



Lebalelo Water User Association
SE2 Pipeline and associated infrastructure
Draft Environmental Management Programme
DFFE Reference Number: 14/12/16/3/3/1/2442

October 2021

Alta van Dyk Environmental Consultants cc
Postnet Suite # 745
Private Bag X 1007
Lyttelton
0140
Tel: +27 12 940 9089
suzanne@avde.co.za



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October 2021

Project Ref: 131-001

Prepared by: Suzanne van Rooy



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VERSION CONTROL	
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Version:	Draft
Approved by:	<u>Alta van Dyk</u>
Signed:	
Position:	Environmental Specialist
Date:	October 2021

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Abbreviations

BAR	Basic Assessment Report
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
LWUA	Lebalelo Water User Association
NEMA	National Environmental Management Act
NWA	National Water Act
ORWRDP	Olifants River Water Resource Development Project
SAHRA	South African Heritage Resources Agency
SE1	Southern Extension 1
SE2	Southern Extension 2

1 INTRODUCTION AND BACKGROUND

An Environmental Management Programme (EMPr) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

A site-specific EMPr has been prepared for the management of all activities associated with the development of Lebalelo Water User Association's (LWUA) proposed Southern Extension 2 (SE2) pipeline and associated infrastructure in order to confirm the likely environmental issues that may arise from the activities, the likely harm that these activities may pose on the surrounding environment and how these activities will be managed as to minimise any harm to the environment.

1.1 Introduction

An EMPr is a plan or programme that sets out guidelines that describe how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored and subsequently achieve a required operational and/or end state.

The purpose of the EMPr is to provide for preventative, corrective and best practice measures to ensure that activities are undertaken in an environmentally responsible manner and that such activities are sustainable in the long term. The primary objectives of the EMPr, include, but are not limited to the following:

- Describe actions that when implemented will achieve mitigation of environmental impacts, or result in approved management of activities thereby reducing the probability of impacts occurring;
- Define organisational and administrative arrangements for environmental management and monitoring, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures;
- Ensuring that discussions are held with the site supervision staff, regarding pro-active environmental management, such that potential problems can be identified and mitigation measures adopted prior to any work being carried out;
- Define the procedures to be followed as to ensure environmental control, in the event of pollution occurring that may require actions.

1.2 Content of the Environmental Management Programme

The EMPr has been structured in accordance with the requirements as specified in Appendix 4 of the National Environmental Management Act (Act No. 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations. Refer to Table 1:1.

Table 1:1: Requirements of an EMPr

No	Description	Reference
1	An EMPr must comply with Section 24N of the Act and include-	
a)	details of: (i) the EAP who compiled the EMPr; and (ii) the expertise of the EAP to prepare an EMPr, including a Curriculum Vitae;	Chapter 2 Annexure A
b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 3
c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 3.1 Figure 3.2

No	Description	Reference
d)	<p>a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including–</p> <ul style="list-style-type: none"> (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities; 	<p>Chapter 5 Table 5.1 Table 5.2</p>
f)	<p>a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to –</p> <ul style="list-style-type: none"> (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable; 	<p>Chapter 5 Table 5.1 Table 5.2</p>
g)	<p>the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Chapter 9</p>
h)	<p>the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);</p>	<p>Chapter 9</p>
i)	<p>an indication of the persons who will be responsible for the implementation of the impact management actions;</p>	<p>Chapter 4</p>
j)	<p>the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;</p>	<p>Table 5.1 Table 5.2</p>
k)	<p>the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);</p>	<p>Chapter 9</p>
l)	<p>a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;</p>	<p>Chapter 9</p>
m)	<p>an environmental awareness plan describing the manner in which—</p> <ul style="list-style-type: none"> (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and 	<p>Chapter 8</p>
n)	<p>any specific information that may be required by the competent authority.</p>	<p>Not applicable</p>

2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Table 2:1 provides the details of the Environmental Assessment Practitioner (EAP) for the SE2 pipeline and associated infrastructure project.

Table 2:1: Details of the Environmental Assessment Practitioner

Environmental Assessment Practitioner	Suzanne van Rooy
Company	Alta van Dyk Environmental Consultants cc
Qualifications	MPhil Environmental Management (University of Stellenbosch)
Professional Registrations	Pr.Sci.Nat (Reg nr.400378/11)
Postal Address	Postnet Suite # 745 Private Bag X 1007 Lyttelton 0140
Telephone number:	012 940 9457
Fax number:	086 634 3967
Email address	suzanne@avde.co.za

2.1 Expertise of the Environmental Assessment Practitioner

Suzanne is a senior environmental scientist and has 13 years' experience as an environmental assessment practitioner, having worked largely in South Africa's mining sector. She is a professionally registered environmental scientist with the South African Council of Natural Scientific Professionals (registration number 400378/11). Her field of expertise includes the compilation of environmental impact assessments and environmental management programmes, environmental auditing and stakeholder engagement.

Refer to Annexure A for the Curriculum Vitae of the EAP.

3 PROJECT DESCRIPTION

3.1 Background to LWUA

The LWUA was established to supply raw water to mines along the Eastern Limb of the Bushveld Igneous Complex. The main aim of the project was to supply raw water to a number of existing and planned new mines in the area, and as a spin-off, to provide additional capacity in the water supply scheme to meet the requirements of the rural population in the area. Only raw water is provided by LWUA, and the responsibility of treatment to drinking water standards lies with the distributing authority. The water is abstracted from the Olifants River via the Flag Boshielo Dam and abstracted at the Havercroft weir. The users receiving the water from the pipeline make up the LWUA. The Lebalelo water supply forms part of the Olifants River Water Resource Development Project (ORWRDP). The water is currently sourced from the Olifants River via the Flag Boshielo Dam, with abstraction at the Havercroft weir, and in future will be from the Steelpoort River via De Hoop Dam.

3.2 Proposed SE2 pipeline project

LWUA is proposing a new raw water pipeline between the Spitskop Pump Station and Mototolo Mine, near Steelpoort in the Limpopo Province. This project is also referred to as the SE2 pipeline. There is an existing raw water pipeline running from LWUA's Havercroft Pump Station to Borwa Pump Station, referred to as Southern Extension 1 (SE1). The new pipeline (SE2) will be constructed within the current pipeline's (SE1) servitude. The purpose of the new pipeline (SE2) is to provide raw water to several mines and industries located along the pipeline route. The current pipeline's capacity is not sufficient for the growing water demand from LWUA's members.

The following is proposed for the new pipeline (SE2) project:

- New pump station at existing Spitskop Pump Station (within fenced area of existing Spitskop Pump Station);
- Solar panels (75 x 75m) to be constructed within fenced area of existing Spitskop Pump Station. This is for a 0,5MW solar panel generation plant;
- New 500mm pipeline 15 km in length from Spitskop Pump Station to Dwarsrivier Pump Station (within the current pipeline servitude);
- New concrete reservoir to be constructed near the Dwarsrivier Pump Station (10 Mℓ);
- New pump station adjacent to the current Dwarsrivier Pump Station; and
- New 300 or 350 mm pipeline 9 km in length from the new Dwarsrivier Pump Station to Mototolo Mine (within current pipeline servitude).

The proposed SE2 pipeline will provide raw water to the following entities:

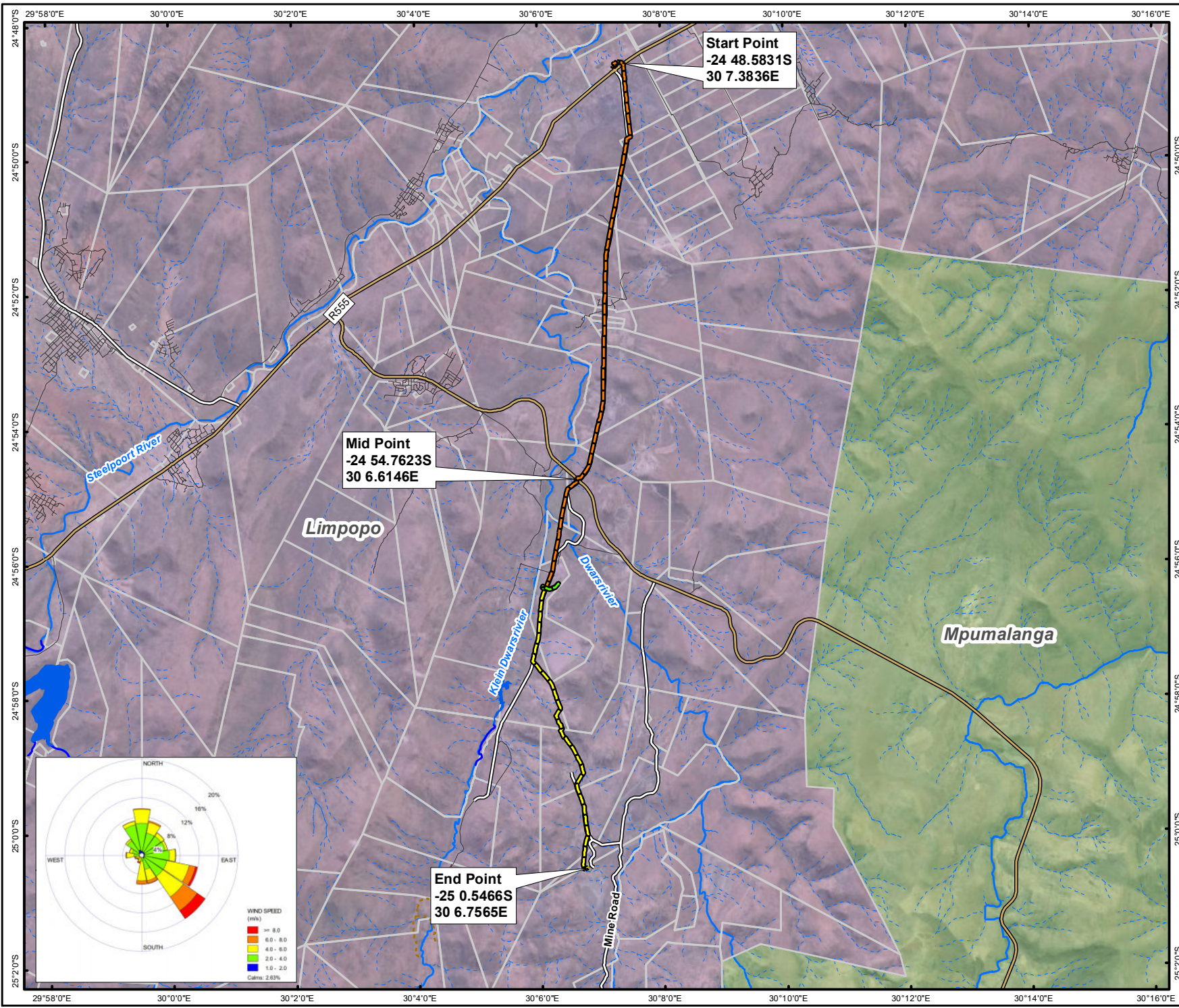
- Lion Smelter (Glencore South Africa);
- Dwarsrivier Mine (Assore);
- Two Rivers Mine (African Rainbow Minerals);
- Mototolo Mine (Anglo American Platinum); and
- Steelpoort Industrial Park (Freedom Property Fund) (potentially).

3.3 Locality

The proposed project is located near Steelpoort in the Limpopo Province. Table 3:1 Project location details outlines the details relating to the location of the proposed project. Refer to Figure 3:1 and Figure 3:2 for the locality maps.

Table 3:1 Project location details

Site specific details	Description	
Municipal jurisdiction	Fetakgomo Tubatse Local Municipality Sekhukhune District Municipality	
Ward number	Ward 27	
Nearest town	The proposed pipeline starts approximately 5 km west from Steelpoort, Limpopo Province, from where it runs in a southerly direction to Mototolo Mine.	
Site coordinates	Latitude	Longitude
Starting point <i>(Spitskop Pump Station)</i>	-24° 48.5831S	30° 7.3836E
Middle point	-24° 54.7623S	30° 6.6146E
End point <i>(Mototolo Mine)</i>	-25° 0.5466S	30° 67565E



Legend

Pipelines

- New Pipeline Dwars River PS to Mototolo Storage
- New Pipeline – Spitskop PS to Dwars River PS
- New reservoir to Dwars River PS

Farm Portion

Roads

- Secondary Road
- Tertiary Road
- Street/Road
- Track

Rivers

- Perennial River Centre line
- Non-Perennial River Centre line

Water Areas

Province

- Limpopo
- Mpumalanga

Scale: 1: 225 000

Title: Locality Map of Proposed SE2 Pipeline, Limpopo

Client: Lebalelo Water User Association

DATE: Sep 2021	PROJECT: SE2_PIPELINE
DRAWN: THURLOW MAPPING	APPROVED: SVR
MAP: SE2_Pipeline_Locality_Rev2.mxd	REV: 2

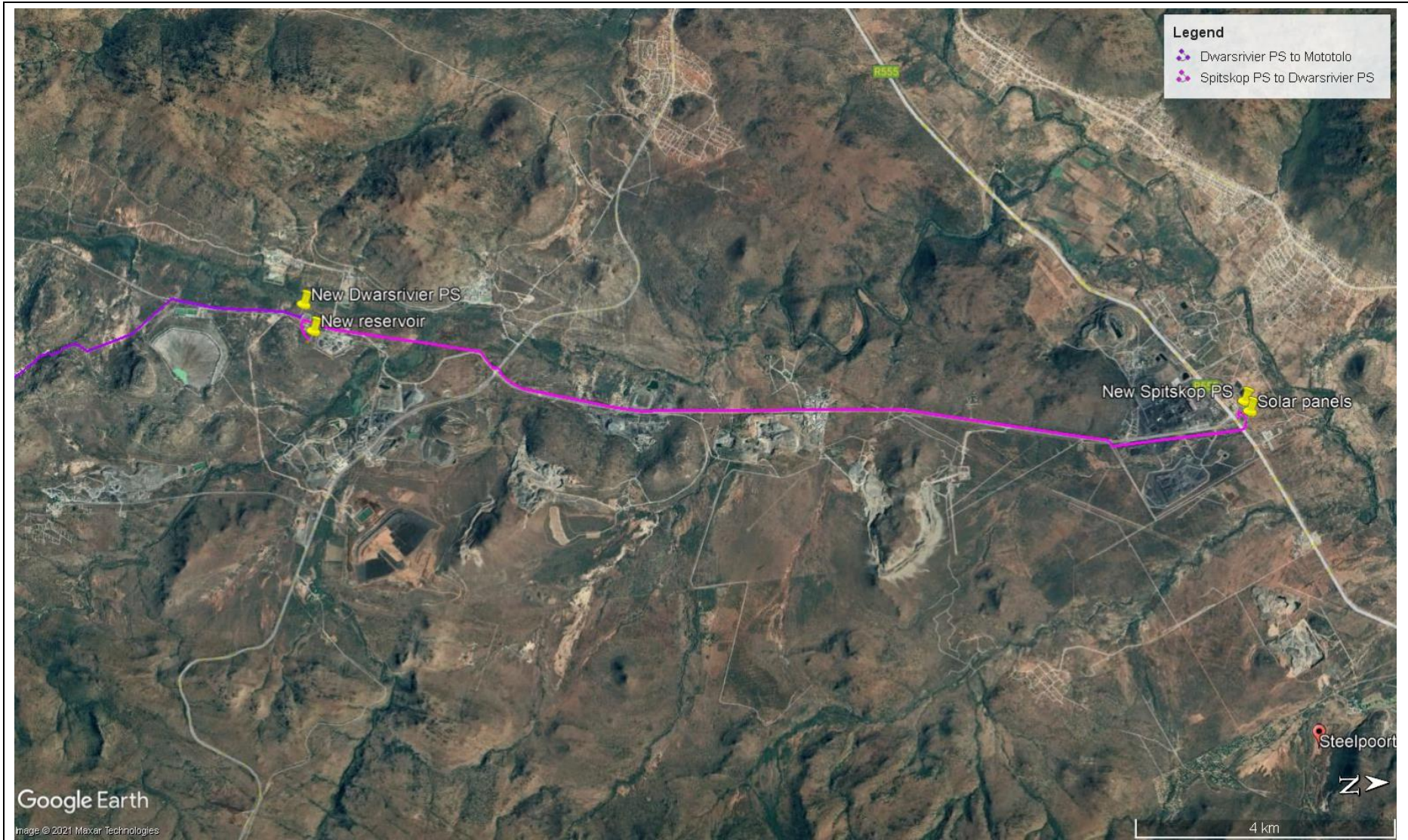
Alta van Dyk Environmental Consultants cc (2011/059764/23)

VAT No: 4630259952
 Tel: 012 940 9457
 Fax: 086 634 3967
 Cel: 061 403 2462

Alta van Dyk Environmental

Projection: Transverse Mercator CM: 31 Datum:WGS 84
 Source: OSM Vector 2021 - NGI_TOPO50_Mosaic_latest_Editions-Jan-2017.ecw
 Inset: ESRI Data and Maps

SIZE: A4



Locality map indicating associated infrastructure

Figure 3:2

Figure 3:2 Locality map indicating associated infrastructure

3.4 Construction of new infrastructure

3.4.1 New pump station at Spitskop Pump Station

A new pump station will be constructed next to the existing Spitskop Pump Station within the existing Lebalelo servitude. The existing connection point at the pump station will be used to abstract water from the existing DWS pipeline between the De Hoop Dam and the Steelpoort Pump Station. Excavations will be done by mechanical means and by hand and the excavated material stockpiled on the site and used for backfilling. Any surplus material will be spread and finished off in the area around the pump station in the fenced off servitude.

Once the excavation has been completed a concrete blinding layer, approximately 50mm thick will be constructed. This will be followed by the fixing of steel reinforcement for the structure followed by the erection of shuttering according to the dimensions of the structure as per the relevant drawings.

After approval of shuttering and reinforcement for correctness the concrete will be cast, finished off, and after treatment of the concrete carried out to prevent it from drying out rapidly. Concrete will preferably be obtained from a ready-mix plant within the area.

Once the concrete has reached sufficient strength, the shutters will be stripped off, the concrete finished and the backfilling around the structure done.

The pump station walls will consist of steel columns with filled in brick.

The above work will be carried out by hand making use of people with the required skills under management and supervision of the Contractor.

3.4.2 Raw water pipeline (Spitskop Pump Station to Dwarsrivier Pump Station)

Excavations of the pipeline trench will be carried out using an excavator and the material stockpiled along the trench for later use for backfilling after the pipe has been laid.

Once the trench has been backfilled the pipe bedding will be trimmed and prepared to receive the pipes. Pipes will be laid using mechanical equipment to lift it and place it in position. This work will all be done in accordance with the levels as per the relevant drawings.

After laying of the pipes the pipe blanket will be constructed using selected material from the excavated material and compacted by hand and making use of walk behind self-propelled compaction equipment.

After completion of the fill blanket around the pipe the bulk backfilling will be done using the excavated material and compacted with walk behind self-propelled compaction equipment.

The pipeline crosses the R555 and the road D1261_010 (adjacent to the Lion Smelter) and the road to Mashishing (D1212_05). The three pipeline crossings will be done by means of pipe jacking a sleeve underneath the roads and position the steel pipe through the sleeve. The ends of the sleeve will be closed off once the pipe is in position.

The total length of the pipeline is approximately 15 000m.

3.4.3 Concrete reservoir

A new 10ML reservoir will be constructed near the existing Dwarsrivier Pump Station. The work entails the following:

Excavations will be done by mechanical means and the excavated material will be spread and finished off in the area around the reservoir in the fenced off servitude.

Once the excavation has been completed a concrete blinding layer, approximately 50mm thick will be constructed. This will be followed by the fixing of steel reinforcement for the structure followed by the erection of shuttering according to the dimensions of the structure as shown on the drawings.

After approval of shuttering and reinforcement for correctness the concrete will be cast, finished off, and after treatment of the concrete carried out to prevent it from drying out rapidly. Concrete for the floor slab will preferably be obtained from a ready-mix plant within the area. The walls and roof of the reservoir utilise pre-fabricated modules to speed up the construction process and to limit construction activities on site.

The above work will be carried out by mechanical means and by hand making use of people with the required skills under management and supervision of the Contractor.

3.4.4 New pump station at Dwarsrivier Pump Station

A new pump station will be constructed next to the existing Dwarsrivier Pump Station.

Excavations will be done by mechanical means and by hand and the excavated material stockpiled on the site and used for backfilling. Any surplus material will be spread and finished off in the area around the pump station in the fenced off servitude.

Once the excavation has been completed a concrete blinding layer, approximately 50mm thick will be constructed. This will be followed by the fixing of steel reinforcement for the structure followed by the erection of shuttering according to the dimensions of the structure as per the relevant drawings.

After approval of shuttering and reinforcement for correctness the concrete will be cast, finished off, and after treatment of the concrete carried out to prevent it from drying out rapidly. Concrete will preferably be obtained from a ready-mix plant within the area.

Once the concrete has reached sufficient strength, the shutters will be stripped off, the concrete finished and the backfilling around the structure done.

The pump station walls will consist of steel columns with filled in brick. The above work will be carried out by hand making use of people with the required skills under management and supervision of the Contractor.

3.4.5 Raw water pipeline (Dwarsrivier Pump Station to Mototolo Mine)

Excavations of the pipeline trench will be carried out using an excavator and the material stockpiled along the trench for later use for backfilling after the pipe has been laid.

Once the trench has been backfilled the pipe bedding will be trimmed and prepared to receive the pipes. Pipes will be laid using mechanical equipment to lift it and place it in position. This work will all be done in accordance with the levels as per the relevant drawings.

After laying of the pipes the pipe blanket will be constructed using selected material from the excavated material and compacted by hand and making use of walk behind self-propelled compaction equipment.

After completion of the fill blanket around the pipe the bulk backfilling will be done using the excavated material and compacted with walk behind self-propelled compaction equipment.

The total length of the pipeline is approximately 8 500m.

3.4.6 Valve chambers

Concrete valve chambers will be constructed at approximately 200m intervals along the pipeline. Such valve chambers are mainly used for maintenance purposes.

At the positions of the valve chambers the trench excavations will be widened to provide working space for the workers. The floor area of the valve chambers will be trimmed and compacted using hand tools after the

concrete blinding layer will be constructed to provide a clean working area. This will be followed by the fixing of the steel reinforcement and erection of the shuttering.

Once the reinforcement has been inspected and approved the shuttering will be erected in accordance with the details on the drawings and the concrete cast using concrete from a ready-mix plant within the area.

After the concrete has gained sufficient strength, the shutters will be removed, the concrete finished off and the backfilling around the structures done and compacted and the areas finished off neatly. Any excess material will be spread over the area round the structures and finished off.

LWUA is also considering using pre-cast chambers, should it be a more viable option.

3.5 Maintenance activities during the operational phase

Once the SE2 pipeline is operational, several activities will be undertaken in order to maintain the pipeline in a working condition. Although the SE2 pipeline will mainly be buried, at certain watercourse crossings an overland structure may be utilised. Table 3:2 outlines the general maintenance activities that are planned for the SE2 pipeline.

Table 3:2 General maintenance activities for the SE2 pipeline (SRK, 2018)

Maintenance activity	Actions
Site inspections of the pipeline	Undertake regular inspections to ensure that: <ul style="list-style-type: none"> The pipeline structure remains structurally intact; The watercourses crossed are not blocked with sediment or debris; No erosion is occurring along river banks, at culverts and pipeline crossings; No new alien vegetation is encroaching Erosion structures (gabion and reno mattresses) remain intact
Removal of alien vegetation and establishment of indigenous vegetation at the watercourse crossings, culverts and erosion protection structures	<ul style="list-style-type: none"> Remove alien vegetation encroaching around pipeline
Removal of sediment, debris or nuisance vegetation at watercourse crossings	<ul style="list-style-type: none"> All sediment, debris, overgrowth of vegetation and waste rock from erosion control structures should be removed from the watercourse and pipeline crossings
Repair to erosional structures (such as gabions and reno mattresses)	<ul style="list-style-type: none"> Erosional structures such as gabions and reno matters must be repaired in a timely manner to prevent erosion from occurring.
Erosion Protection along the watercourse crossings	<ul style="list-style-type: none"> Areas along the watercourse and pipeline crossings that have been eroded should be backfilled with sediment or erosion protection structures Embankments along the watercourse should be stabilised and sloped
Encasing the pipeline at watercourse crossing	<ul style="list-style-type: none"> Disturbance to the local vegetation may occur during the concreting of the pipeline. Disturbance to the river banks due to concreting the pipeline may occur. There is potential for the contamination of wetlands resources if the concrete is spilled while mixing.

3.6 Environmental related permits required

Triggered listed activities in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations (as amended in 2017) are shown in Table 3:3 below. Activities in Listing 1 and 3 are triggered by the proposed development, and therefore a Basic Assessment environmental authorisation process is followed.

Table 3:3: Listed activities triggered by the SE2 pipeline project

List and activity number	Listed activity	Description of activity
Listing 1 Activity 9	<p>The development of infrastructure exceeding 1000 meters in length for the bulk transportation of water or storm water –</p> <p>(i) with an internal diameter of 0.36 meters or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more,</p> <p>excluding where:</p> <p>(a) such facilities or infrastructure are for bulk transportation of water, or storm water or storm water drainage inside a road reserve or railway line reserve; or</p> <p>(b) where such development will occur within an urban area</p>	<p>The development of the raw water pipeline between Spitskop Pump Station and Dwarsrivier Pump Station is 15km in length with an internal diameter of 500mm (0.5m), and therefore triggers this activity.</p> <p>The development of the raw water pipeline between Spitskop Pump Station and Mototolo Mine is with an internal diameter of 300/350mm (0.3/0.35m), and therefore does not trigger this activity.</p>
Listing 1 Activity 19	<p>The infilling or depositing of any material of more than 10m³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m³ from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving-</p> <p>(a) will occur behind a development setback;</p> <p>(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>(e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.</p>	<p>The proposed SE2 pipeline crosses several watercourses and earthworks will be required within these watercourses to construct the proposed pipeline.</p>
Listing 1 Activity 27	<p>The clearance of an area of 1 ha or more, but less than 20ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for-</p> <p>(i) the undertaking of a linear activity; or</p>	<p>Clearance of indigenous vegetation will take place for the proposed SE2 pipeline, but as it is a linear activity, this listed activity does not apply.</p> <p>However, the following areas will also be cleared:</p>

List and activity number	Listed activity	Description of activity
	(ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Solar panels (0.5 ha) New Spitskop Pump Station (0.16 ha) New reservoir at Dwarsrivier Pump Station (0.53ha) New Dwarsrivier Pump Station (0.2 ha) The cumulative clearance of indigenous vegetation is more than 1 ha. This activity is triggered.
Listing 3 Activity 2	The development of reservoirs excluding dams, with a capacity of more than 250m ³ .	A concrete reservoir with a capacity of 10Mℓ will be developed, within an Ecological Support Area, as per the Limpopo Conservation Plan (LCP).
Listing 3 Activity 12	The clearance of an area of more than 300m ² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed SE2 pipeline and associated infrastructure will require the clearing of more than 300m ² of indigenous vegetation, within in areas listed as Critical Biodiversity areas and Ecological support areas as per the LCP.
Listing 3 Activity 14	The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.	The proposed SE2 pipeline crosses several watercourses, within in areas listed as Critical Biodiversity areas and Ecological support areas as per the LCP.

In addition, a Water Use Licence Application will be submitted in terms of the National Water Act (Act No. 36 of 1998) (NWA) as Section 21 water uses are triggered by the proposed development.

Table 3:4 list the water uses that require authorisation in terms of Section 21 of the National Water Act for the proposed development.

Table 3:4 List of Section 21 Water Uses to be applied for

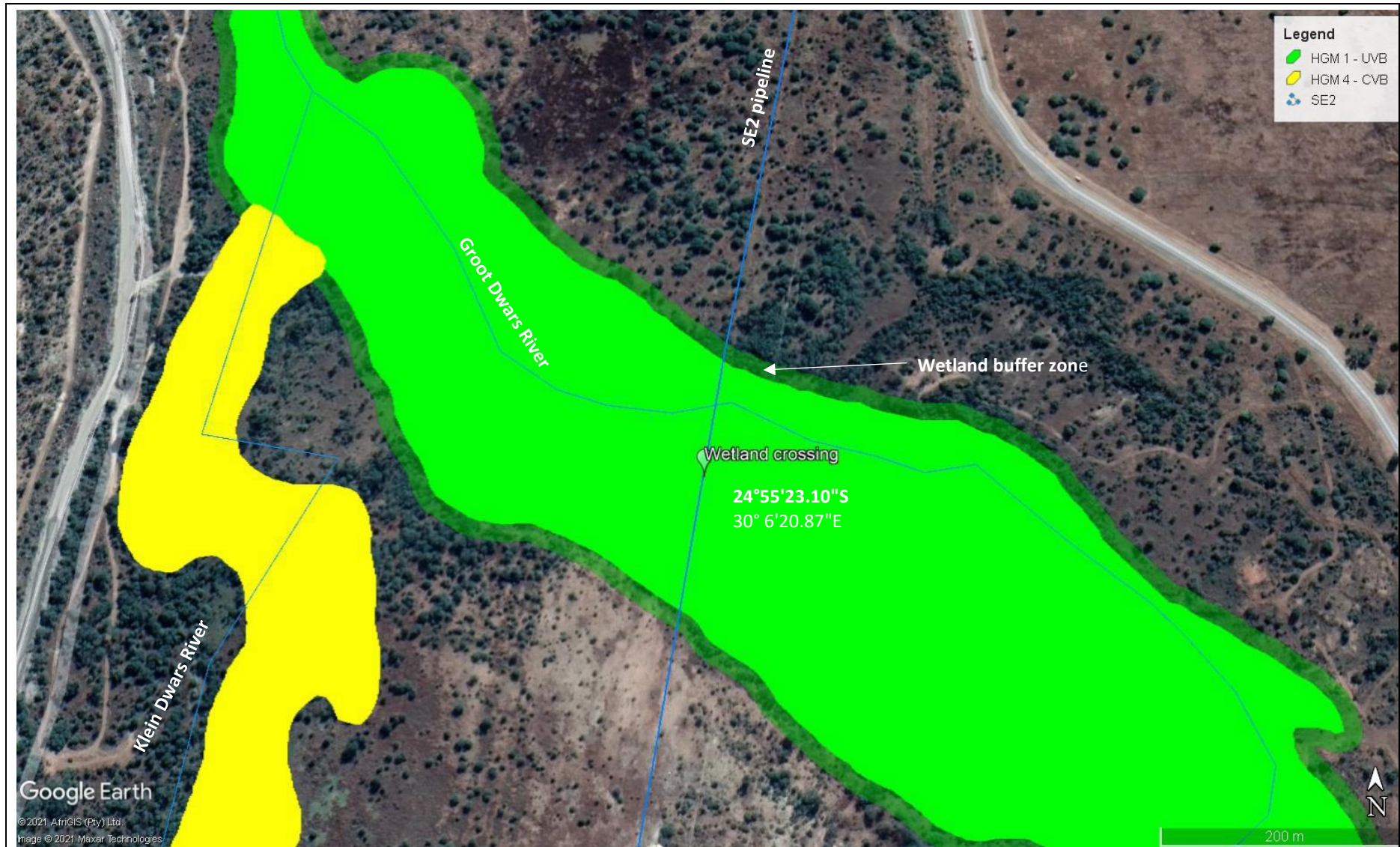
Section 21 Water Use	Activities which require the Water Use Licence
(c) – impeding or diverting the flow of water in a watercourse (i) – altering the bed, banks, course or characteristics of a watercourse	<ul style="list-style-type: none"> • Watercourse crossing by SE2 pipeline • Activities to be undertaken with a horizontal distance of 100m from the edge of the watercourse and within 500m of a delineated wetland.

3.7 Sensitive areas

The following sensitive areas in proximity of the proposed SE2 pipeline and associated infrastructure have been identified:

- Delineated wetlands and watercourses;
- Heritage sites.

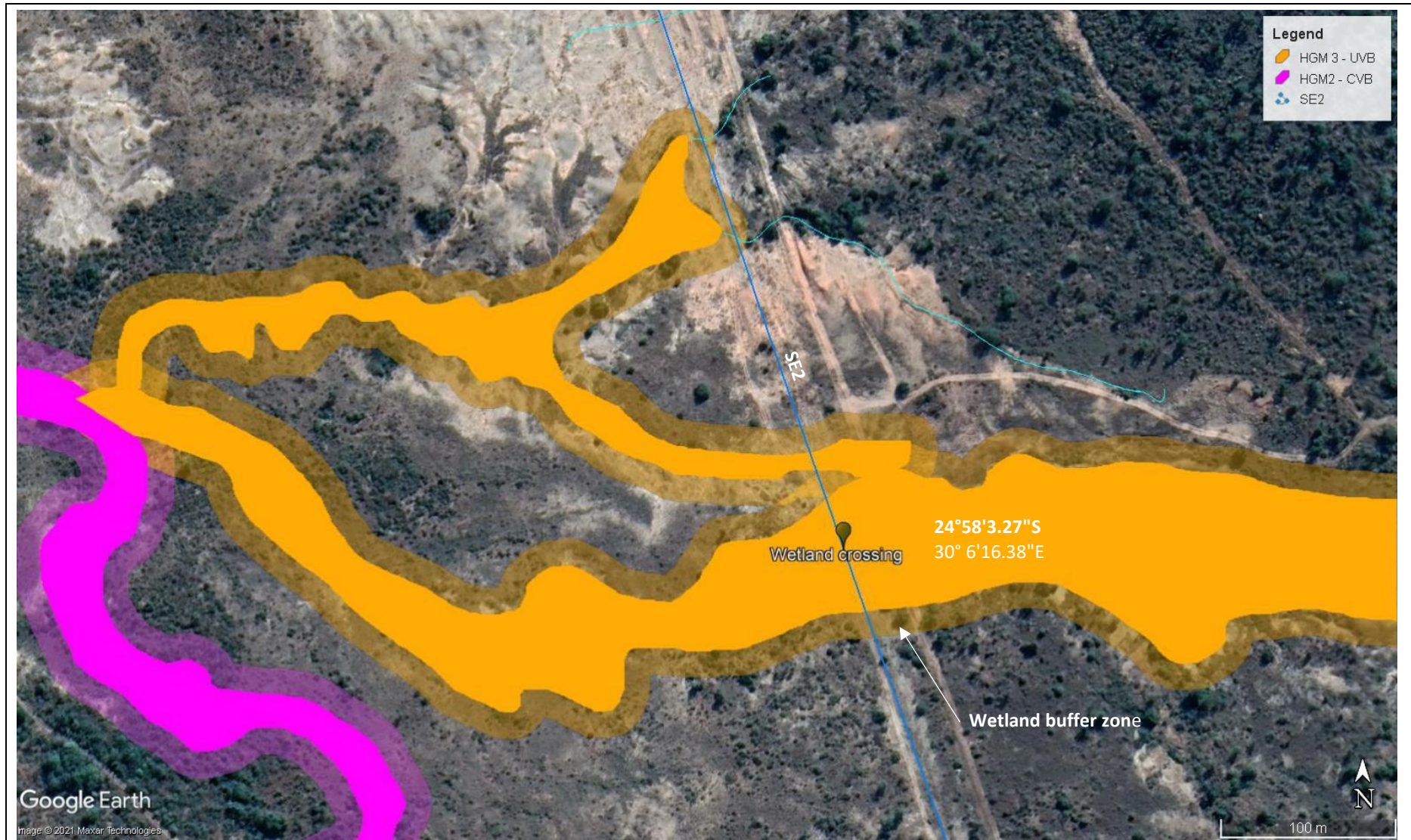
Refer to Figure 3:3 to Figure 3:5 for delineated wetland areas traversed by the SE2 pipeline route, and Figure 3:6 for heritage features identified along the SE2 pipeline route.



Wetland sensitive areas: HGM 1 – Unchanneled Valley Bottom

Figure 3:3

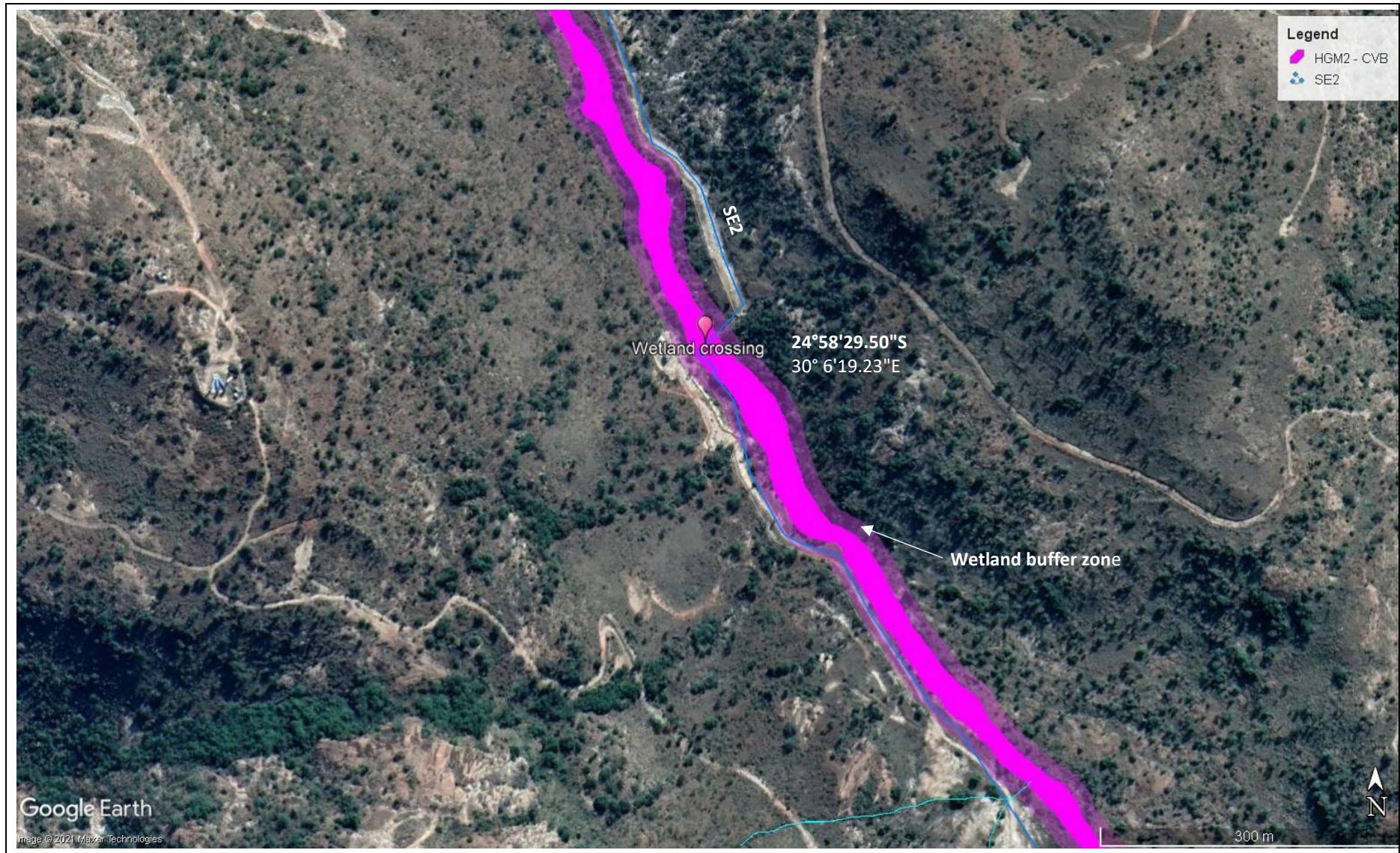
Figure 3:3 Wetland sensitive areas: HGM 1 – Unchanneled Valley Bottom



Wetland sensitive areas: HGM 3 – Unchanneled Valley Bottom

Figure 3:4

Figure 3:4 Sensitive wetland areas: Wetland sensitive areas: HGM 3 – Unchanneled Valley Bottom



Wetland sensitive areas: HGM 3 – Channelled Valley Bottom

Figure 3:5

Figure 3:5 Sensitive wetland areas: Wetland sensitive areas: HGM 3 – Channelled Valley Bottom

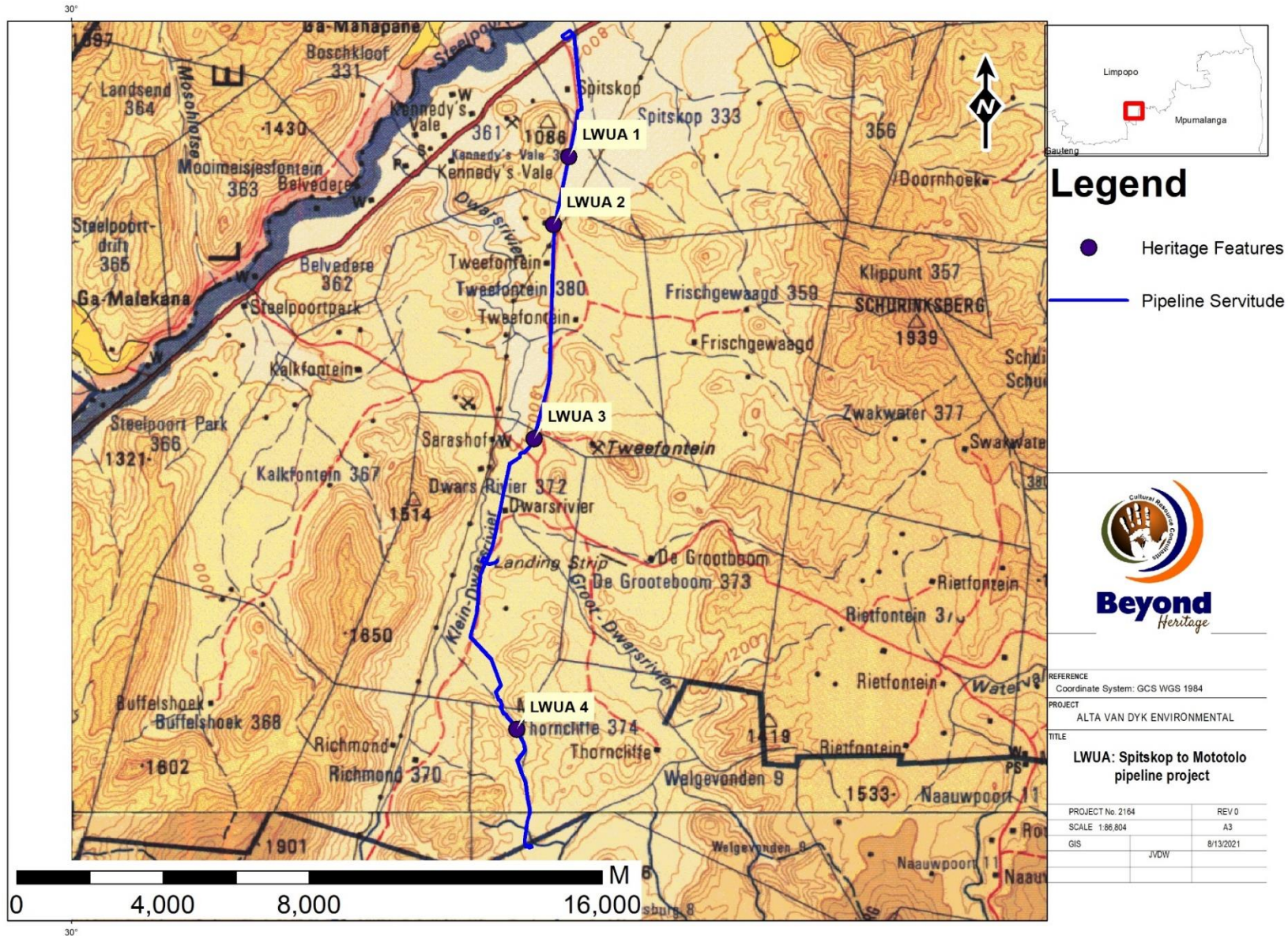


Figure 3:6 Heritage features identified along the proposed SE2 pipeline route (Beyond Heritage, 2021)

4 ROLES AND RESPONSIBILITIES

The roles and responsibilities indicate which team member(s) are responsible for implementation of the identified mitigation measures, management plan and monitoring. The following parties will have roles and responsibilities in the implementation of this EMPr.

- Applicant (LWUA);
- Construction Contractor;
- Environmental Control Officer; and
- Operator (LWUA).

The roles and responsibilities of each party is described in the sections below.

4.1 Applicant

LWUA is the applicant and will therefore be the entity monitoring the implementation of the EMPr and compliance with the authorisation. The following roles and responsibilities are assigned to the applicant:

- Ensure compliance with the conditions in the EMPr and environmental authorisation during all phases of the project;
- Ensure that contractors and operators undertake to adhere to all the provisions of the EMPr;
- Ensure that environmental monitoring takes place;
- Ensure that independent environmental audits are undertaken;
- Ensure that all monitoring and audit reports are submitted to the competent authority.

4.2 Construction Contractor

During the construction phase, the construction contractor will:

- Be responsible to have the EMPr available on site at all times;
- Appoint an Environmental Control Officer for the construction phase
- Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr; and
- Ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

4.3 Environmental Control Officer

During the construction phase, the Environmental Control Officer (ECO) will:

- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results; and
- Assistance with the preparation of environmental monitoring reporting and permit applications.

4.4 Operator

During the operational phase, the operator (LWUA) will:

- Be familiar with the contents and commitments documented in the EMPr;
- Will adhere to the management obligations;
- Ensure that all problems identified during inspections, are addressed, and rectified as soon as reasonably possible.
- Implement LWUA Management policies, procedures, and management plans;
- Review and analysis of monitoring results and preparation of reports to management and stakeholders;
- Planning of and carrying out environmental training programs for employees and contractors;
- Obtaining and maintaining all necessary environmental permits in liaison with the legal manager; and
- Management of the environmental related components of the grievance mechanism.

5 MITIGATION AND/OR MANAGEMENT MEASURES

A variety of potential impacts are associated with the construction and operational related activities for this project. These impacts can be categorised as general construction related impacts as well as construction impacts specifically related to this site. The construction phase is expected to last 18 months. The SE2 pipeline and associated infrastructure will be a permanent facility, and therefore no mitigation for the closure phase have been included.

General best practice rules during construction should be followed at all times. In addition to this the specific mitigation measures and recommendations as highlighted by the Basic Assessment Report (BAR) and various specialists studies for this specific site are included.

5.1 Construction related impacts

During the construction phase, the following possible impacts may occur:

- Loss of soils to compaction and erosion;
- Contamination of soils due to spilled concrete or hydrocarbons;
- Destruction, fragmentation and degradation of habitats;
- Loss of protected plant and tree species;
- Spread and/or establishment of alien and/or invasive species;
- Introduction of nuisance vectors (pests) such as flies, rodents and baboons;
- Direct loss, disturbance and degradation of wetlands;
- Increased bare surfaces, runoff and potential for erosion and resulting sedimentation of the wetlands;
- Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation;
- Increased sediment loads to downstream reaches;
- Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste;
- Disruption of wetland soil profile and alteration of hydrological regime;
- Impact on graves and cemeteries found along SE2 pipeline route;
- Impact of the ephemeral walling at LWUA 04;
- General rise in ambient noise levels;
- Increased dust fallout around construction areas;
- Benefits resulting from employment and income opportunities created by the construction of the pipelines;
- Influx of people and construction workers leading to increased pressure on social services and infrastructure, social pathologies and disruptions, resulting in spontaneous settlements; and
- Dissatisfaction over employment opportunities and conditions of procurement which could potentially lead to community protests and unrests, as well as conflicts within communities.

Mitigation measures to be implemented during the construction phase is presented in Table 5:1.

Table 5:1: Mitigation measures to be implemented during the construction phase of the SE2 pipeline project

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
Site clearing and preparation Trench excavation and installation of pipeline Construction of reservoir	Soils	Conservation of soils a resource	Loss of soils to compaction and erosion	Medium (-)	Low (-)	Stockpile the topsoil and sub-soil separately on either side of the trench and backfill in the correct order.	Construction contractor	Once off	Monthly compliance report
						All removed soil and material stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Construction contractor	Throughout construction phase	Monthly compliance report
						The amount of stockpiling of surplus soil material must be limited as far as practically possible, to avoid unnecessary handling of soil resources.	Construction contractor	Throughout construction phase	Monthly compliance report
						Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.	Construction contractor	Throughout construction phase	Monthly compliance report
						These designated stockpile areas must be viewed as temporary and kept for backfill material.	Construction contractor	Throughout construction phase	Monthly compliance report
						Maintain soil quality and minimise damage to the soil structure during the time the material is stockpiled.	Construction contractor	Throughout construction phase	Monthly compliance report
						All construction access must make use of the existing roads that can be found in and around the project area.	Construction contractor	Throughout construction phase	Monthly compliance report
						Compacted areas are to be ripped to loosen the soil structure where necessary.	Construction contractor	Throughout construction phase	Monthly compliance report
						Implement appropriate stormwater management measures, including the temporary diversion of upstream run-off from the construction and laydown areas.	Construction contractor	Throughout construction phase	Monthly compliance report
						A rehabilitation strategy focussed on revegetation must be initiated after the construction phase.	Construction contractor	Upon rehabilitation	Construction close-out report
						Ensure topsoil is spread back over trench area on closure of the trench. It is preferred that the trench is created on a needs basis to avoid an excessive excavation. As pipe is laid, the trench must be backfilled and topsoil replaced.	Construction contractor	Upon rehabilitation	Construction close-out report
Trench excavation and installation of pipeline Construction of reservoir	Soils	Conservation of soils a resource	Contamination of soils due to spilled concrete or hydrocarbons	Medium (-)	Low (-)	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site.	Construction contractor	Throughout construction phase	Monthly compliance report
						A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.	Construction contractor	Throughout construction phase	Monthly compliance report
						The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.	Construction contractor	Throughout construction phase	Monthly compliance report

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
						Any fuel, oil or hazardous substance spills must be cleaned-up immediately and discarded correctly.	Construction contractor	As required	Monthly compliance report
						Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers.	Construction contractor	Throughout construction phase	Monthly compliance report
Vegetation clearing and site preparation	Biodiversity – Fauna and Flora	Limit the disturbance and destruction of vegetation, fauna and habitat	Destruction, fragmentation and degradation of habitats	Medium (-)	Low (-)	Demarcate the footprint area with high visibility plastic fencing.	Construction contractor	Throughout construction phase	Monthly compliance report
						Restrict the disturbance footprint to within the designated pipeline route.	Construction contractor	Throughout construction phase	Monthly compliance report
						Reduce the disturbance footprint and the unnecessary clearing of vegetation on either side of the trench as far as possible.	Construction contractor	Throughout construction phase	Monthly compliance report
	Biodiversity – Fauna and Flora	Limit the disturbance and destruction of vegetation, fauna and habitat	Loss of protected plant and tree species	Medium (-)	Low (-)	Prior to the construction phase, a suitably qualified botanist should undertake a walkdown of the SE2 pipeline route and identify all protected plants and confirm presence of Species of Conservation Concern.	Construction contractor	Once off prior to commencement of construction	Botany report
						Any individual of the nationally protected trees or protected plants that were observed needs a relocation or destruction permit that will be required for any individual that may be removed or destroyed due to the development, alternatively the trees/plants can be relocated within the property without a permit or otherwise left unharmed. High visibility flags must be placed near any protected trees/plants.	Construction contractor	Once off prior to commencement of construction	Issuance of permits if required
Vegetation clearing and site preparation Trench excavation and installation of pipeline Construction of reservoir	Biodiversity – Fauna and Flora	Minimise and prevent the spread of alien and/or invasive species	Spread and/or establishment of alien and/or invasive species	Low (-)	Low (-)	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Construction contractor	Throughout construction phase	Construction close-out report
						Compilation of and implementation of an alien vegetation management plan.	Construction contractor	Throughout construction phase	Monthly compliance report
						A pest control plan must be put in place and implemented; it is imperative that poisons not be used. Opt for manual removal.	Construction contractor	Throughout construction phase	Monthly compliance report
Vegetation clearing and site preparation Trench excavation and installation of pipeline Construction of reservoir	Biodiversity – Fauna and Flora	Limit the disturbance and destruction of vegetation, fauna and habitat	Introduction of nuisance vectors (pests) such as flies, rodents and baboons	Low (-)	Low (-)	Ensure the correct handling, storage and operation of general waste generated on the construction site.	Construction contractor	Throughout construction phase	Monthly compliance report
						Remove general waste generated frequently as to prevent the development of a breeding habitat for nuisance pests such as flies, and attracting rodents and baboons.	Construction contractor	Weekly	Monthly compliance report
Vegetation clearing and site preparation Trench excavation and installation of pipeline	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Direct loss, disturbance and degradation of wetlands.	Medium (-)	Low (-)	Restrict all construction related activities to within the designated pipeline route.	Construction contractor	Throughout construction phase	Monthly compliance report
						Use wetland spatial data (shapefiles) to mark out the positions where the pipeline will enter and exit the 15 m buffer on the boundary of a wetland. Indicate delineated wetlands on site layout plans.	Construction contractor	Throughout construction phase	Monthly compliance report

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
						Adhere to the prescribed wetland buffers for secondary activities. Restrict all secondary activities (e.g. laydown yards, storage areas, cement mixing and equipment to outside of wetlands and their prescribed buffers.	Construction contractor	Throughout construction phase	Monthly compliance report
						Signpost the area beyond the construction footprint where the pipeline traverses the wetlands as an environmentally sensitive area and keep all excavation, soil stockpiling, general access and construction activities out of this area.	Construction contractor	Throughout construction phase	Monthly compliance report
						Demarcate the 15 m buffer zone around wetlands on the ground (e.g. painted wooden poles/high visibility plastic fencing).	Construction contractor	Throughout construction phase	Monthly compliance report
						Reduce the disturbance footprint and the unnecessary clearing of vegetation on either side of the trench as far as possible when traversing wetlands.	Construction contractor	Throughout construction phase	Monthly compliance report
						Consider above ground crossings over wetland areas. Alternatively, open trench crossings are permissible but backfilling and rehabilitation must be undertaken.	Construction contractor	Throughout construction phase	Monthly compliance report
						Load wetland spatial data onto a GPS and use it to mark out the positions where the pipeline will enter and exits the prescribed buffer on the boundary of a wetland. Try to reduce the disturbance footprint and the unnecessary clearing of vegetation on either side of the trench as far as possible when traversing wetlands.	Construction contractor	Throughout construction phase	Monthly compliance report
						Construct the wetland crossings during winter, if possible, when flow volumes are lowest. This will reduce impacts to wetlands due to soil poaching/sourcing and vegetation trampling under peak saturation levels. Additionally, the risk of vehicles getting stuck and further degrading the vegetation integrity is lowest during this time.	Construction contractor	Throughout construction phase	Monthly compliance report
Vegetation clearing and site preparation	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Increased bare surfaces, runoff and potential for erosion and resulting sedimentation of the wetlands	Medium (-)	Low (-)	Keep the trench excavation neat and tidy.	Construction contractor	Throughout construction phase	Monthly compliance report
						Separate sub-soil and topsoil on either side of the trench.	Construction contractor	Throughout construction phase	Monthly compliance report
						Limit construction activities across the wetlands to the dry season, if possible, when storms are least likely to wash concrete and sand into wetlands.	Construction contractor	Throughout construction phase	Monthly compliance report
						Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.	Construction contractor	Throughout construction phase	Monthly compliance report
						Mixing of concrete must under no circumstances take place in any wetland or their buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished.	Construction contractor	Throughout construction phase	Monthly compliance report
						Do not situate any of the construction material laydown areas within any wetland or buffer areas.	Construction contractor	Throughout construction phase	Monthly compliance report
						No machinery/equipment should be allowed to be parked in any wetlands or buffer zone areas	Construction contractor	Throughout construction phase	Monthly compliance report

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
						Ensure topsoil is spread back over trench area on closure of the trench. It is preferred that the trench is created on a needs basis to avoid an excessive excavation. As pipe is laid, the trench must be backfilled and topsoil replaced.	Construction contractor	Upon rehabilitation	Construction close-out report
						Landscape and lightly till (no deeper than 30 cm) denuded areas to encourage vegetation establishment as soon as possible.	Construction contractor	Upon rehabilitation	Construction close-out report
Vegetation clearing and site preparation	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Medium (-)	Low (-)	Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.	Construction contractor	Throughout construction phase	Monthly compliance report
						The use of herbicides is not recommended in or near wetlands (opt for mechanical removal).	Construction contractor	Throughout construction phase	Monthly compliance report
						Appropriately stockpile topsoil cleared from the project area. This can be used for rehabilitation of the servitude.	Construction contractor	Throughout construction phase	Monthly compliance report
						Clearly demarcate construction footprint, and limit all activities to within this area.	Construction contractor	Throughout construction phase	Monthly compliance report
						Minimize unnecessary clearing of vegetation.	Construction contractor	Throughout construction phase	Monthly compliance report
						All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".	Construction contractor	Throughout construction phase	Monthly compliance report
						Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).	Construction contractor	Throughout construction phase	Monthly compliance report
						No dumping of construction material on site may take place within the wetland or buffer area. All material must be contained in waste skips and removed to designated (and licensed) facilities.	Construction contractor	Throughout construction phase	Monthly compliance report
						All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.	Construction contractor	Weekly	Monthly compliance report
						Landscape and re-vegetate all denuded areas as soon as possible.	Construction contractor	Upon rehabilitation	Construction close-out report
Vegetation clearing and site preparation Trench excavation and installation of pipeline	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Increased sediment loads to downstream reaches	Medium (-)	Low (-)	Implement mitigation for increased bare surfaces, runoff and potential for erosion.	Construction contractor	Throughout construction phase	Monthly compliance report
						Re-instate topsoil and lightly till disturbance footprint.	Construction contractor	Throughout construction phase	Monthly compliance report
						At all crossings install sandbags on downstream side of the footprint to trap sediment until the site has been constructed and vegetation has re-established.	Construction contractor	Throughout construction phase	Monthly compliance report

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
Vegetation clearing and site preparation Trench excavation and installation of pipeline	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste	Medium (-)	Low (-)	Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.	Construction contractor	Throughout construction phase	Monthly compliance report
						Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetland areas.	Construction contractor	Throughout construction phase	Monthly compliance report
						Mixing of concrete must under no circumstances take place within the wetland or buffer areas.	Construction contractor	Throughout construction phase	Monthly compliance report
						Regularly maintain stormwater infrastructure, pipes, pumps and machinery to minimise the potential for leaks. Check for oil leaks, keep a tidy operation, install bins and promptly clean up any spills or litter.	Construction contractor	Throughout construction phase	Monthly compliance report
						Provide appropriate sanitation facilities during construction and service them regularly. These must be beyond the wetland and buffer area.	Construction contractor	Weekly	Monthly compliance report
						Monitor and inspect machinery, vehicles and equipment for leaks and spills.	Construction contractor	Throughout construction phase	Monthly compliance report
Backfilling of trench	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Disruption of wetland soil profile and alteration of hydrological regime	Medium (-)	Low (-)	Document the soil profile on removal and check the order in which soil is replaced. Separate the topsoil (including seedbank) from the subsoil layer.	Construction contractor	Upon rehabilitation	Construction close-out report
						Ensure that topsoil is appropriately stored and re-applied during trench backfilling.	Construction contractor	Upon rehabilitation	Construction close-out report
						Ensure that the soil is backfilled and compacted to accepted geotechnical standards to avoid flow canalisation along the trench and the potential for sinkhole formation.	Construction contractor	Upon rehabilitation	Construction close-out report
Site clearing and preparation Trench excavation and installation of infrastructure	Heritage	Protect and preserve heritage resources	Impact on graves and cemeteries found along SE2 pipeline route	Medium-High (-)	Low (-)	All recorded graves and burial sites should be indicated on development plans and avoided with a buffer of 30m.	Construction contractor	Throughout construction phase	Monthly compliance report
						The graves and cemeteries must be accessible at all times during construction.	Construction contractor	Throughout construction phase	Monthly compliance report
						Implement dust suppression around graves and cemeteries to minimise dust fallout on headstones.	Construction contractor	Daily	Monthly compliance report
						Implement the chance find procedure should an artefact or grave be uncovered during construction.	Construction contractor/LWUA	As required	Monthly compliance report
Site clearing and preparation Trench excavation and installation of infrastructure	Heritage	Protect and preserve heritage resources	Impact of the ephemeral walling at LWUA 04	Medium (-)	Low (-)	Implement the chance find procedure should an artefact or grave be uncovered during construction.	Construction contractor/LWUA	As required	Monthly compliance report

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
Site clearing and preparation Trench excavation and installation of pipeline Construction of reservoir	Noise	Minimise the generation of noise	General rise in ambient noise levels	Medium (-)	Low (-)	Ensure high level of equipment maintenance, especially intake and exhaust mufflers.	Construction contractor	Monthly	Monthly compliance report
						Replace pure tone (beeping) with broadband (hissing) reversing alarms.	Construction contractor	As required	Monthly compliance report
						Construction activities to take place only during daylight hours.	Construction contractor	Throughout construction phase	Monthly compliance report
Site clearing and preparation Trench excavation and installation of pipeline Construction of reservoir	Air Quality	Minimise atmospheric emissions and dust generation	Increased dust fallout around construction areas	Medium (-)	Low (-)	Apply dust suppressants to gravel roads used.	Construction contractor	Daily	Monthly compliance report
						Set speed limits to 40 km/h to minimise the creation of fugitive dust within the project boundary.	Construction contractor	Throughout construction phase	Monthly compliance report
						Dust-reducing mitigation measures must be put in place and must be strictly adhered to, during the construction phase. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.	Construction contractor	Throughout construction phase	Monthly compliance report
Construction of SE2 pipeline and reservoir	Social	Maximise employment opportunities and social benefits	Benefits resulting from employment and income opportunities created by the construction of the pipelines	Low (+)	Low (+)	Develop a clear and concise employment policy prioritising local employment	LWUA	Once off	LWUA Employment Policy
						Employ local works if qualified applicants with the appropriate skills are available.	Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
						Purchase goods and services at a local level if available.	Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
Construction of SE2 pipeline and reservoir	Social	Maximise employment opportunities and social benefits	Influx of people and construction workers leading to increased pressure on social services and infrastructure, social pathologies and disruptions, resulting in spontaneous settlements	Medium (-)	Low (-)	Develop a clear and concise employment and recruitment policy that prioritizes local recruitment. Ensure that contractors adhere to this policy.	LWUA	Once off	LWUA Employment Policy
						Identify and support community development programmes that address challenges raised by population influx and spontaneous settlement.	LWUA/ Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
						Support local government capacity for integrated development planning.	LWUA	Throughout construction phase	Stakeholder Engagement Plan
						Prepare a detailed vocational training program in consultation with the local community to be implemented during the construction phase.	LWUA/ Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
						Through the stakeholder engagement process ensure that expectations are managed around employment opportunities and practices.	LWUA/ Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
Construction of SE2 pipeline and reservoir	Social	Maximise employment	Dissatisfaction over employment opportunities and conditions of	Medium (-)	Low (-)	Develop a clear and concise employment and recruitment policy that prioritizes local recruitment. Ensure that contractors adhere to this policy.	LWUA	Once off	LWUA Employment Policy

Construction Phase									
Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential Environmental Impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period	Method of monitoring
		opportunities and social benefits	procurement which could potentially lead to community protests and unrests, as well as conflicts within communities			Through the stakeholder engagement process ensure that expectations are managed around employment opportunities and practices.	LWUA/ Construction contractor	Throughout construction phase	Stakeholder Engagement Plan
						Monitor and implement the Grievance Management Mechanism.	LWUA/ Construction contractor	Throughout construction phase	Grievance register
						Involve Local Ward Councillors and keep them informed about project developments, and included in all stakeholder engagement processes. Their involvement will assist with the successful development of relationships between the LWUA, the municipality and the communities.	LWUA/ Construction contractor	Throughout construction phase	Stakeholder Engagement Plan

5.2 Operational related impacts

During the operational phase, the management of the SE2 pipeline and associated infrastructure will fall under the responsibility of LWUA. Impacts will be limited to the maintenance of the SE2 pipeline and associated infrastructure.

During the operational phase of the project, the following possible impacts may occur:

- Disturbance to soils around watercourse crossings;
- Contamination of soils due to spilled concrete or hydrocarbons;
- Disturbance to local vegetation, leading to spread and/or establishment of alien and/or invasive species;
- Disturbance to wetlands due to repair work undertaken at watercourse crossings;
- Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste;
- Increased raw water inputs to downstream wetlands;
- General rise in ambient noise levels;
- Increased dust fallout; and
- Water provision to benefitting mines and industries.

Mitigation measures to be implemented during the operational phase are presented in Table 5:2.

Table 5:2: Mitigation measures to be implemented during the operational phase of the SE2 pipeline project

Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential environmental impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period
General maintenance activities	Soils	Conservation of soils as a resource	Disturbance to soils around watercourse crossings	Medium (-)	Low (-)	All maintenance contractors must access watercourse crossings using existing roads that can be found in and around the project area.	LWUA	During maintenance activities
						Compacted areas are to be ripped to loosen the soil structure where necessary.	LWUA	During maintenance activities
						Areas that are denuded during maintenance activities need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	LWUA	During maintenance activities
Encasing the pipeline caused by erosion at watercourse crossings	Soils	Conservation of soils as a resource	Contamination of soils due to spilled concrete or hydrocarbons	Medium (-)	Low (-)	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site.	LWUA	During maintenance activities
						A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.	LWUA	Once off
						The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.	LWUA	During maintenance activities
						Any fuel, oil or hazardous substance spills must be cleaned-up immediately and discarded correctly.	LWUA	As required during maintenance activities
						Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.	LWUA	During maintenance activities
						All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers.	LWUA	As required during maintenance activities
General maintenance activities	Biodiversity – Fauna and Flora	Minimise and prevent the spread of alien and/or invasive species	Disturbance to local vegetation, leading to spread and/or establishment of alien and/or invasive species	Medium (-)	Low (-)	Areas that are denuded during maintenance activities need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	LWUA	As required during maintenance activities
						Implementation of an alien vegetation management plan.	LWUA	During maintenance activities
						Promptly remove all alien and invasive plant species observed during site inspections (i.e. weedy annuals and other alien forbs) must be removed.	LWUA	During maintenance activities
						The use of herbicides is not recommended in or near wetlands (opt for mechanical removal).	LWUA	During maintenance activities
Repair to erosion protection structures at watercourse pipeline crossings	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Disturbance to wetlands due to repair work undertaken at watercourse crossings	Medium (-)	Low (-)	Repair to erosion protection structures should be done by hand.	LWUA	During maintenance activities
						No vehicles should enter the watercourse areas.	LWUA	During maintenance activities
						Undertake repair activities during winter, if possible. This will reduce impacts to wetlands due to soil poaching/souring and vegetation trampling under peak saturation levels. Additionally, the risk of vehicles getting stuck and further degrading the vegetation integrity is lowest during this time.	LWUA	During maintenance activities
General Maintenance activities	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste.	Medium (-)	Low (-)	All sediment and debris removed from crossings must not be stored within wetland areas and buffer zones, or within other watercourses and must be deposited at an appropriate waste facility.	LWUA	During maintenance activities
						Mixing of concrete must under no circumstances take place within the wetland or buffer areas	LWUA	During maintenance activities
						Provide appropriate sanitation facilities during maintenance activities and service them regularly. These must be beyond the wetland and buffer area.	LWUA	During maintenance activities

Activity that may cause an impact	Environmental/Social aspect	Management Outcomes	Potential environmental impact	Significance before mitigation	Significance after mitigation	Management Measure	Responsible Person	Frequency and/or time period
						Monitor and inspect machinery, vehicles and equipment for leaks and spills.	LWUA	During maintenance activities
Operation of raw water pipeline Pipeline leak	Surface water and wetlands	Minimise the potential for surface water pollution Limit the disturbance and destruction of delineated wetlands	Increased raw water inputs to downstream wetlands	Low (-)	Low (-)	Conduct regular inspections of manholes along both the pipeline routes and fix leaks timeously. Engineers should advise on the frequency of pressure tests to detect leaks.	LWUA	As per inspection requirements
						Monitor water quality at pump stations.	LWUA	As per requirements of the water use licence/general authorisation
						Install leak detection devices.	LWUA	Once off
General maintenance activities	Noise	Minimise the generation of noise	General rise in ambient noise levels	Low (-)	Low (-)	Ensure high level of equipment maintenance, especially intake and exhaust mufflers.	LWUA	During maintenance activities
						Replace pure tone (beeping) with broadband (hissing) reversing alarms.	LWUA	During maintenance activities
						Maintenance activities to take place only during daylight hours.	LWUA	During maintenance activities
General maintenance activities	Air quality	Minimise atmospheric emissions and dust generation	Increased dust fallout	Low (-)	Low (-)	Apply dust suppressants to gravel roads used.	LWUA	Daily when maintenance is undertaken
						Set speed limits to 40 km/h to minimise the creation of fugitive dust within the project boundary.	LWUA	During maintenance activities
						Dust-reducing mitigation measures must be put in place and must be strictly adhered to, during the maintenance. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.	LWUA	Daily when maintenance is undertaken
Operation of raw water pipeline	Social	Maximise social benefits	Water provision to benefitting mines and industries	Medium (+)	Medium (+)	Ensure that the raw water pipeline is in good working order and is regularly maintained.	LWUA	As per inspection requirements

6 MANAGEMENT PLANS

The following management plans are detailed in the sections below:

- Heritage chance find procedure;
- Paleontological chance find procedure;
- Construction camp management;
- Waste management plan;

6.1 Heritage chance find procedure

The possibility of the occurrence of subsurface archaeological finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMPr. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the South African Heritage Resources Agency (SAHRA).

6.2 Paleontological chance find procedure

The following procedure is only required if fossils are seen on the surface and when excavations/drilling commence.

- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the mining activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. Refer to the Palaeontology study for photos of examples. This information will be built into the EMPr's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/contractor then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be

made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.

- If no good fossil material is recovered, then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

6.3 Construction Camp Management

The following management measures will be implemented at the construction camp/laydown area:

- Demarcate the construction camp/laydown area.
- Adequate portable ablution facilities for construction crews will be provided by the Construction Contractor and will be located at least 30m from the edge any delineated wetlands.
- All vehicles must make use of the existing roads.
- No uncontrolled discharges from the construction camp shall be permitted.
- Correct storage, handling and operation of the waste handling, management and storage area and laydown areas.

6.4 Waste Management Plan

The following waste management measures will be implemented:

- The contractors must provide and maintain a method statement for “solid waste management”. The method statement must provide information on proposed licensed facility to be utilised and details of proposed record keeping for auditing purposes. Waste management must be a priority and all waste must be collected and stored effectively.
- Bins must be clearly marked for ease of management.
- Sufficient closed containers must be strategically located around the construction site to handle the amount of litter, wastes, rubbish, debris, and builder’s wastes generated on the site.
- Monitoring of litter, spills, fuels, chemicals and human waste in and around the project area.
- A minimum of one toilet must be provided per 10 persons during construction. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.
- The Contractor/Operator should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.
- Where a registered disposal facility is not available close to the project area, the Contractor/Operator shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned or buried on site without the necessary approvals.
- General waste generated shall be removed on a frequent basis to prevent the development of a breeding habitat for nuisance pests such as flies and attracting rodents.
- Procedures for firefighting equipment that need to be checked and tested are aligned with the firefighting policy and procedure.

7 ENVIRONMENTAL MONITORING

A monitoring programme will be implemented for the duration of the construction of the SE2 pipeline and associated infrastructure. This programme will include (but is not limited to):

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact on the development area;
- Monitoring of the spread of alien invasive species around the site;
- Monitoring of stormwater management structures and the effectiveness thereof;
- Ensuring that re-vegetation is taking place at rehabilitated construction areas; and
- Site inspections during construction activities to monitor the excavation of heritage features by taking photographs of excavated areas

8 ENVIRONMENTAL AWARENESS PLAN

Environmental awareness is an essential part of the implementation of the EMPr during the construction and operational phases of the project. The purpose of environmental awareness is to make contractors and employees mindful of the environmental sensitivities around the site, the potential environmental impacts as well as the mitigation measures that need to be implemented.

8.1 Environmental awareness training

Environmental awareness training must be implemented during the construction and operational phases of the development. The ECO will be responsible for compiling the material required for the training, and should include, as a minimum, the following:

- Environmental legal requirements and obligations;
- Environmental sensitive areas;
- Details regarding plant Species of Conservation Concern, and the procedures to be followed should these be encountered;
- Heritage features and the associated chance find procedure should any archaeological finds be made;
- Details of the waste management procedures
- Emergency procedures; and
- Relevant mitigation measures to be carried out as listed in the EMPr.

All personnel, contractors to undergo environmental awareness training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of protected species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.

8.2 Basic Rules of Conduct

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid. NOTE: ALL new site personnel must attend an environmental awareness/induction presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ECO.

DO:

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any “HOT WORK” is undertaken e.g. welding, grinding, gas cutting etc.
- Prevent excessive dust and noise.

DO NOT:

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked chemical toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not litter or leave food lying around.

9 COMPLIANCE WITH THE EMPR

The implementation of the management measures specified in Table 5:1 and Table 5:2 will be monitored as detailed in the following sections.

9.1 Site inspections

During the construction phase, the construction contractor must appoint an Environmental Control Officer (ECO) to undertake visual site inspections supported by photographic evidence. The frequency of these visual site inspections must be monthly. The visual inspection findings must be collated into a monthly compliance report to report on the compliance of the construction phase mitigation measures. The monthly site inspection reports should cover the following:

- routine observations of behaviours and practices;
- noting of unusual events, incidents and accidents (natural and human triggered);
- brief statement whether or not conditions of the EMPr are being met; and where it is reportable to authorities;
- possible reasons why conditions are not being met; and
- corrective action plans.

The monthly report should be submitted to the construction contractor and LWUA. Copies of the inspection reports should be kept on site.

It is recommended that photographs are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with other records related to this EMP. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMP. Photographic reference of wetlands and relocation related aspects should be included.

9.2 Internal EMP Performance Assessment

During the construction phase, a formal EMPr Performance Assessment as per the NEMA EIA Regulations must be undertaken by the ECO once during the construction period and once when construction has been completed prior to the site being handed over to the Operator. This report will be approved/signed-off by both the applicant and Construction Contractor in support of close-out of the construction phase.

9.3 External EMP Performance Assessment

After the construction phase, an external EMP Performance Assessment must be undertaken by an independent Environmental Assessment Practitioner to assess the effectiveness of mitigation measures identified in the EMP and to formally document the close-out of the construction phase. The report must be submitted to the LWUA for review, and the final report must be submitted to the competent authority.

9.4 Incident Reporting

An environmental incident is an unwanted event that has an actual or potential (near-hit) negative impact on the environment, affecting the quality of air, land or water, fauna or flora, and / or causing stakeholder concern. A causal link must be able to be made between an operational activity and the event. Environmental Incidents is monitored to establish the following:

- Which repeat incidents occur;
- Has the incident been investigated and the root cause been identified;

- Effectiveness of implementation of preventative and corrective actions; and
- To monitor trends to check the effectiveness of the mitigation measures.

Table 9:1: Incident register

Name of person reporting the incident	Information on the incident	Date of incident identified	Actions taken as to address the incident	Date of rectification	Signature

9.5 Emergency Procedures

The purpose of this procedure is to:

- document the mechanism by which potential emergency situations and accidents will be identified during the construction phase that can have an impact on the environment; and
- Provide guidelines on the response to actual emergency situations and accidents to prevent or mitigate associated environmental impacts that may occur.

An environmental emergency situation or accident is an unexpected, sudden occurrence with the potential to endanger people or seriously damage the environment, either immediately or with a delayed effect.

Potential emergencies shall be identified and response plans shall be developed for all identified emergencies. These include the following:

- how potential emergency situations and accidents will be identified;
- a guideline for developing emergency preparedness and response procedures, for use by the construction contractor to address section-specific emergencies, stating how to respond to potential emergencies that might have an impact on the environment;
- the process to be followed in the case where an emergency situation or accident occurs;
- when potential emergency situations or accidents and their associated procedures will be reviewed; and
- The frequency at which the procedures shall be tested.

10 SITE REHABILITATION

10.1 Removal of structures and infrastructures

Following the completion of the construction activities, the area affected must be rehabilitated by undertaking alien plant eradication, replacement of removed topsoil, landscaping and levelling, and re-vegetation establishment. All construction equipment, containers and fencing erected by the contractor must be removed.

10.2 Waste management

The following actions should be implemented when construction is completed:

- Any rubble, excavated rock or construction material will be removed from the construction site and disposed of at a registered landfill site, if it cannot be recycled or re-used;
- All waste storage containers such as skips must be emptied and removed from site;
- All portable sanitation facilities will be removed by a registered contractor. No leaks or spillages from sanitation facilities will be allowed during the removal thereof;
- Any hazardous waste temporarily stored on site need to be removed and disposed of at a registered hazardous waste facility.

10.3 Rehabilitation


- Landscaped areas should be vegetated with species naturally occurring in the area.
- As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils.
- All areas of disturbed and compacted soil need to be ripped and reprofiled before rehabilitation.

11 ANNEXURES

ANNEXURE A: CURRICULUM VITAE

Name:	Suzanne	Surname	Van Rooy
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CURRICULUM VITAE

Personal Information:	Surname	Van Rooy
	First names	Suzanne
	Date of birth	1982-05-06
	Gender	Female
	Nationality	RSA
Contact Details:	Telephone number (land line)	012 940 9457
	Cell Number	078 196 6002
	Email Address	suzanne@avde.co.za
Signature:		

Expertise:

Date August 2020 to present	Area of expertise	Project management, environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, environmental feasibility, water use licensing
	Employers Name	Alta van Dyk Environmental Consultants cc
	Employer's locality and contact details	4 Garcia Peak Midlands Estate Centurion 1692 012 940 9457
	Main Activities and Responsibilities	Environmental Assessment Practitioner (EAP) Project Manager Project Planning Project Financing
Date 1 September 2009 – 31 July 2020	Area of expertise	Environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, environmental feasibility, water use licensing
	Employers Name	SRK Consulting (South Africa) (Pty) Ltd
	Employer's locality and contact details	265 Oxford Road Illovo 2196 011 441 1111
	Main Activities and Responsibilities	Environmental Assessment Practitioner (EAP) Project Manager Project Planning Project Financing
Date 7 May 2007 31 August 2009	Area of expertise	Environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, closure costing, bio-monitoring
	Employers Name	GCS (Pty) Ltd
	Employer's locality and contact details	63 Wessel Road Rivonia 2191 011 803 5726

Name:	Suzanne	Surname	Van Rooy
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Main Activities and Responsibilities	Environmental Assessment Practitioner (EAP) Project Manager Project Planning Project Financing
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Years of professional experience

Years of experience as substantiated in the individual CV.

13 Years	Water and Environmental Fields
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Qualifications:

Qualification Awarded	MPhil Environmental Management
Name of Institution	Stellenbosch University
Date awarded	2013
Qualification Awarded	Post Graduate Certificate in Education
Name of Institution	University of Johannesburg
Date awarded	2007
Qualification Awarded	B.Sc Honours Aquatic Health
Name of Institution	University of Johannesburg
Date awarded	2005
Qualification Awarded	B.Sc Natural and Environmental Sciences (Geography and Zoology)
Name of Institution	University of Johannesburg
Date awarded	2004

Membership of Professional Bodies:

Professional body	South African Council for Natural Scientific Professions (SACNASP)
Details of membership	400378/11 Registered as a Professional Natural Scientist
Dates	31 August 2011 to present
Professional body	International Association for Impact Assessment South Africa
Details of membership	Membership - 5894
Dates	Since 2018

Language skills: one (1) for low to five (5) for high).

Language	Reading	Speaking	Writing
English	5	5	5
Afrikaans (Mother Tongue)	5	5	5

Computing skills - (1) for low to five (5) for high).

Word	Excel	Power Point	Microsoft Projects
5	5	4	3

Name:	Suzanne	Surname	Van Rooy
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Recent Project Experience: Environmental Authorisations

Client	Lebalelo Water User Association
Project	SE2 pipeline and associated infrastructure
Responsibility	Environmental Scientist, project manager, environmental authorisation process and water use licence application, including coordination of specialists and public participation
Year	2021
Client	Lebalelo Water User Association
Project	Clapham Dam upgrades and associated infrastructure
Responsibility	Environmental Scientist, project manager, environmental authorisation process and water use licence application, including coordination of specialists and public participation
Year	2021
Client	KTN Consulting Engineers
Project	Delmore Park Ext 8 Bulk Services
Responsibility	Environmental Scientist, project manager, environmental authorisation process and water use licence application, including coordination of specialists and public participation
Year	2020 - 2021
Client	De Beers Consolidated Mines
Project	Venetia Limpopo Nature Reserve Lodge
Responsibility	Environmental Scientist, project manager, environmental authorisation process and water use licence application, including coordination of specialists and public participation
Year	2020 - 2021
Client	Anglo Operations (Pty) Ltd
Project	Permitting and Environmental feasibility reporting for the Elders Colliery Project (underground coal mine)
Responsibility	Environmental Scientist, project manager, compilation of the permitting and environmental chapters in support of the feasibility report
Year	2020
Client	Kudumane Manganese Resources
Project	Environmental permitting gap analysis for Kudumane's proposed river diversion
Responsibility	Project management, environmental and water authorisation gap analysis
Year	2020
Client	AngloGold Ashanti
Project	Environmental authorisation for Siguiri Mine's Block 2 project

Name:	Suzanne	Surname	Van Rooy
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Responsibility	Environmental Scientist, project management, specialist coordination compilation of the Environmental and Social Impact Assessment Report
Year	2019 - 2020
Client	GAUFF Engineering
Project	Development of an Environmental and Social Action Plan for the proposed Bukasa Port's environmental authorisation
Responsibility	Project coordinator, assistance in compilation of the Environmental and Social Action Plan
Year	2019
Client	Anglo Operations (Pty) Ltd
Project	Permitting and Environmental feasibility reporting for the Elders Colliery Project (underground coal mine)
Responsibility	Environmental Scientist, project management, compilation of the permitting and environmental chapters in support of the feasibility report
Year	2019
Client	Anglo American Coal
Project	Environmental feasibility reporting for the SACE Lifex Complex that entails the open cast mining of previously underground coal mines
Responsibility	Environmental Scientist, compilation of the permitting and environmental chapters in support of the feasibility report
Year	2019
Client	Anglo Operations (Pty) Ltd
Project	Environmental authorisation process for the Khwezela Colliery borrow pits project, two borrow pits were required to provide material for construction for reclamation of the Landau 3 Mineral Residue Deposit (MRD)
Responsibility	Environmental scientist, specialist coordination, compilation of Basic Assessment Reports, project management, public participation
Year	2018
Client	AngloGold Ashanti
Project	Specialist environmental and social baseline assessment for Siguiri Gold Mine Block 2, a proposed open cast mine project
Responsibility	Project management, specialist coordination, compilation of baseline report
Year	2018
Client	Harmony Gold Mining Company
Project	Harmony acquiring several assets from AngloGold Ashanti's Vaal River Operations, requiring the compilation of an EMP for the acquired assets

Name:	Suzanne	Surname	Van Rooy
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Responsibility	Environmental Scientist, compilation of EMP
Year	2017
Client	DRA Global
Project	Environmental authorisation gap analysis for Sasol's proposed destoning plant
Responsibility	Environmental scientist, permitting gap analysis
Year	2017
Client	Anglo Operations (Pty) Ltd
Project	Environmental authorisation process for the reclamation of the Landau 3 Mineral Residue Deposit (MRD) to facilitate Eskom's powerline relocation
Responsibility	Environmental scientist, specialist coordination, compilation of Scoping Report, compilation of EIA/EMP report, project management, public participation
Year	2017
Client	Air Liquide
Project	Investigation regarding the feasibility of a phytoremediation plant for Air Liquide's excess water at their plant in eMalahleni
Responsibility	Environmental scientist, project management
Year	2017
Client	DRA Global
Project	Feasibility study for Anglo American Platinum's Amandelbult Mine's proposed Merensky chrome recovery plant
Responsibility	Environmental scientist, report compilation, compilation of the permitting and environmental chapters in support of the feasibility report
Year	2017
Client	Modikwa Platinum Mine
Project	Basic assessment process for the upgrade of the Matimatjatji gravel road to tar road at Modikwa Platinum Mine
Responsibility	Environmental Scientist, compilation of Basic Assessment Report and associated Environmental Management Programme
Year	2017
Client	Southern African Power Pool (SAPP)
Project	Environmental and Social Management Framework (ESMF) for SAPP
Responsibility	Environmental Scientist, development of a generic terms of reference for several specialists for various power producing entities
Year	2016
Client	Anglo Operations (Pty) Ltd

Name:	Suzanne	Surname	Van Rooy
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Project	Environmental authorisation process for an open cast coal mine (Navigation Pit) and dragline walkway
Responsibility	Environmental Scientist, compilation of Stakeholder Engagement Plan (SEP) and Government and Social Affairs (GSA) report
Year	2016
Client	Anglo Operations (Pty) Ltd
Project	Environmental authorisation process for the Setlabotsha proposed underground coal mine
Responsibility	Environmental Scientist, specialist coordination, compilation of Scoping Report, compilation of EIA/EMP report, project management, public participation
Year	2016
Client	Anglo Operations (Pty) Ltd
Project	Environmental authorisation process for the Elders Colliery underground coal mine and overland conveyor
Responsibility	Environmental Scientist, specialist coordination, compilation of Scoping Report, compilation of EIA/EMP report, project management, public participation
Year	2015 - 2016
Client	Falcon Oil and Gas
Project	Environmental authorisation process for a petroleum exploration right to undertake a seismic survey
Responsibility	Environmental Scientist, public participation
Year	2015
Client	Anglo American Platinum
Project	Environmental authorisation process for the Der Brochen EMP consolidation and amendment to include an open cast mining and tailings storage facility
Responsibility	Environmental Scientist, project manager, specialist coordination, compilation of Scoping Report, compilation of EIA/EMP report, public participation
Year	2014 - 2015
Client	Anglo American Platinum
Project	Environmental authorisation process for the raising of the existing Helena tailings storage facility
Responsibility	Environmental Scientist, project manager, compilation of Scoping Report, EIA/EMP report, public participation, specialist coordination
Year	2014
Client	Anglo American Coal

Name:	Suzanne	Surname	Van Rooy
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Project	Environmental authorisation process for the construction of a powerline at Kriel Colliery's Block F
Responsibility	Environmental Scientist, compilation of a Basic Assessment Report
Year	2013
Client	Anglo Operations (Pty) Ltd
Project	Environmental authorisation process for the Elders Colliery underground coal mine and associated mini open-pit
Responsibility	Environmental Scientist, specialist coordination, compilation of Scoping Report, compilation of EIA/EMP report, public participation, project management
Year	2012 - 2013
Client	Platinum Mile Resources
Project	Investigation for a tailings pipeline route for Platinum Mile Resources
Responsibility	Environmental Scientist, project coordinator, field work, report compilation
Year	2012
Client	Nkomati Mine
Project	Environmental authorisation process for a sewage treatment plant at Nkomati Mine
Responsibility	Environmental Scientist, application for basic assessment, public participation, compilation of a Basic Assessment Report
Year	2011
Client	Aquarius Platinum
Project	Environmental authorisation process to extend underground mining at the existing K5 Shaft
Responsibility	Environmental Scientist, compilation of Scoping Report, compilation of EIA/EMP report
Year	2010
Client	Aquarius Platinum
Project	Environmental authorisation process for the rehabilitation of the Marikana open pit by depositing tailings material in pit
Responsibility	Environmental scientist, specialist coordination, public participation
Year	2010
Client	Anglo American Platinum
Project	Environmental authorisation process for the K6 shaft to undertake underground platinum mining
Responsibility	Environmental Scientist, project management, site audits, environmental training, environmental management progress reports
Year	2010

Name:	Suzanne	Surname	Van Rooy
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Client	Coca Cola
Project	Source vulnerability assessment of freshwater for Coca Cola's factory in Bloemfontein
Responsibility	Environmental Scientist, research, report compilation
Year	2009
Client	Simmer and Jack
Project	Environmental authorisation process for an underground gold mine (historical Rietfontein Mine)
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, compilation of EIA/EMP report, specialist coordination, public participation
Year	2009
Client	Simmer and Jack
Project	Environmental authorisation process to open cast mining of surface deposits and heap leaching of mined ore (PTDs)
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, specialist coordination, public participation
Year	2009
Client	Simmer and Jack
Project	Environmental authorisation process for open cast mining of surface deposits and heap leaching of mined ore
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, compilation of EIA/EMP report, specialist coordination, public participation
Year	2009
Client	Simmer and Jack
Project	Environmental authorisation process for the underground mining of the historical Beta Mine
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, compilation of EIA/EMP report, specialist coordination, public participation
Year	2008 - 2009
Client	Simmer and Jack
Project	Environmental authorisation process for open cast mining of surface deposits and heap leaching of mined ore
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, compilation of EIA/EMP report, specialist coordination, public participation
Year	2008

Name:	Suzanne	Surname	Van Rooy
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Client	Simmer and Jack
Project	Environmental authorisation process for the heap leaching of an historical tailings dam (Glynn's Lydenburg)
Responsibility	Environmental Scientist, project management, mining right application, compilation of Scoping Report, compilation of EIA/EMP report, specialist coordination, public participation
Year	2008
Client	Simmer and Jack
Project	Environmental authorisation process for the rehabilitation of a historical tailings dams (Elandsdrift) by means of heap leaching
Responsibility	Environmental Scientist, project management, compilation of EIA/EMP report, specialist coordination, public participation
Year	2007

Recent Project Experience: Environmental Management Programme and Water Use Licence Audits

Client	Anglo American Platinum
Project	Amandelbult Water Use Licence Audit
Responsibility	Lead auditor, reporting
Year	2021
Client	Anglo American Platinum
Project	Der Brochen EMP Performance Assessment
Responsibility	Environmental Scientist, lead auditor, reporting, project management
Year	2016
Client	Eskom
Project	Lethabo Power Station Water Use Licence Audit
Responsibility	Environmental Scientist, auditor, reporting
Year	2012
Client	Sasol Nitro
Project	Sasol Nitro Phalaborwa Water Use Licence Audit
Responsibility	Environmental Scientist, auditor, reporting
Year	2011
Client	Aquarius Platinum
Project	Kroondal and Marikana Mines EMP Performance Assessment
Responsibility	Environmental Scientist, auditor, reporting
Year	2011
Client	Aquarius Platinum
Project	K6 Shaft EMP Performance Assessment
Responsibility	Environmental Scientist, auditor, reporting

Name:	Suzanne	Surname	Van Rooy
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Year	2010, 2012
Client	Impala Platinum
Project	Marula Platinum Annual EMP Audit
Responsibility	Environmental Scientist, auditor, reporting
Year	2010
Client	Anglo American Platinum
Project	Polokwane Metallurgical Complex Water Use Licence compliance audit
Responsibility	Environmental Scientist, auditor, reporting
Year	2010
Client	Aquarius Platinum
Project	Kroondal Mine EMP Performance Assessment
Responsibility	Environmental Scientist, auditor, reporting
Year	2009

Recent Project Experience: Water Use Licences

Client	Lebalelo Water User Association
Project	SE2 pipeline and associated infrastructure
Responsibility	Water use licence application
Year	2021
Client	Lebalelo Water User Association
Project	Clapham Dam upgrades and associated infrastructure
Responsibility	Water use licence application
Year	2021
	Isanti Glass
Project	Water Use Licence Application for a natural gas pipeline
Responsibility	Environmental Scientist, project manager, water use licence application process
Year	2020
Client	Anglo Operations (Pty) Ltd
Project	General Authorisation for Elders Colliery
Responsibility	Project Manager
Year	2019
Client	Anglo American Coal
Project	General Authorisation for South African Coal Estates (SACE) Lifex Complex
Responsibility	Compilation of general authorisation report for the drilling of geochemical, geological and geotechnical boreholes
Year	2019
Client	Optimum Coal
Project	Updating of the existing Optimum Colliery's Integrated Water and Waste Management Plan

Name:	Suzanne	Surname	Van Rooy
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Responsibility	Environmental Scientist, compilation of an Integrated Water and Waste Management Plan
Year	2013
Client	Imperial Properties
Project	Preparation of a Water Use Licence Application for Imperial Properties' Kia Motor Vehicle Dealership
Responsibility	Environmental Scientist, Compilation of Water Use Licence Application, specialist coordination
Year	2011