse will take place during the construction of the pipeline.
GN.R. 324, (7 April 2017)	<p>Activity 14: The development of: –</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs –</p> <p style="padding-left: 20px;">a) within a watercourse;</p> <p>h) North West:</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority;</p> <p>v. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>or</p>	The proposed sewer line will be constructed over an area of 10 square meters or more within a watercourse on areas identified as Critical biodiversity areas & sensitive by the North West Conservation Plan.

3.2 Legislation and Guidelines that have informed the preparation of this BA Report

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in **Table 3.2**, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 3.2: Relevant legislative and permitting requirements applicable to the proposed project

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
The Constitution of South Africa	<p>The development has to comply with environmental right in the Bill of Rights in the Constitution of the Republic of South Africa (Act 108 of 1996), which reads as follows (Chapter 2, section 24): “Everyone has the right a) to an environment that is not harmful to their health or well-being; and b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <p>i) prevent pollution and ecological degradation; ii) promote conservation; and iii) secure sustainable development and use of natural resources while promoting justifiable economic and social development.”</p>	
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>The NEMA EIA Regulations in Government Notice R326 in Government Gazette No. 40772 came into effect on 7 April 2017. These Regulations regulate the procedure and criteria as contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.</p> <p><i>Environmental Impact Assessment process being complied with according to the Section 24 of NEMA (Act 107 of 1998) and NEMA EIA Regulations GNR 982 (Government Gazette 38282, 14 December 2014), Regulation 19 under the National Environmental Management Act (NEMA) Act 107 of 1998:</i> <i>(a) Basic Assessment Report (BAR) –</i> <i>(b) Environmental Management Programme (EMPr)</i></p>	North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT)
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p> <p><i>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the BA phase and will continue to apply throughout the life cycle of the project.</i></p>	DEDECT
National Water Act (Act No 36 of 1998)	<p>The development also triggers activities that require a Water Use License (WUL) because it crosses several water courses. Therefore, before construction activities may take place, the activity will require a Water Use License as per requirement in the National Water Act (Act No.36 of 1998) (NWA) under Section 21 Water Uses. In terms of the NWA, this development requires a Water Use License for the following water uses:</p> <ul style="list-style-type: none"> • Section 21(c) impeding or diverting the flow of water in a watercourse and; • Section 21 (i) altering the bed, banks, course or characteristics of a watercourse. 	Department of Water and Sanitation (DWS)

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	<p><i>A water use license (WUL) is required in terms of Section 21(c) and 21 (i) of the National Water Act for the project.</i></p>	
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas."</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p> <p>GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas</p>	<p>DEDECT & Local Municipality</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<ul style="list-style-type: none"> • S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including: <ul style="list-style-type: none"> ○ The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; ○ Any development or other activity which will change the character of a site exceeding 5 000 m² in extent • The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. • Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component. <p><i>A Heritage Impact Assessment (HIA) was compiled to identify, assess and, if necessary, mitigate against areas of heritage significance.</i></p>	<p>South African Heritage Resources Agency (SAHRA)</p>
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p> <p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011). GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.</p> <p><i>An ecological study has been undertaken as part of the BA process, as such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered within this report.</i></p>	<p>DEDECT</p>

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
National Forests Act (Act No. 84 of 1998)	<p>In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated” GN 908 provides a list of protected tree species.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> • Adding other waste management activities to the list. • Removing waste management activities from the list. • Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> • The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste. • Adequate measures are taken to prevent accidental spillage or leaking. • The waste cannot be blown away. • Nuisances such as odour, visual impacts and breeding of vectors do not arise; and • Pollution of the environment and harm to health are prevented. <p><i>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMPr. The volumes of waste to be generated and stored on the site during construction and operation of the facility will not require a waste license.</i></p>	DEDECT

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
National Road Traffic Act (Act No 93 of 1996)	<ul style="list-style-type: none"> The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. <p><i>An abnormal load/vehicle permit may be required to transport the various components to site for construction.</i></p>	South African National Roads Agency Limited (SANRAL) (national roads) Provincial Department of Transport
Conservation of Agricultural Resources Act (Act No 43 of 1983)	The Regulations provides a number of prohibitions of noise nuisance conditions one which states: “No person shall – erect a building or structure on residential premises or allow it to be erected there if this may cause a noise or nuisance”. <p><i>While no permitting or licensing requirements arise from this legislation, this Act will find application during the BA process and will continue to apply throughout the life cycle of the project.</i></p>	DAFF
Development Facilitation Act (Act No 67 of 1995)	<p>The Development Facilitation Act contains development facilitation regulations under the Regulations under Development facilitation Act 3. The Act is directed at provincial and local spheres of government; and serves to re-address the imbalances of the past and to ensure that there is equity in the application of spatial development planning and land use management systems.</p> <p>Provides for the overall framework and administrative structures for planning throughout the Republic.</p> <ul style="list-style-type: none"> S (2-4) provide general principles for land development and conflict resolution. <p>The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the DFA.</p>	DEDECT
Occupational Health and Safety Act (Act No. 85 of 1993)	The Occupational Health and Safety Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of machinery; the protection of persons other than persons at work, against hazards to health and safety arising out of or in connection with the activities of persons at work. <p><i>The proposed development site and crew are to be managed in strict accordance with the Occupational Health and Safety Act (Act No. 85 of 1993) [OHSA] and the National Building Regulations.</i></p>	
National Building Regulations and Building Standards Act, 1997 (Act No. 103 of 1997)	Section 7 of the National Building Standards and Building Regulations Act states that “council must be satisfied that buildings or structures are not dangerous to life or property”. <p><i>The proposed development is in line with the Act as the structure is not deemed dangerous to life or property.</i></p>	
National Development Plan 2030	The National Development Plan (NDP) offers a long-term perspective. It defines a desired destination and identifies the role different sectors of society need to play in reaching that goal.	

LEGISLATION	APPLICABLE REQUIREMENTS	RELEVANT AUTHORITY
	<p>As a long-term strategic plan, it serves four broad objectives:</p> <ul style="list-style-type: none"> • Providing overarching goals for what the nation want to achieve by 2030. • Building consensus on the key obstacles to us achieving these goals and what needs to be done • to overcome those obstacles. • Providing a shared long-term strategic framework within which more detailed planning can take • place in order to advance the long-term goals set out in the NDP. • Creating a basis for making choices about how best to use limited resources. <p>The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality. The core elements of a decent standard of living identified in the Plan are:</p> <ul style="list-style-type: none"> • Housing, water, electricity and sanitation • Safe and reliable public transport • Quality education and skills development • Safety and security • Quality health care • Social protection • Employment • Recreation and leisure • Clean environment • Adequate nutrition <p><i>The proposed development does not take place in contrast with the objectives of the NDP, in fact the proposed development supports the objectives of the NDP.</i></p>	
<p>North West Provincial Spatial Development Framework</p>	<p>The North West Provincial Rebranding, Repositioning and Renewal (RRR) Strategy, aims to support the successful implementation of the National Development Plan (NDP). The RRR contributes expressively to the NDP objectives and therefore strife to bring about the desired socio-economic transformation to the people within the province. The North West Spatial Development Framework needs to be conducive for sustainable development and will provide for the execution of the following objectives:</p> <p>“</p> <p><i>“3. Giving spatial effect to objectives set by National Government Policies on Sustainability to support the optimal integration of the aspects of social, economic, institutional, political, physical and engineering services”</i></p>	<p>DEDECT</p>
<p>Public Participation Guideline in terms of National Environmental Management Act, 1998 - (Department of Environmental Affairs 2017)</p>	<p>Guideline document in conducting the Public Participation Process for Basic Assessments. This document was used to guide the public participation process for the proposed development, including Chapter 6 of GN. R 982.</p>	<p>Department of Environmental Affairs</p>

3.3 Guidelines documents and standards

The following Guideline documents have been considered in the preparation of this report:

- South African National Standards (SANS) 10328 (Methods for environmental noise impact assessment in terms of Nema 107 of 1998);
- The Equator Principles (June 2003);
- Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series 7, Public Participation in the EIA Process as published in Government Gazette No. 33308, 18 June 2010;
- North West Provincial Spatial Development Framework
- District and Local municipality Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs).
- Municipal by-laws and guidelines.

4 PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) was conducted in accordance with **Chapter 6 of the Environmental Impact Assessment Regulations, Published in Government Notice R326 in Government Gazette No. 40772 on 7 April 2017**. In addition, the PPP was guided by the Integrated Environment Management Guidelines Series 7, Public Participation in the EIA process, published in Government Gazette no. 33308, 18 June 2010.

4.1 Purpose of Public Participation

The engagement of Interested and Affected Parties (I&AP's) and the Stakeholder Engagement Process is an important part of any environmental Impact assessment. The main objectives of the Stakeholder Engagement / Public Participation Process include amongst others:

- Informing the adjacent landowners, tenants, residents' associations, ward councillors, the local municipality and other organs of state of the proposed project;
- Establishing lines of communication between the stakeholders, I&AP's and the project team;
- Providing all parties with an opportunity to exchange information and to express their views and concerns regarding the proposed project;
- Obtaining comments/input from stakeholders and I&AP's, and ensuring that all views, issues, concerns and queries raised are fully documented; and
- Identifying all the significant issues associated with the proposed project

4.2 Public Participation Undertaken

In terms of the requirement of Chapter 6 of the EIA Regulations, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- Giving written notice to:
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority.
- Placing an advertisement in:
 - (i) one local newspaper; and
 - (ii) in at least one provincial newspaper.

- Open and maintain a register/ database of interested and affected parties and organs of state.
- Release of a Draft EIA Report for Public Review
- Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6, the following summarises the key public participation activities conducted to date.

4.2.1 Placement of Site Notices

Site notices were displayed in different points within the study area. This is included in **Appendix C1**.

4.2.1 Written notifications

Access to all information that could influence interested and affected parties has been initiated by the project announcement, which included the placement of site notices and distribution of Background Information Documents (BID's) in the areas. A Background Information Document was produced and distributed during the initial PPP phase in the form of a i) email distribution to registered I&APs ii) a "knock and drop" exercise during visits to surrounding areas iii) registered mail posted to I&APs with no email contacts and lastly iv) a notification to of the project progress. These are all included in **Appendix C2**.

4.2.2 Newspaper advertisement

Newspaper advertisements was placed in the *Potchefstroom Herald Newspaper* requesting Interested and Affected Parties (I&APs) to register, and submit their comments. This is included in **Appendix C3**.

4.2.3 Review of the Draft Basic Assessment Report

The draft BA Report was publicly made available to all registered I&AP's for public review for 30-day review period from **03 February 2022 to 07 March 2022** at

- **Potchefstroom Library**
- **Dropbox link** sent to registered I&APs via email; and
- **Email copy of the Draft BAR** document (without appendices) sent to registered I&APs via email

4.2.4 Summary of Issues Raised by I&AP's

Issues and concerns raised by I&AP's will be integrated into the Issues and Responses Report. The issues and concerns were raised by means of

- issues raised during open day meeting and focus group meetings;
- written submissions in response to advertisements
- telephonic communications with I&AP's;
- issues raised through written correspondence received from I&AP's (fax, email and mail).

All comments received from IAPs are included in **Appendix C4** of this report.

4.2.5 Consultation with IAPs

In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities will be provided in order for I&APs to have their issues noted. I&APs will be consulted through the following means:

- Telephonic consultation sessions
- Written, faxed or e-mail correspondence
- Virtual meetings

4.2.6 Comments and Responses Report

At the end of the announcement phase, all comments/input from stakeholders and I&AP's, will be captured in the Issues and Response Report (IRR) which formed part of the Final BA Report. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent.

This is included in **Appendix C7**.

4.2.7 Identification of I&APs and establishment of a database

Identification of I&APs was undertaken by Envirolution Consulting through existing contacts and databases, recording responses to site notices and the newspaper advertisement, as well as through the process of networking. The key stakeholder groups identified include authorities, local and district municipalities, public stakeholders, Parastatals and Non-Governmental Organisations. All relevant stakeholder and I&AP information has been recorded within a database of affected parties. While I&APs were encouraged to register their interest in the project from the onset of the process undertaken by Envirolution Consulting, the identification and registration of I&APs has been on-going for the duration of the EIA phase of the process. This is included in **Appendix C8**.

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section provides a description of the environment that may be affected by the proposed project, as stipulated in the EIA Regulations (Appendix 3 Section (h) iv). The requirement is that the description of the footprint should focus on the Geographical, physical, biological, social, economic, heritage and cultural aspects. The environmental specialist studies that were undertaken to inform this section of this Report and have focussed on significant environmental issues of the project.

5.1 Land uses

The region has been significantly transformed since the 1970s when an increase in residential and other developments occurred in the area. On aerial images from 1939 a small impoundment (Poortjie Dam) is visible. This impoundment increased in size until 1944 when it reached today's current size. What appears to be a dolerite dyke is located west of the Poortjie Dam. A dyke occurs when water is forced between two impermeable geological features to form a key point. Wetlands are formed upstream of key points as backflooding occurs. A gypsum mine and a gypsum processing plant are located in close proximity to the watercourse, downstream of the dam. Formal and informal structures occur close to and adjacent to the watercourse. Raw sewerage was recorded to pollute Poortjie Dam and the water quality has decreased significantly.

The pipeline route is in a narrow open space between Sooliman Street, the Poortjies Dam and the Spitskopspruit. Google Earth satellite imagery show minimal change in the land cover over time (**Figure 5.1**). Some dumping can be seen on the imagery. Several dirt tracks traverse the open space. A large mine heap is situated to the southeast of the pipeline and a sports centre is present to the north-west.



Figure 5.1: Historical image of the study site in 2008

The site verification found that the vegetation around the pipeline route was heavily impacted on by trampling, past disturbances, dumping, sewerage spillages and subsequent maintenance work. Also, several historical impacts to the Spitskopspruit in the eastern extent of the pipeline were noted (**Figure 5.2**).

Natural vegetation is present south of Sooliman Street, on a rocky ridge. This area falls outside of the study area.



Remnants of maintenance roads Natural rocky grassland south of the project Manhole overflowing into the Spitskopspruit



Figure 5.2: Most recent Google Earth imagery of the site (2021) with photographic inserts of the land cover

5.1 Geology

Geological map of the area around the western side of Potchefstroom (Figure 5.3), the location of the proposed project is indicated along the yellow line. Abbreviations of the rock types are explained in Table 1. Map enlarged from the Geological Survey 1: 250 000 map 2626 West Rand. The site lies in the Transvaal Basin with the Transvaal Supergroup sequence exposed.

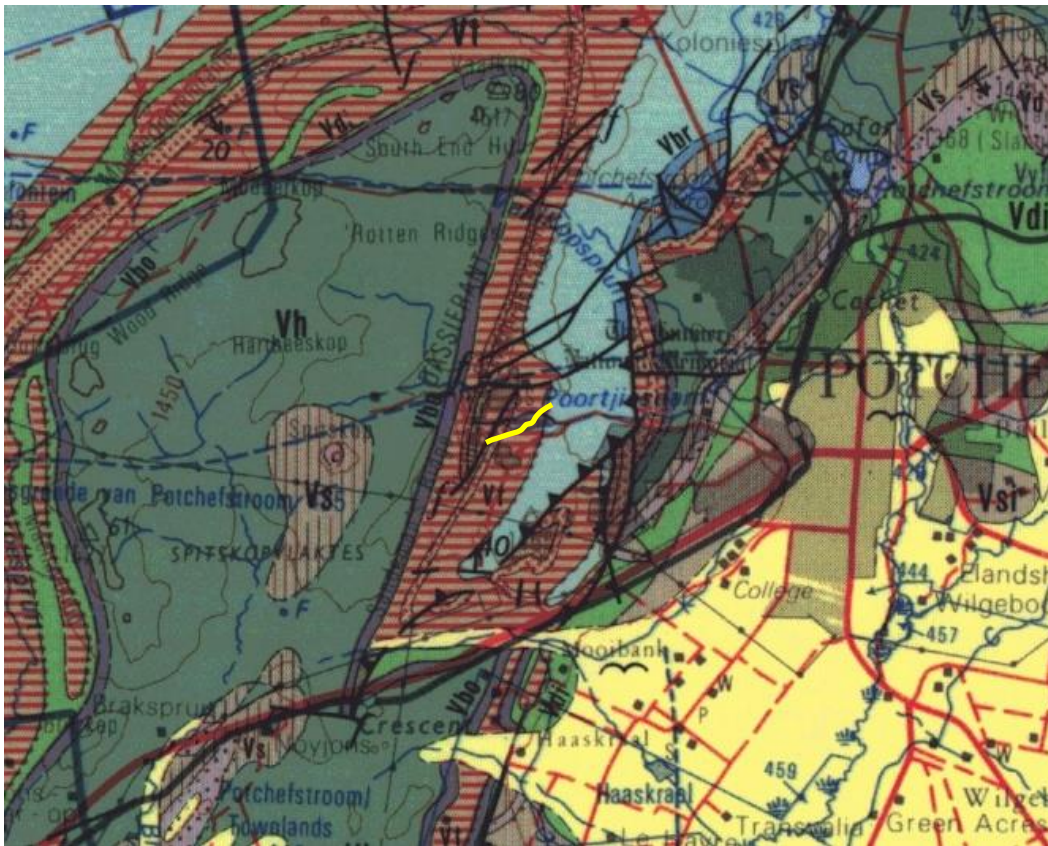


Figure 5.3: Geological map of the area around the western side of Potchefstroom

Table 1: Explanation of symbols for the geological map and approximate ages (Eriksson et al., 2006; 2012; Zeh et al., 2020). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project.

Symbol	Group/Formation	Lithology	Approximate Age
Q	Quaternary	Alluvium, sand, calcrete	Neogene, ca 2.5 Ma to present
Vdi	Diabase	Intrusive diabase	Post Transvaal SG ca
Vh	Houtenbek Fm, Pretoria Group, Transvaal SG	Quartzite, hornfels, limestone, chert	<2072 Ma
Vt	Timeball Hill Fm Pretoria Group, Transvaal SG	Shale, siltstone, conglomerate in places; dotted = Quartzite	Ca 2316 – 2266 Ma
Vmd	Malmani SG, Chuniespoort Group, Transvaal SG	Dolomite, chert	Ca 2585 – 2480 Ma
Vbr	Black Reef Fm, Transvaal SG	Quartzite, conglomerate, shale	<2618 Ma

5.2 Vegetation

5.2.1 **Vegetation Overview:**

The site is situated within the historical extent of the Andesite Mountain Bushveld, in the Savannah Biome. The vegetation comprises a dense, medium-tall thorny bushveld with a well-developed grass layer on hill slopes and some valleys with undulating landscape. This vegetation is not currently threatened (Least Concern).

However, three (3) vegetation types converge close to the pipeline locality and the vegetation. The other two vegetation types fall within the Grassland Biome and therefore the vegetation on the site could also exhibit elements of the grassland biome. The Carletonville Dolomite Grassland is Vulnerable and the Rand Highveld Grassland is Endangered (**Figure 5.4**).

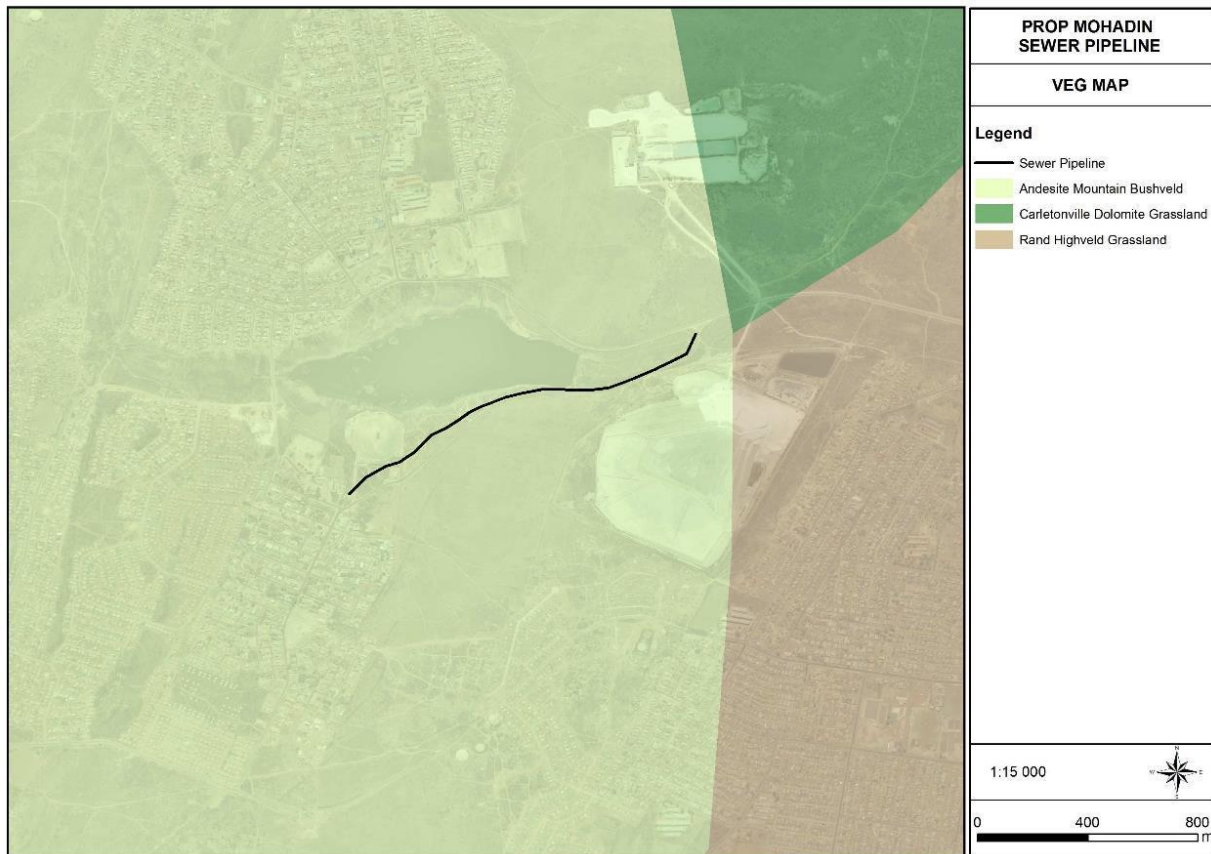


Figure 5.4: National vegetation categories that underly the pipeline

5.2.2 Plant Species of Conservation Concern

A list of plants of conservation concern was compiled using information from the South African National Biodiversity Institute's (SANBI) Botanical Database of Southern Africa (BODATSA) (SANBI, 2016), as well as sensitive species information via the SANBI EIA data base. Other data consulted for plant species of conservation concern include the citizen science website, iNaturalist.

A list of ten (10) species for which suitable habitat is present in natural vegetation around the site were short-listed in Appendix D2.

- The degraded watercourse vegetation is the only vegetation group in the (Primary study area) that may support the two (2) species listed that have an affinity for moist conditions. Both are listed as Near Threatened. However, the degraded state makes it highly unlikely that these species are present (Appendix D2). No further studies are recommended as the likelihood of occurrence are low.
- The rocky grassland and Andesite Mountain Bushveld south of the study area are suitable habitat to six (6) of the listed species. This area should not be considered for lay-down areas or construction camps and are no-go areas.

5.2.3 Protected plants

Certain activities, known as 'Restricted Activities', are regulated on listed species using permits by a special set of regulations published under the Act. Restricted activities regulated under the act are keeping, moving, having in possession, importing and exporting, and selling. The first list of threatened and protected species published under NEMBA was published in the government gazette on the 23rd of February 2007 along with the Regulations on Threatened or Protected Species. **No TOP species are present within the study area.**

5.2.4 Provincially Protected Plants

Provincially, several plants are protected by the Transvaal Nature Conservation Ordinance Act No.12 of 1983, the North West Biodiversity Bill (North West Provincial Gazette, N0 7603 of 2016). The removal or pruning of these plants will require a permit from the North West Department of Rural, Environment and Agriculture Development.

No species listed were recorded within the study area. These species are likely to be present south of the study area, within the rocky grassland and Andesite Mountain Bushveld.

5.2.5 North West Biodiversity Conservation Assessment:

Most of the pipeline falls within a Critical Biodiversity Area 1 (CBA1). The CBA has a high irreplaceability and are important to reach conservation targets in the province. The pipeline also traverses an Ecological Support Area 1 (ESA) as shown in **Figure 5.5**.

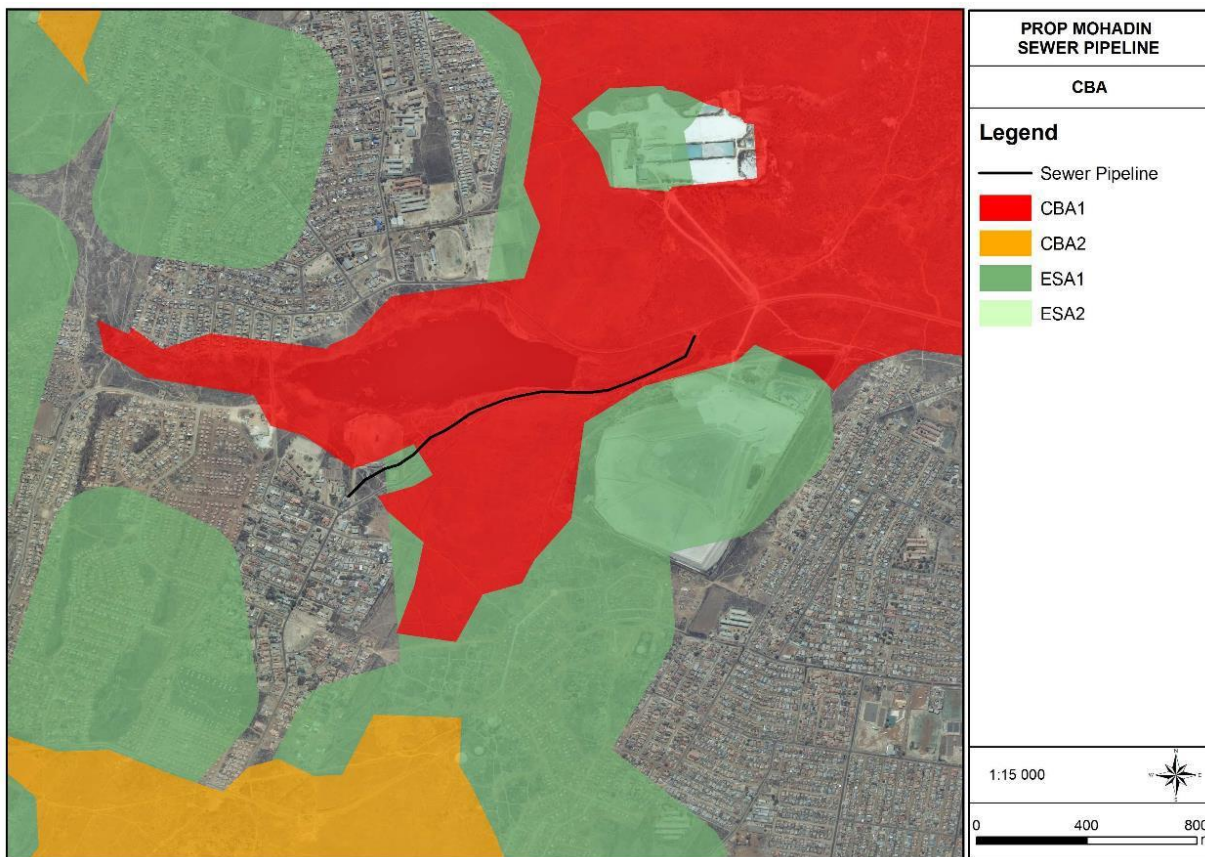


Figure 5.5: The site in relation to the North West Biodiversity Conservation Assessment

5.3 Fauna

- No SCCs are expected to occur on site due to lack of appropriate habitat.
- Two TOP species cannot be excluded on site, but the Lesser Kestrel is a highly mobile species that can retreat from the area when activity commences. The South African Hedgehog should be conspicuous and visible to prevent inadvertent harm to the species. They should never be under direct threat from the activity as long as staff and contractors are vigilant and do not interfere with the species.
- The nearby dam may support congregatory water birds, but will not be directly impacted; indirect impact through runoff must be mitigated. Water birds may be impacted by noise generation, which could also interfere with their breeding, and this must be actively managed on site.

- The site does not support any special endemic species and does not form part of an area of faunal endemism and no impacts are expected on restricted endemic species.
- Alien invasive (AI) species (AIS) recorded in the Pentad were limited to three Category 3 species (Rock Dove, the Common Myna and the House Sparrow). The species are common species in the peri-urban setting and occur throughout South Africa (Picker & Griffiths, 2011).

5.4 Wetland & Baseline Aquatic Assessment

Quaternary Catchment C23H is located in the #5 Vaal Major: rivers include the Wilge, Liebenbergsvlei, Mooi, Renoster, Vals, Sand, Vet, Harts, Molopo and Vaal. The watercourse associated with the sewer is the Spitskopspruit River which flows into the Mooi River east of the study area (Figure 5.6).

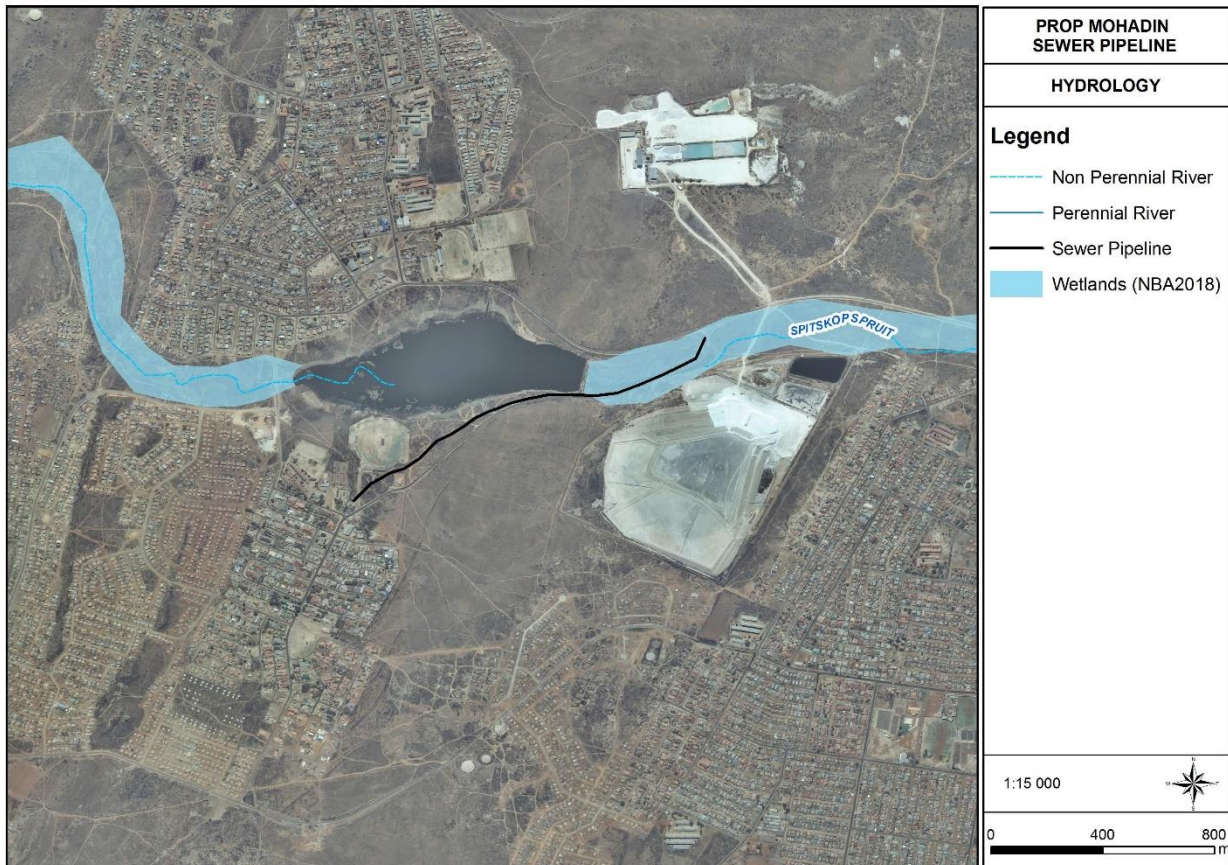


Figure 5.6: Regional hydrology of the study site and surrounding.

Sample assessment methodology and site selection: Due to the fixed location of the pipeline the placement of the sample sites was done in accordance with the closest to the impact rather than in terms of the habitat requirements. An upstream and downstream sample point system to allow for the detection of impact using comparative assessment methods. The locations of these sampling points are illustrated in Figure 5.7.



Figure 5.7: Sampling point for biomonitoring at the proposed study area

Watercourse Classification and Delineation: The wetland associated with the pipeline was impounded, and largely inundated, to form the Poortjie Dam, approximately 140m east (downstream) of the key point. Wetland conditions remain upstream and downstream of the dam, although the characteristics of this wetland is far removed from its theoretical undisturbed (reference) state. (Du Toit et al., 2021) suggest that this wetland is an important pollutant filter. After leaving the wetland, the Spitskopspruit flows through the industrial area of Potchefstroom, after which the stream bed is converted into a concrete-lined canal that joins the Mooi River approximately 3 km downstream from Potchefstroom Dam.

The proposed sewerage line is located adjacent to the dam with only a small section adjacent to the wetland habitat. A wetland crossing occurs at the Sooliman Street - Promosa Road T-Junction (at approximately 26°42'35.73"S and 27° 2'40.24"E). Stormwater outlets into the watercourse were recorded to the north and south and are shown in the delineation map (**Figure 5.8**). A protective buffer zone around the wetland was calculated as 16 m (the risk category selected was service infrastructure and specifically pipelines for the transport of waste) (Macfarlane et al., 2015).

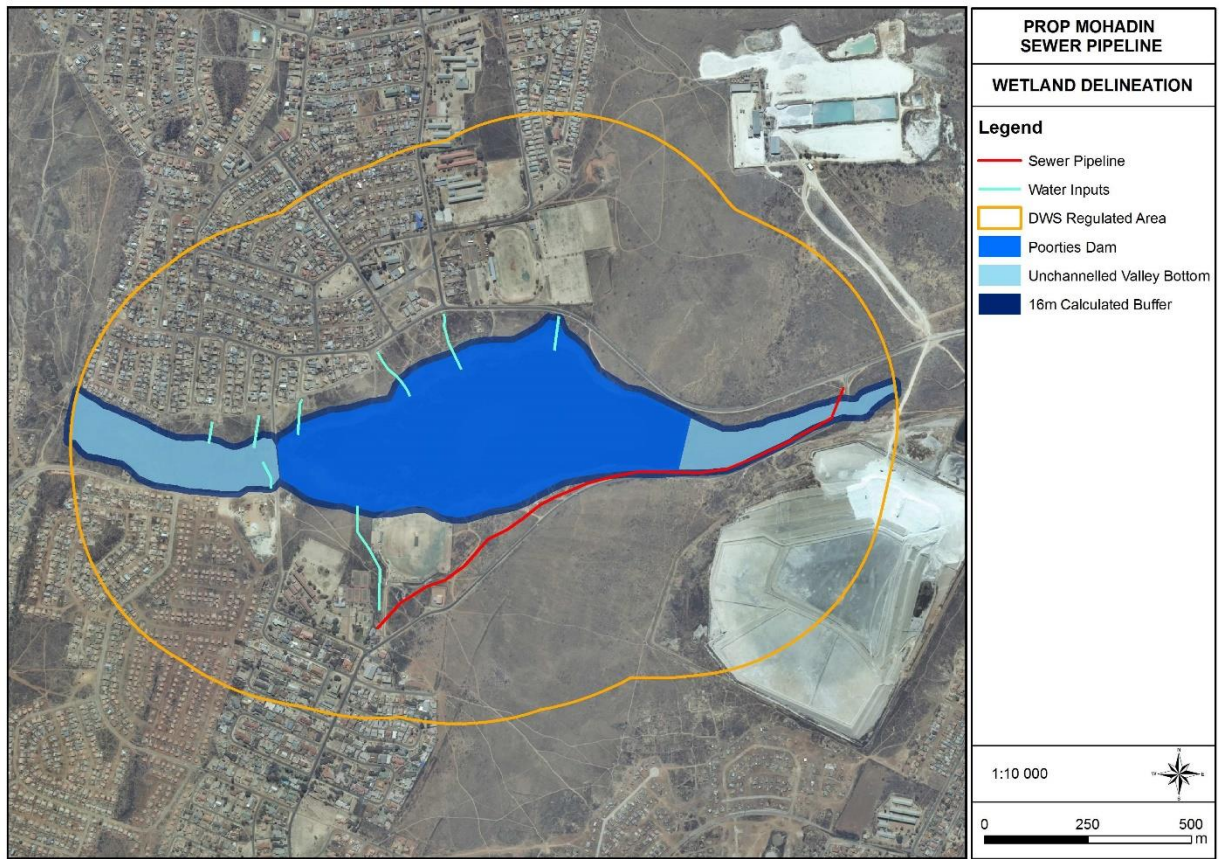


Figure 5.8: Channelled valley bottom, associated calculated buffer zone, stormwater outlets and the DWS regulated area

Soil & Vegetation Indicators: The original wetland was impounded to form the dam as early as 1930. Furthermore, large areas were historically disturbed by mining, diggings and dumping. Soil samples therefore could not be reliably used to determine the extent of the current functional wetland boundary, although redoximorphic features were often encountered.

The vegetation composition is dominated by Alien Invasive Species (AIS) and is expected to degrade further in the next 5 years due to the large-scale impacts of mining and other disturbances (**Figure 5.9**). The following AIS were recorded: *Amaranthus viridis*, *Argemone ochroleuca*, *Persicaria lapathifolia*, *Arundo donax*, *Verbena bonariensis*, *Verbena aristigera*, *Solanum* sp., and *Tagetes minuta*. Some of the woody AIS include *Melia azadarch* and *Eucalyptus* sp.

The remaining indigenous species recorded include: *Senegalia caffra*, *Vachellia karroo*, *Typha capensis*, *Phragmites australis*, *Aloe* sp., *Asparagus africana*, *Cyperus sexungularis*, and *Schoenoplectus corybosus*. It should be noted that algae were abundant and could indicate eutrophication due to sewerage pollution.



Figure 5.9: Vegetation composition of the study area.

5.5 Heritage Aspects of the area

5.5.1 Heritage:

The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a very limited Stone Age occupation, followed later by large scale settlement of agro-pastoralists dating to the Late Iron Age. The second component consists of two elements, being made up of a farming community and a later urban element, most of which developed during the last 150 years.

Three built features were identified in the vicinity of the pipeline route (**Figure 5.10**):

- The Poortjiesdam, which was constructed prior to 1938. Based on the aerial photographs, it seems as if the wall was raised at some point in time, increasing the basement capacity.
 - It is unlikely that the pipeline route will be located in such a position that it would compromise the dam wall.
- An old concrete road bridge across the Spitskopspruit. It probably was part of an older access road towards the west. It is classified as a pipe culvert as this type of crossing is usually made of reinforced concrete, steel pipes or corrugated iron. It is commonly used on roads carrying low volumes of traffic.
 - As it is located across the streambed, it is unlikely that it would be impacted on by the pipeline.
- An old ore bin that was probably part of the Gypsum tailings dam.
 - This site is located some distance to the south of the pipeline route and it is very unlikely that it would be impacted on by the proposed development.



Concrete road bridge

Ore bin

Figure 5.10. Features found in the vicinity of the project area

5.5.2 Paleontological overview

The site lies in the Transvaal Basin with the Transvaal Supergroup sequence exposed.

The Late Archaean to early Proterozoic Transvaal Supergroup is preserved in three structural basins on the Kaapvaal Craton (Eriksson *et al.*, 2006). In South Africa are the Transvaal and Griqualand West Basins, and the Kanye Basin is in southern Botswana. The Griqualand West Basin is divided into the Ghaap Plateau sub-basin and the Prieska sub-basin. Sediments in the lower parts of the basins are very similar but they differ somewhat higher up the sequences. Several tectonic events have greatly deformed the south western portion of the Griqualand West Basin between the two sub-basins

The Transvaal Supergroup comprises one of world's earliest carbonate platform successions (Beukes, 1987; Eriksson *et al.*, 2006; Zeh *et al.*, 2020). In some areas there are well preserved stromatolites that are evidence of the photosynthetic activity of blue green bacteria and green algae. These microbes formed colonies in warm, shallow seas.

In the Transvaal Basin the Transvaal Supergroup is divided into two Groups, the lower Chuniespoort Group and the upper Pretoria Group (with ten formations; Eriksson *et al.*, 2006). The Chuniespoort Group is divided into the basal Malmani Subgroup that comprises dolomites and limestones and is divided into five formations based on chert content, stromatolitic morphology, intercalated shales and erosion surfaces. The top of the Chuniespoort Group has the Penge Formation and the Deutschland Formation.

Making up the lower Pretoria Group are the Timeball Hill Formation and the Boshhoek Formation. The Hekpoort, Dwaalheuwel, Strubenkop and Daspoort Formations form a sequence as the middle part of the Pretoria Group, Transvaal Supergroup, and represent rocks that are over 2060 million years old. The Hekpoort Formation is a massive lava deposit and is overlain by the Dwaalheuwel conglomerates, siltstone and sandstone (not present here). A hiatus separates the Strubenkop Formation shales and slates from the overlying quartzites of the Daspoort Formation. Another seven formations make up the Upper Pretoria Group.

The Transvaal sequence has been interpreted as three major cycles of basin infill and tectonic activity with the first deep basin sediments forming the Chuniespoort Group, the second cycle deposited the lower Pretoria Group, and the sediments in this area are from the interim lowstand that preceded the third cycle. These sediments were deposited in shallow lacustrine, alluvial fan and braided stream environments (Eriksson *et al.*, 2012). After the deposition of the Transvaal Supergroup, there was a series of intrusions by dykes and sills. This material is called

diabase. In much more recent times, the Quaternary, erosion and deposition of the older rocks has accumulated in lower-lying areas as sands and alluvium.

5.6 Social Characteristics of the Study Area and Surrounds

The purpose of this section is to provide an overview of the current socio-economic situation within the proposed project area. This section will provide a strategic understanding of the socio-economic profile of the study area, in order to develop a better understanding of the socio-economic performance as a background to the development of the project. The data presented in this section has been largely derived from the most recent (2011) Census, as well as the municipalities IDP.

5.6.1 Socio-Economic Context

The demographic features of Nkangala District Municipality (NDM) are investigated in this section. The purpose of the section is to provide an overview of the socio-economic characteristics of the district together with its local municipalities. Such an overview will assist in identifying the localized issues with reference to demographic and labour force dimensions. In order to provide comprehensive baseline information regarding the mentioned dimensions, the characteristics of the following salient features are investigated:

Demographic Features

The population of JB Marks Municipality has increased from 219 463 to 243 527 between 2011 and 2016. The vast majority of the population is made up of black Africans followed by whites as reflected in Figure 5.11 below.

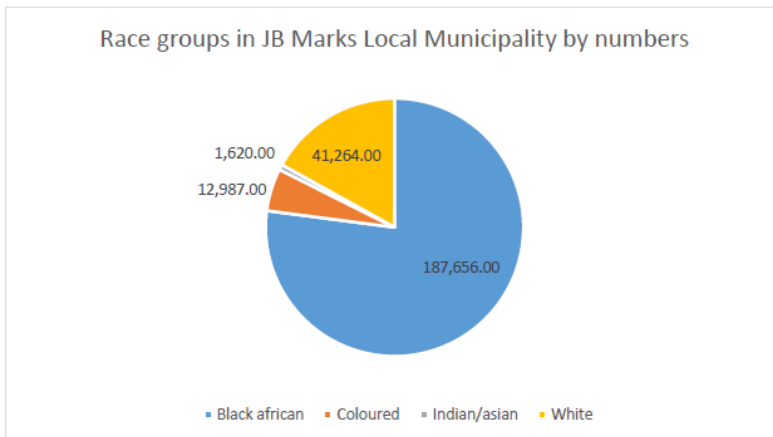


Figure 5.11: Race Groups in JB Marks Municipality

As can be seen from Figure 5.12, below, about 67 per cent of the population in the municipality is composed of the age group of 15-64. This age group is made up of the economically active members of the population and there has not been changes in this group between 2011 and 2016. There has also been a 1 per cent increase in the other two age groups of 0-14 and over 64.

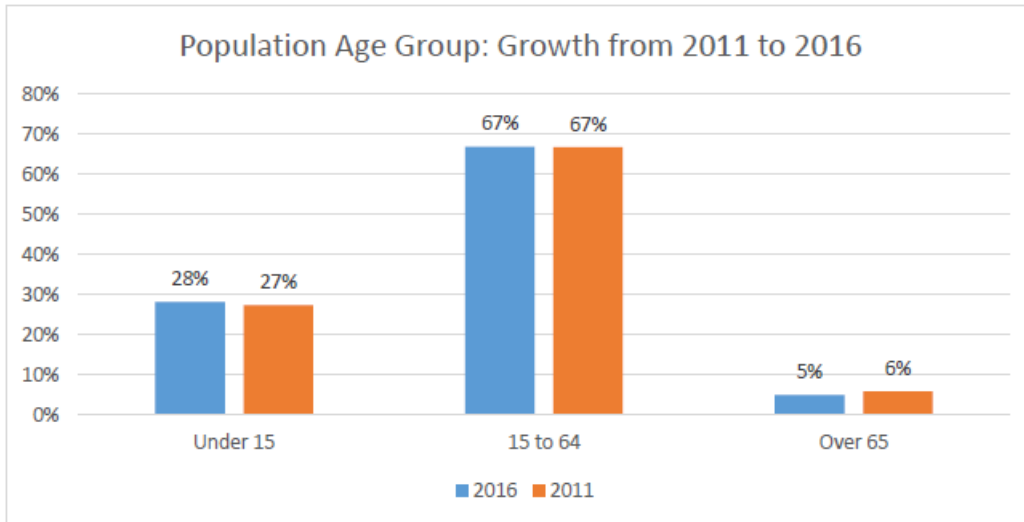


Figure 5.12: Population Age Groups 2011 and 2016

Level of education

Figure 5.13 below depicts the level of education in the municipality for the period 2011 and 2016. The figure shows that there was a drop of less than one per cent in the number of people without any schooling and a positive increase in those with matric from 27 per cent to 30 per cent. There was a one per cent drop in the number of people with higher education during the same period.

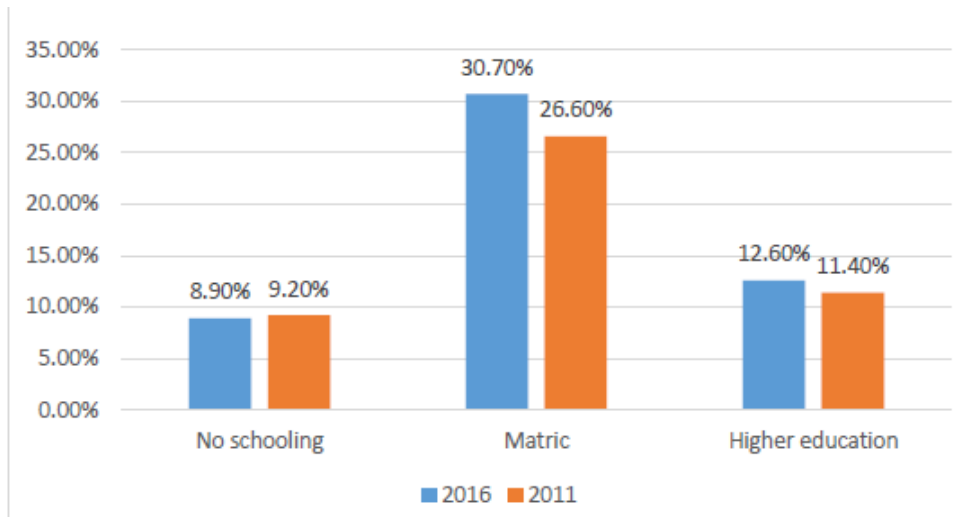


Figure 5.13: Level of Education - 2011-2016

Housing is one of the important services provided by the municipality, which is also an indicator of development. As reflected in Table 1, below, 63 per cent of houses in the municipal area are classified as formal while about 10 per cent of houses are located in informal settlements. About 7 per cent of households reside in flats or apartments while the same percentage stays in backyards.

Table 1: Types of Dwellings

Type of Dwelling	%
Formal dwelling/house or brick/concrete block structure on a	63,16
Traditional dwelling/hut/structure made of traditional mater	0,33
Flat or apartment in a block of flats	7,60
Cluster house in complex	0,98
Townhouse (semi-detached house in a complex)	0,69
Semi-detached house	1,00
Formal dwelling/house/flat/room in backyard	7,56
Informal dwelling/shack in backyard	6,18
Informal dwelling/shack not in backyard (e.g. in an informal	10,33
Room/flatlet on a property or larger dwelling/servants quart	1,04
Caravan/tent	0,09
Other	1,04

Access to services

Figure 5.14 below indicate access to municipal services in JB Marks Municipality from 2011 to 2016. The data shows that there has been a steady increase in the number of households with access to flush toiled from 71 per cent in 2011 to 76% in 2016. Access to piped water has decreased from 49 per cent to 46 per cent in the same period due to the growth in population and allocation of unserviced stands in the municipal area. Access to electricity has not changed much for the period with the access standing at 87%. The highest increase in access to services has been in the removal of refuse removal which increased from 57 per cent to 71 per cent. As can be seen the municipality still needs to double its efforts in extending the provision of service to the entire municipal area.

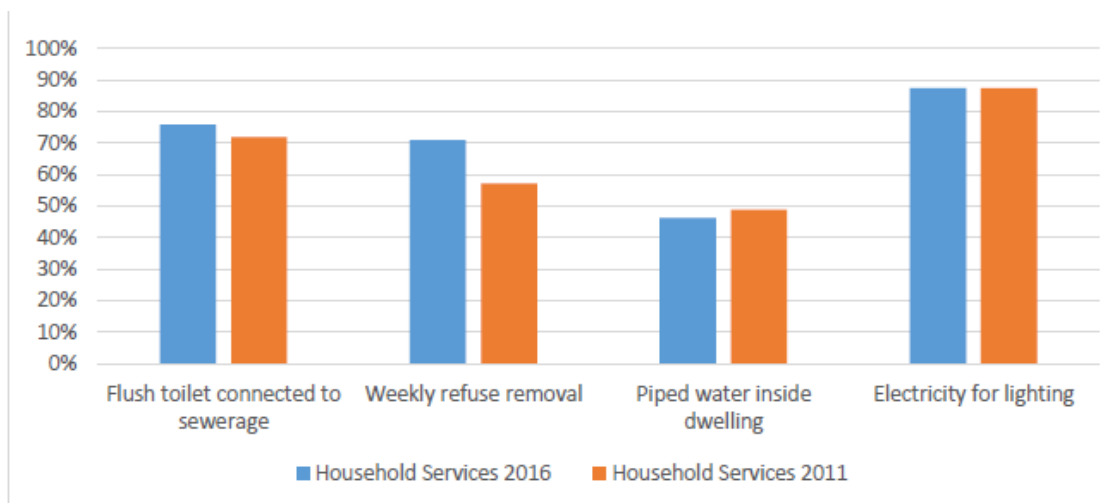


Figure 5.14: Access to service in JB Marks Municipality 2001 and 2016

Below Table 2 indicate that the total number of households in the municipal area increased from 67 098 to 80 572 between 2011 and 2016. This is an increase of more than 12 000 households. An interesting finding is that 37 per cent of households are headed by females and this figure has not changed since 2011. About 52 per cent of houses are privately owned by residents.

Table 2: Household Dynamics

Household Dynamics		
Households	80 572	67 098
Average household size	3.0	3.1
Female headed households	37.1%	37.1%
Formal dwellings	82.0%	78.5%
Housing owned	52.6%	52.7%

6 DESCRIPTION OF POTENTIAL IMPACTS AND ISSUES

The activities that are associated with the construction, maintenance and operation of the proposed power lines, which could potentially have an impact on the environment, are also highlighted in this section. In addition, the Department of Environmental Affairs guide on assessing cumulative effects² describes that it is not practical to analyse the cumulative effects of an action on every environmental receptor. Therefore, for cumulative effects analysis to help the decision-maker and inform interested and affected parties, it must be limited to effects that can be evaluated meaningfully. This chapter will highlight potential impacts and issues that can be evaluated.

6.1 Risk of impacts on Aquatic and Wetlands

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D1 – Aquatic and Wetland Impact Assessment Report** for more details).

Results of the Wetlands Assessment

Impacts expected to be associated with the construction of the proposed sewage infrastructure adjacent to, and within the wetland are associated with earthworks in the construction phase, and potential spills during the operational phase. Upgrade of sewer infrastructure is likely to have a net positive impact on water quality in the area since spills are expected to be reduced. Temporary disturbance of local wetland habitat, sedimentation and construction-related pollution can be effectively managed, mitigated and rehabilitated. The potential spill of sewage should infrastructure fail will result in significant negative impacts to water quality. However, installation of upgraded sewage infrastructure is likely to decrease sewage spills in this area and is likely to contribute to improved water quality. It is important that any mitigation be implemented in the context of an Environmental Management Plan in order to ensure accountability and ultimately the success of the mitigation.

A discussion on impacts to the aquatic environment (as required in GN320 of March 2020) is summarised in Table 6.1. Impact scores as set out in the NEMA 2016 Impact Assessment are presented in Section 7.2.1.

Table 6.1: Impacts as per GN320 of March 2020

Number	Impact question	Expected impact
2,5,3	How will the development impact on fixed and dynamic ecological processes that operate within or across the site	Impacts are associated with nutrient cycling, as well as water cycling. Through mitigation measures this can be reduced.
	a) How will the development impact on fixed and dynamic ecological processes that operate within or across the site a. Impacts on hydrological functioning at a landscape level and across the site which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes); and	The impact will be limited due to the transient nature of the activity proposed. The operational phase will not affect hydrological function on a landscape level, affect flood regimes or dynamic processes Table 12

² DEAT (2004) *Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria.*

Number	Impact question	Expected impact
	b) Change in the sediment regime (e.g. sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns) of the aquatic ecosystem and its sub -catchment;	During the construction phase there can be a significant increase in sedimentation if mitigation measures are not adhered to. This is also expected in the early operation phase until areas are vegetated. Sediment regimes are expected to stabilise over time. Mitigation measures are presented in Table 13
	c) The extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.).	The proposed sewer line if functional will have a negligible impact on the functionality of the aquatic ecosystem. Refer to impact scores in Tables 12, 14, 15
	d) to what extent will the risk associated with water uses and related activities change?	See risk assessment (GN509 of NWA) in the accompanying risk assessment report.
2,5,4	How will the proposed development impact on the functioning of the aquatic feature? This must include:	
	a) Base flows (e.g. too little/too much water in terms of characteristics and requirements of system)	Not expected to be impacted if the sewer line remains functional. (Refer to Table 12).
	b) Quantity of water including change in the hydrological regime or hydroperiod of the aquatic ecosystem (e.g. seasonal to temporary or permanent; impact of over - abstraction or instream or off -stream impoundment of a wetland or river)	Not expected to be impacted if the sewer line remains functional. (Refer to Table 12).
	c) Change in the hydrogeomorphic typing of the aquatic ecosystem (e.g. change from an unchanneled valley - bottom wetland to a channelled valley -bottom wetland).	Unlikely since hydrological processes will not change. (Refer to Table 12).
	d) Quality of water (e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication)	Not expected to be impacted if the sewer line remains functional. Failure of the pipeline and subsequent spills will have a significant impact on water quality. (Refer to Tables 16 and 17).
	e) Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).	Some fragmentation is expected but will stabilise over time given that the trench is effectively rehabilitated. (Refer to Table 12).
	f) The loss or degradation of all or part of any unique or important features (e.g. waterfalls, springs, oxbow lakes, meandering or braided channels, peat soils, etc.) associated with or within the aquatic ecosystem.	Not observed and thus not expected to be impacted.
2,5,5,	How will the development impact on key ecosystem regulating and supporting services especially:	As long as the sewer line remains functional the impact will be negligible. Mitigation measures are presented in Tables 12, 13, 14, 15
	a) Flood attenuation	
	b) Stream flow regulation	
	c) Sediment trapping	
	d) Phosphate assimilation	
	e) Nitrate assimilation	
	f) Toxicant assimilation	
	g) Erosion Control	
	h) Carbon Storage?	

Function and Integrity of the wetland on either side of the Poortjie Dam

A summary of the results recorded for the wetland unit potentially affected by the proposed upgrade and replacement of sewer infrastructure at Mohadin are provide below

Present Ecological Status (PES): Category D, having obtained a combined impact score of 5.9 (Present Ecological Status (PES) 41%) (Table 4). Wetlands in this category are considered to be **Largely modified**. A large change in ecosystem processes and loss of natural habitat and biota has occurred. The condition is likely to remain stable over the next 5 years although the integrity of the vegetation component is expected to deteriorate

Ecological Importance and Sensitivity (EIS): The highest scoring regulating and supporting services include sediment trapping, phosphate assimilation and toxicant assimilation, which scored **Moderate**. This reflects the impact of pollutants from adjacent mines and supports the findings of DuToit *et al.* (2021). **High** scores were obtained for Cultural and Spiritual services.

EIS: Moderate Score of 1.3 - Wetlands that are considered to be ecologically important and sensitive on a provincial or local scale. The biodiversity of these wetlands is not usually sensitive to flow and habitat modifications. They play a small role in moderating the quantity and quality of water in major rivers.

In situ water quality: Within range based on limited parameters. Increased turbidity (identified by opaque water color) due to recent rainfall in the catchment and can be construed as natural process. All aspects were within the parameters for aquatic ecosystems.

Instream habitat (IHAS): The IHAS score was calculated to 43% sample site (**Error! Reference source not found.**). This indicates the habitat is "Insufficient for supporting a diverse aquatic macro invertebrate community" (**Error! Reference source not found.**).

Aquatic macroinvertebrate assemblages: The sample site's ASPT was calculated to 1.8. The SASS 5 results show the system to be in poor condition. The sample site had a SASS score of 9 and with 5 taxa. The taxa observed are all hardy and able to survive in difficult conditions. The taxa are also associated with polluted water. Using the "Dallas Bands" (Dallas, 2007) the SASS5 Ecological Category was determined in to E/F classification. The classification suggests that the system is in poor condition. This assessment is in line with the site observations.

Recommended Ecological Management Category: D

Summary of impacts assessed

Impacts to hydrological function at a landscape level: Changes to hydrological function at a landscape level which can arise from changes to flood regimes (e.g. suppression of floods, loss of flood attenuation capacity, unseasonal flooding or destruction of floodplain processes). The extent of the modification in relation to the overall aquatic ecosystem (i.e. at the source, upstream or downstream portion, in the temporary, seasonal, permanent zone of a wetland, in the riparian zone or within the channel of a watercourse, etc.). Changes to base flows (e.g. too little/too much water in terms of characteristics and requirements of system). Fragmentation (e.g. road or pipeline crossing a wetland) and loss of ecological connectivity (lateral and longitudinal).

Changes in sediment regime: Changes in sediment regimes of the aquatic ecosystem and its sub-catchment by for example sand movement, meandering river mouth /estuary, changing flooding or sedimentation patterns

Introduction and spread of alien vegetation impact: The moving of soil and vegetation resulting in opportunistic invasions after disturbance and the introduction of seed in building materials and on vehicles. Invasions of alien plants can impact on hydrology, by reducing the quantity of water entering a watercourse, and outcompete natural vegetation, decreasing the natural biodiversity. Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.

Loss and disturbance of watercourse habitat and fringe vegetation impact: Loss and disturbance of watercourse habitat and fringe vegetation due to direct development on the watercourse as well as changes in management, fire regime and habitat fragmentation.

Changes in water quality: Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication

Loss of aquatic biota: Loss of instream habitat, deposition of wind-blown sand, loss of fringing vegetation and erosion, alteration in natural fire regimes and subsequent loss of non-marginal and marginal vegetation. Increase in invasive species due to disturbance.

A water use authorization will need to be obtained from the Department of Water and Sanitation for approval of the water use aspects of the proposed activities are to be placed within the 500m buffer area of wetlands

6.2 Risk of impacts on the ecology

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E2 – Terrestrial Impact Assessment Report** for more details).

6.2.1 **Vegetation**

Results of the Vegetation Study:

Vegetation within the study area: Limited natural vegetation is present along the route. Encroached grassland and degraded watercourse vegetation are the two main vegetation groups delineated and are shortly discussed below and geographically represented in **Figure 6.1**. Infrastructure within the study area were not mapped (e.g. Sooliman Street, buildings etc).

No sensitive vegetation groupings are present along the pipeline route or within the secondary project area of interest (study area). The vegetation is considered moderately modified in which the species composition has been altered, however the vegetation retains a functional role. Natural rocky grassland is present south of Sooliman Street, outside of the project footprint. This vegetation is briefly discussed as it may be proposed for construction camps or laydown areas of pipes.

1. *Vachellia karoo* – *Cynodon dactylon* grassland
2. *Persicarya laphatifolia*_ *Typha capensis* moist area
3. Degraded watercourse vegetation

No plant species of conservation concern were noted, and none are expected to be present in this severally modified vegetation.

Vegetation south of the study area

Good condition, rocky grassland and Andesite Mountain Bushveld are present south of the study area, separated from the pipeline by Sooliman Street (**Figure 6.1**). The grassland on the foot slope of the ridge supported a high species diversity and towards the top of the rocky ridge, a dense tree layer, typical of the Andesite Mountain Bushveld were recorded (Photograph 1).



Photograph 1: Rocky grassland and Andesite Mountain Bushveld south of the study area

This area is suitable habitat to plant species of conservation concern and are in a good ecological condition. This vegetation should not be impacted on by any activities related to the sewerage upgrade.

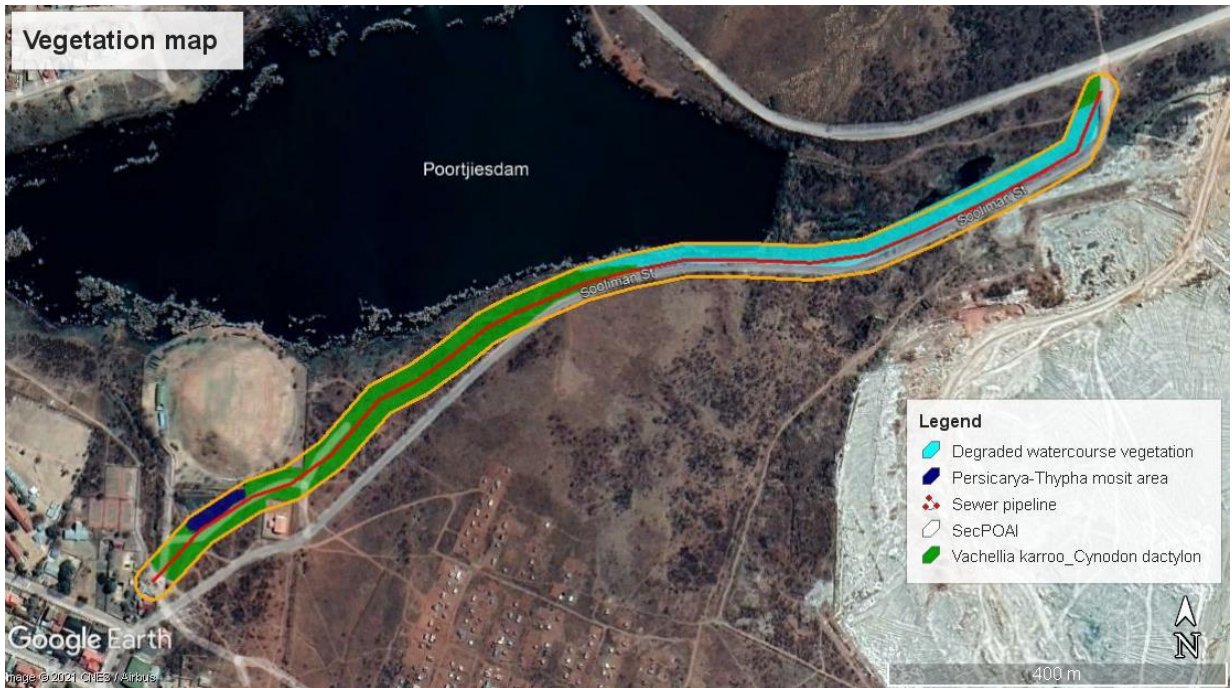


Figure 6.1: Vegetation within the study area.

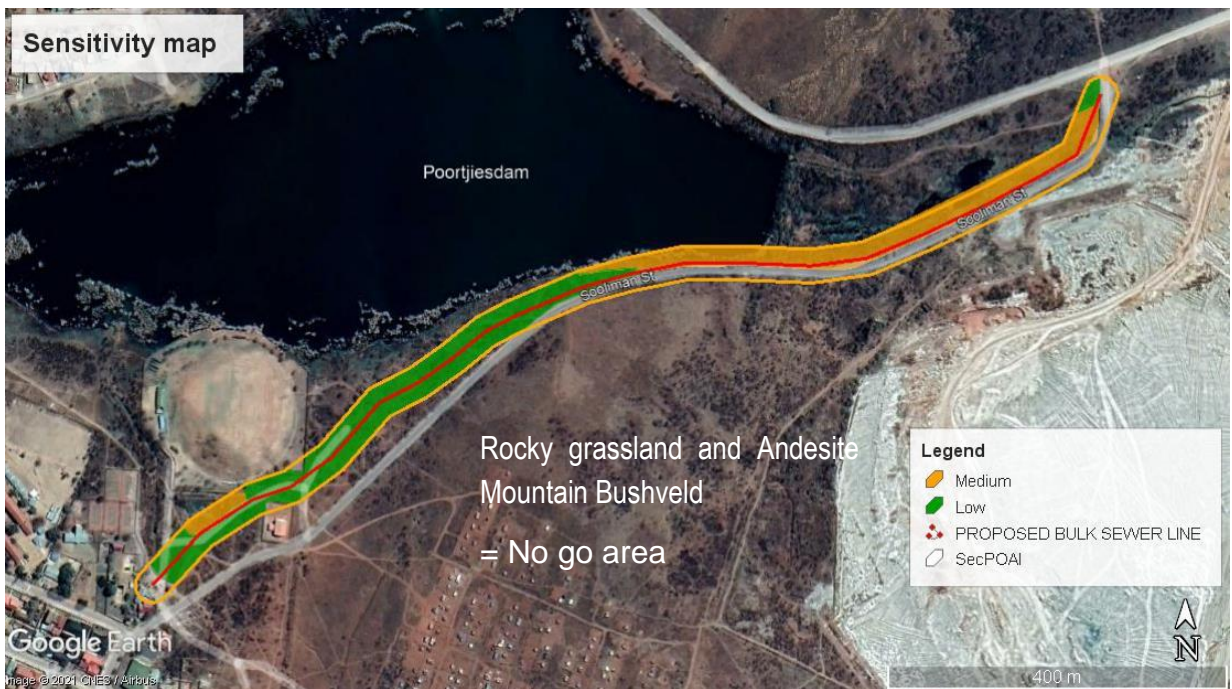


Figure 6.2: Vegetation sensitivity to the proposed development

Impact on ecosystem threat status: Although the vegetation along the pipeline falls within the Andesite Mountain Bushveld, it is more likely that the vegetation was historically grassland representative of the Carletonville Dolomite Grassland or Rand Highveld Grassland. However, the grassland is degraded, trampled and include a high frequency of invasive plant species. It is also encroached by *Vachellia karroo.*, the pipeline falls outside of the mapped remnant patches of grassland ecosystems and will therefore not impact on targets.

Sensitive Areas and No-go areas: Good condition, rocky grassland and Andesite Mountain Bushveld are present south of the study area, separated from the pipeline by Sooliman Street. This area is suitable habitat to plant species

of conservation concern and are in a good ecological condition. It is unlikely that this area will be directly impacted on, However, indirect impacts are likely. Therefore, the rocky grassland and Andesite Mountain Bushveld south of the study area must be regarded as a no-go area that should not be impacted on by any activities related to the sewerage upgrade.

Plant species of conservation concern: No plant species of conservation concern were recorded, and none are expected to be present within the study area.

Main impacts: The main impacts expected are as follows:

- potential increase in alien and invasive plant species,
- lack of rehabilitation with indigenous species; and
- pollution of the soil and water due to spillages / leakages.

6.2.2 Fauna

Results of the Faunal study: A site verification assessment was completed on the 18 November 2021. The site assessment indicated that the pipeline and road servitude is highly impacted showing signs of past excavations and significant sewage leaks and does not support any significant habitat for ecologically important species. Furthermore, the pipeline appears to be in disrepair with sewage leaks evident on site and manholes left open, hazardous to animals and pedestrians.

Nearby koppies and hills that support rocky bushveld habitat are well outside the development area and can be avoided and should not be impacted by the pipeline replacement. The dam is utilised by birds, and the existing pipeline servitude encroaches into the dam buffer and impact during construction will be unavoidable and must be managed.

Faunal Habitat Sensitivity:

From the desktop assessment, the only on-site desktop feature of ecological relevance was the CBA1 and ESA. The CBA incorporates the surrounding ridges / kloofs which provide unique and sensitive rocky habitat and the Poortjiesdam. The on-site habitat has been previously disturbed due to the existing pipeline, associated sewage leaks and the road and gravel road servitudes and supports no sensitive or important fauna habitat. The following is relevant:

- Any indiscriminate activity into the surrounding areas could damage the rocky habitat and fauna associated with the rocky habitat.
- Parts of the pipeline are immediately adjacent to the Poortjiesdam which is utilised by water birds, although TOP species are deemed unlikely to be present. Regardless activities should proceed in a manner to reduce impact and noise-related stress to the surrounding avifauna.
- The site provides little in terms of habitat for significant or sensitive terrestrial fauna.
- The site is part of the aquatic buffer of the dam and linked to the riverine ecological corridor, but the current sewage leaks impact the buffer area and riverine system and the site is very degraded. The development may improve current site conditions in the long term.

Description of Ecological Impacts: For the purposes of this assessment, the potential impacts to the terrestrial flora and fauna and local terrestrial biodiversity resulting from the proposed activities can be grouped into the following impact categories:

- **Direct ecosystem destruction and modification impacts** – This impact refers to the direct physical destruction and/or modification of terrestrial vegetation communities and habitat during the construction and

operational phases of the project and includes habitat loss impacts, biota fatalities and population reductions, habitat fragmentation, habitat patch size reduction, and the occurrence of barriers to propagule and animal movement.

- **Indirect ecosystem disturbance impacts** – This impact refers to the indirect impacts to the biota and vegetation communities as a result of activities within close proximity that result in the following impacts: (i) alteration of abiotic soil and moisture conditions, (ii) increased rates of erosion and sedimentation, (iii) alteration of the chemical and biological characteristics of soil and water, (iv) increased alien invasive plant invasion, (v) noise pollution, (v) vibrations and (vi) light pollution, and (vii) expanded edge effect.

6.3 Heritage & Cultural Resources Impacts

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D4 & D5 – Heritage & Paleo Impact Assessment Report** for more details).

Results of the Heritage Study: Three built features were identified in the vicinity of the pipeline route:

- The Poortjiesdam, which was constructed prior to 1938. Based on the aerial photographs, it seems as if the wall was raised at some point in time, increasing the basement capacity.
 - It is unlikely that the pipeline route will be located in such a position that it would compromise the dam wall.
- An old concrete road bridge across the Spitskopspruit. It probably was part of an older access road towards the west. It is classified as a pipe culvert as this type of crossing is usually made of reinforced concrete, steel pipes or corrugated iron. It is commonly used on roads carrying low volumes of traffic.
 - As it is located across the streambed, it is unlikely that it would be impacted on by the pipeline.
- An old ore bin that was probably part of the Gypsum tailings dam.
 - This site is located some distance to the south of the pipeline route and it is very unlikely that it would be impacted op by the proposed development.

During the survey, the following sites, features and objects of cultural significance were identified in the project area (**Figure 6.3**).

Stone Age No sites, features or objects of cultural significance dating to the Stone Age were identified in the project area.

Iron Age No sites, features or objects of cultural significance dating to the Iron Age were identified in the project area.

Historic period No sites, features or

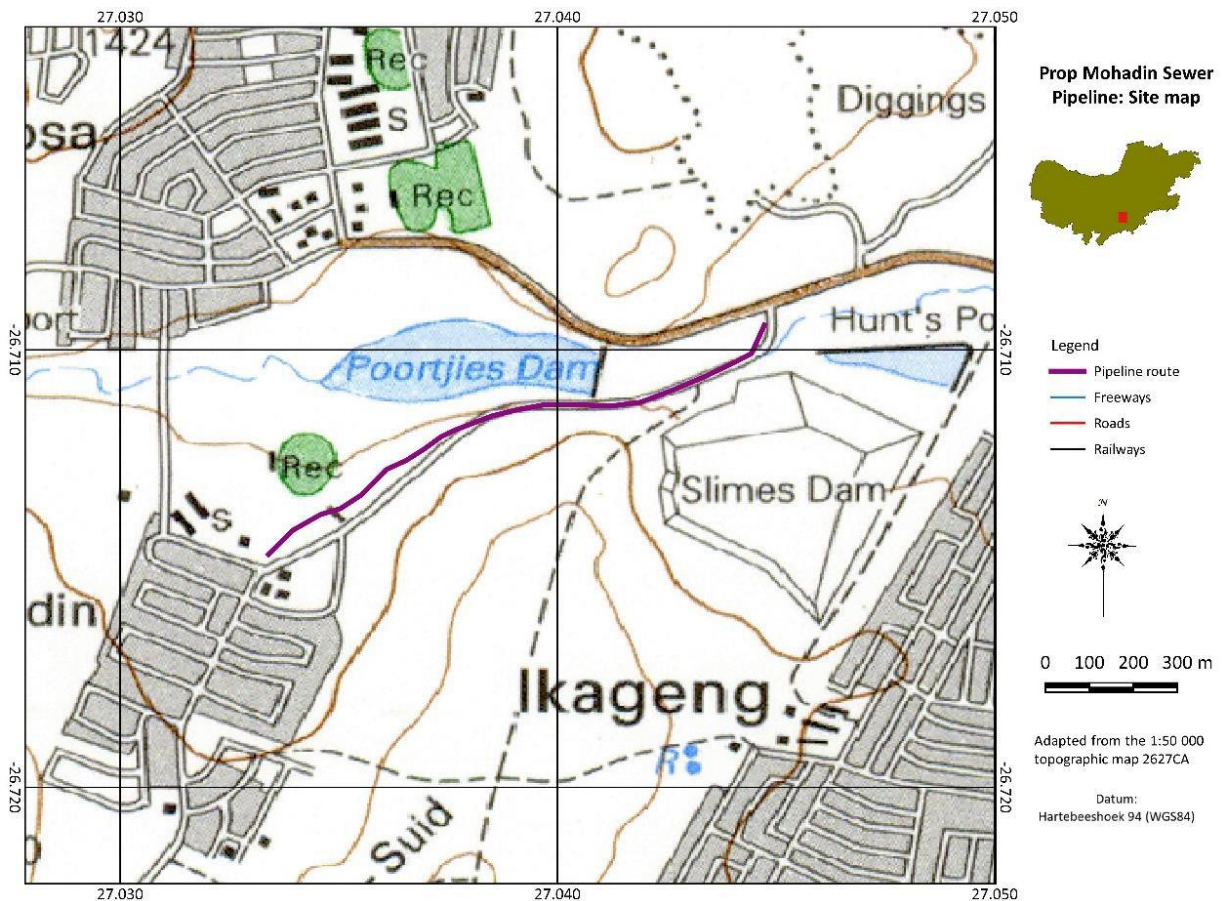


Figure 6.3: Location of heritage sites in the project area (Please note that as nothing was found on the site, nothing is indicated on the map)

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development

- As no sites, features or objects of cultural historic significance have been identified in the project area, there would be no impact as a result of the proposed development.

Results of the Paleo Study

The palaeontological sensitivity of the area under consideration is presented in **Figure 6.4**. The eastern route is in the older Malmani Subgroup dolomites but mapped as the whole subgroup because there is insufficient exposure to enable separation into one of the five formations. The dolomites can have various proportions of dolomite, stromatolitic or oolitic dolomite, stromatolites and chert.

Stromatolites are the layers upon layers of inorganic materials that were deposited during photosynthesis, namely calcium carbonate, magnesium carbonate, calcium sulphate and magnesium sulphate. These layers can be in the form of flat layers, domes or columns depending on the environment where they grew (Beukes, 1987). Some environments did not form stromatolites, just layers of limestone that later was converted to dolomite. The algae that

formed the stromatolites are very rarely preserved, and they are microscopic so they can only be seen from thin sections studies under a petrographic microscope.

The western route is in the Timeball Hill Formations shales and siltstones that might preserve trace fossils of microbes, also known as microbially induced sedimentary structures (MISS). Such features have been recorded from the Magaliesberg Formation (Parizot *et al.*, 2005; Bosch and Eriksson, 2017) but only inferred for the Timeball Hill Formation. The Magaliesberg trace fossils comprise crack-like features, vermiform structures and circular imprints resembling concretions or, possibly, oncolites occur on sand sheet surfaces. They have been found north of Pretoria (Bosch and Eriksson, 2017).

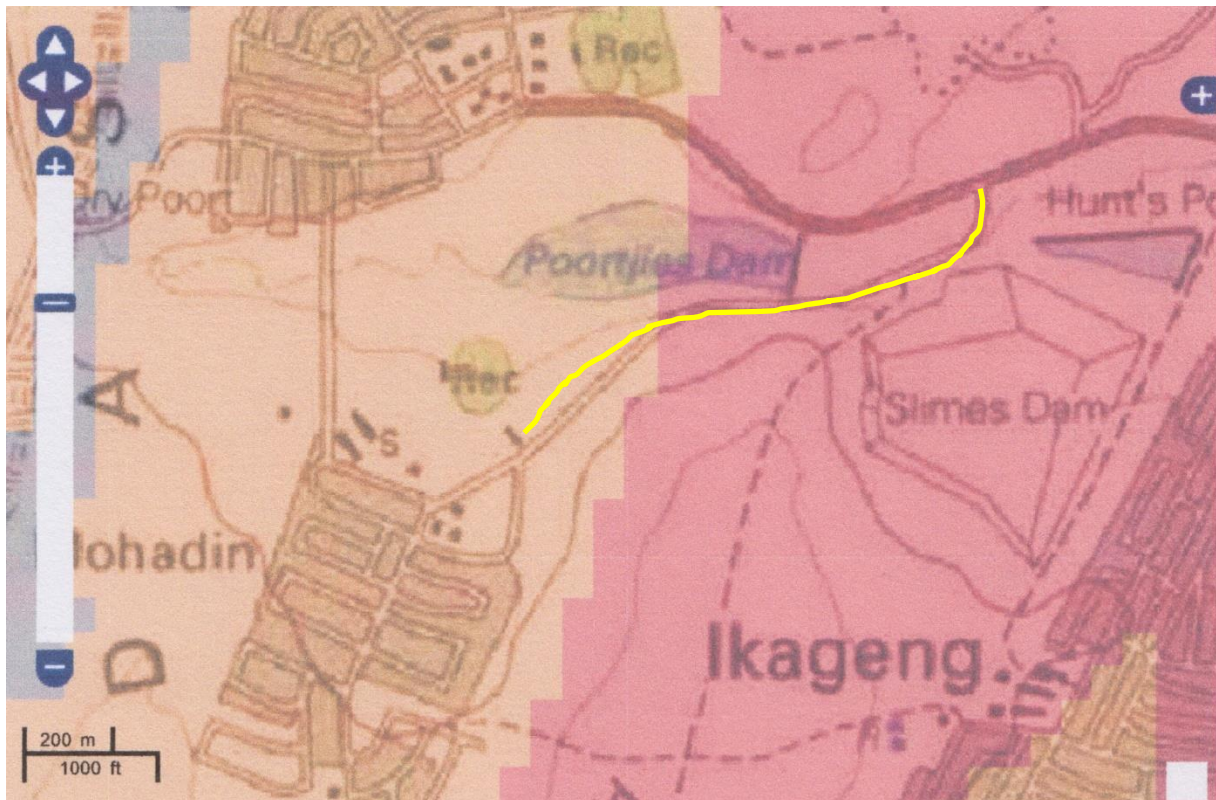


Figure 6.4: SAHRIS palaeosensitivity map for the site for the proposed Mohadin sewer pipe shown by the yellow line. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

From the SAHRIS map above the area is indicated as very highly sensitive (red) for the eastern portion on the Malmani Subgroup dolomites, and as highly sensitive (orange) for the Timeball Hill Formation shales and siltstones that might have trace fossils.

Impact Assessment

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old to contain body fossils, but may have trace fossils of microbes and algae. Since there is an extremely small chance that fossils from the Timeball

Hill Formation and Malmani Subgroup may be disturbed a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

6.4 Social environment Impacts

The following impacts are identified as the major impacts associated with the development of the project the construction and operational phases of the development.

- **Inflow of Workforce and Jobseekers**
- **Employment Opportunities and Local Procurement**
- **Impact on Daily Living**
- **Safety and Security Related Impacts**
- **Impacts on Roads and Traffic:** An increase in traffic can be expected during the construction phase. The movement of machinery and vehicles will constitute an additional source of noise to the study area. However, this will be limited to the period of construction and mitigation can involve the use of equipment fitted with noise abatement technology (where possible) and the restriction of construction to certain days and times.

Considering the size and extent of the study area as well as details of the exact tower positions are still unknown, it is difficult to estimate exactly which roads will be utilised for the transport and consequently deliver equipment to the site from various centres. It was therefore decided to firstly assess the access roads outside the study area for importing components and consequently site access roads within the study area being utilised during construction.

Summary of Traffic impacts: The general load will comprise building materials such as concrete and reinforcement, structural steel, and cables for the stringing of the conductor. The proposed project will only have limited increase (i.e. construction vehicles for delivery of materials and clearing/ excavation) in traffic during the construction phase; therefore, a **Traffic impact assessment is not required and has not been assessed further within this report.**

6.5 Assumptions, uncertainties, and gaps in knowledge of the study

A number of limitations and assumptions, as described below, are noted for this environmental impact assessment.

- Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and some do contain trace fossils of Stromatolites (Malmani Subgroup) or microbially induced sedimentary structures (Timeball Hill Formation).
- It should be noted that the proposed route is already highly disturbed. In addition, the lack of finer resolution within the Malmani Subgroup indicates that the distinguishing rocks such as stromatolites, are absent. The overlying soils and sands of the Quaternary period would not preserve fossils.

7 ENVIRONMENTAL IMPACT ASSESSMENT

7.1 Methodology of the Impact Assessment

The identification of potential impacts includes impacts that may occur during the construction, operational and decommissioning phases of the proposed development. The assessment of impacts includes direct, indirect as well as cumulative impacts. In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed projects is well understood so that the impacts associated with the projects can be assessed. The process of identification and assessment of impacts includes:

- Determining the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured;
- Determining future changes to the environment that will occur if the activity does not proceed;
- Develop an understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

The impact assessment methodology has been aligned with the requirements for BA Reports as stipulated in Appendix 1 (3) (1) (j) of the 2014 NEMA EIA Regulations (as amended), which states the following:

“A BA Report must contain the information that is necessary for the Competent Authority to consider and come to a decision on the application, and must include 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 mitigated”.

As per the DEAT Guideline 5: Assessment of Alternatives and Impacts, the following methodology is applied to the prediction and assessment of impacts and risks. Potential impacts and risks have been rated in terms of the direct, indirect and cumulative:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
- **Cumulative impacts** are impacting that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. therefore, assuming worst case scenario.

In addition to the above, the impact assessment methodology includes the following aspects whereby the significance of the impact is calculated as follows and rating significance is explained below.

- » The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.

- » The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- » The **duration**, wherein it is indicated whether:
 - * The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - * The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - * Medium-term (5–15 years) – assigned a score of 3;
 - * Long term (> 15 years) - assigned a score of 4; or;
 - * Permanent - assigned a score of 5.
- » The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
 - * 0 is small and will have no effect on the environment;
 - * 2 is minor and will not result in an impact on processes;
 - * 4 is low and will cause a slight impact on processes;
 - * 6 is moderate and will result in processes continuing but in a modified way;
 - * 8 is high (processes are altered to the extent that they temporarily cease); and
 - * 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability** of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
 - * Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
 - * Assigned a score of 2 is improbable (some possibility, but low likelihood);
 - * Assigned a score of 3 is probable (distinct possibility);
 - * Assigned a score of 4 is highly probable (most likely); and
 - * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- » The **status**, which is described as positive, negative or neutral.
- » The degree to which the impact can be reversed.
- » The degree to which the impact may cause irreplaceable loss of resources.
- » The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

$S = (E+D+M) P$; where

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance** weightings for each potential impact are as follows:

- » **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),

- » **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

7.2 Impact Assessment

The specialist findings presented in this section represents a summary of the detailed and original specialist studies contained in the relevant appendices to this report (**Appendices D1 to D6**). The current summary of specialist findings is provided in the interest of brevity and with a view to facilitating public participation; as contemplated in the NEMA principles. The Competent Authority, with its mandate of substantive review of the EIA report, is therefore urged to also read the original specialist studies in the relevant appendices to this report with the aim of discharging its decision-making function. *Should any discrepancy occur between this summary, and the relevant detailed specialist study; the detailed specialist study will prevail.*

Table 7.1 & 7.2 below for each field of study are impacts for proposed sewer **line**. In some instances, where there is an impact specific to one of the lines deviation, this will be stipulated in **red**. Cumulative impacts have been discussed in each sub-section below for the respective field of study and summarised in section 7.3.

7.2.1 IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION PHASE

Table 7.1: A summary of anticipated significance of the potential direct, indirect and cumulative impacts that is likely to occur as a result of the CONSTRUCTION PHASE

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
1. IMPACT ON THE AQUATIC BIODIVERSITY				
<p>Direct Impacts (1a) Impacts to hydrological function at a landscape level</p> <p>Indirect Impacts: Placing the pipeline underground within the wetland will affect hydrology during the construction phase when temporary stream diversions are likely to be necessary. During the operational phase, the trench and new pipe may create a barrier to natural flow leading to damming up of water behind the new structures, or release of water into preferential flowpaths that lead to erosion downstream.</p> <p>Cumulative Impacts: Further disturbance of water flow in this wetland will exacerbate an already impacted system</p>	Medium	<ul style="list-style-type: none"> • During the detailed design phase, the footprint and design of structures should aim to have the least impact on habitat quality and hydrology of the watercourse • A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase • Effective stormwater management should be a priority during the construction phase. This should be monitored as part of the EMP. • High energy stormwater input into the watercourses should be prevented at all cost. 	Low	Expected to be low due to the transient nature of the activity proposed. The operational phase will not affect hydrological function on a landscape level, affect flood regimes or dynamic processes

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (1b): Changes in sediment entering and exiting the system</p> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> Disturbance of soil surface Disturbance of slopes through creation of roads and tracks adjacent to the watercourse Erosion (e.g. gully formation, bank collapse) <p>Cumulative Impacts: Expected to be low. Should mitigation measure not be implemented effectively, sediment deposition may affect the capacity of downstream culverts which may cause flooding. Reversing this process is unlikely and should be prevented in the first place.</p>	Medium	<ul style="list-style-type: none"> Consider the various methods and equipment available and select whichever method(s) that will have the least impact on watercourses. Sediment traps should be installed Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area. Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover. During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the adjacent surface vegetation. Sediment control should be effective and not allow any release of sediment pollution downstream. This should be audited on a weekly basis to demonstrate compliance with upstream conditions. Excavated materials (from any trenching) should not be contaminated and it should be ensured that the minimum surface area is taken up Any excavated soil/ stockpiles may not exceed 1 m in height. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, so as for later usage as backfill material. 	Low	Expected to be limited provided that the mitigation measures are implemented effectively and sedimentation is appropriately managed.
<p>Direct Impacts (1c): Introduction and spread of alien vegetation</p> <p>Indirect Impacts:</p> <p>Once in a system alien invasive plants can spread through the catchment. If allowed to seed before control measures are implemented alien plants can easily colonise and impact on downstream users.</p> <p>Cumulative Impacts:</p> <p>Since alien vegetation is already present in the catchment, cumulative impacts can be Moderate to High. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed.</p>	Medium	<ul style="list-style-type: none"> Undertake an Alien Plant Control Plan which specifies actions and measurable targets Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area and returning it where possible afterwards. 	Low	Expected to be limited provided that an Alien Plant Control Plan is effectively implemented

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (1d): Loss and disturbance of watercourse habitat and fringe vegetation</p> <p>Indirect Impacts: Assuming that earthworks will remain confined to road reserves vegetation clearing will likely not destroy wetland habitat.</p> <p>Cumulative Impacts: Expected to be Low. Should degradation occur, it may result in a high degree of irreplaceable loss of resources.</p>	Medium	<ul style="list-style-type: none"> The development footprint should remain outside the delineated wetland, riparian areas and buffer zones. Demarcate the watercourse areas and buffer zones to limit disturbance, clearly mark these areas as no-go areas 	Low	Expected to be limited
<p>Direct Impacts (1e): Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication</p> <p>Indirect Impacts: Construction and operational activities may result in the discharge of solvents and other industrial chemicals, leakage of fuel/oil from vehicles and the disposal of sewage resulting in the loss of sensitive biota in the wetlands/ rivers and a reduction in watercourse function</p> <p>Cumulative Impacts: Decreased water quality from spills of contaminants will contribute to regional water quality decrease, therefore should be considered a significant cumulative impact</p>	Medium	<ul style="list-style-type: none"> Locate the infrastructure outside the calculated buffer zone Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse. Provision of adequate sanitation facilities located outside of the watercourse area or its associated buffer zone The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g. water runoff from cleaning of equipment, vehicle access etc. After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use. Maintenance of construction vehicles / equipment should not take place within the watercourse Measures should be put in place to prevent spills or water contaminated by waste material by for example constructing sumps or drains which can contain any spills in order for contaminated water to be isolated from the watercourse and removed from the site for appropriate disposal Implement Best Practice with regards to concrete mixing on site and control of waste and pollution All manholes are to be raised above the 1:100-year floodline Manholes should be constructed to SANS 1200 specification with maximum spacing of 80 m Ensure that sewage infrastructure include emergency measures to contain spills, for example emergency by-pass lines It should be ensured that regular maintenance takes place to prevent failure of any infrastructure associated with the proposed development; 	Low	Although it may be controlled and largely prevented, the impact of a single spill will have a significant residual effect on the local watercourse integrity. Residual risks should therefore be considered significant

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (1f): Loss of aquatic biota Loss and disturbance of biota due to direct development on the watercourse as well as changes in habitat including water quality, the water column, increased sediment, increased alien vegetation fire regime and habitat fragmentation</p> <p>Indirect Impacts: Loss of instream habitat, deposition of wind-blown sand, loss of fringing vegetation and erosion, alteration in natural fire regimes and subsequent loss of non-marginal and marginal vegetation. Increase in invasive species due to disturbance. Change in water quality. Changes in flow</p> <p>Cumulative Impacts: Expected to be Low. Should degradation occur, it may result in a high degree of irreplaceable loss of resources.</p>	<p>Medium</p>	<ul style="list-style-type: none"> • Ensure that no additional vegetation is removed, • Avoid unnecessary aquatic ecosystem crossing - limit work within the stream, river or wetland. The use of single access points for crossings. • Other than approved and authorized structure, no other development or maintenance infrastructure is allowed within the delineated watercourse or its associated buffer zones. • Mark all areas which don't form part of the proposed development within the watercourse as no-go areas. 	<p>Low</p>	<p>Due to the already seriously modified nature of the aquatic ecosystems surrounding the proposed development it is expected to be limited provided that the mitigation measures are implemented correctly, and effective rehabilitation of the site is undertaken where necessary</p>
2. IMPACT ON VEGETATION				
<p>Direct Impacts (2a): Potential increase in alien and invasive plant species</p> <ul style="list-style-type: none"> • The study area harbours several category 1b and other weedy invasive species. Disturbed areas will be colonised by such species and could spread downstream. • Disturbed areas should be sown with an indigenous grass mix suitable to the soil and climatic conditions (e.g., highveld grass mix). • Implement an alien invasive plant management plan. All alien seedlings and saplings must be removed as they become evident for the duration of construction and operation. • If filling material is to be used, this should be sourced from areas free of invasive species 	<p>Medium</p>	<p><i>Planning</i></p> <ul style="list-style-type: none"> • Plan all activities as far away from the watercourses as possible. • Prevent stormwater and effluent from reaching the watercourses. • No activities or edge effects may impact on the rocky grassland and Andesite Mountain Bushveld south of the study area. This is a no-go area. If this area is proposed for any activities, a plant species assessment / habitat assessment must be undertaken. <p><i>Construction</i></p> <ul style="list-style-type: none"> • Prevent spillage of construction material, oils, or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated development footprint. 	<p>Low</p>	<p>Degradation of the sensitive vegetation due to ailed rehabilitation or adverse impacts during construction</p>

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (2b): Destruction or degradation of watercourse vegetation</p> <p>The construction will likely require the removal of vegetation in proximity to the watercourse, and depending on the workplan, removal of vegetation within the watercourse. This will impact on the health and functioning of the vegetation within the watercourse. Construction and operation could also result in pollution of the watercourse.</p> <p>Indirect Impacts: This will impact on the health and functioning of the vegetation within the watercourse. Construction could also result in pollution of the watercourse.</p> <p>Cumulative Impacts: Loss of functionality of the vegetation within the watercourse, as well as erosion due to edge effects.</p>	<p>Medium</p>	<p><i>Planning:</i></p> <ul style="list-style-type: none"> • Plan all activities as far away from the watercourses as possible. • Prevent stormwater and effluent from reaching the watercourses. • No activities or edge effects may impact on the rocky grassland and Andesite Mountain Bushveld south of the study area. This is a no-go area. If this area is proposed for any activities, a plant species assessment / habitat assessment must be undertaken. <p><i>Construction:</i></p> <ul style="list-style-type: none"> • Prevent spillage of construction material, oils, or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. • Prohibit vehicular or pedestrian access into natural areas beyond the demarcated development footprint. 	<p>Low</p>	<p>Residual impacts are limited and will only take place in the near-natural grassland south of the study area if mitigation is not implemented.</p>

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (2c): Pollution of the soil and water due to spillages / leakages.</p> <p>Indirect Impacts: This could lead to the loss of vegetation and/or species of conservation concern, alteration and loss of micro-habitats, altered vegetation cover, increased erosion and contamination of soil and groundwater</p> <p>Cumulative Impacts: Pollution of ground water</p>	<p>Medium</p>	<p><i>Planning:</i></p> <ul style="list-style-type: none"> Construction camps must be located outside of areas classified as outside areas of medium, medium-high and high sensitivity. <p><i>Construction:</i></p> <ul style="list-style-type: none"> In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately. Prevent spillage of construction material, oils or other chemicals, strictly prohibit other pollution. Ensure there is a method statement in place to remedy any accidental spillages immediately. Pollution of the surface and groundwater. Mitigation for this potential impact includes: <ul style="list-style-type: none"> In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs must be informed immediately No uncontrolled discharges from the construction crew camps to any surface water resources shall be permitted. Any discharge points need to be approved by the relevant authority. 	<p>Low</p>	<p>Residual impacts are limited and will only take place in the near-natural grassland south of the study area if mitigation is not implemented.</p>
3. IMPACT ON FAUNA				
<p>Direct Impacts 3(a): Destruction of fauna habitat and ecological connectivity, Disturbance to fauna through noise, vibration and dust</p> <p>Indirect Impacts: The limited on-site ESA provides the most significant natural habitat and very limited ecological corridor to fauna in the area but will only be partially affected by the pipeline replacement</p> <p>Cumulative Impacts: Indiscriminate and uncontrolled activities within the CBAs could cause sedimentation of the downstream rivers and dams, alter the aquatic environment and impact on downstream environments.</p>	<p>Low</p>	<ul style="list-style-type: none"> No needless noise generation is permitted on site to reduce impact to the existing water birds in the area. Consider conducting the pipeline replacement during the dry season when birds are least likely to be breeding. Staff must be instructed to remain within designated operational areas only (outside all rocky habitats and avoid the edges of the dams where aquatic birds may be breeding). Staff and contractors should remain vigilant of potential fauna species, specifically the South African Hedgehog, which should be reported to the Environmental Officer if noted on site. Allow species the opportunity to freely move away from the area. If threatened by activities, then contract permitted specialists to relocate the species to the nearby surrounds. 	<p>Low</p>	<p>Sedimentation could alter drainage patterns within the downstream aquatic ecosystems and reduce water holding capacity and flow characteristics important to ecosystems in the long term.</p>

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
		<ul style="list-style-type: none"> All potentially contaminating material (fuel, chemicals, waste, oils and lubricants, sewage, etc.) will be stored and handled according to best practice and will never be needlessly exposed to the environment. Spills will be actively monitored and cleared immediately to prevent contamination of the dam and downstream faunal habitats. All excavated earth material from the pipeline trench will be placed up-slope of the trench while pipelines are being placed, and then used to fill the trench. The area will then be levelled, seeded and rehabilitated. 		
4. IMPACTS ON THE HERITAGE FEATURES				
<p>Direct Impacts: Direct or physical impacts, implying alteration or destruction of heritage features</p> <p>As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development</p>	Low	<ul style="list-style-type: none"> Known sites should be clearly marked in order that they can be avoided during construction activities. The contractors and workers should be notified that archaeological sites might be exposed during the construction activities. Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken; Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1). 	Low	Low
<p>Indirect impacts:</p> <p>Impact of cultural heritage resources under threat of the proposed development, is</p>				
<p>Cumulative impacts:</p> <p>The loss of a number of archaeological sites</p>				
5. VISUAL IMPACTS				
<p>Direct Impacts:</p> <p>Pollution may occur due to the littering and illegal dumping on the site and surrounding areas which can affect the visual character of the site.</p>	Medium	<ul style="list-style-type: none"> Ensure that no litter, refuse, waste, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent or surrounding properties including road verges, roads or public places and open spaces during or after the construction period. All waste/litter/rubbish etc. must be disposed of at an approved dumping site as approved by the Council. 	Low	Medium

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Indirect impacts:</p> <p>None</p>		<ul style="list-style-type: none"> Bare surfaces must be rehabilitated as soon as possible with indigenous vegetation that will be able to grow in the area; The landscape must be rehabilitated in such a way that it corresponds to the surrounding topography; Manage construction activities in accordance with the accepted/ approved construction EMPr. Screen Construction site from neighbouring area by means of a fence and opaque cover/sheeting Ensure appropriate housekeeping No construction rubble, construction material, refuse, litter or any other material not found naturally in the surroundings should be allowed at any time to be lying around on the construction site 		
<p>Cumulative impacts:</p> <p>As more development establish in the area there will be a change in the visual character of the area from agriculture use to mixed land use.</p>				
6.NOISE IMPACTS				
<p>Direct Impacts:</p> <ul style="list-style-type: none"> Increase in noise pollution due to, among others, excavations and site clearing, noise from construction vehicles and construction staff and or drilling activities. Noise pollution caused during construction could potentially be a nuisance to neighbouring residential areas. 	Medium	<ul style="list-style-type: none"> Construction activities must be limited to normal working hours and according to municipal bylaws, i.e. working hours must be limited to weekdays only. If construction is required on the weekend; permission from adjacent landowners will be required prior to construction. No sound amplification equipment such as sirens, loud hailers or hooters are to be used on site except in emergencies and no amplified music is permitted on site. Equipment that is fitted with noise reduction facilities (e.g. side flaps, silencers etc) must be used as per operating instructions and maintained properly during site operations. Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment. Introduce a formal recording system/grievance mechanism to capture public perceptions and complaints with regard to noise impact. 	Low	Medium
<p>Indirect impacts:</p> <p>None</p>				
<p>Cumulative impacts:</p> <p>As more development establish in the area there is a possibility that the ambient noise levels may change from that of agriculture/residential area to mixed use developed area.</p>				
7.IMPACTS ON THE AIR QUALITY				
<p>Direct Impacts:</p> <p>Construction activities have the potential to be sources of fugitive dust on site. These include:</p> <ul style="list-style-type: none"> Dust from access roads. 		<ul style="list-style-type: none"> Dust suppression measures must be implemented on access roads and working areas during dry periods. Water used for this purpose must be in quantities that do not result in the generation of run-off. 		

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<ul style="list-style-type: none"> Dust from area cleared for construction. Emissions from construction machinery and equipment. Trucks transporting spoil and fill material. 	Low	<ul style="list-style-type: none"> Adherence to speed limits on site roads to prevent the liberation of dust into the atmosphere must be enforced All site workers will need to wear the appropriate PPE Transported material that can be blown off as dust must Contractor to provide method statement of site-specific dust control measures A speed limit of 40km/h to be maintained on all dirt roads. Dust suppression by means of either water or biodegradable chemical agent is required. 	Low	Low
Indirect impacts: None				
Cumulative impacts: None				
8. TRAFFIC IMPACTS				
Direct Impacts: <ul style="list-style-type: none"> Anticipated impact on traffic owing to construction vehicles and heavy vehicles delivering materials to the site. Traffic congestion in and around the area may offend neighbouring property owners during the construction phase. 	Medium	<ul style="list-style-type: none"> Construction vehicles are not to be parked on the roads thereby blocking the way to the neighbouring properties. Clear signs should be displayed and entrance to the site indicating a construction site and turning construction vehicles. Construction vehicles are to avoid main roads during peak traffic hours and mitigation measures outlined in the EMP are to be implemented. Ensure an appropriate access procedure to avoid backlog of traffic at the entry point to the site 	Low	Low
Indirect impacts: None				
Cumulative impacts: Possible traffic congestion or delays if no mitigation measures are implemented				
9. SOCIAL ECONOMIC (POSITIVE IMPACTS)				
Direct Impacts: Employment Opportunities In terms of employment opportunities, the following should be considered: <ul style="list-style-type: none"> The number of jobs that would be created during the construction and operational phase of the proposed project; and The extent to which certain groups such as the unemployed, disadvantaged and minority groups could be employed. Typical of a project of this nature, some specialised skills are required although some opportunities for local labour in the 	Low	Enhancement: <ul style="list-style-type: none"> It is recommended that local employment policy is adopted to maximize the opportunities made available to the local labour force. Training and skills development programmes should be provided to all employees. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. 	Medium	None, it is a positive impact

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
unskilled and semi-skilled categories would be available even if only of a limited nature. At this stage the extent of labour required is not finalised.				
Indirect impacts: Economic multiplier effects from the use of local contractors such as (waste transporters and security personnel used to provide services on site)				
Cumulative impacts: Possible economic boost				

7.2.2 IMPACTS THAT MAY RESULT FROM THE OPERATION PHASE

Table 7.2: A summary of anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the OPERATION PHASE

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
1. IMPACT ON THE AQUATIC BIODIVERSITY				

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (1a) Impacts to hydrological function at a landscape level</p> <p>Indirect Impacts: Placing the pipeline underground within the wetland will affect hydrology during the construction phase when temporary stream diversions are likely to be necessary. During the operational phase, the trench and new pipe may create a barrier to natural flow leading to damming up of water behind the new structures, or release of water into preferential flowpaths that lead to erosion downstream.</p> <p>Cumulative Impacts: Further disturbance of water flow in this wetland will exacerbate an already impacted system</p>	<p>Low</p>	<ul style="list-style-type: none"> After closure of the trench, the contours should resemble pre-development conditions. Where lateral water flow in the soil profile is intercepted by the trench and pipe, this water should be released back into the wetland in such a way as to not cause scouring or erosion 	<p>Low</p>	<p>Expected to be low due to the transient nature of the activity proposed. The operational phase will not affect hydrological function on a landscape level, affect flood regimes or dynamic processes</p>
<p>Direct Impacts (1b): Changes in sediment entering and exiting the system</p> <p>Indirect Impacts:</p> <ul style="list-style-type: none"> Disturbance of soil surface Disturbance of slopes through creation of roads and tracks adjacent to the watercourse Erosion (e.g. gully formation, bank collapse) <p>Cumulative Impacts: Expected to be low. Should mitigation measure not be implemented effectively, sediment deposition may affect the capacity of downstream culverts which may cause flooding. Reversing this process is unlikely and should be prevented in the first place.</p>	<p>Low</p>	<ul style="list-style-type: none"> Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. Monitoring should be done to ensure that sediment pollution is timeously dressed 	<p>Low</p>	<p>Expected to be limited provided that the mitigation measures are implemented effectively and sedimentation is appropriately managed.</p>

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
Direct Impacts (1c): Introduction and spread of alien vegetation	Medium	<ul style="list-style-type: none"> Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan Rehabilitate or revegetate disturbed areas 	Low	none
Direct Impacts (1d): Loss and disturbance of watercourse habitat and fringe vegetation	Low	<ul style="list-style-type: none"> Implement an Alien Plant Control Plan Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish 	Low	none
Direct Impacts (1e): Changes in water quality due to input of foreign materials e.g. due to increased sediment load, contamination by chemical and /or organic effluent, and /or eutrophication	Medium	<ul style="list-style-type: none"> It should be ensured that regular maintenance takes place to prevent failure of any infrastructure associated with the proposed development; The managing authority should test the integrity of the sewer pipelines at least once every five years or more often should there be any sign or reports of a leak. Standard Operating procedures, training drills and audits should be put in place and revised annually. A detailed rehabilitation plan should be drawn up with the input from a water quality, soil contamination assessment and ecologist should any spills occur. Independent water quality analyses should be undertaken annually, or as specified by an aquatic specialist, to demonstrate and audit compliance of effective pollution control measures 	Low	none

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
<p>Direct Impacts (1f): Loss of aquatic biota</p> <p>Loss and disturbance of biota due to direct development on the watercourse as well as changes in habitat including water quality, the water column, increased sediment, increased alien vegetation fire regime and habitat fragmentation</p>	<p>Medium</p>	<ul style="list-style-type: none"> • Weed control in aquatic ecosystem and buffer zone. • Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance of the proposed infrastructure and take immediate corrective action where invasive species are observed to establish. • All management procedures listed above for the change in water quality. 	<p>Low</p>	<p>none</p>
2. IMPACT ON VEGETATION				
<p>Direct Impacts (2a): Potential increase in alien and invasive plant species</p> <ul style="list-style-type: none"> • The study area harbours several category 1b and other weedy invasive species. Disturbed areas will be colonised by such species and could spread downstream. • Disturbed areas should be sown with an indigenous grass mix suitable to the soil and climatic conditions (e.g., highveld grass mix). • Implement an alien invasive plant management plan. All alien seedlings and saplings must be removed as they become evident for the duration of construction and operation. • If filling material is to be used, this should be sourced from areas free of invasive species 	<p>Low</p>	<ul style="list-style-type: none"> • Monitor regrowth vegetation and ensure that groundcover is established on relandscaped areas as soon as possible. • Monitor the emergence of alien invasive plant species and remove as soon as they become apparent. 	<p>Low</p>	<p>Degradation of the sensitive vegetation due to ailed rehabilitation or adverse impacts during construction</p>
<p>Direct Impacts (2b): Destruction or degradation of watercourse vegetation</p>	<p>Low</p>	<ul style="list-style-type: none"> • Monitor regrowth vegetation and ensure that groundcover is established on relandscaped areas as soon as possible. • Monitor the emergence of alien invasive plant species and remove as soon as they become apparent. 	<p>Low</p>	<p>Erosion, sedimentation, pollution of the watercourse and invasion by alien invasive plant species.</p>

Potential impacts:	Significance rating of impacts	Proposed mitigation:	Significance rating of impacts (with Mitigations)	Risk of the impact and mitigation not being implemented
Direct Impacts (2c): Pollution of the soil and water due to spillages / leakages.	Low	<ul style="list-style-type: none"> Monitor regrowth vegetation and ensure that groundcover is established on relandscaped areas as soon as possible. Monitor the emergence of alien invasive plant species and remove as soon as they become apparent. 	Low	none
3. IMPACT ON FAUNA				
Direct Impacts 3(a): Destruction of fauna habitat and ecological connectivity, Disturbance to fauna through noise, vibration and dust	Low	<ul style="list-style-type: none"> All excavated earth material from the pipeline trench will be placed up-slope of the trench while pipelines are being placed, and then used to fill the trench. The area will then be levelled, seeded and rehabilitated. 	Low	None

7.2.3 CUMULATIVE IMPACT ASSESSMENT

- **Impacts** to hydrological function are expected to be low should mitigation measure not be implemented effectively; sediment deposition may affect the capacity of downstream culverts which may cause flooding. Reversing this process is unlikely and should be prevented in the first place.
- **Changes** in sediment regimes of the aquatic ecosystem and its sub-catchment are expected to be low, should mitigation measure not be implemented effectively, sediment deposition may affect the capacity of downstream culverts which may cause flooding. Reversing this process is unlikely and should be prevented in the first place.
- **Loss** and disturbance of watercourse habitat and fringe vegetation impact are expected to be Low should degradation occur; it may result in a high degree of irreplaceable loss of resources.
- **Introduction** and spread of alien vegetation. Since alien vegetation is already present in the catchment, cumulative impacts can be Moderate to High. Regular monitoring should be implemented during construction, rehabilitation including for a period after rehabilitation is completed
- **Changes** in water quality. Decreased water quality from spills of contaminants will contribute to regional water quality decrease, therefore should be considered a significant cumulative impact
- Loss of aquatic biota are moderate due to further loss of the aquatic biota
- **Destruction or degradation of Vegetation - No** cumulative impacts are expected. Residual impacts are limited and will only take place in the near-natural grassland south of the study area if mitigation is not implemented.
- **Positive Cumulative Impacts: Social economic**
The development may have positive social impacts during construction and operation through the provision of job opportunities to local people and improving on skills transfer as well as adding to the market confidence for economic development in the area. The cumulative impact is anticipated to be **Low Positive** with or without enhancement

Generally, the cumulative impact of this project is rated of Low significance for the larger part of the project, however the cumulative impacts on the wetland area could be of medium significance should mitigation measure not be implemented as changes made to the bed or banks of watercourse and unstable channel conditions may result causing erosion, meandering, increased potential for flooding and movement of bed material, which will result in property damage adjacent to and downstream of the site. Reversing this process is unlikely and should be prevented in the first place. Responsible environmental management will be required during the entire project life cycle. These management measures should be guided by the Environmental Management Plan, attached as **Appendix E**.

7.2.4 NO-GO ALTERNATIVE ASSESSMENT

This is the option of not undertaking the proposed and construction of on this particular site. This is the option of not upgrading the Mohadim Sewer Pipeline in the JB Marks Local Municipality will result in no impacts occurring on the biophysical environment (i.e. biodiversity, soils), and will result in no visual or social impact hence the project site status quo remains. The existing under-capacitated sewers are based on hydraulic analysis capacity requirements at ultimate development flows to obviate any further blockages or spillages. In summary the situation on the ground will remain the same and the `do nothing alternative` will not assist JB Marks Local Municipality in

addressing issues that require quick emergency response as detailed above. **The cost of the `do nothing alternative` are expected to outweigh the benefits and therefore this alternative is not a preferred alternative.**

8 CONCLUSIONS AND RECOMMENDATIONS

The previous chapters of this report together with the **specialist studies** contained within **Appendix D** provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the Basic Assessment Report for the proposed project by providing a summary of the conclusions of the assessment of the proposed powerline. In so doing, it draws on the information gathered as part of the BA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project. Potential impacts which could occur as a result of the proposed project are summarised in the sections which follows.

8.1 Summary of impacts

A summary of the impact assessments is presented in **Table 8.1**; the tables cover the construction and operational impacts. An overall weighted score is provided in each case. Thus far each of the environmental issues are assigned equal weighting (i.e. the weighted score is the average of each of the individual scores. The impact scores are also colour coded according to the following:

< 30	Low significance
30 to 60	Medium significance
>60	High significance

It must be noted that the impact scores in **Table 8.1** below are not intended to be definitive measures of environmental impact, but they are a useful guide to evaluating the overall environmental performance of a new development and they assist in interpreting key influences of a development

Table 8.1: Impact Summary table

CONSTRUCTION PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
1. Aquatic Biodiversity Assessment:		
Impacts to hydrological function at a landscape level	Medium	Low
Changes in sediment entering and exiting the system	Medium	Low
Introduction and spread of alien vegetation	Medium	Low
Loss and disturbance of watercourse habitat and fringe vegetation	Medium	Low
Changes in water quality due to pollution	Medium	Low
Loss of aquatic biota	Medium	Low
2. Vegetation:		
Potential increase in alien and invasive plant species	Medium	Low
Destruction or degradation of watercourse vegetation	Medium	Low
Pollution of the soil and water due to spillages / leakages.	Medium	Low
3. Fauna		
Destruction of fauna habitat and ecological connectivity, Disturbance to fauna through noise, vibration and dust	Medium	Low
4. Heritage:		
Direct or physical impacts, implying alteration or destruction of heritage features	Low	Low
5. Others:		

Visual Impacts	Medium	Low
Noise Impacts	Low	Low
Social-Economic: Direct employment and skills development (Positive)	Low	Medium
OPERATIONAL PHASE		
Environmental Aspect	Without Mitigation	With Mitigation
1. Aquatic Biodiversity Assessment:		
Impacts to hydrological function at a landscape level	Low	Low
Changes in sediment entering and exiting the system	Low	Low
Introduction and spread of alien vegetation	Medium	Low
Loss and disturbance of watercourse habitat and fringe vegetation	Low	Low
Changes in water quality due to pollution	Medium	Low
Loss of aquatic biota	Medium	Low
2. Vegetation:		
Potential increase in alien and invasive plant species	Low	Low
Destruction or degradation of watercourse vegetation	Low	Low
Pollution of the soil and water due to spillages / leakages.	Low	Low
3. Fauna		
Destruction of fauna habitat and ecological connectivity, Disturbance to fauna through noise, vibration and dust	Low	Low

Table 8.1 gives a summary of the impact significance established through the basic assessment investigation, from this summary it is apparent that the significance levels of the majority of identified impacts are of Medium-Low significance for all alternatives investigated and this can further be reduced to acceptable low significance levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr and the Rehabilitation Plan (Appendix E) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments. Apart from the anticipated Construction phase impacts, which would be temporary (short-term duration), other impacts identified (including cumulative impacts) are associated with ecological aspects, waste and potential, but slight, increase in traffic volumes. Where impacts are unavoidable, they have been found to be of moderate to low significance according to the criteria used and furthermore, can be mitigated through appropriate design and effective implementation of the EMPr.

8.2 Conclusion (Impact Statement)

Summarised Findings of the Specialist Studies:

Aquatic Biodiversity & Wetland Assessment: The wetland associated with the pipeline was impounded, and largely inundated, to form the Poortjie Dam, during the 1930s. Wetland conditions remain upstream and downstream of the dam, although the characteristics of this wetland are far removed from the theoretical undisturbed (reference) state. The proposed sewerage line is located adjacent to the dam with only a small section adjacent to the wetland habitat. A wetland crossing occurs at the Sooliman Street - Promosa Road T-Junction (at approximately 26°42'35.73"S and 27° 2'40.24"E). Stormwater outlets into the watercourse were recorded to the north and south were recorded. A protective buffer zone around the wetland was calculated as 16 m (the risk

category selected was service infrastructure and specifically pipelines for the transport of waste) (Macfarlane et al., 2015).

Impacts expected to be associated with the construction of the proposed sewage infrastructure adjacent to, and within the wetland are associated with earthworks in the construction phase, and potential spills during the operational phase. Upgrade of sewer infrastructure is likely to have a net positive impact on water quality in the area since spills are expected to be reduced. Temporary disturbance of local wetland habitat, sedimentation and construction-related pollution can be effectively managed, mitigated and rehabilitated. The potential spill of sewage should infrastructure fail will result in significant negative impacts to water quality. However, installation of upgraded sewage infrastructure is likely to decrease sewage spills in this area and is likely to contribute to improved water quality. It is important that any mitigation be implemented in the context of an Environmental Management Plan in order to ensure accountability and ultimately the success of the mitigation.

Vegetation: The vegetation along the pipeline route and within the study area was degraded. Most of the vegetation comprised *Vachellia karroo* encroached grassland with a low species diversity and a high frequency of alien and invasive plants. The vegetation along the watercourse and dam was dominated by alien and invasive plant species as several soil disturbances and pollution was evident along the entire route.

Other than a functional role such as mammal habitat and corridors along the watercourse and soil stabilisation, the vegetation was low in species diversity and in a modified state. The wetland report should be consulted to the delineation of watercourses and its importance.

- The degraded watercourse vegetation is the only vegetation group in the (Primary study area) that may support the two (2) species listed to occur. These species are both listed as Near-Threatened and have an affinity for moist conditions. However, the degraded state makes it highly unlikely that these species are present. No further studies are recommended as the likelihood of occurrence are low.
- Good condition, rocky grassland and Andesite Mountain Bushveld are present south of the study area, separated from the pipeline by Sooliman Street. This area is suitable habitat to plant species of conservation concern and are in a good ecological condition. It is unlikely that this area will be directly impacted on, However, indirect impacts are likely.
- Therefore, the rocky grassland and Andesite Mountain Bushveld south of the study area must be regarded as a no-go area that should not be impacted on by any activities related to the sewerage upgrade.

Heritage: The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age and Iron Age) occupation and a much later colonial (farmer) component. The second component is an urban one, most of which developed during the last 150 years or less. Identified sites: During the survey no sites, features or objects of cultural significance were identified. For the current study, as no sites, features or objects of cultural significance were identified, no mitigation measures are proposed. From a heritage point of view, it is recommended that the Proposed Project be allowed to continue on acceptance of the mitigation measures presented in the heritage report (Appendix D4).

Paleo: Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the overlying soils. There is a very small chance that trace fossils of microbes may occur in the shales of the Timeball Hill Formation, or stromatolites in the Malmani Subgroup dolomites, so a Fossil Chance Find Protocol should be added to the EMP. If fossils are found by the environmental officer, or other responsible person once excavations for pipes have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. As far as the palaeontology is concerned, the emergency project should be authorised.

Overall summary:

Although the vegetation along the pipeline falls within the Andesite Mountain Bushveld, it is more likely that the vegetation was historically grassland representative of the Carletonville Dolomite Grassland or Rand Highveld Grassland. However, the grassland is degraded, trampled and include a high frequency of invasive plant species. It is also encroached by *Vachellia karroo*. The pipeline falls outside of the mapped remnant patches of grassland ecosystems and will therefore not impact on targets. Therefore, upgrade of the sewer will likely have a positive impact on the vegetation. The upgrade will ensure that regular maintenance and pollution due to overflowing and spillages are negated, and the vegetation will be able to re-establish to a secondary state. Therefore, this assessment found no objection to the continuation of this project, provided mitigation measures are implemented to prevent direct and indirect impacts to the wetland area and no impacts take place south of the study area in the rocky grassland.

Having assessed the impacts of the construction of the sewer pipeline as summarised in **Table 8.1**, no environmental fatal flows and no significant negative impacts have been identified to be associated with the proposed development. The Impact Assessment section of this report indicates that the identified environmental impacts associated can be effectively **mitigated** to have a **low significance**. The significance levels of the majority of identified negative impacts can generally be reduced to acceptable levels thus, the proposed developments could proceed provided that the mitigation measures set out in this report and in the EMPr (**Appendix E**) are diligently implemented to limit the potential impacts on vegetation, watercourses and social during construction and operation of the developments.. *The Site investigated is considered suitable for the proposed upgrade and construction of the Mohadim Sewer Pipeline provided that the recommendations made in this report are implemented and/or adhered to.*

8.3 Recommendations

It is therefore, the EAP opinion that the project should be authorised, the findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are no environmental fatal flaws that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.

The following conditions would be required to be included within an authorisation issued for the project:

- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report.
- An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
- An appropriate stormwater management plan must be developed and implemented to the site. Adequate measures must be put in place to prevent polluted runoff water from entering the, wetland and soil, thus preventing surface and groundwater pollution;
- The relevant authorisations and water use licenses must be obtained from Department of Water Affairs prior to the commencement of construction activities. No activities may proceed within or in proximity to watercourses without a Water Use License permitting the activity.
- The developer should **obtain all necessary permits** from relevant authorities prior to the commencement of construction i.e. water use license & plant permits
- Creation of new access roads should be minimised as far as possible.

- All declared alien plants must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). The implementation of a monitoring programme in this regard is recommended. On-going monitoring of the development sites must be undertaken to detect and restrict the spread of alien plant species.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed until a healthy plant cover is again established.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

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