APPENDIX D: SPECIALIST STUDIES

APPENDIX D1: VEGETATION AND WETLAND STUDY

WETLAND ASSESSMENT & DESKTOP VEGETATION REPORT FOR THE PROPOSED LEBALELO WATER USER ASSOCIATION SPITSKOP TO MOTOTOLO PIPELINE PROJECT

Steelpoort, Limpopo Province

August 2021

CLIENT

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Specialist Details

Report Name	**WETLAND ASSESSMENT & DESKTOP VEGETATION REPORT FOR THE PROPOSED LEBALELO WATER USER ASSOCIATION SPITSKOP TO MOTOTOLO PIPELINE PROJECT**
Reference	**TBC-Labelelo-082021**
Submitted to	Alta van Dyk Environmental
Report Writer	**Martinus Erasmus** Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, basic assessments and assisting specialists in field during his studies since 2015. Martinus is a specialist terrestrial ecologist and botanist which conducts floral surveys faunal surveys which include mammals, birds, amphibians and reptiles.
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

1 Introduction

The Biodiversity Company was appointed to undertake a desktop vegetation assessment, and a wetland delineation and functional assessment for the new Lebalelo Water User Association (LWUA) raw water pipeline between the Spitskop Pump Station and Mototolo Mine, located near Steelpoort in the Limpopo Province (Figure 1-1). This project is also referred to as the Southern Extension 2 (SE2) pipeline. There is an existing raw water pipeline running from LWUA's Havercroft Pump Station to Borwa Pipe Station, referred to as Southern Extension 1 (SE1). The new pipeline (SE2) will be constructed within the current pipeline (SE1) servitude. The purpose of this project is to provide raw water to several mines and industries located along the pipeline. The current pipeline's capacity is not sufficient to cater for the growing water demand from LWUA's members, and therefore an additional line is required.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: "Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation" (Reporting Criteria).

The wetland assessment has been completed in accordance with the requirements of the published GN 509 by the Department of Water and Sanitation (DWS). This notice was published in the Government Gazette (no. 40229) under Section 39 of the National Water Act (Act no. 36 of 1998) in August 2016, for a Water Use Licence (WUL) in terms of Section 21(c) & (i) water uses. The GN 509 process provides an allowance to apply for a WUL for Section 21(c) & (i) under a General Authorisation (GA), as opposed to a full Water Use Licence Application (WULA). A water use (or potential) qualifies for a GA under GN 509 when the proposed water use/activity is subjected to analysis using the DWS Risk Assessment Matrix (RAM). This assessment will implement the RAM and provide a specialist opinion on the appropriate water use authorisation.

The purpose of the specialist studies is to provide relevant input into the basic assessment process and provide a report for the proposed activities associated with the project. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project.

1.1 Project Description

The LWUA was established to supply raw water to mines along the Eastern Limb of the Bushveld Igneous Complex. The main aim of the LWUA is 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 Water Services Authority (WSA). Currently 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.

Water will in future be obtained from the Steelpoort River via De Hoop Dam for the Southern Extension pipeline. LWUA has the following authorisations for the existing pipeline (SE1):

- A weir near Havercroft mine and a 46km underground pipeline. All infrastructure such as pump stations and reservoirs are included in this development. File No. 16/1/3/2-23, issued on 26 February 2001 by the MEC for Agriculture and Environment; and
- Southern extension of Lebalelo Water Supply Scheme Project, Ref No. 12/12/20/531, issued on 14/03/2006 by the Department of Environmental Affairs and Tourism.

The following is proposed for the new SE2 Pipeline 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 15km in length next to the existing pipeline (within the current pipeline servitude) to a new reservoir near the existing Dwarsrivier Pump Station;
- A new reservoir to be constructed near the existing Dwarsrivier Pump Station (10Mℓ);
- New pump station at the existing Dwarsrivier Pump Station adjacent to the existing pump station fenced off area;
- New 300 or 350mm pipeline 9km in length next to the existing pipeline in the pipeline reserve from the new Dwarsrivier Pump Station to Mototolo Mine; and
- Valve chambers along pipeline route.

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).

1.2 Terms of Reference

The Terms of Reference (ToR) included the following:

- Description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Desktop vegetation assessment, which will include
    - A probability list for Red and Orange Data plant species will be provided;
    - Vegetation units will be identified, classified and delineated at a desktop level;

- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application;

- The delineation, classification and assessment of wetlands within 500 m of the project area;
- Conduct risk assessments relevant to the proposed activity; and
- Impact assessment and supporting mitigation measures.

1.3 Project Location

The pipeline is located in the Steelpoort area, within the Limpopo Province. A locality map of the project area is shown in Figure 1-1.

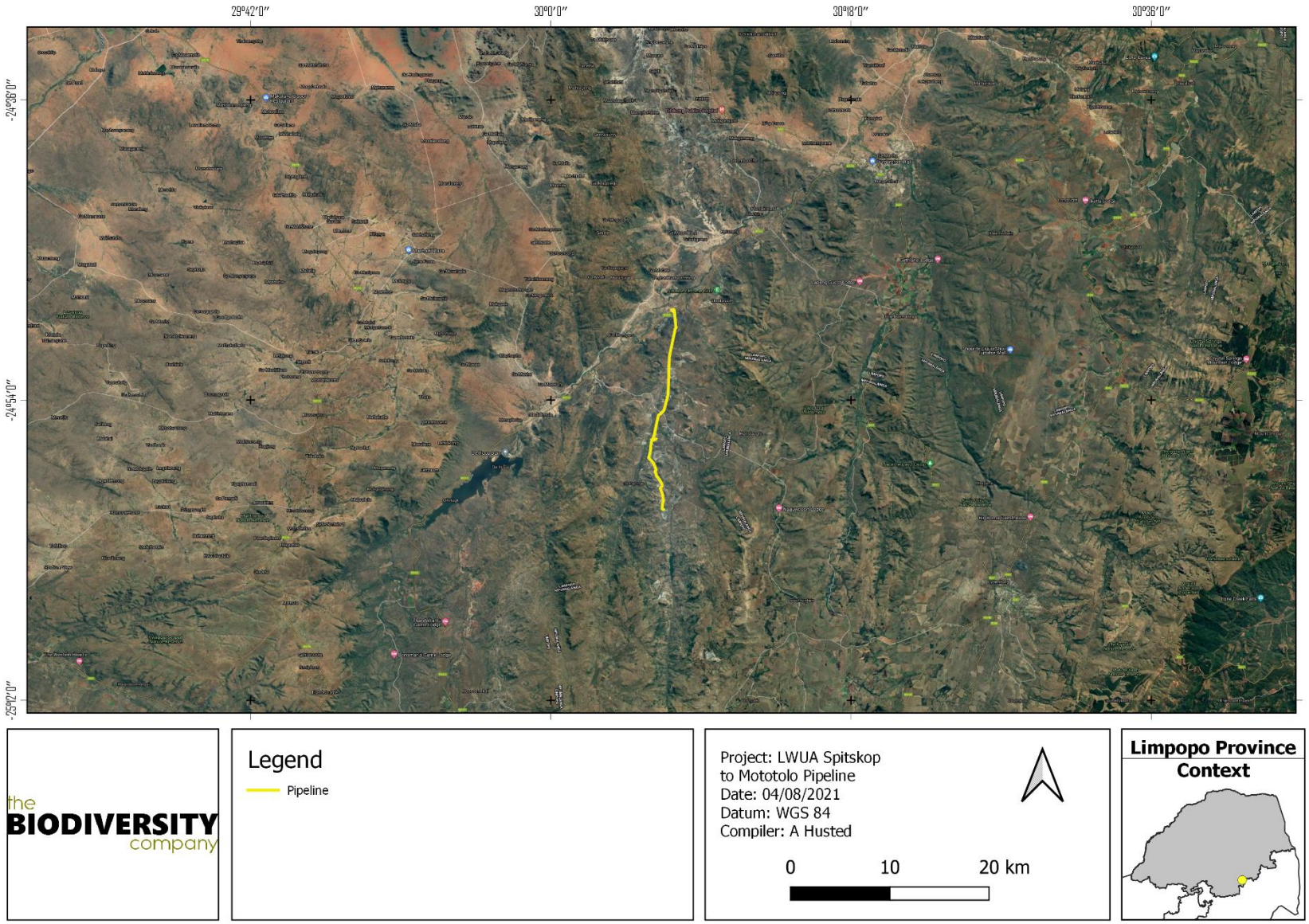

Figure 1-1 Locality of the project area

2 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below (Table 2-1).

Table 2-1 A list of key legislative requirements relevant to biodiversity and conservation in the Limpopo Province

Region	Legislation / Guideline
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 320 of Government Gazette 43310 (March 2020)
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 1150 of Government Gazette 43855 (October 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
Provincial	Limpopo Conservation Plan (2018)
	Limpopo Environmental Management Act (2003)

3 Methods

3.1 Terrestrial Assessment

3.1.1 Geographic Information Systems (GIS) Mapping

Existing data layers were incorporated into a GIS to establish how the proposed development might influence the flora in the area. Emphasis was placed around the following spatial datasets:

- Vegetation types (SANBI, 2018); and
- National Biodiversity Assessment (NBA, 2018).

Brief descriptions of the standardised methodologies applied in the specialist disciplines are provided below. More detailed descriptions of survey methodologies are available upon request.

3.2 Botanical Assessment

3.2.1 Literature Study

A literature review was conducted as part of the desktop study to identify the potential habitats present within the project area. The SANBI provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree square (QDS) resolution.

The Red List of South African Plants website (SANBI, 2019) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- A Field Guide to Wild Flowers (Pooley, 1998);
- Field Guide to Trees of Southern Africa (Van Wyk & Van Wyk, 1997);
- Guide to grasses of Southern Africa (Van Oudtshoorn, 1999);
- Orchids of South Africa (Johnson & Bytebier, 2015); and
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);

Additional information regarding ecosystems, vegetation types, and species of conservation concern (SCC) included the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006); and
- Red List of South African Plants (Raimondo *et al.,* 2009; SANBI, 2019).

3.3 Wetland Assessment

The following information sources were considered for the desktop assessment;

- Aerial imagery (Google Earth Pro);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);

- South African Inventory of Inland Aquatic Ecosystems (Van Deventer *et al*., 2019);
- Topographical Data (Topo Data) (2012)
- The National Freshwater Ecosystem Priority Areas (Nel *et al*., 2011); and
- Contour data (5m).

3.3.1 Wetland Identification and Mapping

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) was considered for this assessment. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels. In addition, the method also includes the assessment of structural features at the lower levels of classification (Ollis *et al.,* 2013).

The wetland areas are delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 3-1. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
- The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

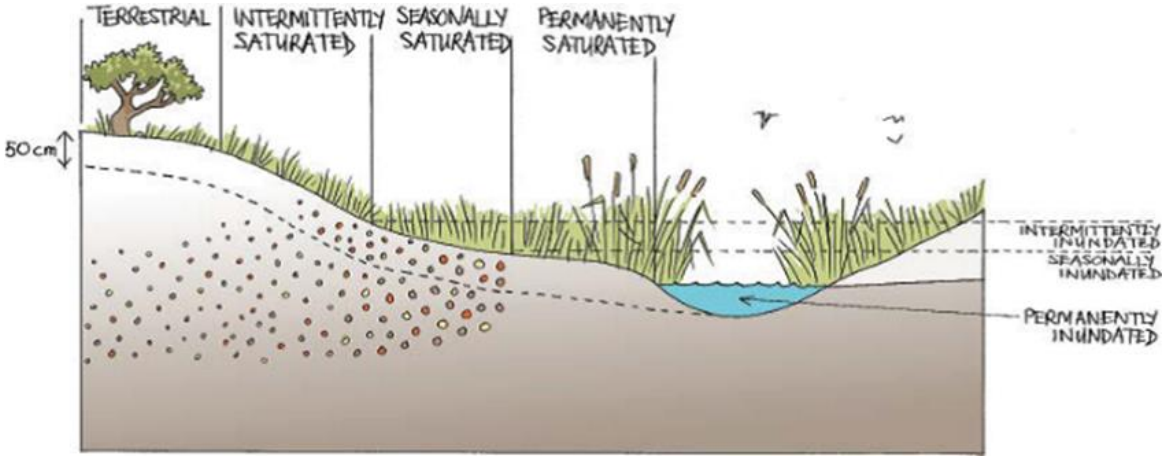

Figure 3-1 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al., 2013).

3.3.2 Ecosystem Services

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze *et al*., 2009). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 3-1).

Table 3-1 Classes for determining the likely extent to which a benefit is being supplied (Kotze et al., 2009)

Score	Rating of Likely Extent to which a Benefit is Being Supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate
2.1 - 3.0	Moderately High
> 3.0	High

3.3.3 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in Table 3-2.

Table 3-2 The Present Ecological Status categories (Macfarlane et al., 2009)

Impact Category	Description	Impact Score Range	PES
None	**Unmodified, natural**	**0 to 0.9**	**A**
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

3.3.4 Ecological Importance and Sensitivity

The importance and sensitivity of water resources is determined to establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Importance and Sensitivity (IS) category, as listed in Table 3-3 (Rountree and Kotze, 2013).

Table 3-3 Description of ecological Importance and Sensitivity categories

IS Category	Range of Mean	Recommended Ecological Management Class

Very High	3.1 to 4.0	A
High	2.1 to 3.0	B
Moderate	1.1 to 2.0	C
Low Marginal	< 1.0	D

3.3.5 Ecological Classification and Description

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this assessment. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and also then includes structural features at the lower levels of classification (Ollis *et al*., 2013).

3.3.6 Determining Buffer Requirements

The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane *et al*., 2014) was used to determine the appropriate buffer zone for the proposed activity.

3.4 Limitations

The following limitations should be noted for the assessment:

- Only a single season survey was conducted, this would constitute a dry season survey;
- The vegetation assessment was based on on desktop information alone only, and information provided should be interpreted accordingly,
- The wetlands within the project area that would be traversed by the pipeline were the focus for the assessment, these systems were ground-truthed and further assessed. Wetland areas beyond the project area but within the 500 m regulated area not considered to be at any appreciable level of risk were only considered at a desktop level; and
- The GPS used for delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side

4 Receiving Environment

4.1 Desktop Spatial Assessment

The following features describes the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI. The desktop analysis and their relevance to this project are listed in Table 4-1.

Table 4-1 Desktop spatial features examined.

Desktop Information Considered	Relevant/Not relevant	Section
Limpopo Conservation Plan	The majority of the project area overlaps with ESA 1 and NNR areas, with one segment crossing over CBA 1	4.1.1.
Ecosystem Threat Status	The majority of the project area falls within an ecosystem which is listed as LC ecosystem, a small portion is listed as EN.	4.1.2.1
Ecosystem Protection Level	The project area falls in a "poorly protected" area.	4.1.2.2

Biome	Located in the Savanna Biome	4.1.3
Vegetation Type	The project area is situated within two vegetation types; the Sekhukhune Plains Bushveld and the Sekhukhune Mountain Bushveld	4.1.4
NFEPA Rivers and Wetlands	The project area does overlap with a true FEPA wetland.	4.1.6.
NBA Wetlands	No wetlands are located within the regulation area.	4.1.7.
Protected Areas	Irrelevant: No conservation areas are close to the project area. The nearest protected area is the De Hoop Dam Protected Environment more than 6 km west of the project area.	-
SWSA	Irrelevant: The project area does not fall within a SWSA	-

4.1.1 The Biodiversity Conservation Plan

The Limpopo Conservation Plan, Version 2 (LCPv2), was completed in 2018 for the Limpopo Department of Economic Development, Environment & Tourism (LEDET) (Desmet *et al.,* 2018). The purpose of the LCPv2 was to develop the spatial component of a bioregional plan (i.e. map of Critical Biodiversity Areas and associated land-use guidelines). The previous Limpopo Conservation Plan (LCPv1) was completely revised and updated (Desmet *et al.,* 2018). A Limpopo Conservation Plan map was produced as part of this plan and sites were assigned to the following CBA categories based on their biodiversity characteristics, spatial configuration and requirement for meeting targets for both biodiversity pattern and ecological processes:

- Critical Biodiversity Area 1 (CBA1);
- Critical Biodiversity Area 2 (CBA2);
- Ecological Support Area 1 (ESA1);
- Ecological Support Area 2 (ESA2);
- Other Natural Area (ONA);
- Protected Area (PA); and
- No Natural Remaining (NNR).

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (Desmet *et al.,* 2018).

Ecological Support Areas (ESA's) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services (SANBI, 2017). Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

Other Natural Areas (ONAs) consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (Desmet *et al.,* 2018).

Areas with No Natural Habitat Remaining (NNR) are areas in poor ecological condition that have not been identified as CBAs or ESAs. They include all irreversibly modified areas (such as urban

or industrial areas and mines), and most severely modified areas (such as cultivated fields and forestry plantations). A biodiversity sector plan or bioregional plan must not specify the desired state/management objective or provide land-use guidelines for NNR areas (Desmet *et al.,* 2018).

Figure 4-1 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a CBA 1 area, but most of the servitude is classified as ESA 1 or NNR.

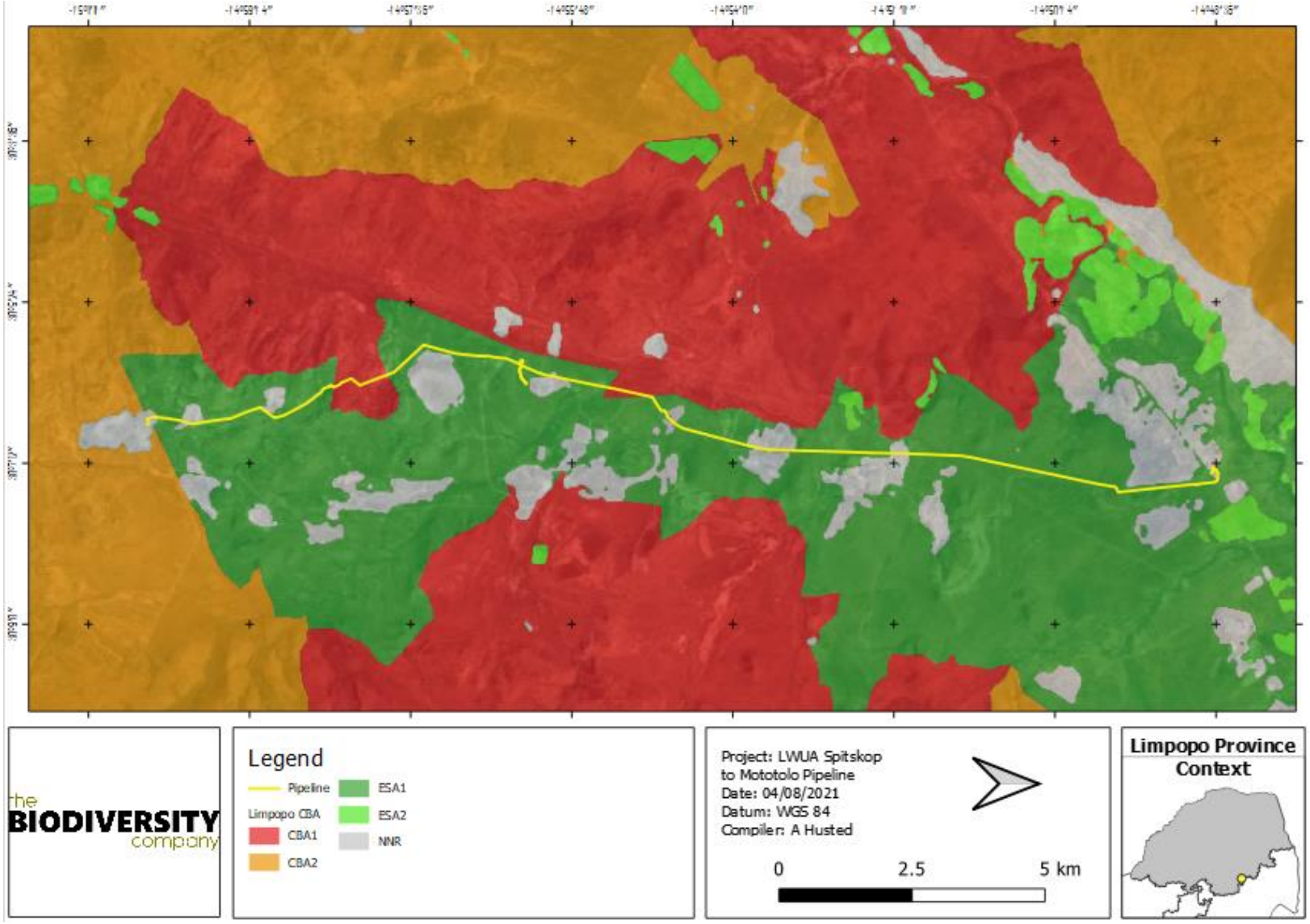

Figure 4-1 Project area superimposed on the Limpopo Conservation Plan terrestrial map

4.1.2 Project Area in Relation to the NBA

The two headline indicators assessed in the NBA are ecosystem threat status and ecosystem protection level (Skowno *et al*, 2019).

4.1.2.1 Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Skowno *et al.*, 2019).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concerned (LC), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno *et al.*, 2019).

The project area was superimposed on the terrestrial ecosystem threat status (Figure 4-2). The project area overlaps predominantly with an ecosystem that is listed as LC, with a portion of the northern extent of the pipeline located in an EN ecosystem.

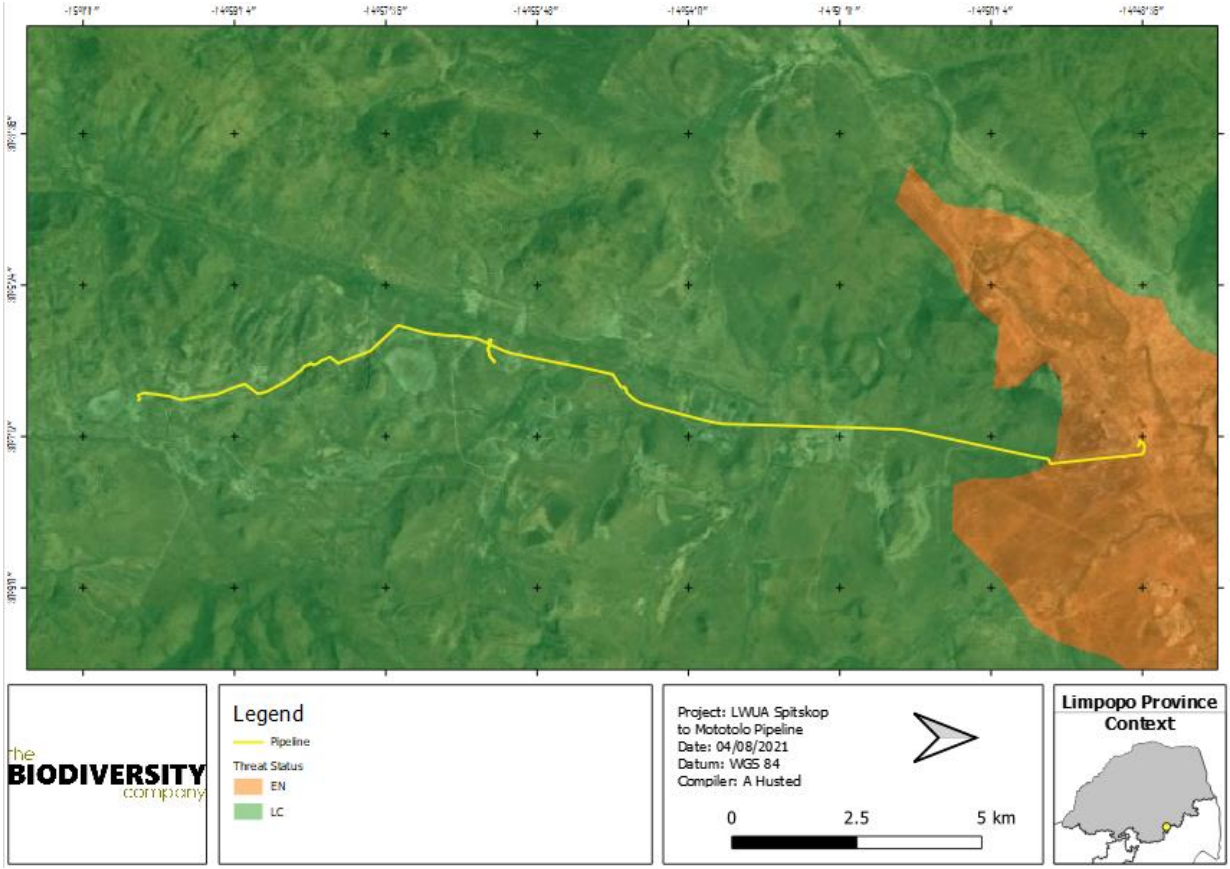

Figure 4-2 The project area showing the ecosystem threat status of the associated terrestrial ecosystems (NBA, 2018)

4.1.2.2 Ecosystem Protection Level

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno *et al*, 2019).

The project area was superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 4-3). Based on Figure 4-3 the project area falls in an area classified as *Poorly Protected*.

Figure 4-3 The project area showing the level of protection of terrestrial ecosystems (NBA, 2018).

4.1.3 Biome

The project area is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include:

a) Seasonal precipitation; and

b) (Sub) tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layers, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include *Vachellia*, *Senegalia* and *Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993).

4.1.4 Vegetation Type

The project area is situated within two vegetation types; the Sekhukhune Plains Bushveld and the Sekhukhune Mountain Bushveld, according to Mucina & Rutherford (2006) (Figure 4-4).

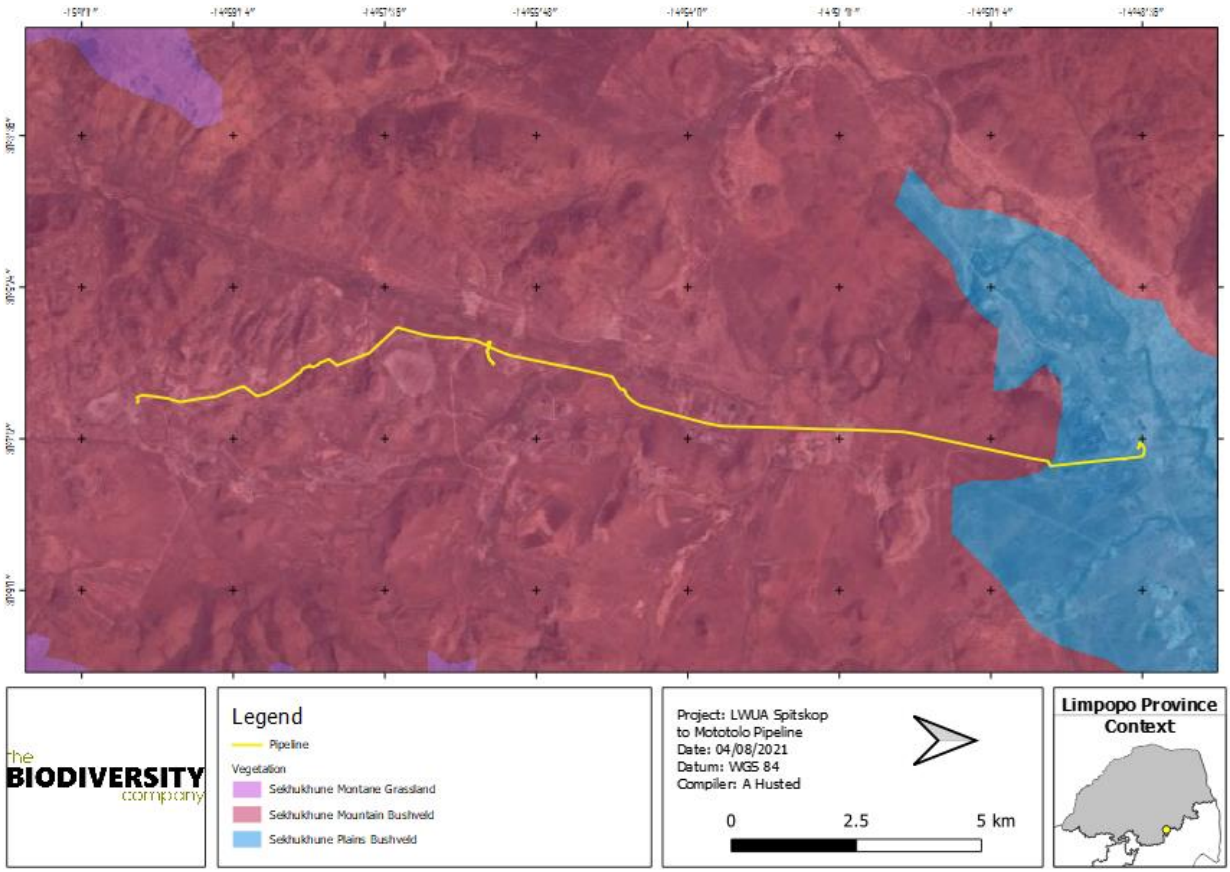

Figure 4-4 Project area showing the vegetation type based on the Vegetation Map of South Africa, Lesotho & Swaziland (BGIS, 2017).

4.1.4.1 Sekhukhune Plains Bushveld

The Sekhukhune Plains Bushveld occurs in the Limpopo and Mpumalanga Provinces, mainly in semi-arid plains and open valleys in between small mountains. The vegetation consists predominantly of open to close thornveld with large numbers of Aloe species (Mucina & Rutherford, 2006).

4.1.4.1.1 Important Plant Taxa

Based on Mucina & Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species are important taxa in the Sekhukhune Plains Bushveld vegetation type:

Tall Trees: *Acacia erioloba*, *Philenoptera violacea*.

Small Trees: *Acacia mellifera* subsp. *detinens*, *A. nilotica*, *A. tortilis* subsp. *heteracantha*, *Boscia foetida* subsp. *rehmanniana*, *Acacia grandicornuta*, *Albizia anthelmintica*, *Balanites maughamii*, *Combretum imberbe*, *Commiphora glandulosa*, *Maerua angolensis*, *Markhamia zanzibarica*, *Mystroxylon aethiopicum* subsp. *schlechteri*, *Ptaeroxylon obliquum*, *Schotia brachypetala*, *Ziziphus mucronata*.

Succulent Tree: *Euphorbia tirucalli*.

Tall Shrubs: *Searsia engleri*, *Cadaba termitaria*, *Dichrostachys cinerea*, *Ehretia rigida* subsp. *rigida*, *Grewia bicolor*, *Karomia speciosa*, *Maerua decumbens*, *Rhigozum brevispinosum*, *R. obovatum*, *Tinnea rhodesiana*, *Triaspis glaucophylla*.

Low Shrubs: *Felicia clavipilosa* subsp. *transvaalensis*, *Seddera suffruticosa*, *Gnidia polycephala*, *Gossypium herbaceum* subsp. *africanum*, *Jamesbrittenia atropurpurea*, *Jatropha latifolia* var. *latifolia*, *Lantana rugosa*, *Melhania rehmannii*, *Monechma divaricatum*, *Myrothamnus flabellifolius*, *Pechuel-Loeschea leubnitziae*, *Plinthus rehmannii*.

Succulent Shrubs: *Aloe cryptopoda*, *Euphorbia enormis*, *Kleinia longiflora*, *Aloe castanea*, *A. globuligemma*.

Woody Succulent Climber: *Sarcostemma viminale*.

Herbaceous Climbers: *Coccinia rehmannii*, *Decorsea schlechteri*.

Graminoids: *Cenchrus ciliaris*, *Enneapogon cenchroides*, *Panicum maximum*, *Urochloa mosambicensis*, *Aristida adscensionis*, *A. congesta*, *Eragrostis barbinodis*, *Paspalum distichum*, *Schmidtia pappophoroides*, *Stipagrostis hirtigluma* subsp. *patula*, *Tragus berteronianus*.

Herbs: *Becium filamentosum*, *Phyllanthus maderaspatensis*, *Blepharis integrifolia*, *Corchorus asplenifolius*, *Hibiscus praeteritus*, *Ipomoea magnusiana*.

Geophytic Herbs: *Drimia altissima*, *Sansevieria pearsonii*.

4.1.4.1.2 Biogeographically Important Taxa

Small Tree: *Lydenburgia cassinoides*.

Tall Shrub: *Nuxia gracilis*

Low Shrubs: *Amphiglossa triflora*, *Asparagus fourei*, *Hibiscus barnardii*, *Orthosiphon fruticosus*, *Petalidium oblongifolium*, *Rhus batophylla*.

Woody Climber: *Asparagus sekukuniensis*.

Herb: *Aneilema longirrhizum*.

Geophytic Herb: *Chlorophytum cyperaceum*.

Succulent Herb: *Piaranthus atrosanguineus*.

4.1.4.1.3 Conservation Status of the Vegetation Type

According to Mucina and Rutherford (2006), this vegetation type is classified as VU. The national target for conservation protection for this vegetation types is 19%, with approximately 2% statutorily conserved in Potlake, Bewaarkloof and Wolkberg Caves Nature Reserves. Approximately 25% of this area has been transformed and is mainly under dry-land subsistence cultivation.

4.1.4.2 Sekhukhune Mountain Bushveld

Sekhukhune Mountain Bushveld occurs in the Provinces of Limpopo and Mpumalanga. Although this vegetation type forms part of the Roossenekal Subcentre of the Sekhukhuneland

Centre of Endemism (CE) with numerous endemic and undescribed plant species it is classified as Least Concern by Mucina and Rutherford (2006) due to the low level of transformation.

4.1.4.2.1 Important Plant Taxa

Tall Tree: *Senegalia nigrescens.*

Small Trees: *Acacia senegal var. leiorhachis, Combretum apiculatum, Kirkia wilmsii, Terminalia prunioides, Vitex obovata subsp. wilmsii, Ziziphus mucronata, Bolusanthus speciosus, Boscia albitrunca, Brachylaena ilicifolia, Combretum molle, Commiphora mollis, Croton gratissimus, Cussonia transvaalensis, Hippobromus pauciflorus, Ozoroa sphaerocarpa, Pappea capensis, Schotia latifolia, Sterculia rogersii.*

Succulent Tree: *Aloe marlothii subsp. marlothii.*

Tall Shrubs: *Dichrostachys cinerea, Euclea crispa subsp. crispa, Combretum hereroense, Euclea linearis, Pavetta zeyheri, Tinnea rhodesiana, Triaspis glaucophylla.*

Low Shrubs: *Elephantorrhiza praetermissa, Grewia vernicosa, Asparagus intricatus, Barleria saxatilis, B. senensis, Clerodendrum ternatum, Commiphora africana, Hermannia glanduligera, Indigofera lydenburgensis, Jatropha latifolia var. angustata, Melhania prostrata, Phyllanthus glaucophyllus, Psiadia punctulata, Rhus keetii, Rhynchosia komatiensis.*

Succulent Shrubs: *Aloe castanea, A. cryptopoda.*

Woody Climbers: *Clematis brachiata, Rhoicissus tridentata, Acacia ataxacantha.*

Woody Succulent Climber: *Sarcostemma viminale.*

Graminoids: *Aristida canescens, Heteropogon contortus, Panicum maximum, Setaria lindenbergiana, Themeda triandra, Aristida transvaalensis, Cymbopogon pospischilii, Diheteropogon amplectens, Enneapogon scoparius, Loudetia simplex, Panicum deustum, Setaria sphacelata.*

Herbs: *Berkheya insignis, Commelina africana, Cyphostemma woodii, Kyphocarpa angustifolia, Senecio latifolius.*

Geophytic Herbs: *Hypoxis rigidula, Sansevieria hyacinthoides.*

Succulent Herb: *Huernia stapelioides.*

4.1.4.2.2 Endemic Taxa

Small Tree: *Acacia ormocarpoides.*

Succulent Tree: *Euphorbia sekukuniensis.*

Soft Shrub: *Plectranthus porcatus.*

4.1.4.2.3 Conservation Status of the Vegetation Type

According to Mucina and Rutherford (2006), this vegetation type is classified as Least threatened. The national target for conservation protection for this vegetation types is 24%, with none conserved in statutory conservation areas, but 0.4% conserved in Potlake Nature Reserve. Approximately 15% of this area has been transformed mainly by cultivation and urban built-up.

4.1.4.3 Plant Species of Conservation Concern

Based on the Plants of Southern Africa (BODATSA-POSA, 2021) database, 767 plant species are expected to occur in the area (Figure 4-5). The list of expected plant species can be made available on request.

Of the 767 plant species, 12 species are listed as being Species of Conservation Concern (SCC). Six (6) are provincially protected under the Limpopo Environmental Management Act (act no 7 of 2003, Schedule 12), while two species is a nationally protected tree under the National Forest Act, 1998 (Act No. 84 of 1998).

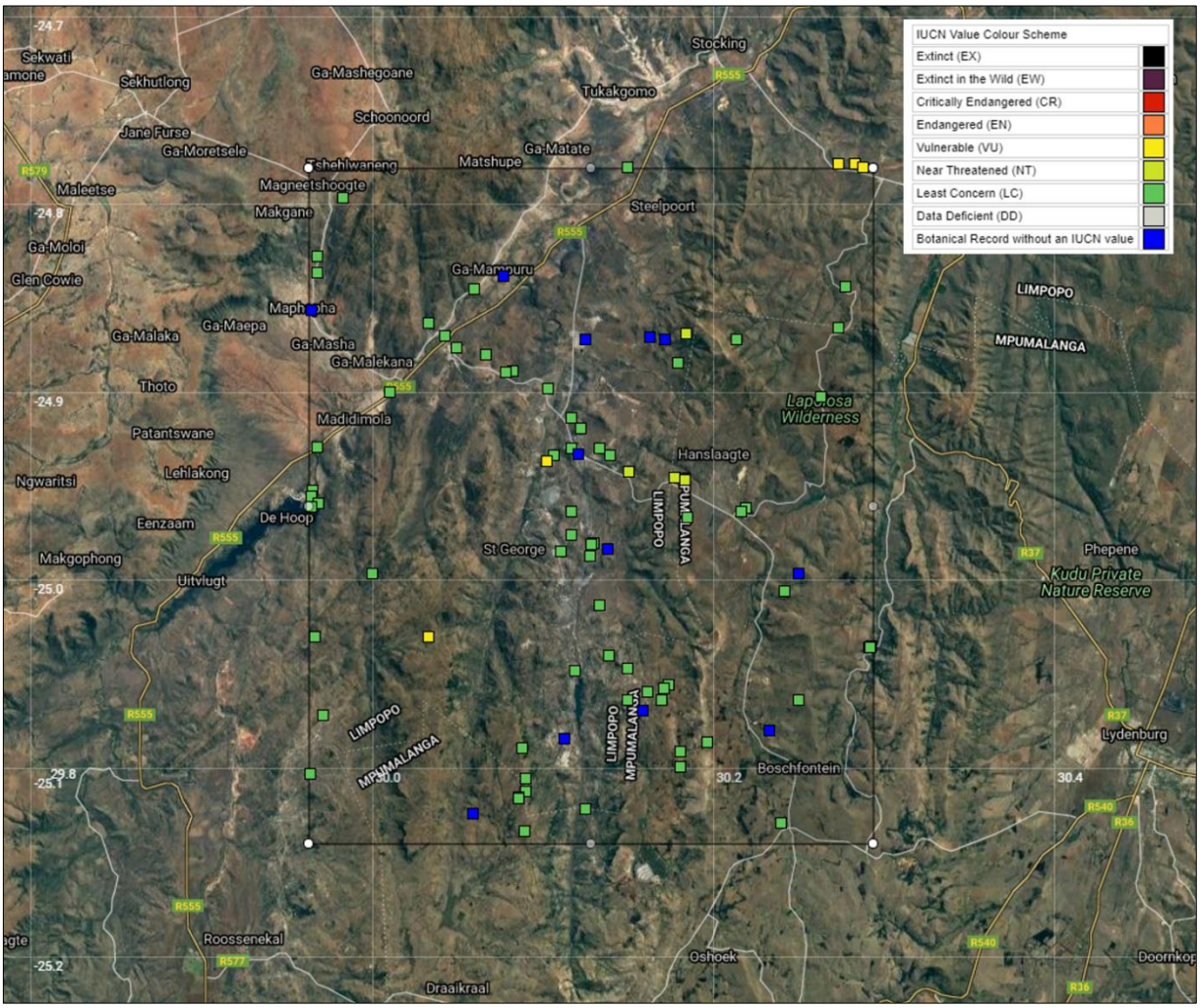

Figure 4-5 Map showing the grid drawn in order to compile an expected species list (BODATSA-POSA, 2021).

Table 4-2 Expected flora SCC

Family	Taxon	Author	IUCN	Ecology	Provincially and Nationally Protected
Acanthaceae	*Dicliptera fruticosa*	K.Balkwill	NT	Indigenous; Endemic	
Amaryllidaceae	*Haemanthus montanus*	Baker	LC	Indigenous	Schedule 12
Anacardiaceae	*Searsia batophylla*	(Codd) Moffett	VU	Indigenous; Endemic	
Anacardiaceae	*Sclerocarya birrea*	(A.Rich.) Hochst.	LC	Indigenous	Protected Tree
Apocynaceae	*Brachystelma minor*	E.A.Bruce	VU	Indigenous; Endemic	Schedule 12
Apocynaceae	*Orbea carnosa*	(Stent) Bruyns	LC	Indigenous; Endemic	Schedule 12
Asphodelaceae	*Aloe reitzii var. reitzii*	Reynolds	NT	Indigenous; Endemic	
Asphodelaceae	*Aloe castanea*	Schonland	LC	Indigenous	Schedule 12
Asphodelaceae	*Aloe fosteri*	Pillans	LC	Indigenous	Schedule 12
Capparaceae	*Boscia albitrunca*	(Burch.) Gilg & Gilg-Ben.	LC	Indigenous	Protected Tree
Celastraceae	*Lydenburgia cassinoides*	N.Robson	NT	Indigenous	
Hyacinthaceae	*Ledebouria dolomiticola*	S.Venter	VU	Indigenous; Endemic	
Hyacinthaceae	*Eucomis vandermerwei*	I.Verd.	VU	Indigenous; Endemic	
Iridaceae	*Gladiolus reginae*	Goldblatt & J.C.Manning	CR	Indigenous; Endemic	
Iridaceae	*Watsonia wilmsii*	L.Bolus	LC	Indigenous; Endemic	Schedule 12
Orchidaceae	*Habenaria barbertoni*	Kraenzl. & Schltr.	NT	Indigenous; Endemic	
Orchidaceae	*Mystacidium capense*	(L.f.) Schltr.	LC		Schedule 12 (All Orchids)
Polygalaceae	*Polygala sekhukhuniensis*	Retief, S.J.Siebert & A.E.van Wyk	VU	Indigenous	
Proteaceae	*Protea parvula*	Beard	NT	Indigenous	
Scrophulariaceae	*Jamesbrittenia macrantha*	(Codd) Hilliard	NT	Indigenous; Endemic	
Thymelaeaceae	*Gnidia variabilis*	(C.H.Wright) Engl.	VU	Indigenous; Endemic	

4.1.5 Sensitivity

The plant species theme sensitivity as indicated in the screening report was derived to be medium (Figure 4-6, it can be downloaded at (https://screening.environment.gov.za/screeningtool/#/pages/welcome).

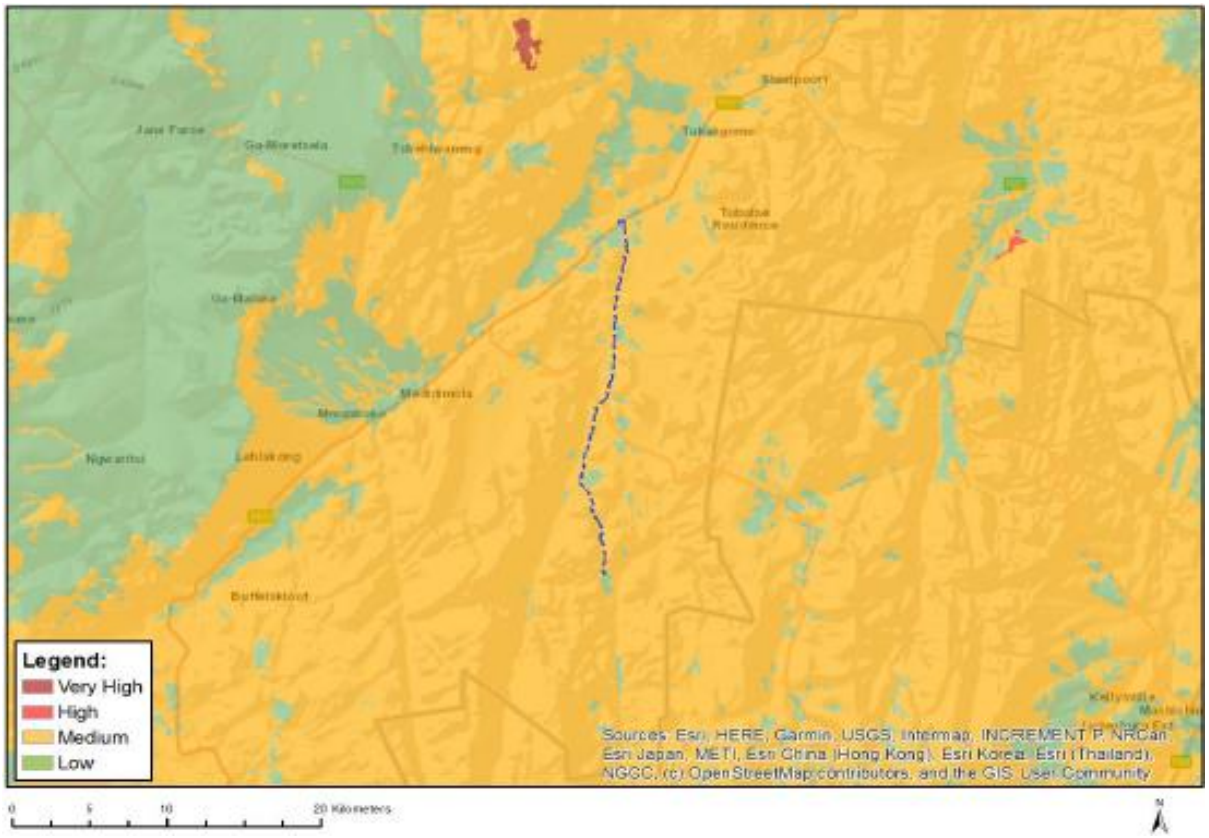

Figure 4-6 Plant Species Theme Sensitivity, TBC Screening Report

4.1.6 NFEPA Wetlands

According to the National Freshwater Ecosystem Priority Areas (NFEPA) data set, no priority wetlands are located within the 500 m regulated area of the pipeline.

4.1.7 National Wetland Map 5

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018.

Ecosystem threat status (ETS) of river ecosystem types is based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LC, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al*., 2019). The National Biodiversity shows that no wetlands will be traversed by the pipeline.

4.1.8 Climate

According to the Köppen-Geiger classification of climate zones (Köppen 1936) the project area falls within the climate classified as Bsh = Hot semi-arid climates, this climate is characterized by relatively hot summers, mild winters and relatively low precipitation levels. The area is characteristically warm with erratic and extremely variable rainfall. The area receives summer rainfall and experiences extremely dry winters, with infrequent frost. Rainfall in the area of the Steelpoort valleys is low, around 500 mm per year. The average daily temperature ranges from a minimum of -0.9°C to a maximum of 37.3°C in the Steelpoort area (Mucina & Rutherford 2006), with an average of approximately 21°C (also see Figure 4-7).

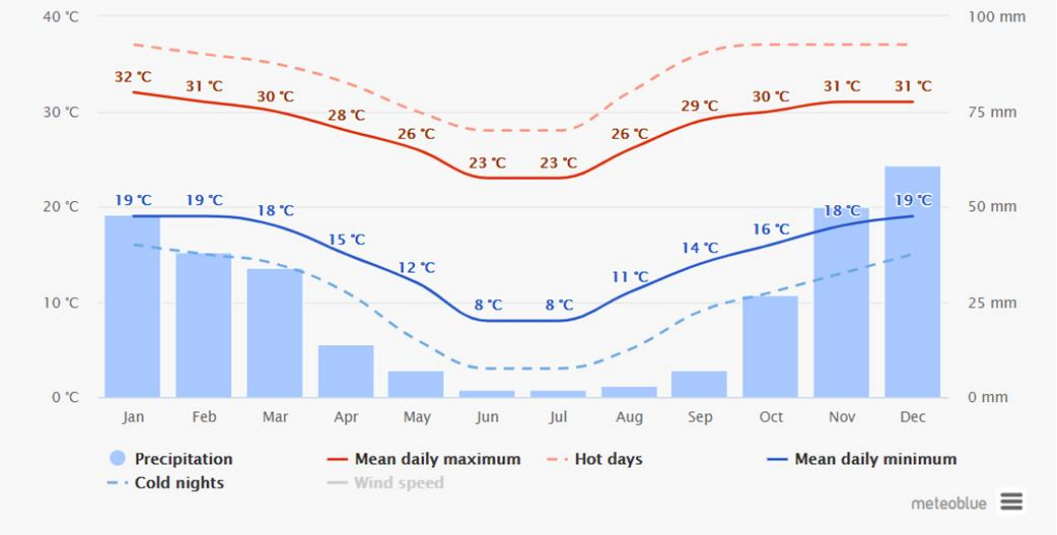

Figure 4-7 Steelpoort Monthly Temperatures, Precipitation and Wind speed (Meteoblue, 2021)

5 Field Survey

5.1 Wetland Assessment

The wetland areas were delineated in accordance with the DWAF (2005) guidelines (see Figure 5-2). According to Ollis *et al.* (2013) there are seven core (Level 4) wetland HGM types, with only two (2) types identified for this project. These include both channelled and unchanneled valley bottom wetlands. A total of three (3) HGM units were identified for each type, these include HGM 1, HGM 3 & HGM 6 for the unchanneled valley bottom type, and HGM 2, HGM 4 and HGM 5 for the channelled valley bottom type. These wetland types are both identified at a landscape level (Level 3), with both types located in the lower lying valley floor areas. The two types of HGM are distinguished by the channel characteristics. Further to this, a network of drainage lines and ephemeral watercourses were also delineated. A few artificial dams were also identified and delineated for this project. The pipeline will traverse three HGM units, namely HGM 1 & HGM 3 (unchanneled valley bottom) and HGM 2 (channelled valley bottom) wetlands, these three units are the primary consideration for the ecological descriptions and associated risk assessment. A photograph collage of the identified systems is presented in Figure 5-1.

The wetland classification as per SANBI guidelines (Ollis *et al.,* 2013) is presented in Table 5-1. Two (2) wetland types were identified within the 500 m regulated area, namely channelled and unchanneled valley bottom wetlands.

Table 5-1 Wetland classification as per SANBI guideline (Ollis et al. 2013)

Wetland System	Level 1	Level 2		Level 3	Level 4		
	System	**DWS Ecoregion/s**	**NFEPA Wet Veg Group/s**	**Landscape Unit**	**4A (HGM)**	**4B**	**4C**
HGM 1	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Unchanneled Valley Bottom	N/A	N/A
HGM 2	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Channelled Valley Bottom	N/A	N/A
HGM 3	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Unchanneled Valley Bottom	N/A	N/A
HGM 4	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Channelled Valley Bottom	N/A	N/A
HGM 5	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Channelled Valley Bottom	N/A	N/A
HGM 6	Inland	Eastern Bankenveld	Central Bushveld Group 1	Valley Floor	Unchanneled Valley Bottom	N/A	N/A

The soil for the channelled valley bottom systems is typically characterised by vertic black clays which do not display typical wetland indicators and provide some difficulty in accurately delineating the outer edge of the wetlands. The presence facultative wetland vegetation species suggests a temporary saturation period. It is apparent that surface run-off is the primary driver for these systems. The unchanneled systems don't differ greatly from the channelled systems but represent systems where the flow velocities and volumes are not sufficient to create a channel within the system. The presence of drainage features and ephemeral watercourses do not display wetland characteristics and cannot be delineated as wetlands.

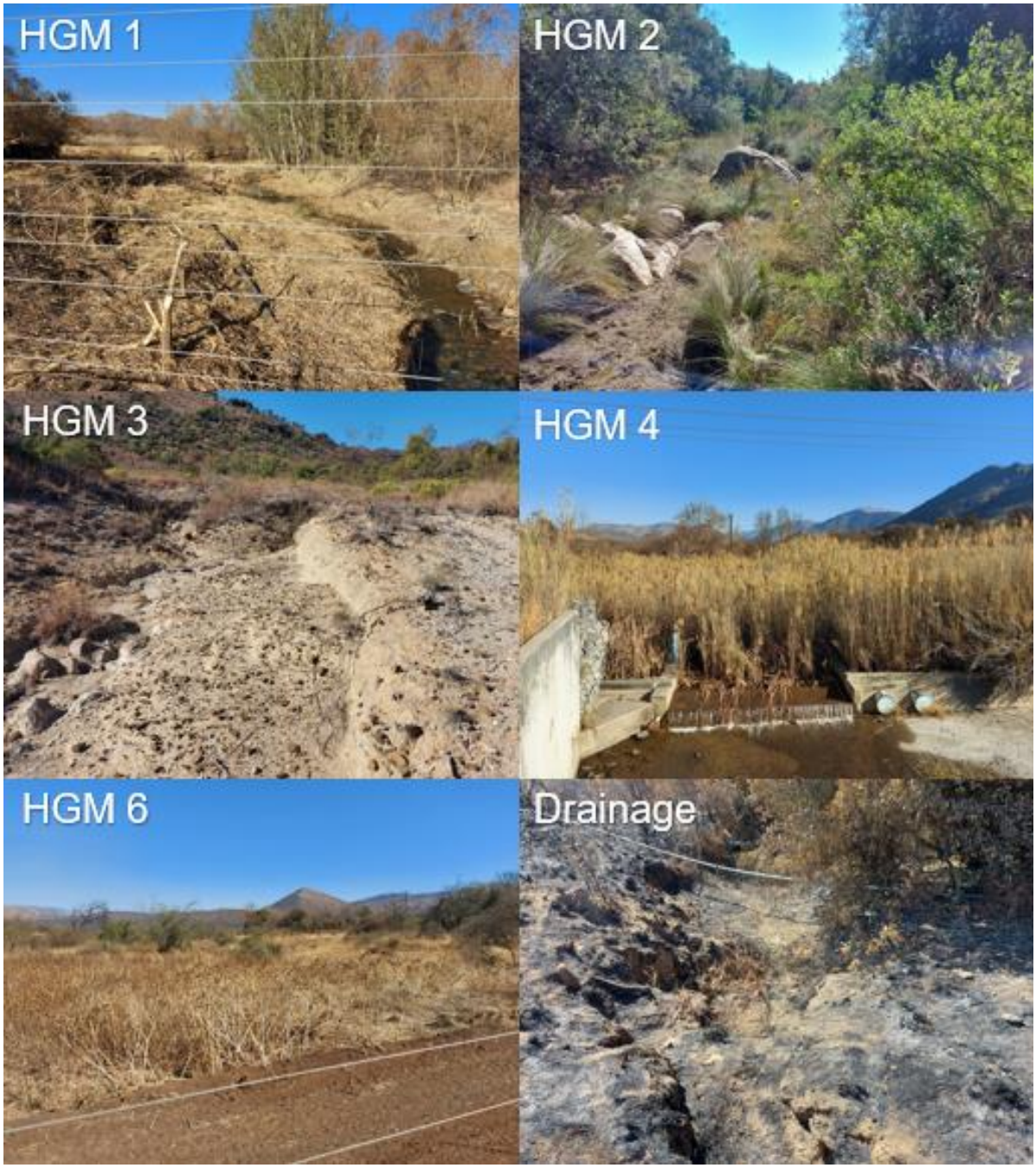

Figure 5-1 Systems identified for the project. HGM 1/3/6 - Unchanneled valley bottom, HGM 2/4 – Channelled valley bottom

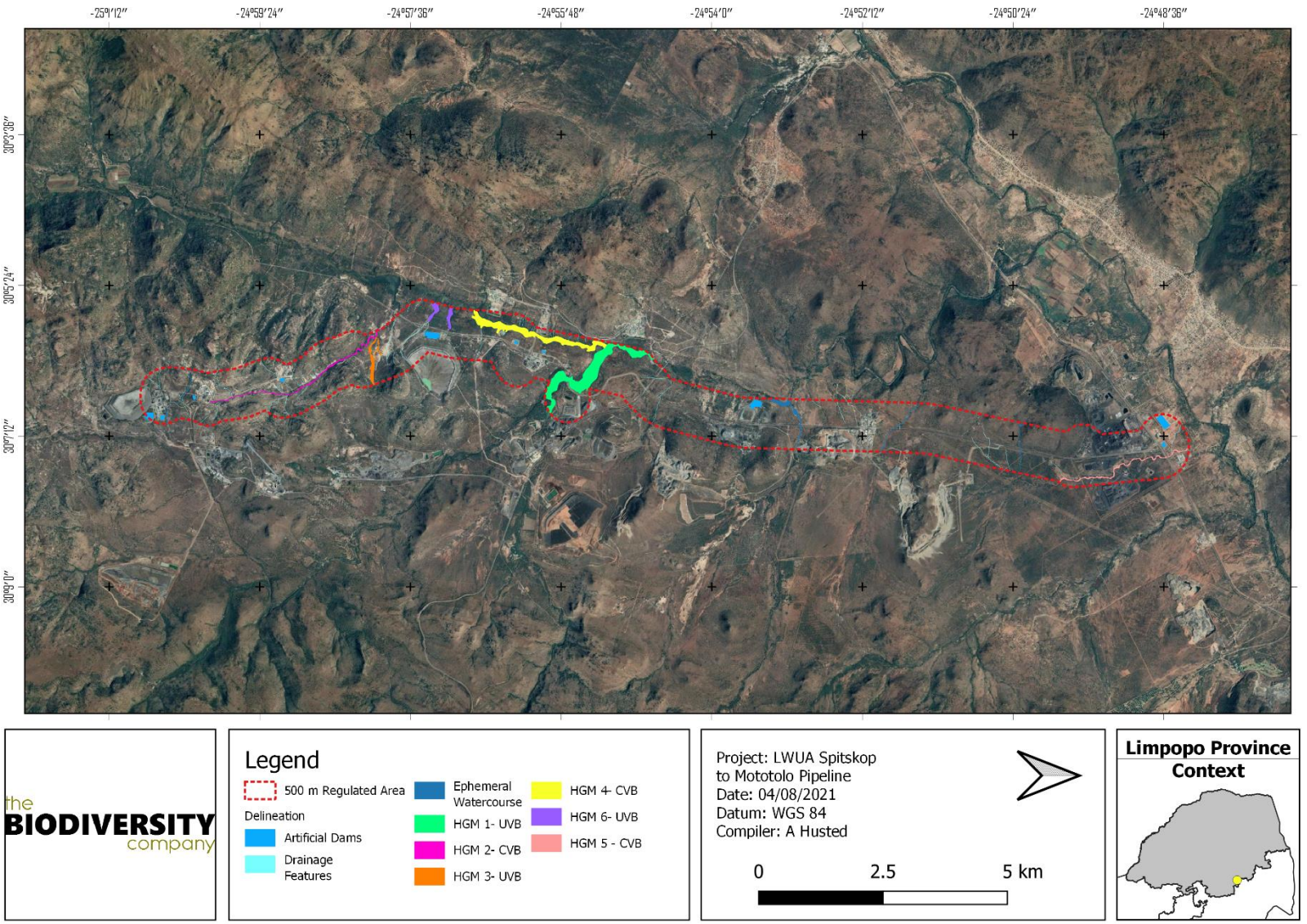

Figure 5-2 Delineation of wetlands within 500 m regulated area

5.1.1 Wetland Unit Setting

Channelled valley bottom wetlands are typically found on valley floors with a clearly defined, finite stream channel and lacks floodplain features, referring specifically to meanders. Channelled valley bottom wetlands are known to undergo loss of sediment in cases where the wetlands' slope is steep and the deposition thereof in cases of low relief. Figure 5-3 presents a diagram of a typical channelled valley bottom, showing the dominant movement of water into, through and out of the system.

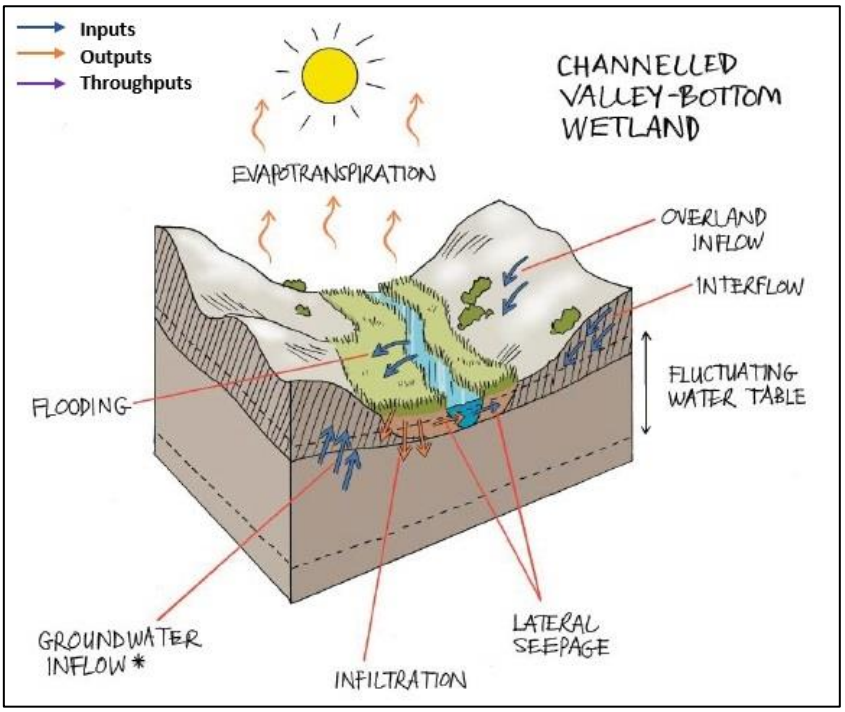

Figure 5-3 Amalgamated diagram of a typical channelled valley bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)

Unchanneled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Figure 5-4 presents a diagram of the relevant HGM units, showing the dominant movement of water into, through and out of the system.

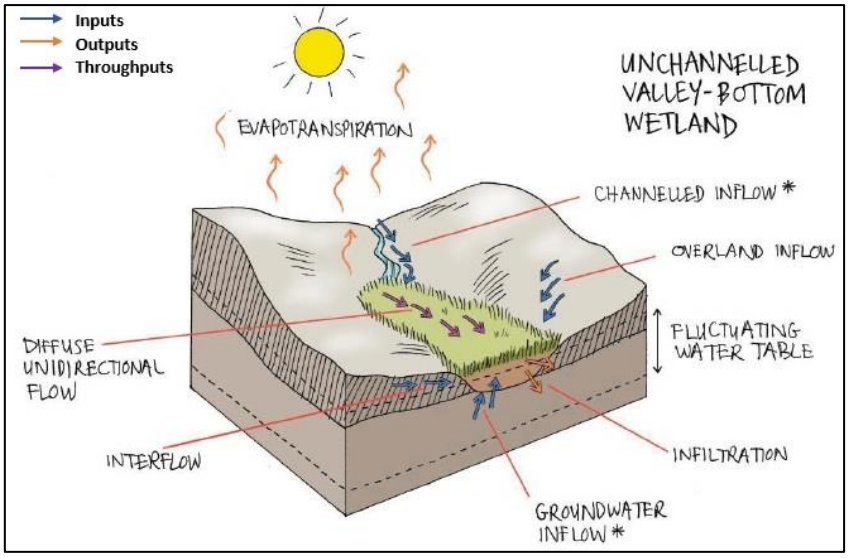

Figure 5-4 Amalgamated diagram of a typical unchanneled valley bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)

5.1.2 Hydromorphic Soils

According to (DWAF, 2005), soils are the most important characteristic of wetlands in order to accurately identify and delineate wetland areas. Two dominant soil forms were identified within the identified wetlands, namely the Dundee and Rensburg soil forms.

The Dundee soil form consists of an Orthic topsoil on top of a stratified alluvium horizon. The soil family group identified for the Dundee soil form is “2222” due to the chromic colour of the topsoil, the brown colour of the subsoil, the non-calcareous nature of the soil form as well as the presence of alluvial wetness.

Orthic topsoils are mineral horizons that have been exposed to biological activities and varying intensities of mineral weathering. The climatic conditions and parent material ensure a wide range of properties differing from one orthic topsoil to another (i.e. colouration, structure etc) (Soil Classification Working Group, 2018).

The stratified alluvium horizon is formed via alluvial or colluvial processes. This soil type is stratified and closely resembles the parent material of this soil type. Stratified alluvium generally is fertile and is often therefore used for cultivation purposes.

The Rensburg soil form consists of a vertic topsoil on top of a gley horizon. The soil family group identified for the Rensburg soil form on-site has been classified as the “1000” soil family due to the non-calcareous nature of the gley horizon.

Vertic topsoils have high clay content with smectic clay particles being dominant (Soil Classification Working Group, 2018). The smectic clays have swell and shrink properties during wet and dry periods respectively. Peds will be shiny, well-developed with a highly plastic consistency during wet periods as a result of the dominance of smectic clays. During shrinking periods, cracks form on the surface and rarely occurs in shallow vertic clays.

Gley horizons that are well developed and have homogenous dark to light grey colours with smooth transitions. Stagnant and reduced water over long periods is the main factor responsible for the formation of a Gley horizon and could be characterised by green or blue tinges due to the presence of a mineral called Fougerite which includes sulphate and

carbonate complexes. Even though grey colours are dominant, yellow and/or red striations can be noticed throughout a Gley horizon. The structure of a Gley horizon mostly is characterised as strong pedal, with low hydraulic conductivities and a clay texture, although sandy Gley horizons are known to occur. The Gley soil form commonly occurs at the toe of hillslopes (or benches) where lateral water inputs (sub-surface) are dominant and the underlaying geology is characterised by a low hydraulic conductivity. The Gley horizon usually is second in diagnostic sequence in shallow profiles yet is known to be lower down in sequence and at greater depths (Soil Classification Working Group, 2018).

5.1.3 Ecological Functional Assessment

The ecosystem services provided by the wetland units identified on site were assessed and rated using the WET-EcoServices method (Kotze *et al.,* 2008). The summarised results are shown in Table 5-2. Overall, HGMs 1 and 2 scored "Intermediate" while HGM 3 scored "Moderately Low" in terms of their wetland ecosystem services. All three wetlands are considered relatively important for regulating and supporting benefits such as flood attenuation and water quality enhancement. The most benefits are associated with HGM 1. Due to the location of the units in relation to the land uses and planned developments, all three wetlands are considered important from biodiversity maintenance perspective.

All of the wetlands are considered moderately (low) important in terms of their direct provisioning of harvestable resources and cultivated foods for humans as the area is predominantly associated with mining. None of the wetlands are considered very important from cultural, tourism and recreation perspective.

Table 5-2 The ecosystem services being provided by the HGM units

Wetland Unit					HGM 1	HGM 2	HGM 3
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		2.2	1.8	1.4
			Streamflow regulation		2.6	2.0	1.5
			Water Quality enhancement benefits	Sediment trapping	2.5	2.2	1.3
				Phosphate assimilation	2.6	2.3	1.2
				Nitrate assimilation	2.7	2.3	1.2
				Toxicant assimilation	2.6	2.2	1.1
				Erosion control	2.5	2.3	1.3
			Carbon storage		1.6	1.1	1.0
	Direct Benefits	**Biodiversity maintenance**			2.4	2.1	1.5
		Provisioning benefits	Provisioning of water for human use		1.4	1.2	0.8
			Provisioning of harvestable resources		1.2	1.1	0.7
			Provisioning of cultivated foods		1.1	1.0	0.6
		Cultural benefits	Cultural heritage		0.3	0.3	0.3
			Tourism and recreation		1.3	1.1	1.0
			Education and research		1.2	0.9	0.8
Average Eco Services Score					1.9	1.6	1.0

5.1.4 The Ecological Health Assessment

The PES for the assessed HGM types is presented in Table 5-3 and Figure 5-6. Due to the local land uses and anthropogenic activities no pristine or natural wetlands were encountered for the project. Mining and infrastructure development have impacted on the wetlands by means of altered hydro-dynamics and impaired water quality and in direct modification by means of encroaching into (or across) wetlands.

The overall Present Ecological State (PES) for HGM 1 and HGM 2 has been determined to be “Largely Modified” which indicates a large change in ecosystem processes and loss of natural habitat and biota has occurred. The ecological classification for HGM 3 was determined to be “Seriously Modified”. Photographs of several aspects which have contributed to the altered state of the systems is presented in Figure 5-5.

This assessment identified numerous aspects which have contributed to the altered state of the wetlands. The dominant land uses identified for the project area contributing to the altered integrity of the wetlands includes access route development, stormwater networks, linear infrastructure and expanding mining operations. The changes to the catchment area are reflected in the modified statuses of the wetland systems. These changes have resulted in some level of degradation of wetland habitats, typically through:

- Erosion of preferred flow channels and the formation of drainage channels. There is evidence of scouring and head cut erosion;
- Altered surface flow dynamics caused by the changes in land use and the development of the catchment area. This has resulted in increased flow velocities and volumes flowing through the systems;
- Flows through systems have also been obstructed by the development of crossing infrastructure; and
- The establishment of alien vegetation in these areas.

Table 5-3 Summary of the scores for the wetland PES

HGM Unit	Hydrology		Geomorphology		Vegetation		Overall PES	
	Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score	Impact Score	Change Score
HGM 1	5.0 (D)	Remain Stable	4.7 (D)	Remain Stable	2.6 (C)	Slowly Deteriorate	4.2 (D)	Slowly Deteriorate
HGM 1	5.0 (D)	Remain Stable	5.2 (D)	Remain Stable	2.7 (C)	Slowly Deteriorate	4.4 (D)	Slowly Deteriorate
HGM 3	7.0 (E)	Slowly Deteriorate	6.3 (E)	Slowly Deteriorate	4.5 (D)	Slowly Deteriorate	6.1 (E)	Slowly Deteriorate

Figure 5-5 Aspects contributing to modifications to wetlands. A) Dilapidated infrastructure. B) Infrastructure crossings. C) Erosion. D) Roads and crossings. E) Infrastructure development. F) Stormwater networks

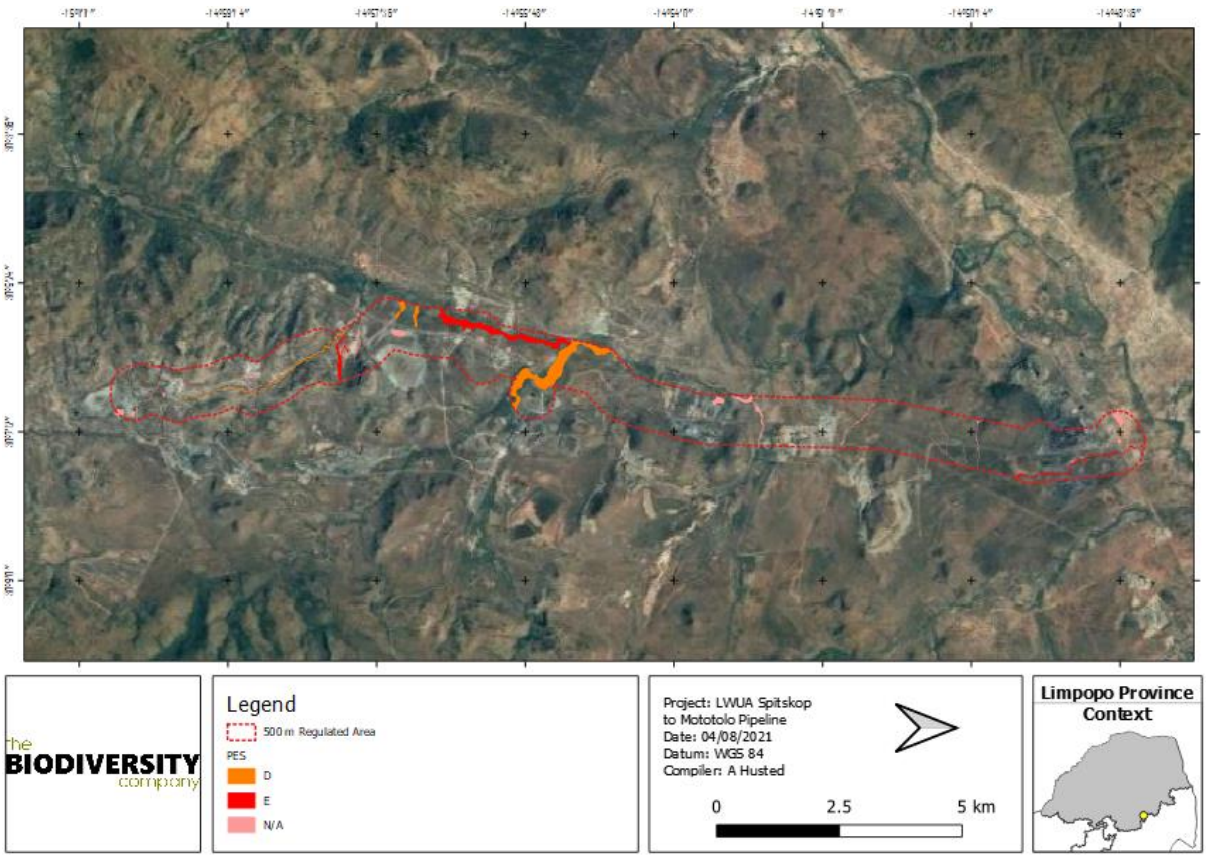

Figure 5-6 The ecological integrity (or PES) of the delineated wetland systems

5.1.5 The Importance & Sensitivity Assessment

The results of the ecological IS assessment are shown in Table 5-4 and Figure 5-7. Various components pertaining to the protection status of a wetland is considered for the IS, including Strategic Water Source Areas (SWSA), the NFEPA wet veg protection status and the protection status of the wetland itself considering the NBA wetland data set. At a regional scale the NFEPA Wetveg database recognises valley bottom wetland types within the Central Bushveld Group 1 as Critically Endangered and Poorly Protected (Nel and Driver, 2012). The IS for both wetland types has been calculated to be “High”, which considers the Critically Endangered (CR) threat status for these systems.

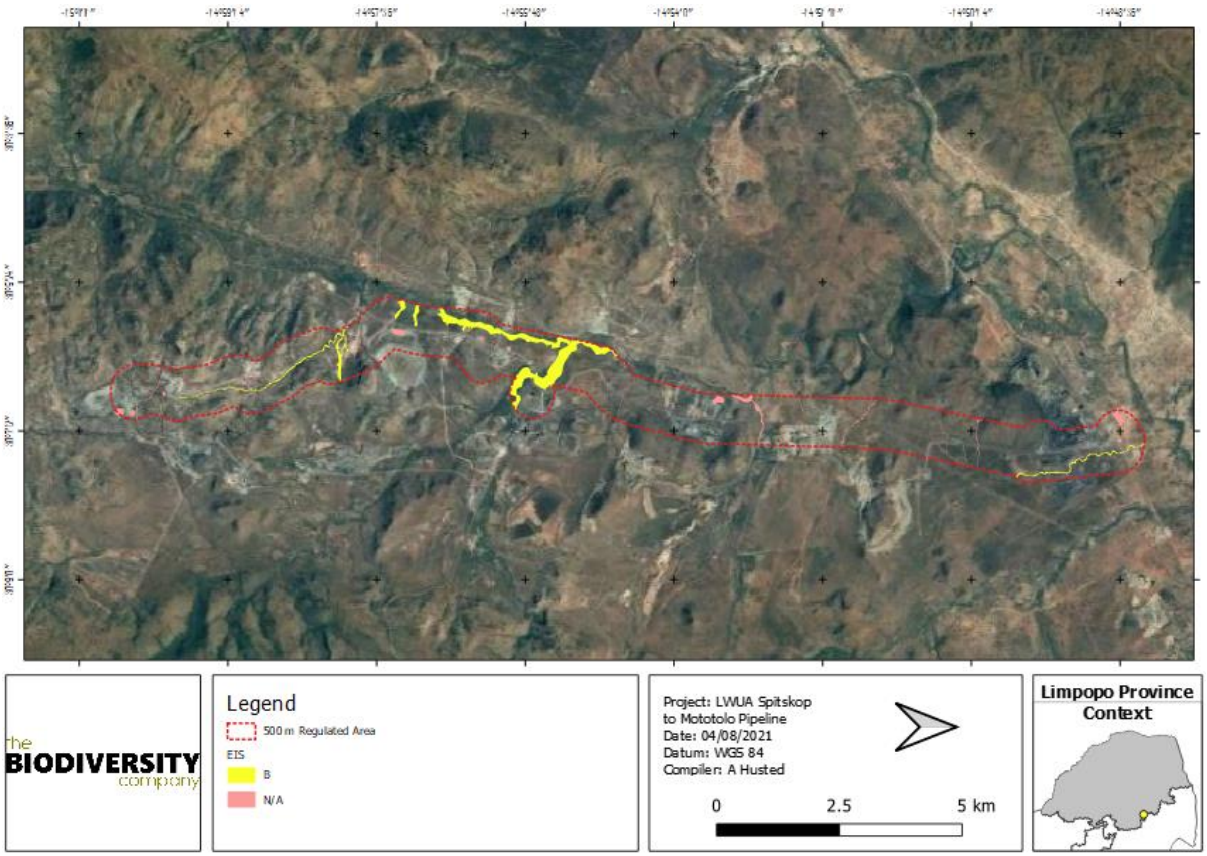

Figure 5-7 The ecological IS for the delineated wetland systems

Table 5-4 The IS results for the delineated HGM units

HGM Type	Wet Veg		NBA Wetlands			SWSA (Y/N)	Calculated IS
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018		
HGM 1 & 3	Central Bushveld Group 1	LC / CR	PP	D/E Largely/Seriously Modified	CR	N	High
HGM 2	Central Bushveld Group 1	LC EN	PP	D/E Largely/Seriously Modified	CR	N	High

5.1.6 Buffer Requirements

Water Use License Application in terms of the National Water Act, 1998 (Act No. 36 of 1998). Government Notice 509 as published in the Government Gazette 40229 of 2016 as it relates to the National Water Act, 1998 (Act No. 36 of 1998). In accordance with GN 509 of 2016 as it relates to the National Water Act, 1998 (Act 36 of 1998), a regulated area of a watercourse in terms of water uses as listed in Section 21 (c) and (i) is defined as:

- the outer edge of the 1 in 100 year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- in the absence of a determined 1 in 100 year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or

- a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

It is worth noting that the scientific buffer calculation (Macfarlane *et al.,* 2014) was used to determine the size of the buffer zones relevant to the pipeline. The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane *et al.,* 2014) determined a pre-mitigation buffer zone of 30 m is recommended for the identified wetland, which can be decreased to 15 m with the addition of all prescribed mitigation measures (see Table 5-5).

Table 5-5 Pre- and post-mitigation buffer sizes

Phase	Buffer Widths
Pre-mitigation buffer	30 m
Post-mitigation buffer	15 m

The following Zones of Regulation (ZoR) are applicable to the wetlands and drainage features identified for the project:

- A 32 m ZoR in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) was assigned for the cryptic wetlands and drainage features;
- A 100 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) was assigned to the episodic drainage features; and
- A 500 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) was assigned to the wetlands.

6 Wetland Risk Assessment

The impact assessment considered both direct and indirect impacts, to the wetland systems. The mitigation hierarchy as discussed by the Department of Environmental Affairs (2013) will be considered for this component of the assessment (Figure 6-1). In accordance with the mitigation hierarchy, the preferred mitigatory measure is to avoid impacts by considering options in project location, sitting, scale, layout, technology and phasing to avoid impacts.

It is evident that the service pipeline will traverse three (3) wetland systems. This phenomenon therefore eliminates the feasibility of the first step (avoidance). The second step (minimising) will be focussed on during the risk assessment to determine the possibility of significance ratings being decreased by means of mitigation.

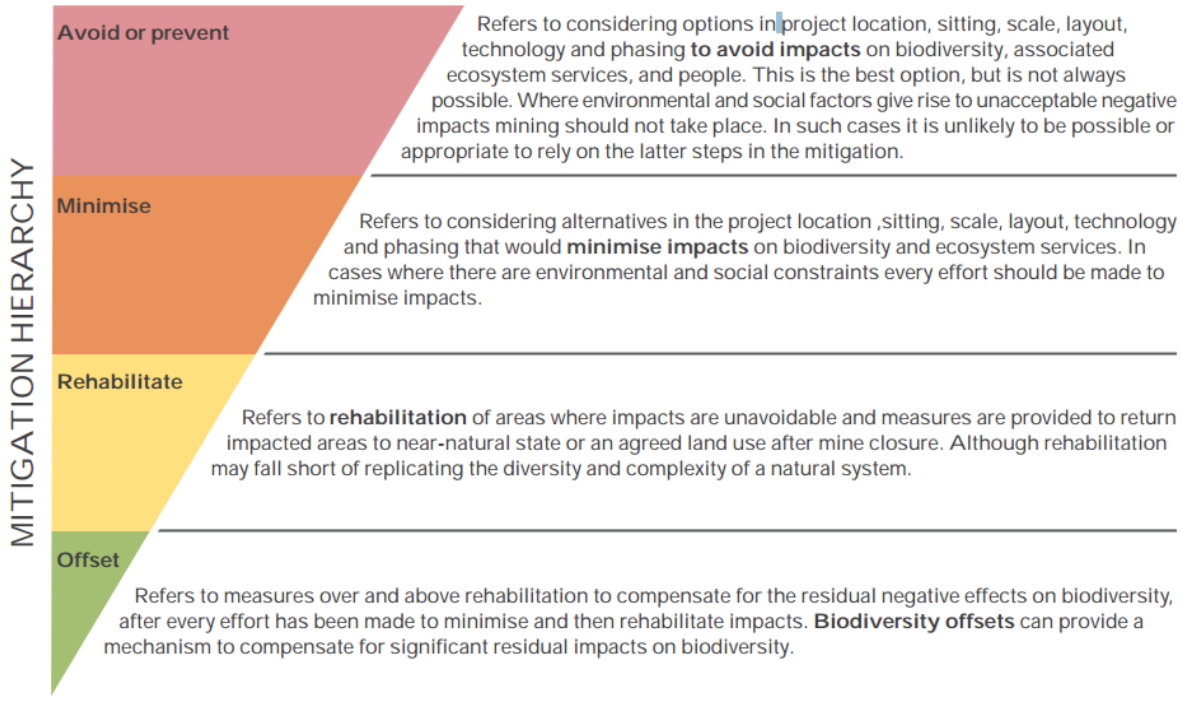

Figure 6-1 The mitigation hierarchy as described by the DEA (2013)

6.1 Potential Impacts Anticipated

Table 6-1 illustrates the potential aspects expected to threaten the integrity of sensitive receptors during the proposed activities. The pre- and post- mitigation significance ratings have been calculated considering various parameters. The potential risks posed to wetlands because of the proposed pipeline project are detailed in Table 6-1. These ratings are based on the DWS Section 21 (c) and (i) Risk Assessment matrix. As per the DWS risk matrix guidelines all activities associated with construction, operation and decommissioning have been accounted for. Ratings are given for scenarios both without and with mitigation. Mitigation is listed alongside each impact.

Based on the information provided the new pipeline (SE2) will be constructed within the current pipeline (SE1) servitude. This inherently reduces the impacts to receiving wetlands. Nevertheless, the sheer scale of the project and three key wetlands crossings suggests that any potential impacts should not be undermined. Although most of the risks were considered

low (post-mitigation) certain activities and their impacts (mainly associated with site clearing and trench excavation) are likely to take place within the delineated boundary of some wetlands (prompting the mandatory assignment of a severity rating of 5) and thus a moderate pre-mitigation risk. No high post-mitigation risks are anticipated to occur because of the pipeline project. Overall, despite this, the impacts associated with this critical service development are unlikely to negatively impact wetland systems to any appreciable level provided that the suggested mitigations measures are effectively implemented. Additionally the pipeline will convey clean water, thus risks associated with leaks are considered low provided they are timeously fixed before erosion damage can occur.

Some of the expected impacts are expected to have “Moderate” significance ratings prior to mitigation and this is attributed to the direct risks being posed to wetlands by the project. All the significance ratings are expected to be decreased by applying all of the prescribed mitigation measures and adhering to recommendations, with the significance of the aspects being reduced to a “Low” level of risk. “Low” post-mitigation risks persist for the remaining phases of the project, and this assumes the prescribed mitigation measures will be implemented.

Table 6-1 DWS Risk Impact Matrix for the proposed pipeline (Andrew Husted Pr Sci Nat 400213/11)

Activity	Aspect	Impact	Wetland Type	Severity					Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
				Flow Regime	Water Quality	Habitat	Biota	Severity											
Construction																			
Site clearing and preparation	Clearing of vegetation and stripping and stockpiling topsoil as well as storage of vehicles and machinery	Direct loss, disturbance and degradation of wetlands.	Pre	4	4	3	2	3.3	3	2	8.3	3	2	5	1	11	91	**M**	• Restrict the disturbance footprint to within the designated pipeline route. Stockpile the topsoil and sub-soil and separate sides of the trench and backfill in the correct order. • The amount of stockpiling of surplus soil material must be limited as far as practically possible, to avoid unnecessary handling of soil resources. • These designated stockpile areas must be viewed as temporary and kept for backfill material. • Maintain soil quality and minimise damage to the soil structure during the time the material is stockpiled. • 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. • Reduce the disturbance footprint and the unnecessary clearing of vegetation on either side of the trench as far as possible when traversing wetlands. • Demarcate the footprint area with high visibility plastic fencing • Signpost the area beyond the construction footprint where the
			Post	2	2	2	2	2	2	2	6	2	1	5	1	9	54	**L**	

Activity	Aspect	Impact	Wetland Type	Severity					Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
				Flow Regime	Water Quality	Habitat	Biota	Severity											pipeline traverses the wetlands as an environmentally sensitive area and keep all excavation, soil stockpiling, general access and construction activities out of this area. • Construct the wetland crossings during winter, if possible. 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.
		Increased bare surfaces, runoff and potential for erosion resulting in sedimentation of the receiving wetlands	Pre	3	3	2	2	2.5	3	2	7.5	3	2	5	3	13	98	**M**	• Keep trench excavation neat and tidy. • Separate sub-soil and topsoil on either side of the trench. •Limit construction activities across the wetlands to the dry season, if possible, when storms are least likely to wash concrete and sand into wetlands. • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • 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. • Do not situate any of the construction material laydown areas within any wetland or buffer areas. • No machinery should be
			Post	2	2	1	1	1.5	2	1	4.5	2	1	5	2	10	45	**L**	

Activity	Aspect	Impact	Wetland Type	Severity					Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
				Flow Regime	Water Quality	Habitat	Biota	Severity											allowed to parked in any wetlands and buffer areas. • 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. • Landscape and lightly till (no deeper than 30 cm) denuded areas to encourage vegetation establishment as soon as possible.
		Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation	Pre	2	2	3	2	2.3	2	2	6.3	2	2	5	3	12	75	**M**	• Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed. • The use of herbicides is not recommended in or near (within the buffer) wetlands (opt for mechanical removal). • Appropriately stockpile topsoil cleared from the footprint area. • Clearly demarcate construction footprint, and limit all activities to within this area. • Minimize clearing of vegetation to the construction footprint only. • Landscape and re-vegetate all denuded areas as soon as possible.
			Post	1	1	2	1	1.3	1	1	3.3	1	1	5	2	9	29	**L**	
Installation of infrastructure	Trench excavation	Increased sediment loads to downstream reaches	Pre	3	3	3	2	2.8	3	2	7.8	3	2	5	3	13	101	**M**	• See mitigation for increased bare surfaces, runoff and potential for erosion • Re-instate topsoil and lightly till

Activity	Aspect	Impact	Wetland Type	Severity					Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
				Flow Regime	Water Quality	Habitat	Biota	Severity											
			Post	2	2	2	1	1.8	2	1	4.8	2	1	5	2	10	48	L	disturbance footprint . • 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.
		Contamination of wetlands with hydrocarbons due to leaks and spillages from machinery, equipment & vehicles as well as Contamination and eutrophication of wetland systems with human sewerage and litter.	Pre	2	3	3	2	2.5	3	2	7.5	3	2	5	3	13	98	M	• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • 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 wetlands. • Mixing of concrete must under no circumstances take place within the wetland or buffer areas. • 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. • Provide appropriate sanitation facilities during construction and service them regularly. These must be beyond the buffer area. • Monitor and inspect machinery, vehicles and equipment for leaks and spills.
			Post	2	2	2	1	1.8	2	1	4.8	2	1	5	1	9	43	L	

Activity	Aspect	Impact	Wetland Type	Severity					Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
				Flow Regime	Water Quality	Habitat	Biota	Severity											
	Backfilling of trench	Disruption of wetland soil profile and alteration of hydrological regime	Pre	2	2	3	2	2.3	3	2	7.3	2	2	5	2	11	80	M	• Document the soil profile on removal and check the order in which soil is replaced. Separate the topsoil (including seedbank) from the subsoil layer. • Ensure that topsoil is appropriately stored and re-applied during trench backfilling. • Make sure that the soil is backfilled and compacted to accepted geotechnical standards to avoid flow canalisation along the trench and the potential for sinkhole formation.
			Post	1	1	2	1	1.3	2	1	4.3	1	1	5	1	8	34	L	
Operation																			
Routine operation and monitoring	Pipeline leaks	Increased water inputs (clean) to downstream wetlands	Pre	2	1	1	2	1.5	2	3	6.5	2	2	5	3	12	78	M	• Conduct regular inspections along the pipeline route and fix leaks timeously. • Monitor water quality regularly at pump stations.
			Post	1	1	1	1	1	1	3	5	1	1	5	1	8	40	L	
Decommissioning																			
Removal of pipeline ad borehole infrastructure	Vehicle access	Degradation of wetland vegetation and proliferation of alien and invasive species	Pre	1	2	1	2	1.5	2	2	5.5	2	2	1	2	7	39	L	• See mitigation for the impacts on direct loss, disturbance and degradation of wetlands and spread of alien and invasive plants.
			Post	1	1	1	1	1	1	1	3	1	1	1	1	4	12	L	
	Re-excavation of trench and backfilling of wetland soils	Disruption of wetland soil profile, hydrological regime and increased sediment loads	Pre	3	2	2	2	2.3	3	2	7.3	3	2	5	3	13	94	M	• See mitigation for increased bare surfaces, runoff and potential for erosion and increased sediment loads during construction • See mitigation for Disruption of wetland soil profile and alteration of hydrological regime
			Post	1	1	1	1	1	2	2	5	2	1	5	2	10	50	L	

6.2 Cumulative Impacts

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general wetland loss and transformation resulting from other activities in the area. The expected post-mitigation risk significance is expected to be low, and the overall cumulative impact is therefore expected to be low (Table 6-2). The cumulative impacts are further mitigated by the fact the new pipeline (SE2) will be constructed within the current pipeline (SE1) servitude. This servitude is already designated and prepared for the pipelines. The operational phase impacts are also low due to the fact the pipeline will be transporting raw water which posed no contamination risk to the wetlands.

Table 6-2 Cumulative wetland impact assessment

Impact Nature: Contamination		
Potential for increased contaminants entering the wetland systems		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Moderate (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)
Significance	**Low**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Residual Impacts:		
Wetland deterioration over time caused by altered hydro-dynamics, and alien vegetation infestation.		

6.3 Unplanned Events

The pipeline is for the transportation of raw water. Even though leaks and bursts on well-engineered pipelines are unlikely, an action plan must be set in place for such an event. The manager or any other responsible individual must be tasked with reporting any leaks or pressure drops that might result in a breach of the pipeline.

6.4 General Mitigation Measures

The following general mitigation measures will be required to ensure the decrease in those significance ratings expected to decrease from “Moderate” to “Low””. These measures are expected to ensure good “housekeep” for the area:

- Adhere to the buffer area where relevant. Only essential services, machinery and personnel are permitted within the wetland and buffer for installation of the pipeline;
- The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly;

- All construction activities must be restricted to the development footprint area. This includes laydown and storage areas, ablutions, offices etc.;
- During construction activities, all rubble generated must be stored in designated waste skips and removed from the site;
- Construction vehicles and machinery must make use of existing access routes;
- All chemicals and toxicants to be used for the construction must be stored in a bunded area;
- All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;
- 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”;
- 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);
- 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;
- Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil;
- 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; and
- All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.

6.4.1 Stripping and Stockpiling Topsoil

- The first 300 mm of soil must be stockpiled separate from the soil excavated deeper than 300 mm; and
- The proposed pipeline system must be divided up into 100 m intervals. Each interval’s soil must be stockpiled and filled back up (in the correct order) to avoid long periods of stockpiling.

6.5 Recommendations

The following recommendation has been made to ensure the conservation of the delineated wetland areas;

- A rehabilitation plan must be compiled and implemented for the project, prioritise the wetland and buffer areas that will be traversed by the pipeline.

7 Conclusion

7.1 Vegetation

The project area is situated within two vegetation types; the Sekhukhune Plains Bushveld and the Sekhukhune Mountain Bushveld, with the associated conservation status being classified as Vulnerable and Least Threatened respectively.

A total of 12 species are listed as being Species of Conservation Concern, with six (6) provincially protected that could potentially occur in the area. The plant species sensitivity theme for the area is classified as medium.

7.2 Wetlands

Two wetland HGM types were identified and delineated for the 500 m regulated area. These include both channelled and unchanneled valley bottom wetlands. Further to this, a network of drainage lines and ephemeral watercourses were also delineated. A few artificial dams were also identified and delineated for this project. The pipeline will traverse three HGM units, namely HGM 1 & HGM 3 (unchanneled valley bottom) and HGM 2 (channelled valley bottom) wetlands, these three units were the primary consideration for the ecological descriptions and associated risk assessment.

Overall, HGMs 1 and 2 scored Intermediate while HGM 3 scored Moderately Low in terms of their wetland ecosystem services. The overall integrity (or health) for HGM 1 and HGM 2 was determined to be Largely Modified, and HGM 3 was classified as Seriously Modified. The ecological classification for HGM 3 was determined to be Seriously Modified. The ecological importance and sensitivity for both wetland types was calculated to be High.

A buffer zone of 15 m has been calculated for all wetlands based on the extent and impacts of the construction and operation of the pipeline.

8 Impact Statement

Considering the status and functioning of the wetland ecosystems, and furthermore the nature and requirements of the project, the proposed activities will result in direct impacts (minimal area) to three (3) wetlands. The construction and operation of the proposed pipeline upgrade is not anticipated to pose significant threats to the receiving wetlands provided the recommended mitigation is effectively applied. The overall cumulative impact is also expected to be low for the proposed pipeline. Due to the low post-mitigation risks, a General Authorisation is permissible for the water use authorisation.

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APPENDIX D2: HERITAGE IMPACT ASSESSMENT

HERITAGE IMPACT ASSESSMENT

(REQUIRED UNDER SECTION 38(8) OF THE NHRA (No. 25 OF 1999)

FOR THE PROPOSED PIPELINE (SE2) BETWEEN SPITSKOP PUMP STATION AND MOTOTOLO MINE, STEELPOORT, LIMPOPO PROVINCE

Type of development:

Water Infrastructure

Client:

Alta van Dyk Environmental Consultants cc

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Project Reference:
Project number 2164
Report date:
August 2021
Revised September 2021

APPROVAL PAGE

Project Name	Proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, located near Steelpoort, Limpopo Province
Report Title	Heritage Impact Assessment for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, located near Steelpoort, Limpopo Province
Authority Reference Number	TBC
Report Status	Final Report
Applicant Name	Lebalelo Water User Association (LWUA)

Responsibility	Name	Qualifications and Certifications	Date
Fieldwork and reporting	Jaco van der Walt - Archaeologist	MA Archaeology ASAPA #159 APHP #114	August 2021
Fieldwork	Ruan van der Merwe - Archaeologist	BA Hons Archaeology	August 2021

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Amendments on Document

Date	Report Reference Number	Description of Amendment
20 September 2021	2164	Technical revision

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Should the applicant wish to utilise any part of, or the entire report, for a project other than the subject project, permission must be obtained from Beyond Heritage to do so. This will ensure validation of the suitability and relevance of this report on an alternative project.

REPORT OUTLINE

Appendix 6 of the GNR 326 EIA Regulations published on 7 April 2017 provides the requirements for specialist reports undertaken as part of the environmental authorisation process. In line with this, Table 1 provides an overview of Appendix 6 together with information on how these requirements have been met.

Table 1. Specialist Report Requirements.

Requirement from Appendix 6 of GN 326 EIA Regulation 2017	Chapter
(a) Details of - (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Section a Section 12
(b) Declaration that the specialist is independent in a form as may be specified by the competent authority	*Declaration of Independence*
(c) Indication of the scope of, and the purpose for which, the report was prepared	Section 1
(cA)an indication of the quality and age of base data used for the specialist report	Section 3.4 and 7.1.
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	9
(d) Duration, Date and season of the site investigation and the relevance of the season to the outcome of the assessment	Section 3.4
(e) Description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used	Section 3
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of site plan identifying site alternatives;	Section 8 and 9
(g) Identification of any areas to be avoided, including buffers	Section 8 and 9
(h) Map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers	Section 8
(I) Description of any assumptions made and any uncertainties or gaps in knowledge	Section 3.7
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity including identified alternatives on the environment or activities;	Section 1.3
(k) Mitigation measures for inclusion in the EMPr	Section 10.1
(I) Conditions for inclusion in the environmental authorisation	Section 10. 1.
(m) Monitoring requirements for inclusion in the EMPr or environmental authorisation	Section 10. 5.
(n) Reasoned opinion - (i) as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan	Section 10.3
(o) Description of any consultation process that was undertaken during the course of preparing the specialist report	Section 6
(p) A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Refer to BAR report
(q) Any other information requested by the competent authority	N.A

Executive Summary

Alta van Dyk Environmental Consultants was appointed as the Environmental Assessment Practitioner (EAP) by Lebalelo Water User Association (LWUA) to undertake the required Environmental Authorisation Process for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, located near Steelpoort, Limpopo Province. Beyond Heritage was appointed to conduct a Heritage Impact Assessment (HIA) for the project and the study area was assessed on desktop level and by a non-intrusive pedestrian field survey. Key findings of the assessment include:

- In anticipation of other mining activities in the greater study area, numerous heritage surveys were conducted (e.g., Huffman & Schoeman 2001, 2002 a and b; van Schalkwyk 2005; Roodt 2003a, 2003b, 2003c, 2005, 2008a, 2008b; Van der Walt & Fourie 2006; Van der Walt & Celliers 2009; Van der Walt 2009; 2016 and Pistorius 2007, 2010, 2011). These studies provide a good understanding of the archaeology of the area and use of the wider landscape.
- The area of interest (AoI) is impacted on by extensive mining developments, road infrastructure and installation of an existing water pipeline within the servitude that the SE2 alignment will follow;
- These activities would have impacted on surface indicators of heritage sites if any ever existed in these areas, however three burial sites (Site numbers LWUA 1, LWUA 2, LWUA 3) and a possible Iron Age site (Site Number LWUA 4) marked by ephemeral stone packed terrace walls have been recorded in proximity of the proposed alignment.
- The project area is of insignificant paleontological sensitivity and no further action is required for this aspect.
- The study area is located within active mining areas and includes a river crossing which prevented access to some areas.

The project is in line with surrounding land use and the impact to heritage resources can be mitigated to an acceptable level. The project can commence provided that the recommendations in this report are adhered to, based on the South African Heritage Resource Authority (SAHRA) 's approval.

Recommendations:

- The recorded burial sites LWUA 1, LWUA 2, LWUA 3 are all located more than 30 meters from the proposed pipeline and will not be directly impacted on. It is recommended that these sites are indicated on development plans and avoided with a 30 m buffer zone. Care must be taken to ensure that access to these sites is not restricted for family members during the construction phase;
- The area around the possible ephemeral terrace walls (LWUA 4) must be monitored during construction;
- Implementation of a chance find procedure for the project.

Declaration of Independence

Specialist Name	Jaco van der Walt
Declaration of Independence	I declare, as a specialist appointed in terms of the National Environmental Management Act (Act No 108 of 1998) and the associated 2014 Environmental Impact Assessment (EIA) Regulations, that I: • I act as the independent specialist in this application; • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant; • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity; • I will comply with the Act, Regulations and all other applicable legislation; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • All the particulars furnished by me in this form are true and correct; and • I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.
Signature	
Date	13/08/2021

a) Expertise of the specialist

Jaco van der Walt has been practising as a CRM archaeologist for 15 years. He obtained an MA degree in Archaeology from the University of the Witwatersrand focussing on the Iron Age in 2012 and is a PhD candidate at the University of Johannesburg focussing on Stone Age Archaeology with specific interest in the Middle Stone Age (MSA) and Later Stone Age (LSA). Jaco is an accredited member of ASAPA (#159) and have conducted more than 500 impact assessments in Limpopo, Mpumalanga, North West, Free State, Gauteng, KZN as well as he Northern and Eastern Cape Provinces in South Africa.

Jaco has worked on various international projects in Zimbabwe, Botswana, Mozambique, Lesotho, DRC Zambia, Guinea and Tanzania. Through this, he has a sound understanding of the IFC Performance Standard requirements, with specific reference to Performance Standard 8 – Cultural Heritage.

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ABBREVIATIONS

ASAPA: Association of South African Professional Archaeologists
BGG Burial Ground and Graves
BIA: Basic Impact Assessment
CFPs: Chance Find Procedures
CMP: Conservation Management Plan
CRR: Comments and Response Report
CRM: Cultural Resource Management
DEA: Department of Environmental Affairs
EA: Environmental Authorisation
EAP: Environmental Assessment Practitioner
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMPr: Environmental Management Programme
ESA: Early Stone Age
ESIA: Environmental and Social Impact Assessment
GIS Geographical Information System
GPS: Global Positioning System
GRP Grave Relocation Plan
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA: Middle Stone Age
NEMA National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NID Notification of Intent to Develop
NoK Next-of-Kin
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

**Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)
Early Stone Age (~ 2.6 million to 250 000 years ago)
Middle Stone Age (~ 250 000 to 40-25 000 years ago)
Later Stone Age (~ 40-25 000, to recently, 100 years ago)
The Iron Age (~ AD 400 to 1840)
Historic (~ AD 1840 to 1950)
Historic building (over 60 years old)

1 Introduction and Terms of Reference:

Beyond Heritage was appointed to conduct a HIA for the proposed pipeline (SE2) between Spitskop Pump Station and Mototolo Mine, located near Steelpoort, Limpopo Province (Figure 1.1 to 1.4). The report forms part of the Basic Assessment (BA) and Environmental Management Programme Report (EMPr) for the development.

The aim of the study is to survey the proposed development footprint to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999). The report outlines the approach and methodology utilized before and during the survey, which includes Phase 1, review of relevant literature; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey, burial sites as well as possible Iron Age ephemeral walling were recorded. General site conditions and features on sites were recorded by means of photographs, GPS locations and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report. SAHRA as a commenting authority under section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) require all environmental documents, compiled in support of an Environmental Authorisation application as defined by NEMA EIA Regulations section 40 (1) and (2), to be submitted to SAHRA for commenting. Upon submission to SAHRA the project will be automatically given a case number as reference. As such the EIA report and its appendices must be submitted to the case as well as the EMPr, once it's completed by the Environmental Assessment Practitioner (EAP).

1.1 Terms of Reference

Field study

Conduct a field study to: (a) locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points of sites/areas identified as significant areas; c) determine the levels of significance of the various types of heritage resources affected by the proposed development.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with the relevant legislation, SAHRA minimum standards and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act No 25 of 1999).

1.2 Project Description

LWUA is proposing a new raw water pipeline between the Spitskop Pump Station and Mototolo Mine, located near Steelpoort in the Limpopo Province. This project is also referred to as the Southern Extension 2 (SE2) pipeline. Project components and the location is outlined under Table 2 and 3.

Table 2: Project Description

Project area	**Pipeline:** Dwarsrivier 372 KT portions RE, Portion 1, 6 and 7 Thorncliffe 374 KT portions 1, 3 and 7 Helena 6 JT portion RE Spitskop 333 KT portion 20 Kennedy's Vale 361 KT portion 12 and 30 Tweefontein 360 KT portions 1, 2, 3, 4, 6, 7, 9 and 10 Steelpoort Ext 11 erven 1216, 1218 and 1221 Steelpoort Ext 10 **Reservoir:** Dwarsrivier 372 KT portion 7
Magisterial District	Fetakgomo Tubatse Local Municipality Sekhukhune District Municipality
Central co-ordinate of the development	Start point 24°48'36.54"S & 30° 7'18.70"E End point 25° 0'32.67"S & 30° 6'45.19"E
Topographic Map Number	2430 CC

Table 3: Infrastructure and project activities

Type of development	Bulk Water Infrastructure
Size of development	Approximately 20 km
Project Components	The LWUA was established to supply raw water to mines along the Eastern Limb of the Bushveld Igneous Complex. The main aim of the LWUA is 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. The following is proposed for the new SE2 Pipeline 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 15km in length next to the existing pipeline (within the current pipeline servitude) to a new reservoir near the existing Dwarsrivier Pump Station; • A new reservoir to be constructed near the existing Dwarsrivier Pump Station (10Mℓ); • New pump station at the existing Dwarsrivier Pump Station adjacent to the existing pump station fenced off area; • New 300 or 350mm pipeline 9km in length next to the existing pipeline in the pipeline reserve from the new Dwarsrivier Pump Station to Mototolo Mine; and • Valve chambers along pipeline route. 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) • Steelpoort Industrial Park (Freedom Property Fund) (potentially)

1.3 Alternatives

No alternatives were provided to be assessed although the extent of the area assessed allows for siting of the development to minimise impacts to heritage resources. The pipeline will be within the existing SE1 pipeline servitude

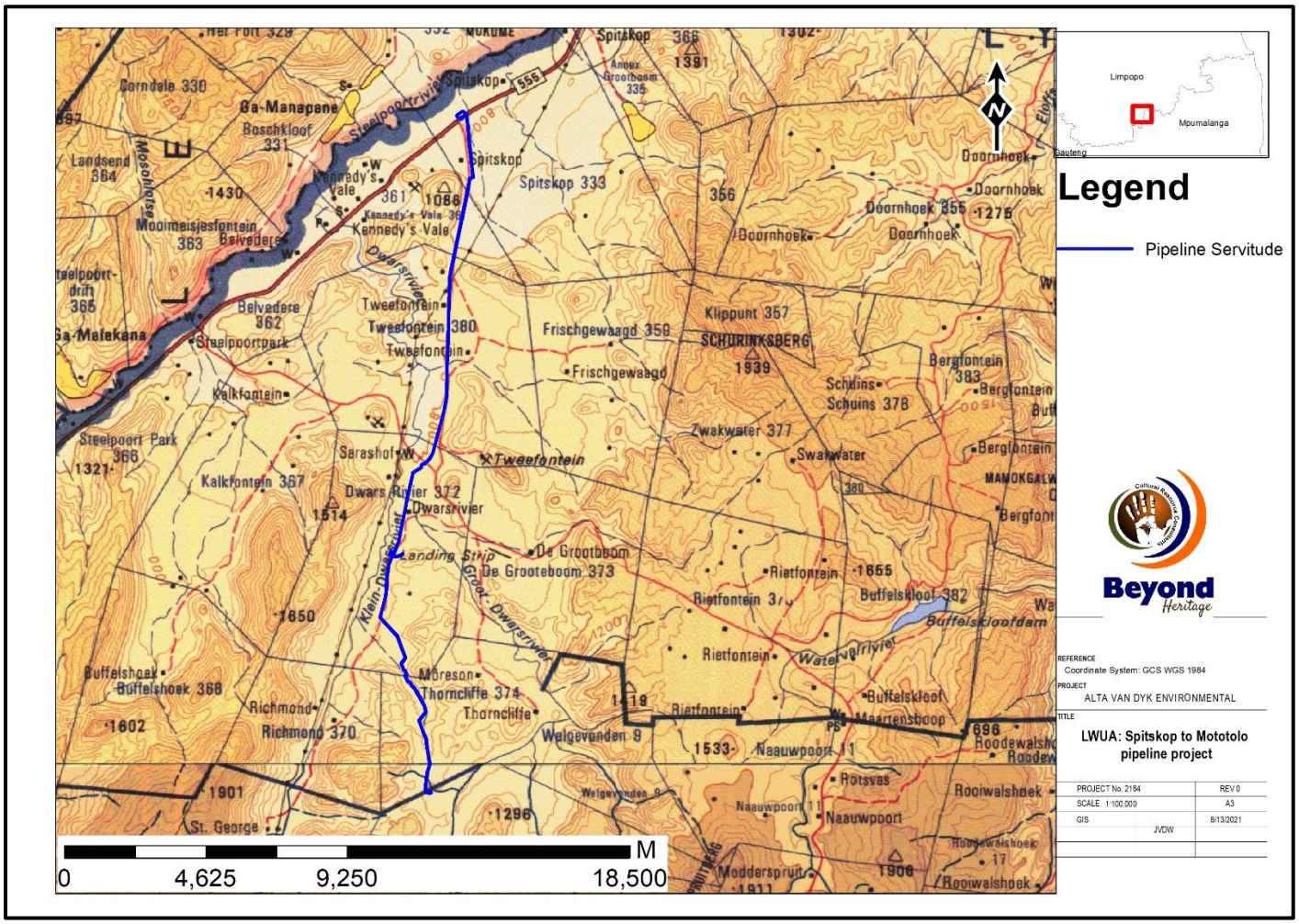


Figure 1.1. Regional setting (1: 250 000 topographical map) of the project.

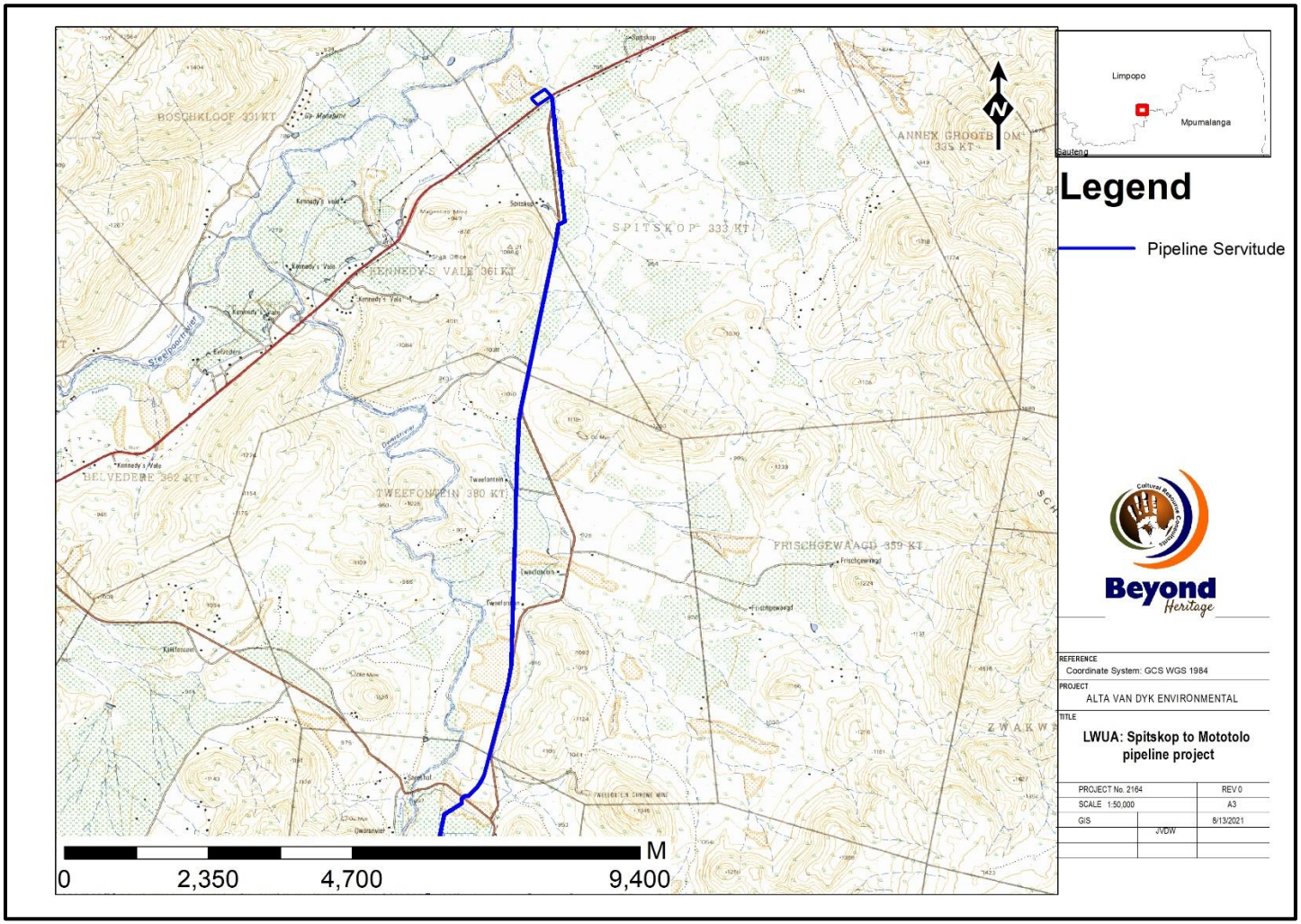


Figure 1.2. Local Setting of the project (Northern section).

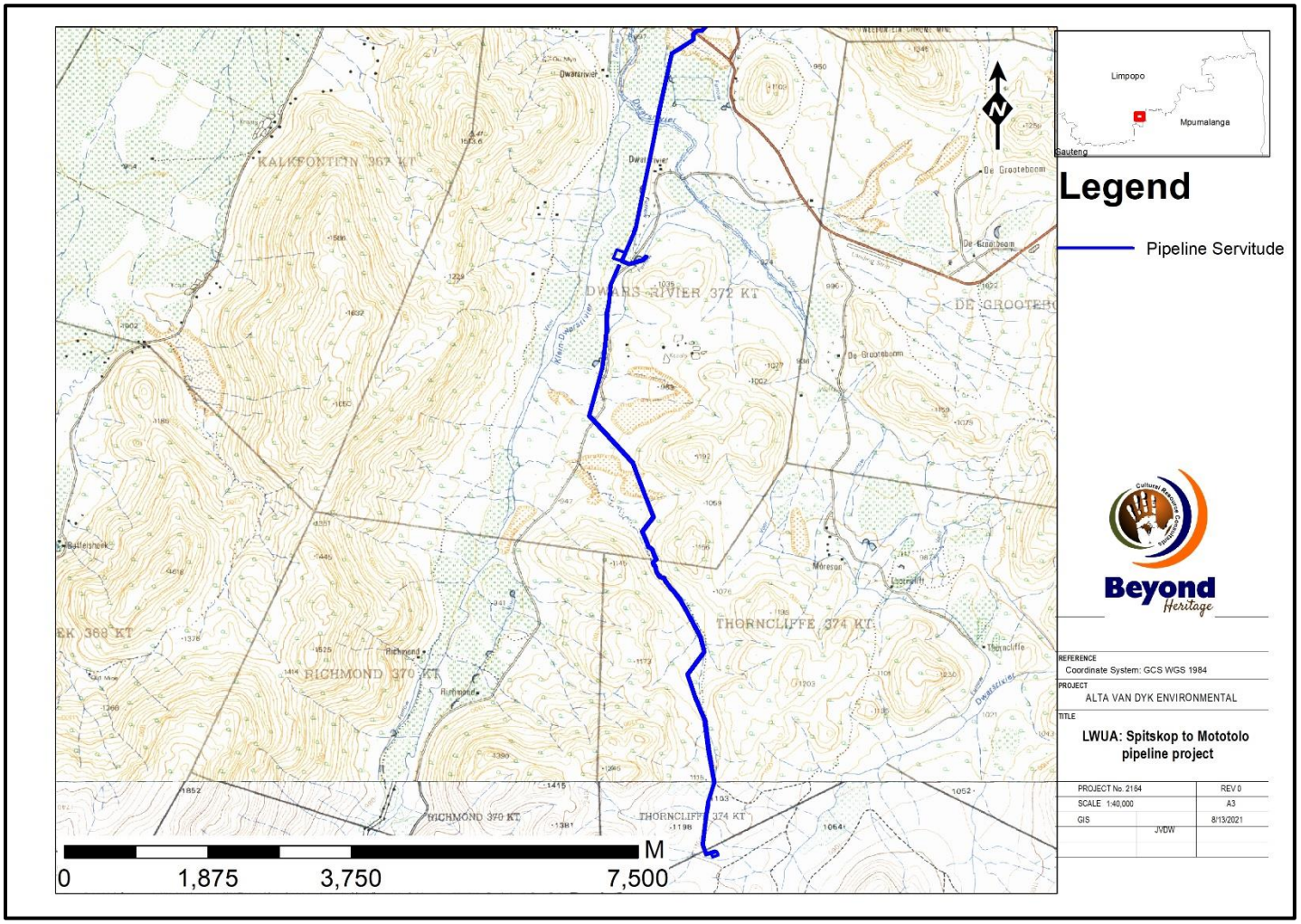


Figure 1.3. Local Setting of the project (Southern section).

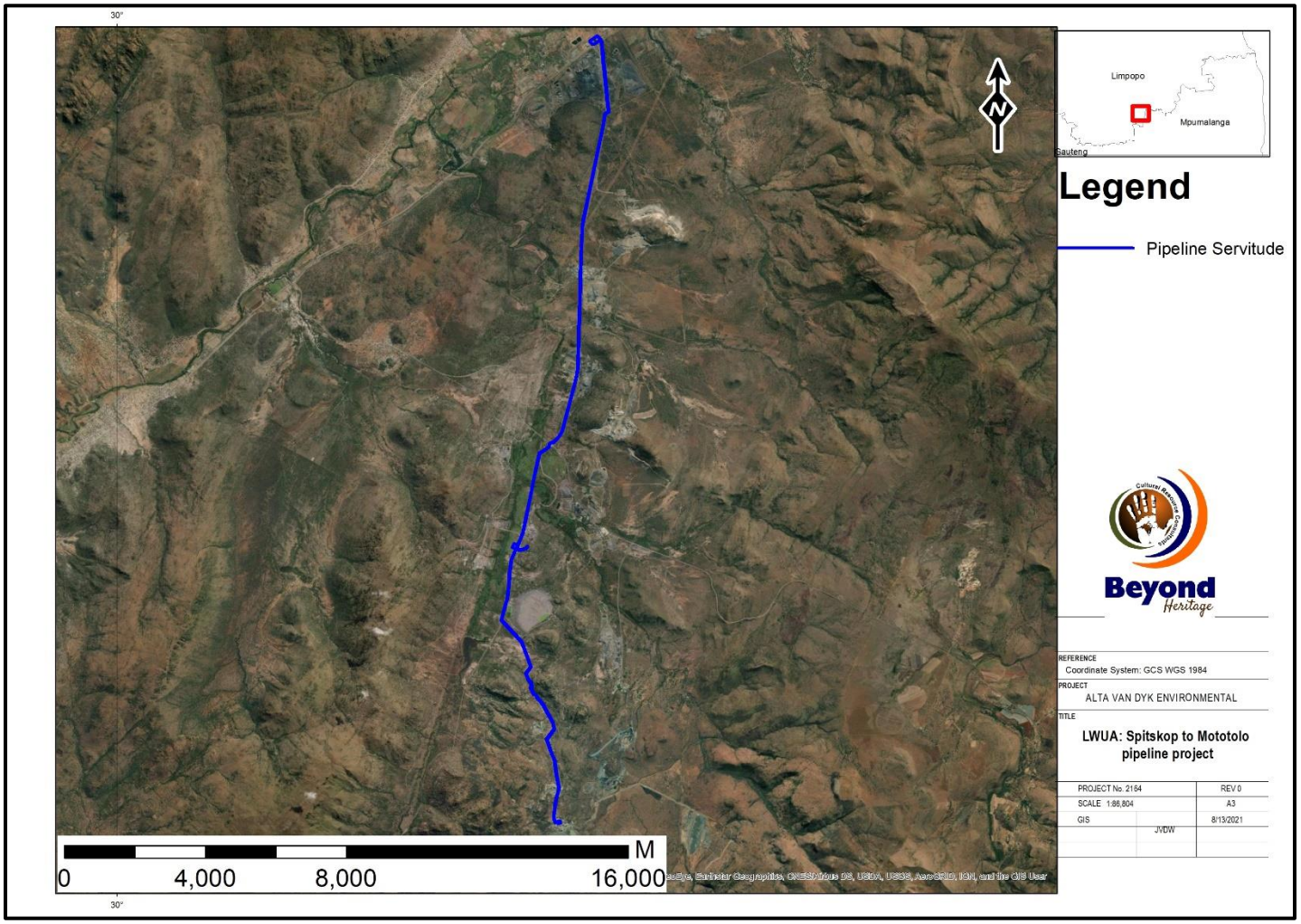


Figure 1.4. Aerial image of the development footprint.

2 Legislative Requirements

The HIA, as a specialist sub-section of the EIA, is required under the following legislation:

- National Heritage Resources Act (NHRA), Act No. 25 of 1999)
- National Environmental Management Act (NEMA), Act No. 107 of 1998 - Section 23(2)(b)
- Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 - Section 39(3)(b)(iii)

A Phase 1 HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of heritage specialist input is to:

- Identify any heritage resources, which may be affected;
- Assess the nature and degree of significance of such resources;
- Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- Assess the negative and positive impact of the development on these resources; and
- Make recommendations for the appropriate heritage management of these impacts.

The HIA should be submitted, as part of the impact assessment report or EMPr, to the PHRA if established in the province or to SAHRA. SAHRA will ultimately be responsible for the evaluation of Phase 1 HIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 HIA reports and additional development information, as per the impact assessment report and/or EMPr, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 HIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level). Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 HIA's are primarily concerned with the location and identification of heritage sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision-making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for with SAHRA by the applicant before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance No. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983) and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare. Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

3 METHODOLOGY

3.1 Literature Review

A brief survey of available literature was conducted to extract data and information on the area in question to provide general heritage context into which the development would be set. This literature search included published material, unpublished commercial reports and online material, including reports sourced from the South African Heritage Resources Information System (SAHRIS).

3.2 Genealogical Society and Google Earth Monuments

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located; these locations were marked and visited during the fieldwork phase. The database of the Genealogical Society was consulted to collect data on any known graves in the area.

3.3 Public Consultation and Stakeholder Engagement:

Stakeholder engagement is a key component of any EA process, it involves stakeholders interested in, or affected by the proposed development. Stakeholders are provided with an opportunity to raise issues of concern (for the purposes of this report only heritage related issues will be included). The aim of the public consultation process was to capture and address any issues raised by community members and other stakeholders during key stakeholder and public meetings. The process involved:

- Placement of advertisements and site notices
- Stakeholder notification (through the dissemination of information and meeting invitations);
- Stakeholder meetings undertaken with I&APs;
- Authority Consultation
- The compilation of Basic Assessment Report (BAR).

3.4 Site Investigation

The aim of the site visit was to:

a) survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest;

b) record GPS points of sites/areas identified as significant areas;

c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Table 4: Site Investigation Details

	Site Investigation
Date	4 and 5 August 2021
Season	Winter – It was not possible to walk the entire line due to access limitations within active mining areas and a river crossing. The project area was however sufficiently covered to understand the heritage character of the area (Figure 3-1 and 3.2).

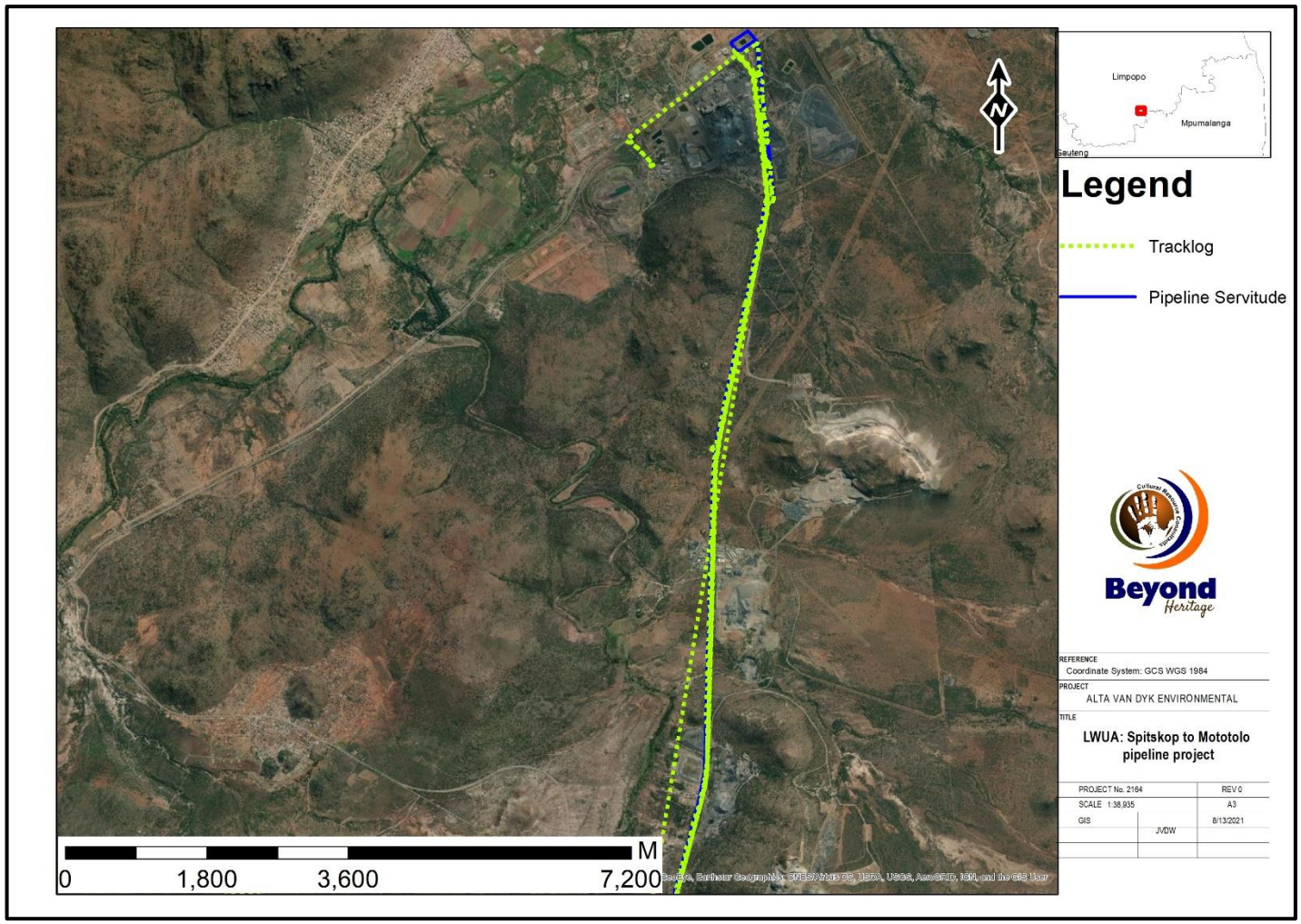


Figure 3.1: Tracklog of the survey in green (Northern section).

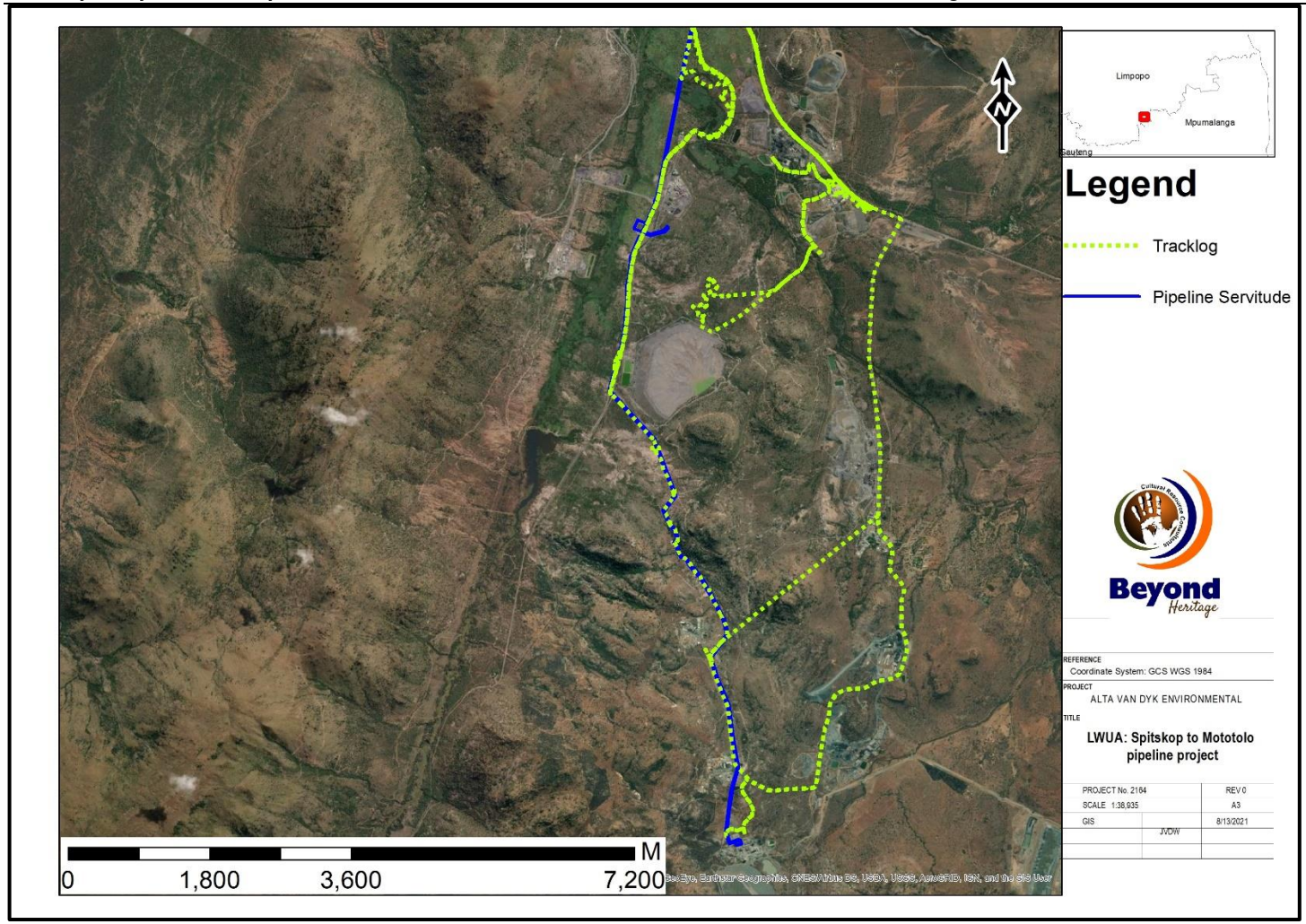


Figure 3.2 . Tracklog of the survey in green (Southern section).

3.5 Site Significance and Field Rating

Section 3 of the NHRA distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- Its importance in/to the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- Sites of significance relating to the history of slavery in South Africa.

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed project the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface. This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance with cognisance of Section 3 of the NHRA:

- The unique nature of a site;
- The integrity of the archaeological/cultural heritage deposits;
- The wider historic, archaeological and geographic context of the site;
- The location of the site in relation to other similar sites or features;
- The depth of the archaeological deposit (when it can be determined/is known);
- The preservation condition of the sites; and
- Potential to answer present research questions.

In addition to this criteria field ratings prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 10 of this report.

Table 5. Heritage significance and field ratings

FIELD RATING	*GRADE*	*SIGNIFICANCE*	*RECOMMENDED MITIGATION*
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP. A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP. B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

3.6 Impact Assessment Methodology

The following impact assessment methodology was provided by the AVDE:

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998 as provided by the EAP. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section.

Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating	Scale	Description / criteria
MAGNITUDE of negative impact (at the indicated spatial scale)	**10**	**Very high**	Bio-physical and/or social functions and/or processes might be *severely* altered.
	8	**High**	Bio-physical and/or social functions and/or processes might be *considerably* altered.
	6	**Medium**	Bio-physical and/or social functions and/or processes might be *notably* altered.
	4	**Low**	Bio-physical and/or social functions and/or processes might be *slightly* altered.
	2	**Very low**	Bio-physical and/or social functions and/or processes might be *negligibly* altered.
	0	**Zero**	Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10**	**Very high**	Positive: Bio-physical and/or social functions and/or processes might be *substantially* enhanced.
	8	**High**	**Positive**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced.
	6	**Medium**	**Positive**: Bio-physical and/or social functions and/or processes might be *notably* enhanced.
	4	**Low**	**Positive**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced.

	2	**Very low**	**Positive**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced.
	0	**Zero**	**Positive**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
DURATION	**5**	**Permanent**	**Impact in perpetuity. –**
	4	**Long term**	Impact ceases after operational phase/life of the activity > 60 years.
	3	**Medium term**	Impact might occur during the operational phase/life of the activity – 60 years.
	2	**Short term**	Impact might occur during the construction phase - < 3 years.
	1	**Immediate**	**Instant impact.**
EXTENT (or spatial scale/influence of impact)	**5**	**International**	**Beyond the National boundaries.**
	4	**National**	Beyond provincial boundaries, but within National boundaries.
	3	**Regional**	Beyond 5 km of the Impact Area and within the provincial boundaries.
	2	**Local**	Within a 5 km radius of the Impact Area .
	1	**Site-specific**	**On site or within 100 meters of the site boundaries.**
	0	**None**	**Zero extent.**
IRREPLACEABLE loss of resources	**5**	**Definite**	**Definite** loss of irreplaceable resources.
	4	**High potential**	**High** potential for loss of irreplaceable resources.
	3	**Moderate potential**	**Moderate** potential for loss of irreplaceable resources.
	2	**Low potential**	**Low** potential for loss of irreplaceable resources.
	1	**Very low potential**	**Very low** potential for loss of irreplaceable resources.
	0	**None**	**Zero potential.**
REVERSIBILITY of impact	**5**	**Irreversible**	Impact **cannot** be reversed.
	4	**Low irreversibility**	**Low** potential that impact might be reversed.
	3	**Moderate reversibility**	**Moderate** potential that impact might be reversed.
	2	**High reversibility**	**High** potential that impact might be reversed.
	1	**Reversible**	Impact **will be** reversible.
	0	**No impact**	No impact.
PROBABILITY (of occurrence)	**5**	**Definite**	>95% chance of the potential impact occurring.
	4	**High probability**	75% - 95% chance of the potential impact occurring.
	3	**Medium probability**	25% - 75% chance of the potential impact occurring
	2	**Low probability**	5% - 25% chance of the potential impact occurring.
	1	**Improbable**	<5% chance of the potential impact occurring.
	0	**No probability**	**Zero probability.**
Evaluation Component	**Rating scale and description / criteria**		
CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. ***Medium****:* The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. ***Low****:* The activity is localised and might have a negligible cumulative impact. ***None****:* No cumulative impact on the environment.		

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.
The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per Table 8.2 below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description / criteria
125 – 150	**Very high (VH)**	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	**High (H)**	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	**Medium-high (MH)**	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked at.
40 – 74	**Medium (M)**	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	**Low (L)**	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	**Positive impact (+)**	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

3.7 Limitations and Constraints of the study

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources and pedestrian surveys, the possibility exists that some features or artefacts may not have been discovered/recorded and the possible occurrence of graves and other cultural material cannot be excluded. Similarly, the depth of cultural deposits and the extent of heritage sites cannot be accurately determined due its subsurface nature. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. During the survey, it was not possible to walk the entire line due to access limitations within active mining areas and a river crossing. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

4 Description of Socio-Economic Environment

The following information was obtained for the municipality from StatsSa.gov.za: The population size is 93 795. Of the population, 99,4% are black African, with the other population groups making up the remaining 0,6%. Of those persons aged 20 years and above, 10,7% have some primary education, 3% have completed primary education, 33,3% have some secondary education and 22% have completed matric. Of the mentioned age group, 6,6% have some form of higher education, and almost one in four (24,3%) had no form of schooling. The municipality has a weak economic base and high poverty levels. There is one shopping centre in the municipality and a few mining activities happening in the region.

Only a third of households (33,1%) have access to piped water on a community stand less than 200 m from their dwelling, followed by 30,2% who have access to piped water in the yard. Only 5,5% of households have access to piped water inside the dwelling, and 11,5% have no access to piped water.

5 Results of Public Consultation and Stakeholder Engagement:

5.1 Stakeholder Identification

Adjacent landowners and the public at large were informed of the proposed activity as part of the BA process. Site notices and advertisements notifying interested and affected parties were placed at strategic points and in local newspapers as part of the process.

6 Literature / Background Study:

6.1 Literature Review (SAHRIS)

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where archaeological and historical sites might be located.

In anticipation of other mining activities in the greater study area, archaeologists have completed numerous heritage surveys including Huffman & Schoeman 2001, 2002 a and b; van Schalkwyk 2005; Roodt 2003a, 2003b, 2003c, 2005, 2008a, 2008b; Van der Walt & Fourie 2006; Van der Walt & Celliers 2009; Van der Walt 2009; 2016 and Pistorius 2007, 2010, 2011 for various Environmental Impact Assessment Reports (EIAs) and Environmental Management Programmes (EMPs). These studies provide a good understanding of the archaeology of the area and use of the wider landscape. Since 2001, heritage surveys have recorded more than 240 sites in the greater study area, ranging from the Middle Stone Age (MSA) to the recent households of farm labourers. The following Cultural Resource Management (CRM) studies (Table 6) were conducted in the immediate area and were consulted for this report:

Table 6. Heritage Reports conducted close to the study area.

Author	Year	Project	Findings
Huffman, T. N. and Schoeman, A.	2002	Archaeological Assessment of The Der Brochen Project, Mpumalanga	25 sites or occurrences, ranging from the Middle Stone Age to the Iron Age and Historic Pedi.
Roodt, F.	2003	Phase 1 Heritage Impact Assessment Der Brochen Tailings Dams Farms: Helena and St. George Mpumalanga Province	39 sites were recorded ranging from the Iron age to burial sites.
Van der Walt, J. and Fourie, W.	2007	Mining development for Mareesburg 8JT Mpumalanga, Archaeological Impact Assessment	3 Iron Age sites
Matoho, E.	2012	Preliminary Report of The Investigation of The Late Iron Age Stone Wall Enclosure Site Identified On The Farm Schaapkraal 42jt, Mpumalanga Province	Iron Age features and burial sites.
Du Piesanie, J and Higgitt, N.	2012	Heritage Impact Assessment for the Everest North Mining 2530 AA, Vygenhoek 10JT, Mpumalanga.	50 Sites recorded ranging from Stone Age, Iron Age and burial sites as well as historical features.
Coetzee, T.	2018	Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd for the Construction of the Mareesburg Haul Road near Boschfontein, Mpumalanga	Seven historical sites consisting of angular stone walling, as well as buildings constructed from bricks and cement; 10 LIA / Farmer sites consisting of linear stone walling and stone-walled enclosures; six stone cairns that might be grave sites; two formal graveyards and two modern sites.

6.1.1 Genealogical Society and Google Earth Monuments

No known grave sites are indicated in the study area.

6.2. Background to the general area

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2012). The three main phases can be divided as follows:

- Earlier Stone Age: associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.
- Middle Stone Age: associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Later Stone Age: associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago

Very few Early Stone Age sites are on record for Mpumalanga and no *in situ* sites dating to this period are expected for the study area. An example in Mpumalanga is Maleoskop on the farm Rietkloof where ESA tools have been found. This is one of only a handful of such sites in Mpumalanga.

Middle Stone Age isolated artefacts are known to occur in the general area. Finds typically include radial cores, triangular points and flakes. These artefacts are usually scattered too sparsely to be of any significance (Van der Walt 2016). Evidence of this period has been excavated at Bushman Rock Shelter, a well-known site on the farm Klipfonteinhoek in the Ohrigstad district located about 70 km from the project area. This cave was excavated twice in the 1960s by Louw and later by Eloff. The MSA layers show that the cave was repeatedly visited over a long period. Lower layers have been dated to over 40 000 BP (Before Present) while the top layers date to approximately 27 000 BP (Esterhuizen & Smith in Delius, 2007; Bergh, 1998). At Bushman Rock Shelter the MSA is also represented and starts at around 12 000 BP but only lasted for some 3 000 years.

The LSA is of importance in geological terms as it marks the transition from the Pleistocene to the Holocene which was accompanied by a gradual shift from cooler to warmer temperatures. This change had its greatest influence on the higher lying areas of South Africa. Both Bushman Rock Shelter and another site, Heuningneskrans, have revealed a greater use in plant foods and fruit during this period (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).
Faunal evidence suggests that LSA hunter-gatherers trapped and hunted zebra, warthog and bovids of various sizes. They also diversified their protein diet by gathering tortoises and land snails (Achatina) in large quantities.
Ostrich eggshell beads were found in most of the levels at these two sites. It appears that there is a gap of approximately 4 000 years in the Mpumalanga LSA record between 9 000 BP and 5 000 BP. This may be a result of generally little Stone Age research being conducted in the province. It is, however, also a period known for rapid warming and major climate fluctuation which may have led people to seek out protected environments in this area. The Mpumalanga Stone Age sequence is visible again during the mid-Holocene at the farm Honingklip near Badplaas in the Carolina district (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

The LSA period is also associated with rock engravings and rock paintings. Approximately 400 rock art sites are distributed throughout Mpumalanga and can be divided into San rock art, herder or Khoe Khoe (Khoi Khoi) paintings (thin scattering from the Limpopo Valley) through the Lydenburg district into the Nelspruit area) and localised late white farmer paintings. Farmer paintings can be divided into Sotho-Tswana finger paintings and Nguni engravings (Only 20 engravings occur at Boomplaats, north-west of Lydenburg). Farmer paintings are more localised than San or herder paintings and were mainly used by the painters for instructional purposes (Smith & Zubieta 2007).

A rock engraving which date from the more recent past were recorded against the eastern slope of the Groot Dwars River Valley (Huffman & Schoeman 2001, 2002[a], 2002[b] & 2002[c]**)** and it is possible that more engravings may exist in this valley.

6.2 The Iron Age

The Iron Age represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age: Most of the first millennium AD.
- The Middle Iron Age: 10th to 13th centuries AD
- The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Most of the decorated pottery found in the study area belongs to the stylistic facies known as *Eiland*. This style dates to between 1550 AD and 1750 AD and was made by Sotho-Tswana people (Huffman 2007: 186-189). These Middle Iron Age Sites do not have any stone walling associated with them and is found close to cultivatable soil. Some stylistic *Marateng* pottery were also recorded presumably in association with Late

Iron Age stone walled settlements. *Marateng* pottery dates to between 1650 AD and 1840 AD (Huffman 2007: 207). Also refer to Section 6.7 for a discussion on the Iron Age Cultural Landscape.

6.3 Historical Information

European occupation began in 1845 when trekkers established Ohrigstad and then Lydenburg a few years later. Originally, the trekkers were interested in ivory, but they also needed land and labour for agriculture. Tensions with African communities over these needs rose to such a point that the Trekkers attacked the Pedi capital in 1852. They failed, however, to destroy Pedi authority. Somewhat later, they negotiated a peace with Sekwati and traded cattle for land. Boers then started to establish farms in the region. GS Maree, for example, settled on Mareesburg in 1871. Tensions over land and labour increased again until the ZAR attacked the Pedi capital in 1876, this battle also failed to break Pedi resistance.
This brief historical outline helps to date some other sites in the study area. A number of settlements located around high meadows in the Dwarsrivier valley probably date from 1860 to 1880, when tensions were high but before major European occupation of local farms.

6.4 Anglo-Boer War Sites

The Anglo-Boer War was the greatest conflict that had taken place in South Africa up to date. No sites relating to the war are known to occur in the study area.

6.5 Cultural Landscape

The cultural landscape of the region is characterised by a rural area that is extensively disturbed by mining activities and in the past by agricultural activities. From the archaeological database of the general area archaeological settlements show different land use patterns. Many agriculturally orientated societies (making Eiland, Leolo and Marateng pottery) built their villages in the valleys near cultivatable alluvium. Others (probably Ndebele) built terraced settlements on basal slopes of the valley edge, while farm labourers usually lived in the valleys as well. During the 19th Century, farmers lived around the edge of high meadows as a measure of protection. A few Middle Iron Age Eiland sites were also cited in this plateau environment.

6.6 Graves and Burial Sites

No known graves are indicated on databases consulted but graves and cemeteries are widely distributed across the landscape and can be expected anywhere.

7 Description of the Physical Environment

The project area is located within an existing servitude next to an existing pipeline. The proposed line starts approximately 5 km west from Steelpoort, from where it runs in a southerly direction to Mototolo Mine. It traverses several mine properties. General site conditions consist of moderate grass cover (burned along some sections) and areas altered by mining and road infrastructure. General site conditions are illustrated in Figure 7.1 to 7.4

Figure 7.1. Existing Spitskop Pumpstation.

Figure 7.2. General site conditions in the servitude.

Figure 7.3. Existing pipeline in the servitude.

Figure 7.4. General site conditions in the servitude.

8 Findings of the Survey

It is important to note that only the development footprint was surveyed over 2 days. Previous disturbances relating to existing mining operations and pipeline are evident along the route and would have destroyed surface evidence of heritage sites within the existing servitude. However, three burial sites (LWUA 1 – LWUA 3) and possible ephemeral Iron Age stone packed terrace site (LWUA 4) were recorded. These sites are all located outside of the pipeline servitude and will not be directly impacted on. The spatial data for the sites are presented in Table 7 and illustrated in Figure 8.1. Burial sites and cemeteries are of high social significance and the recorded sites consists of formal graves with headstones as well as a palisaded cemetery (Figure 8.1 – 8.4). At the Iron Age site, the ephemeral stone packed features have already been disturbed by the existing pipelines and little remains of the site (Figure 8.5 and 8.6).

Table 7. Heritage resources recorded during the survey.

LABEL	LONGITUDE	LATITUDE	DESCRIPTION	HERITAGE SIGNIFICANCE
LWUA 1	30° 07' 19.4124" E	24° 50' 23.1360" S	2 X graves	High Social Significance GP A
LWUA 2	30° 07' 05.5812" E	24° 51' 23.1085" S	Cemetery	High Social Significance GP A
LWUA 3	30° 06' 48.6935" E	24° 54' 32.6772" S	Cemetery	High Social Significance GP A
LWUA 4	30° 06' 33.3215" E	24° 58' 49.4003" S	Possible ephemeral stone packed terraces	Low Significance GP C

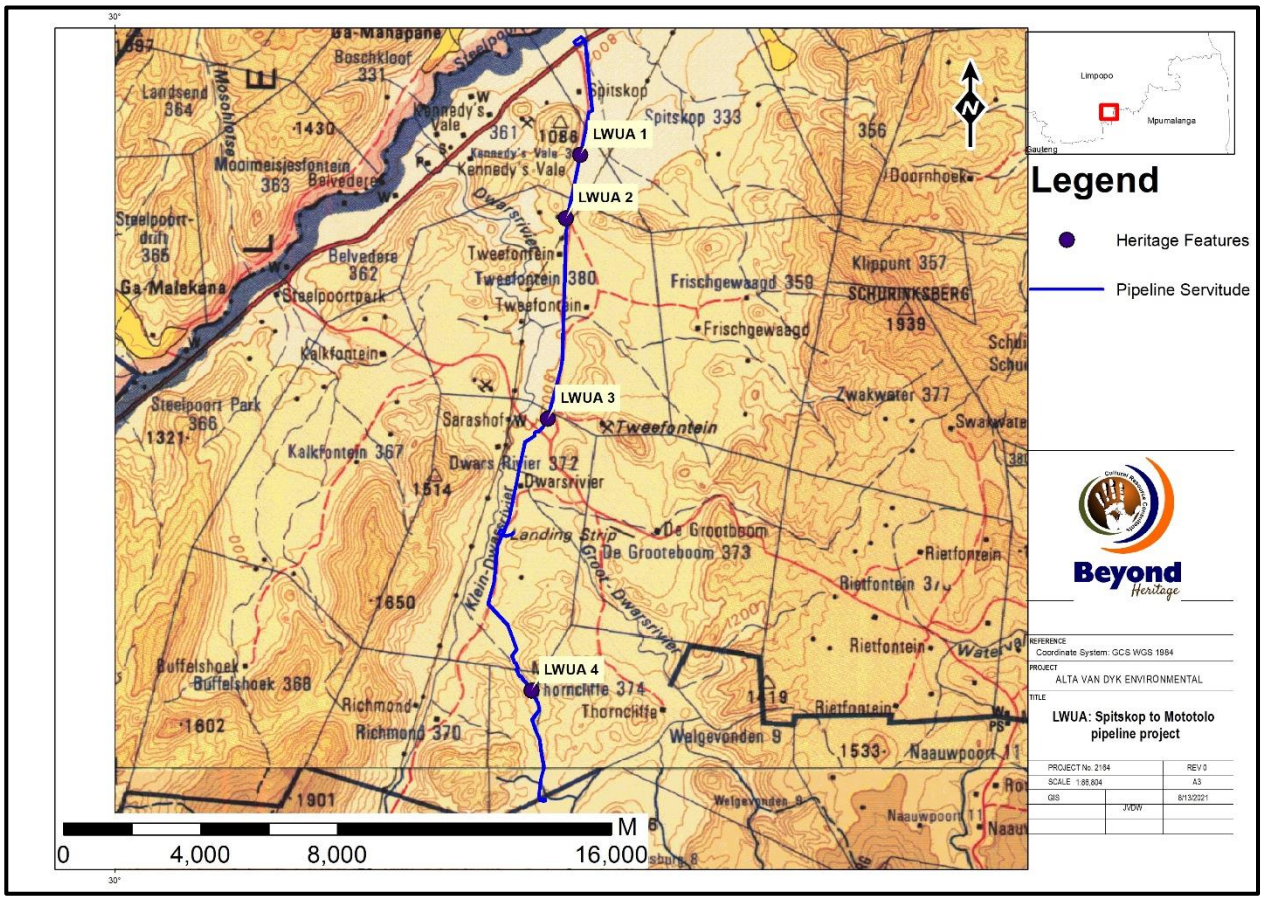


Figure 8.1. Distribution of recorded heritage features.

Figure 8.2. Graves at LWUA 1.

Figure 8.3. Graves at LWUA 1.

Figure 8.4. General site conditions at LWUA 2.

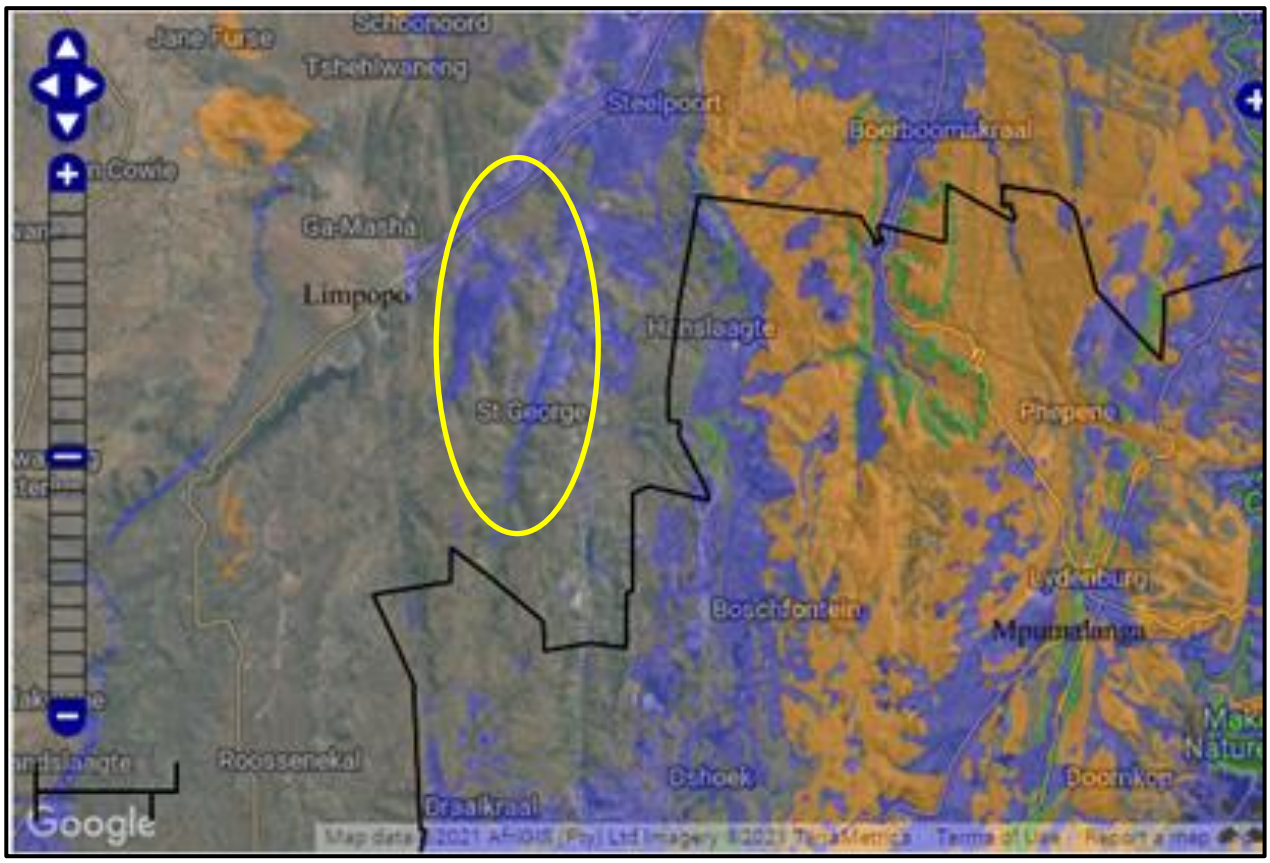
Figure 8.5. General site conditions at LWUA 2.

Figure 8.6. General site conditions at LWUA 4.

Figure 8.7. General site conditions at LWUA 4.

8.1 Paleontological Heritage

According to the SAHRA Paleontological map the paleontological sensitivity of the study area is low, and no further studies are required (Figure 8.7).



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 8.8. Paleontological sensitivity of the study area as indicated on the SAHRA Palaeontological sensitivity map.

9 Potential Impact

Based on the current alignment the pipeline will not have a direct impact on LWUA 1, LWUA 2 and LWUA 3, These sites are all located further than 30 meters away from the pipeline servitude (Figure 9.1 to 9.3). Graves and cemeteries are of high social significance but as these features will be avoided and preserved no impact is expected (Table 8). The project can have a possible indirect impact on LWUA 4 (Figure 9.4), this area is impacted on by the existing pipeline and it is not certain that this is indeed an archaeological site with surface features being destroyed by the existing pipeline. Any additional impacts to subsurface heritage resources can be successfully mitigated by implementing a chance find procedure and this should be implemented during all phases of the project, and the expected impact is low (Table 9).

9.1.1 Pre-Construction phase

It is assumed that the pre-construction phase involves the removal of topsoil and vegetation as well as the establishment of infrastructure. These activities can have a negative and irreversible impact on heritage features if any occur. Impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.2 Construction Phase

During this phase, the impacts and effects are similar in nature but more extensive than the pre-construction phase. Potential impacts include destruction or partial destruction of non-renewable heritage resources.

9.1.3 Operation Phase

No impacts are expected after construction of the pipeline during the operational phase.

9.1.4 Cumulative impacts

Cumulative impacts occur from the combination of effects of various impacts on heritage resources. The importance of identifying and assessing cumulative impacts is that the whole is greater than the sum of its parts. In the case of this project the pipeline will not directly impact on significant heritage resources and with the implementation of the mitigation measures as proposed in this report the cumulative impact of the project on heritage resources is low.

9.1.5 Impact Assessment for the Project

Table 8. Impact assessment of the proposed project on graves and cemeteries.

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SP				M	D	S	I	R	P	TOTAL	SP
Cultural Heritage Impact Assessment																				
Graves and Cemeteries	Construction of the pipeline.	4	5	3	5	5	1	22	L	Low	Negative	• All recorded graves and burial sites should be indicated on development plans and avoided. • Ensuring access to the sites during construction. • Implementation of a chance find procedure for the project.	4	5	3	0	0	1	12	L

Table 9. Impact of the project on archaeological resources.

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								Cumulative	Status	RECOMMENDED MITIGATION MEASURES/ REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SP				M	D	S	I	R	P	TOTAL	SP
Cultural Heritage Impact Assessment																				
Ephemeral walling at LWUA 04.	Construction of the pipeline.	4	5	1	5	5	2	40	L	Low	Negative	• Monitoring during construction as outlined in Section 10.5. • Implementation of a chance find procedure for the project.	4	5	3	0	0	1	12	L

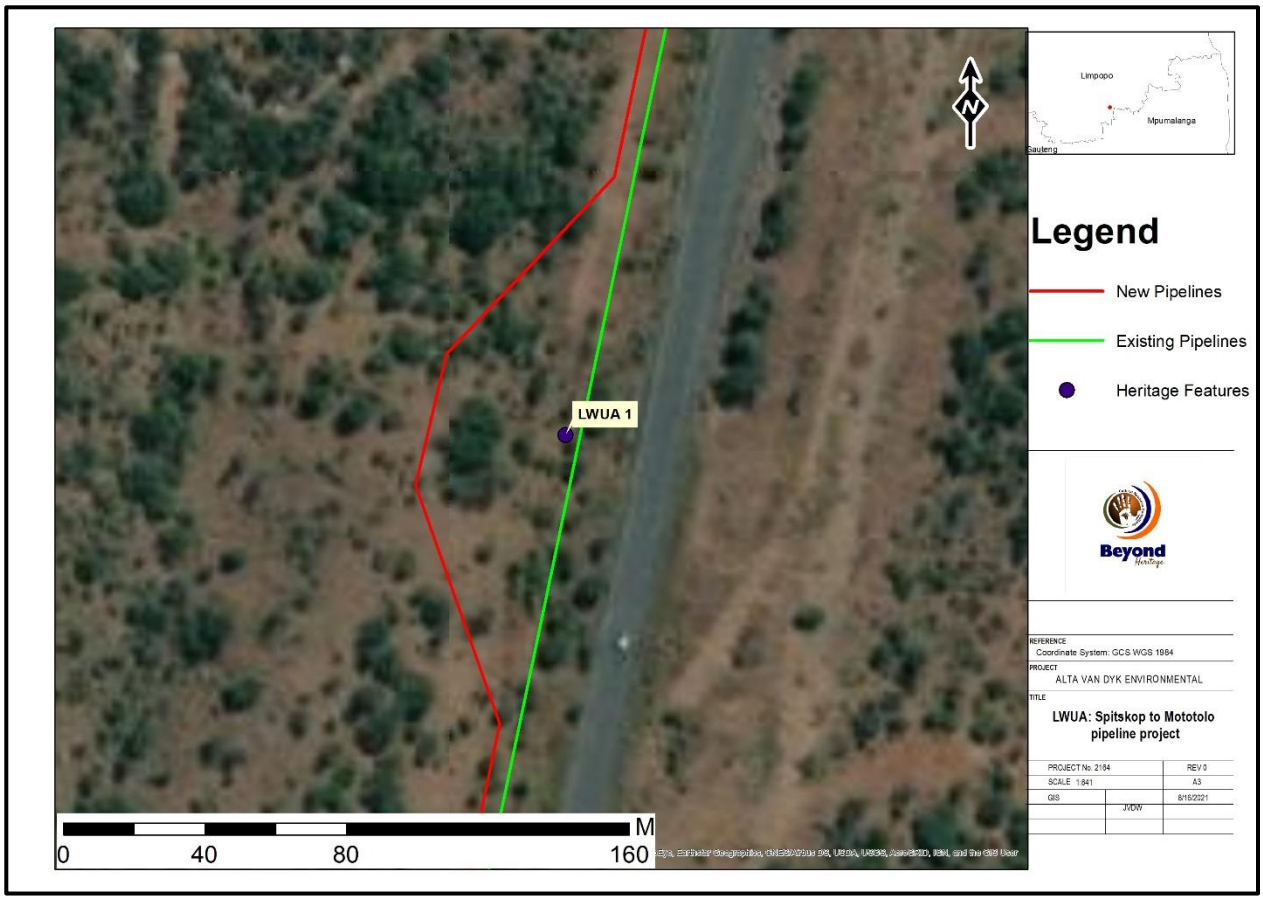


Figure 9.1. Site LWUA 1 in relation to the proposed pipeline.

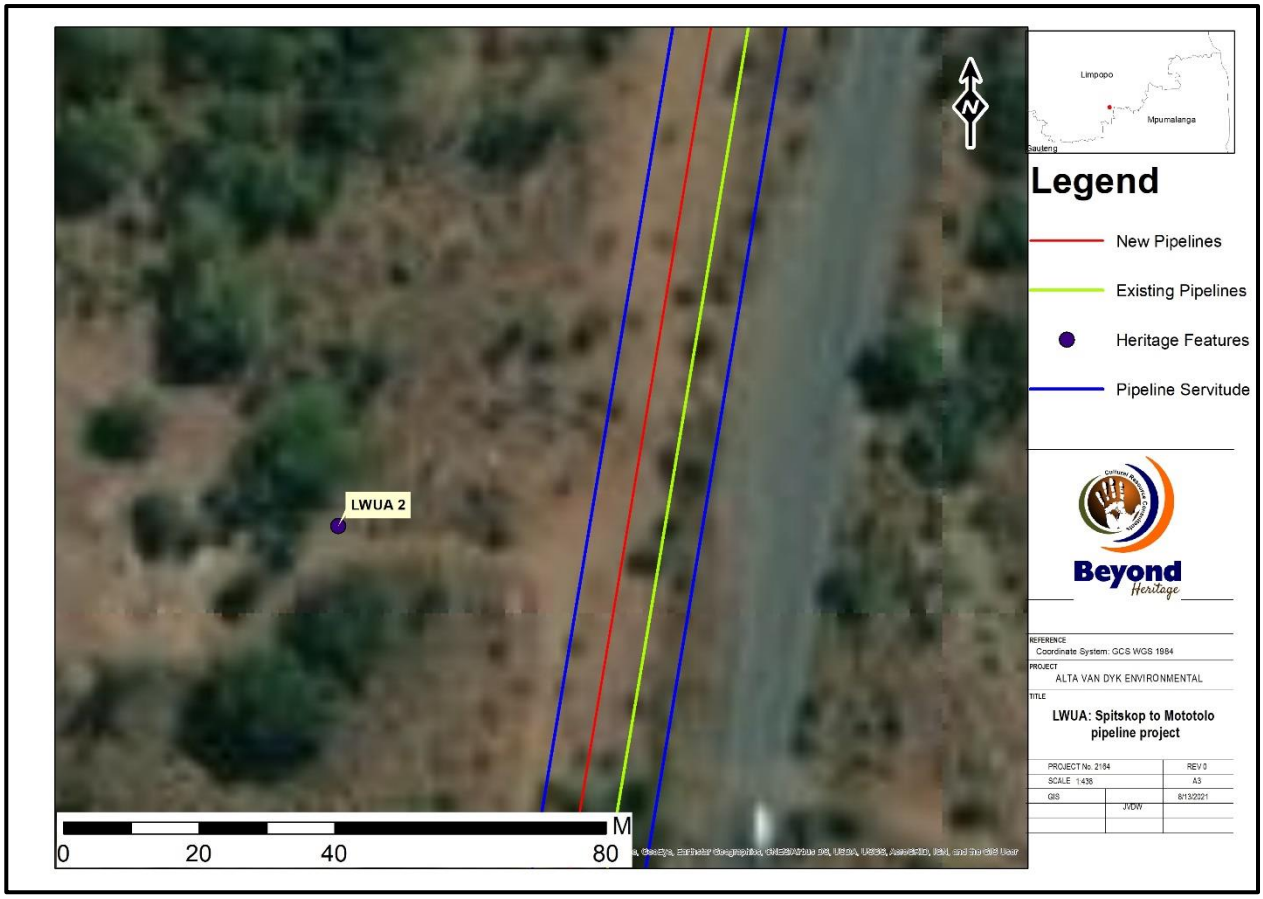


Figure 9.2. Site LWUA 2 in relation to the proposed pipeline.

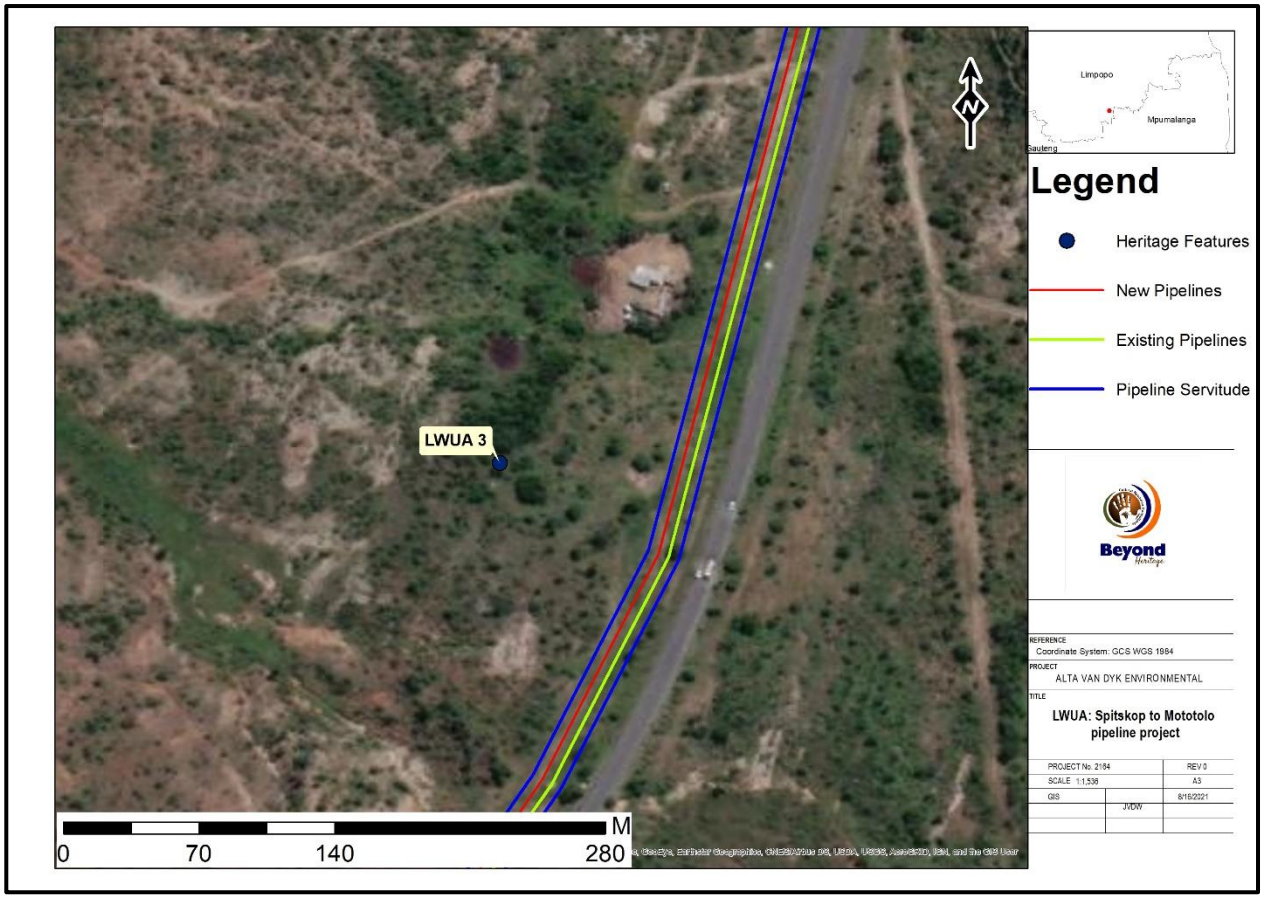


Figure 9.3. Site LWUA 3 in relation to the proposed pipeline.

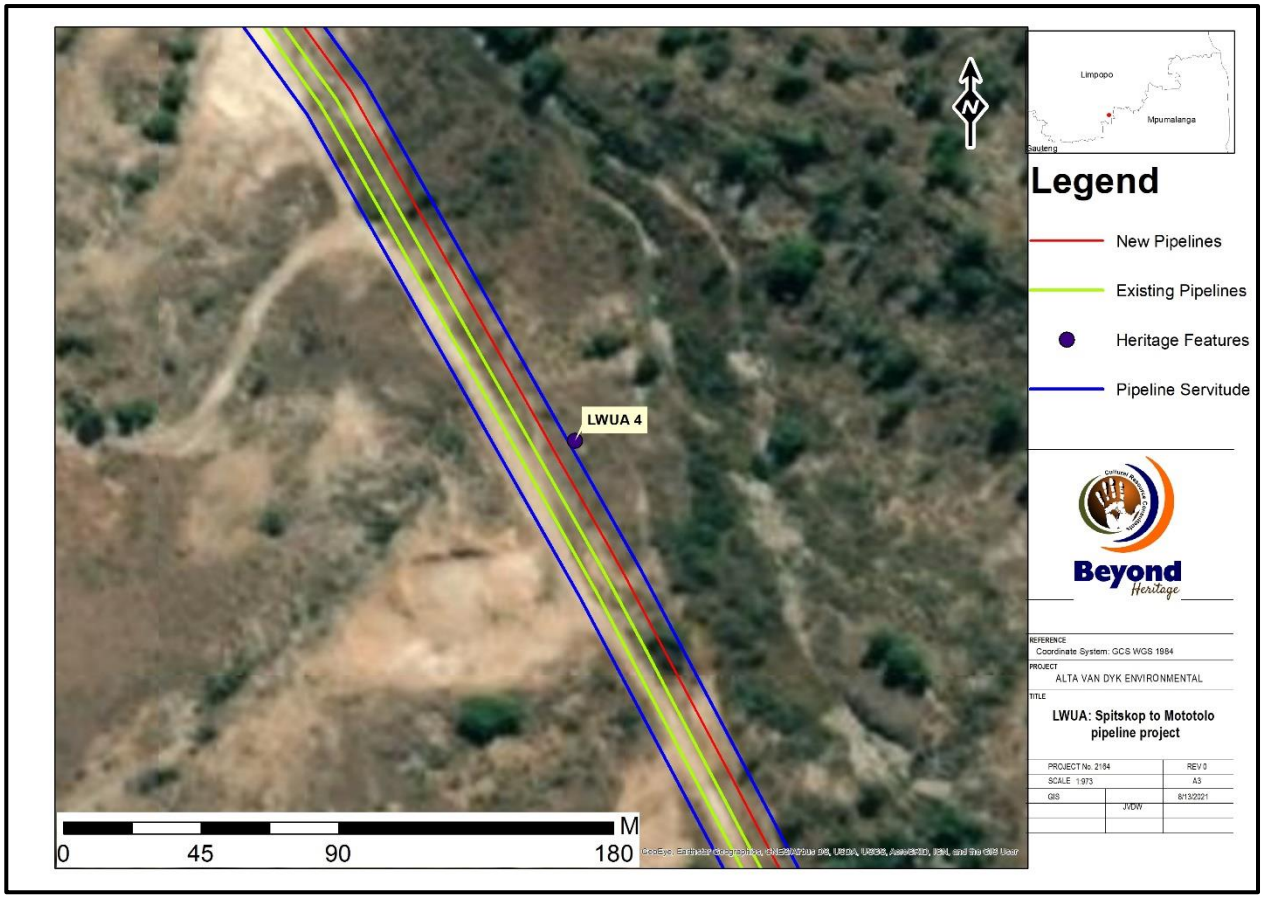


Figure 9.4. Site LWUA 4 in relation to the proposed pipeline.

10 Conclusion and recommendations

Previous disturbances relating to existing mining operations and pipeline are evident along the route and would have destroyed surface evidence of heritage sites within the existing servitude. However, three burial sites (LWUA 1 – LWUA 3) and possible ephemeral Iron Age stone packed terrace site LWAU 4 were recorded. The burial sites are all located further than 30 meters away from the pipeline servitude (Figure 9.1 to 9.3). Graves and cemeteries are of high social significance but as these features will be avoided and preserved no direct impact is expected. Site LWUA 4 is impacted on by the existing pipeline and pipeline servitude and it is not certain that this is indeed an archaeological site with surface features being destroyed by the existing pipeline. Although unlikely any impacts to subsurface heritage resources in this area can be successfully mitigated by implementing a chance find procedure.

The impact of the proposed project on heritage resources can be mitigated to an acceptable level and it is recommended that the proposed project can commence on the condition that the following recommendations are implemented as part of the EMPr, based on approval from SAHRA:

Recommendations:

- It is recommended that all recorded burial sites should be indicated on development plans and avoided by the development (with a 30 m buffer). If this is not possible the graves can be relocated adhering to all legal requirements;
- The recorded Iron Age feature should be monitored during construction;
- Implementation of a chance find procedure for the project as outlined below.

10.1 Chance Find Procedures

The possibility of the occurrence of subsurface 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 therefor chance find procedures should be put in place as part of the EMP. 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 SAHRA.

10.2 Reasoned Opinion

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made in this report. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project.

10.4 Potential risk

Potential risks to the proposed project are the occurrence of intangible features and unrecorded cultural resources (of which graves are the highest risk) or subsurface archaeological deposit. This can cause delays during construction, additional costs involved in mitigation.

10.5 Monitoring Requirements

Ideally, site monitoring should be conducted by an experienced archaeologist or heritage specialist. Day to day monitoring can be conducted by the Environmental Control Officers (ECO). The ECO or other responsible persons should be trained along the following lines:

- *Induction training:* Responsible staff identified by the developer should attend a short course on heritage management and identification of heritage resources.
- *Site monitoring and watching brief*: As most heritage resources occur below surface, all earth-moving activities need to be routinely monitored in case of accidental discoveries. The greatest potential impacts are the initial soil removal and subsequent earthworks during construction. The ECO should monitor all such activities daily. If any heritage resources are found, the chance finds procedure must be followed as outlined above.

Table 10. Monitoring requirements for the project

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Clearing activities and construction	Entire project area	ECO	Weekly (Preconstruction and construction phase)	Proactively	• If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented: 1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist/ palaeontologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. • Only recommence operations once impacts have been mitigated.

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Ephemeral Walling	LWUA 4	EAP/ Applicant	Weekly (Preconstruction and construction phase)	Proactively	• Measure levels of subsidence and compare with recorded baseline conditions; • Status quo will be recorded through photographs; and • Results will be reported in the progress reporting.

10.6 Management Measures for inclusion in the EMPr

Table 11. Heritage Management Plan for EMPr implementation

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General project area	Implement chance find procedures in case possible heritage finds are uncovered	Pre-Construction and construction	Throughout the project	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
LWU 1,2,3	All recorded graves and burial sites should be indicated on development plans and avoided. Ensure access to the sites during construction.	Pre-Construction and construction	Pre-Construction and construction	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	EO Checklist/Report
LWUA 4	Monitor Site during construction	Pre-Construction and construction	Pre-Construction and construction	Applicant EAP	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	EO Checklist/Report

10.7 Knowledge Gaps

Due to the subsurface nature of heritage resources, the possibility of discovery of heritage resources during the construction phase cannot be excluded, in addition it was not possible to walk the entire line due to access limitations within active mining areas and a river crossing and although unlikely heritage sites could occur in these areas. The limitations are successfully mitigated with the implementation of a chance find procedure.

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APPENDIX D3: SPECIALIST DECLARATION FORMS

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

SE2 Pipeline and associated infrastructure

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	THE BIODIVERSITY COMPANY			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	ANDREW HUSTLER			
Specialist Qualifications:	MSC			
Professional affiliation/registration:	SACNASP Pr Sci Nat 400213/11			
Physical address:	177 PERIDOT STR, JUKSKEI PARK			
Postal address:	AS ABOVE			
Postal code:	2158	Cell:	0813191225	
Telephone:		Fax:		
E-mail:	info@thebiodiversitycompany.com			

2. DECLARATION BY THE SPECIALIST

I, ANDREW HUSTLER, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

THE BIODIVERSITY COMPANY

Name of Company:

17/09/2021

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Andrew Hustler, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

The Biodiversity Company

Name of Company

17/09/2021

Date

Signature of the Commissioner of Oaths

17/09/2021

Date

Certified as a true copy of original

Farai Shadreck Mbirimi BD52805

Minister of Religion / Commissioner of Oaths

391 11th Road, Erand, Midrand 1685

Date 17/09/2021

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

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3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

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Environment House
473 Steve Biko Road
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Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	Beyond Heritage			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	EME Level 4	Percentage Procurement recognition	
Specialist name:	Jaco van der Walt.			
Specialist Qualifications:	MA Archaeology.			
Professional affiliation/registration:	ASAPHP #114 ASAPA #159.			
Physical address:	37 Olienhout street Modimolle.			
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Telephone:	082 373 8491.	Fax:		
E-mail:	jaco@heritageconsultants.co.za.			

2. DECLARATION BY THE SPECIALIST

I, Jaco van der Walt, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

Beyond Heritage.
Name of Company:

21/09/21
Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Jaco van der Walt swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

Beyond Heritage.
Name of Company

21/09/21
Date

Signature of the Commissioner of Oaths

21/09/2021
Date

FRANS ROOS
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