

# DRAFT BASIC ASSESSMENT REPORT

## FOR THE

### PROPOSED UPGRADE OF MAIN ROAD P278 AND ASSOCIATED BORROW PITS, LOCATED ON VARIOUS PROPERTIES WITHIN UMSHWATI LOCAL MUNICIPALITY, UMGUNGUNDLOVU DISTRICT, KWAZULU-NATAL

*Draft*

**EDTEA Reference: DC22/0007/2021 KZN/EIA/0001532/2021**



**March 2021**

Applicant:	Engineering Consultant:	Environmental Consultant:
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# 1 Introduction

*Enviroedge* has been commissioned to undertake an Environmental Impact Assessment and Water Use Licence Application for the KwaZulu-Natal Department of Transport by Samani Consulting Engineers for the proposed upgrade of Main Road P278 and the establishment of two borrow pits. The proposed development will require an Application for Environmental Authorisation in the form of a Basic Assessment, (BA), which includes a Basic Assessment Report, (BAR), and a Comments and Responses Report, (CRR), which will be submitted to the Department of Economic Development Tourism and Environmental Affairs, (DEDTEA), for Environmental Authorisation, (EA). The Water Use Licence and Borrow Pits will form separate application processes.

This Basic Assessment process is being undertaken in accordance with Sections 19 – 20 in terms of part 2 of chapter 4 of the National Environmental Management Act, (Act No 107 of 1998), as amended, and the Environmental Impact Assessment Regulations of December 2014, as amended 2017. These Regulations identify various activities which may have a substantial detrimental effect on the environment. In addition, the Regulations list procedures for assessing potential associated environmental impacts. Public participation and the scoping of issues form part of these procedures, the results of which are captured in this, the Basic Assessment Report. The Water Use Licence Application will be undertaken in accordance with the National Water Act, (Act 36 of 1998), and associated GN 126, and the two Borrow Pit applications will be undertaken in accordance with the Department of Mineral Resources requirements.

**EDTEA Reference: DC22/0007/2021 KZN/EIA/0001532/2021**

## 1.1 Details of the EAP

*Enviroedge* was established in 2012 and has a record of undertaking independent environmental processes for a range of clients in compliance with the requirements of the various competent authorities. In this respect we reiterate the declaration of independence made in the application form for this project assented to and lodged with the competent authority.

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Fax:	086 654 6598

Names and details of the expertise of each representative of the EAP involved in the preparation of this report are provided below. *Curricula Vitae* will be provided on request.

Name of representative of the EAP	Educational qualifications	Professional affiliations	Environmental assessment experience (yrs)
Karin Samouilhan	B.A., Pr L.Arch	IAIAsa, SACLAP, CBE	24 years

Names and details of the expertise of each specialist that has contributed to this report:

Name of specialist	Education qualifications	Field of expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in <b>Appendix C</b>
Alex Whitehead	BSc(Hons) Pr.Sci.Nat	Terrestrial and Aquatic Ecology	Appendix C	Wetland and Surface Water Assessment Proposed Upgrade of P278, Dalton, Umshwati Local Municipality
Gavin Anderson	M. Phil (Archaeology and Social Psychology), UCT	Heritage and Palaeontological	Appendix C	Heritage Survey of the Upgrading of Main Road 278 and Two Borrow Pits, including Palaeontological Sensitivity
Bradley Hariram	Geotechnical Engineer	Geotechnical	Appendix C	Results of a Founding Investigation for Two Proposed culverts along Gravel Road P 278 Phase 1 (km 0+000 to km 11+000), near Dalton, KwaZulu-Natal
Francis Smith	Pr. Sci. Nat.			

Name of specialist	Education qualifications	Field expertise	Section/ s contributed to in this basic assessment report	Title of specialist report/ s as attached in <b>Appendix C</b>
Rahul Shriram		Geotechnical	Appendix C	Report on the Geotechnical Investigation Carried Out for the Upgrade of Road P278 in KwaZulu-Natal

## 1.2 Location of the Activity

The project area is situated approximately 35 km north-east of the Pietermaritzburg CBD, 11km north east of Wartburg and 2km east of Dalton, within a commercial sugar cane and agricultural area. The project area extends into Wards 1, 3 and 7 of the Umshwati Local Municipality, uMgungundlovu District Municipality. The start point of the P278 Road upgrade is at the junction of the P157 and P156-1 roads, at the start co-ordinates: 29°21'18.31" S 30°39'20.99" E. The project includes the sourcing of gravel material from two potential Borrow Pits (BP). BP 1 is located on Portion 26 of the Farm Paardfontein 1299 at co-ordinates: 29°16'34.45" S 30°40'46.57" E, and BP2 on Portion 14 of the Farm Paardfontein 1299 at co-ordinates: 29°17'5.84" S 30°42'26.2" E. The R33 Road lies 11km north-west of the site and the R 614 Road, at 3.5km east of the site.

The Manzanymya and Pambanyoni Rivers lie to the north-west of the road site. Watercourse 1 in the southern portion of the road is located directly on a non-perennial tributary of the Manzanymya River which drains in a north easterly direction to meet the Pambanyoni River 4.8km downstream. The Pambanyoni River then feeds into the perennial Khamanzi River 9km to the north. Watercourse crossings 2, 3 and 4 are located directly on non-perennial tributaries of the Mtizane River, which drain in a north easterly direction to meet the Khamanzi River 8.5km to the north. The Albert Falls Dam is located 23km south-west of the road start point and the Blinkwater Nature Reserve 20km north-west of the road start point. The road route is relatively flat with steeper sections at the watercourse crossing points.



**Table 1: Project Proponent and Site Details**

<b>Applicant</b>	
<b>Trading name</b>	KwaZulu-Natal Department of Transport
<b>Contact person</b>	Ms P. F. Sibiya
<b>Postal address</b>	224 Prince Alfred Street, Pietermaritzburg, 3201
<b>Telephone</b>	033 355 0584
<b>Facsimile</b>	-
<b>E-mail</b>	<a href="mailto:Khumbu.Sibiya@Kzntransport.gov.za">Khumbu.Sibiya@Kzntransport.gov.za</a>
<b>Property Details</b>	
<b>Property Details</b>	Please refer to table overleaf
<b>Property Owner</b>	Please refer to table overleaf
<b>SG 21 Code</b>	Please refer to table overleaf
<b>Land Use / Zoning</b>	Agricultural
<b>Title Deed</b>	Please refer to table overleaf
<b>Physical Address</b>	P278 Road starting from the junction of the P157 and P156-1 roads, at the start co-ordinates: 29°21'18.31" S 30°39'20.99" E; and ending at the junction with the P 158 Road at co-ordinates: 29°18'32.17"S; 30°44'31.51"E.
<b>Coordinates</b>	Start point co-ordinates: 29°21'18.31" S 30°39'20.99" E Centre point co-ordinates, (approximate): 29°19'49.88"S; 30°42'11.00"E End point co-ordinates: 29°18'32.17"S; 30°44'31.51"E
<b>Local Municipality</b>	Umshwati Local Municipality
<b>District Municipality</b>	uMgungundlovu District Municipality
<b>Province</b>	KwaZulu-Natal
<b>Neighbouring Landuses</b>	
<b>North</b>	Agricultural area
<b>East</b>	Semi-Rural area
<b>West</b>	Semi-Rural area
<b>South</b>	Semi-Rural area
<b>Water Catchment Management Area</b>	U20G Quaternary Catchment - southern section of the road U40C Quaternary Catchment - majority of the road U40E Quaternary Catchment - north-eastern end of the road uMvoti to uMzimkhulu WMA
<b>Quaternary Drainage Region</b>	U20G Quaternary Catchment - southern section of the road U40C Quaternary Catchment - majority of the road U40E Quaternary Catchment - north-eastern end of the road

**Table 2: List of Affected Properties km 0,0 – km 11,0 – small sections of realignment and expropriation outside of the existing DOT road reserve**

	Property Name	Owner Name	Contact Details		
			Name	Tel	Email
1	Portion 11 Of The Farm Lot 50 No. 1865 SG 21 Code: NOFT00000000186500011	Neil Wittig Family Trust No. 1628/94	Neil Wittig	082 645 8705	erwtrust@gmail.com
2	Portion 2 Of The Farm Lot 55 No. 1796 SG 21 Code: NOFT00000000179600002	Neil Wittig Family Trust No. 1628/94	Neil Wittig	082 645 8705	erwtrust@gmail.com
3	Portion 14 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600014	ME Schroeder Trust No. IT 1559/97	Kevin	084 601 6147	kevin@mkschroder.co.za
4	Portion 8 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600008	ME Schroeder Trust No. IT 1559/97	Kevin	084 601 6147	
5	Portion 10 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600010	Soltau Farm Trust No. IT 2272/95	Werner Schroder	082 772 4344	admin@wrfarming.co.za
6	Portion 35 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600035	Eugen Thies Family Trust No. IT 2506/94	Eugene Thies	082 824 1137	ethies@ipfone.co.za
7	Portion 30 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600030	Lilienthal Property Holdings cc Np CK 86/07628/23	Kevin Schroder	As above	As above
8	Portion 26 Of The Farm Dalton No. 2366 SG 21 Code: NOFT00000000236600026	Wonderfontein Farm Trust No. 9061/92	Ronald Schroder		
9	Portion 2 Of The Farm Paderborn No. 1323 SG 21 Code: NOFT00000000132300002	Not available			
10	Remainder Of The Farm Paderborn No. 1323 SG 21 Code: NOFT00000000132300000	Stegen Property Trust No. IT 46/2001	Jimmy Stegen	084 588 2210	stegen@mweb.co.za
11	Portion 1 Of The Farm Paderborn No. 1323 SG 21 Code: NOFT00000000132300001	RM Mark Family Trust No 3712/94	Mark Meyer	082 373 3183	mfarmingtrust@gmail.com

**Table 3: List of Affected Properties km 0,0 – km 11,0 – within the existing DOT road reserve, (no expropriation required)**

	Property Name	Owner Name	Contact Details		
			Name	Tel	Email
1	Portion 9 Of The Farm Lot 50 No. 1865	Neil Wittig Family Trust No. 1628/94	Neil Wittig	082 645 8705	erwtrust@gmail.com
	SG 21 Code: N0FT00000000186500009				
2	Portion 3 Of The Farm Lot 55 No. 1796	Sharp Move Trading 32 CC	Johann Eckhard Klipp Walter Peter Klipp		
	SG 21 Code: N0FT00000000179600003				
3	Remainder of the Farm Jaagbaan No 17524	Illovo Sugar (South Africa) Proprietary Limited			
	SG 21 Code: N0FT000000001752400000				
4	Portion 63 Of The Farm Dalton No. 2366	No details available			
	SG 21 Code: N0FT00000000186500009				
5	Portion 4 Of The Farm Dalton No. 2366	Lilienthal Freese Trust-Trustees	Walter Bernard Freese		
	SG 21 Code: N0FT00000000236600004				
6	Portion 24 Of The Farm Dalton No. 2366	Land Bank	Johannes Otto Schroder		
	SG 21 Code: N0FT00000000236600024				

### 1.3 Development Proposal

Enviroedge has been commissioned by Samani Consulting Engineers for the KwaZulu-Natal Department of Transport to undertake an Environmental Impact Assessment and Water Use Licence Application for the proposed Upgrade of Main Road P278 and the establishment of two borrow pits in the form of a Basic Assessment Report, (BAR), and a Comments and Responses Report, (CRR), which will be submitted to the Department of Economic Development Tourism and Environmental Affairs, (DEDTEA), for Environmental Authorisation, (EA). The Water Use Licence and Borrow Pits will form separate application processes.

This Basic Assessment process is being undertaken in accordance with the National Environmental Management Act (Act No 107 of 1998), as amended, and the Environmental Impact Assessment Regulations of December 2014, as amended April 2017. These Regulations identify various activities which may have a substantial detrimental effect on the environment. In addition, the Regulations list procedures for assessing potential associated environmental impacts. Public participation and the scoping of issues form part of these procedures, the results of which are captured in this, the Basic Assessment Report.

The project area extends into Wards 1, 3 and 7 of the Umshwati Local Municipality, Umgungundlovu District Municipality. The project site area is situated approximately 35 km north-east of the Pietermaritzburg CBD, 11km north east of Wartburg and 2km east of Dalton.

The proposed Upgrade of Main Road P278, aims to allow local residents, farmers and all road users to have improved vehicular access to their farms, homes, schools, shops and the extended road network, including improved and more efficient access to hospitals and emergency services. The proposed road upgrade will include the upgrading of 11 km of road from gravel to black top road, anticipated to be 8.5m wide with new drain widths of an average of 2.4m wide on either side, 4 watercourse crossings upgrades, storm water improvements, some minor re-alignment sections along the road length, which fall outside of the existing DOT servitude and which will require small sections of expropriation outside of the existing DOT road reserve, including a minor horizontal realignment at km 3,8. There will also be alignment and safety improvement of existing intersections along the road length. The majority of the road will, however, fall within the existing DOT servitude. The proposed Main Road P278 upgrade will create an efficient link between existing gravel and tar roads, including the P156-1, P157, P63, P159, D87, P158 and the R614 Wartburg Road.

Watercourse crossing 1 is located on a non-perennial tributary of the Manzanyma River which drains in a north easterly direction to meet the Pambanyoni River 4.8km downstream. The Pambanyoni River then feeds into the perennial Khamanzi River 9km to the north. Watercourse crossings 2, 3 and 4 traverse non-perennial tributaries of the Mtizane River, which drain in a north easterly direction to meet the Khamanzi River 8.5km to the north. The project is located within the U40C quaternary catchment. The locations of the proposed watercourse crossings are provided below.

	Latitude (dms)	Longitude (dms)	Km
WC1	29° 20' 23.435" S	30° 41' 24.598" E	3.9
WC2	29° 19' 21.141" S	30° 42' 38.540" E	6.9
WC3	29° 18' 57.084" S	30° 43' 34.312" E	8.6
WC4	29° 18' 46.030" S	30° 43' 46.144" E	9.1

#### 1.3.1 Portal Culvert Crossings (2) WC1 and WC3:

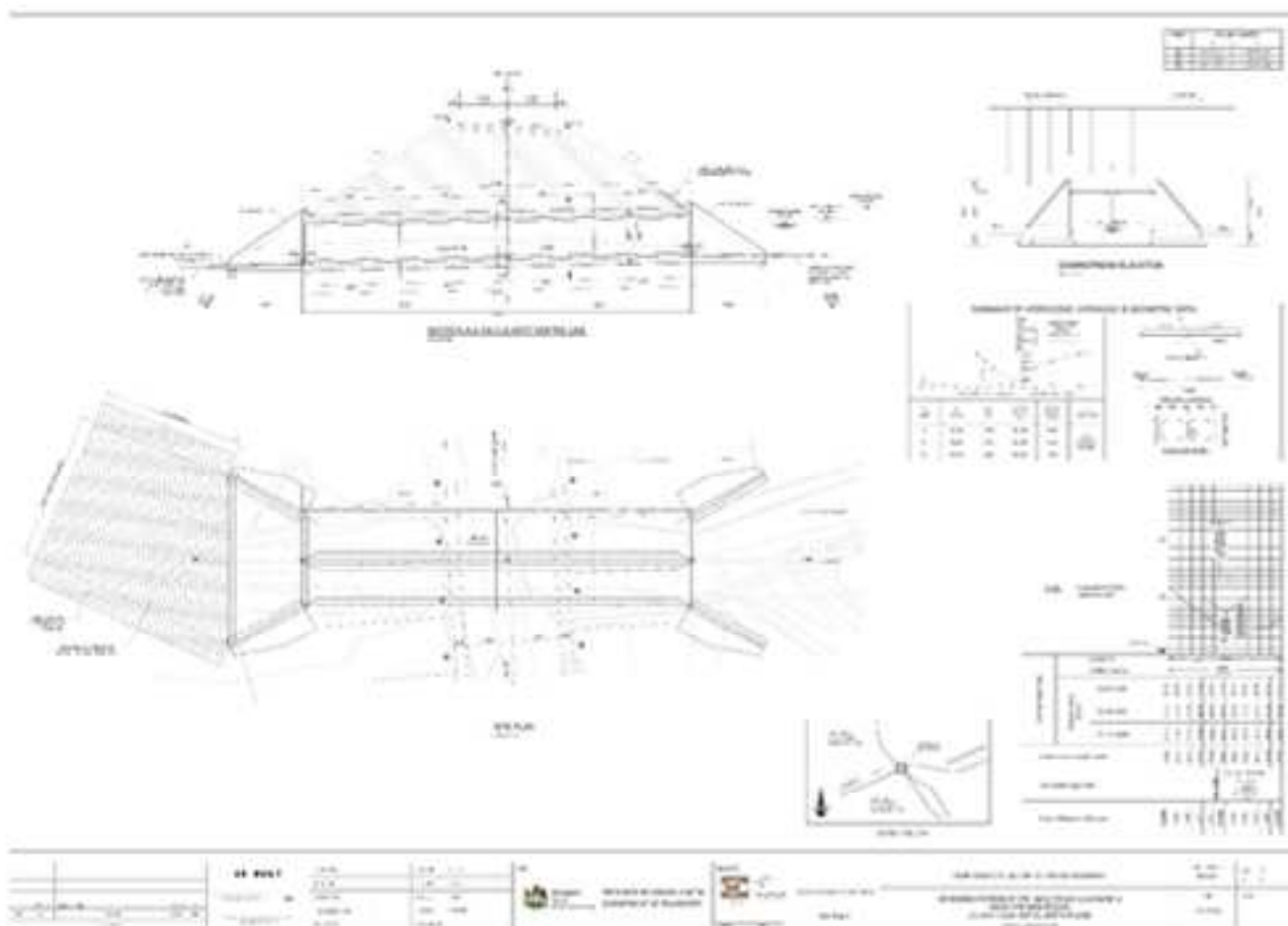
##### 1.3.1.1 Watercourse Crossing 1 (WC1)

Watercourse Crossing 1 proposed culvert comprises two cells of 3,6m x 3,6m concrete portal culverts in 4 sections 8,613m in length, total length of 34,45m. The culverts will have a top 650mm thick x 8,95m wide x 34,45m long concrete slab and a base 650mm thick x 8,95m wide x 34,45m long concrete slab with reinforced concrete wingwalls at each end at 6,468m length x 4,9m height splayed at each side to match the stream. A

300mm thick reno mattress embankment protection will be installed above the concrete culvert on the inlet side at 1,1m vertical height, but 3m minimum width by 8,95m total length. At the inlet base, a 300mm thick reno mattress will be installed as scour protection to tie into the existing streambed, approximately 4m length by 16m wide tapered edges to suit the upper streambed. On the outlet side of the proposed portal culvert structure a 300mm thick reno mattress with geotextile scour protection will be installed at approximately 15m width x 13 – 16m length to tie into the existing streambed. On each side of the 300mm thick reno mattress with geotextile scour protection, 2m wide x 13-16m length gabion box basket structures will be installed with geotextile scour protection to tie into the existing streambed.

The new type 4 black top road will cross over above the new concrete portal culvert structure on compacted base material with 1:1.5 slopes on either side. The total dimensions of the concrete portal culvert structure will be 8,95m wide x 34,45m long x 4,9m height with 6,468m wing walls at each end, trapezoidal shaped apron slab and reno mattress details on either end.

The proposed culvert causeway construction and operation is not considered water intensive, and, as such water will only be utilised for drinking purposes for construction workers. Concrete required for concrete works will be obtained by ready mix concrete trucks. It is expected that approximately 30 litres of water per worker per day will be obtained commercially and brought to site during the construction phase. Owing to the localised nature of the project, low intensity of construction traffic and existing road infrastructure, limited dust suppression is anticipated.



**Figure 1 : Watercourse Crossing 1 - Layout**

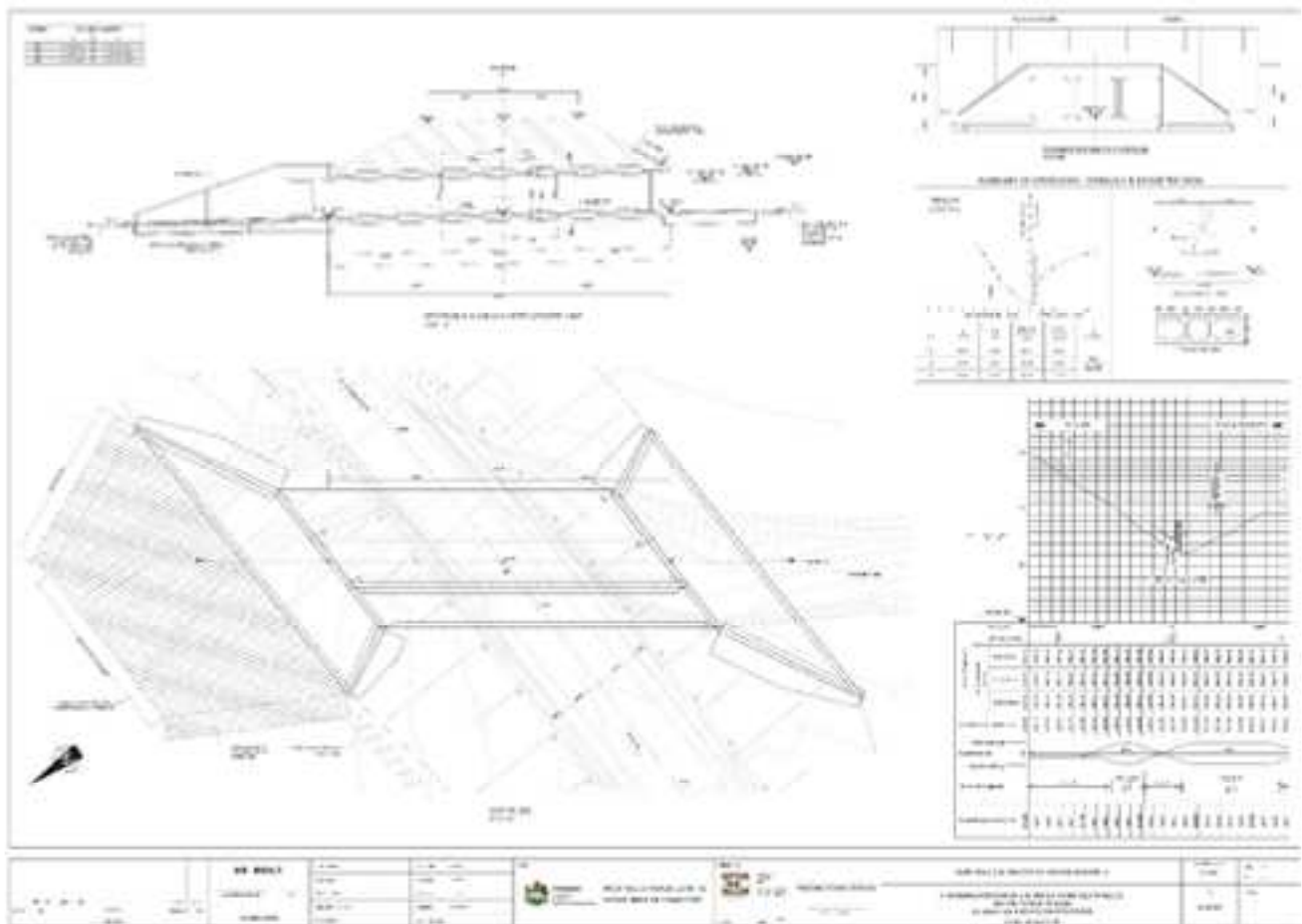
### 1.3.1.2 Watercourse Crossing 3 (WC3)

Watercourse Crossing 3 proposed culvert comprises three cells of 3,6m x 3,6m concrete portal culverts in 3 sections from south to north in direction of flow: 9,964m in length, 10,002m in length and 10,036m in length, total length of 30,194m. The culverts will be set "skew" to the road sense at 38.3°, as opposed to perpendicular, in order to accommodate the river flow beneath the road. The culverts will have a top 500mm thick x 12.7m wide x 30.194m long concrete slab and a base 500mm thick x 12.7m wide x 30,194m long concrete slab with reinforced concrete wingwalls at each end at approximate 10.1m length, (longer splayed side), x 4,9m height splayed at

each side to match the stream. A 300mm thick reno mattress embankment protection will be installed above the concrete culvert on the inlet side at 1,1m vertical height, but 3m minimum width by 12.7m total length. At the inlet base, a 300mm thick reno mattress will be installed as scour protection to tie into the existing streambed, approximately 5m length by 14.5m wide tapered edges to suit the upper streambed. On the outlet side of the proposed portal culvert structure a 300mm thick reno mattress with geotextile scour protection will be installed at approximately 13m width x 13m, (minimum) – 19m length to tie into the existing streambed. On each side of the 300mm thick reno mattress with geotextile scour protection, 2m wide x 13m, (minimum) - 19m length gabion box basket structures will be installed with geotextile scour protection to tie into the existing streambed.

The new type 4 black top road will cross over above the new concrete portal culvert structure on compacted base material with 1:1.5 slopes on either side. The total dimensions of the concrete portal culvert structure will be 12.7m wide x 30.194m long x 4,9m height with 10.1m wing walls at each end, trapezoidal shaped apron slab and reno mattress details on either end.

The proposed culvert causeway construction and operation is not considered water intensive, and, as such water will only be utilised for drinking purposes for construction workers. Concrete required for concrete works will be obtained by ready mix concrete trucks. It is expected that approximately 30 litres of water per worker per day will be obtained commercially and brought to site during the construction phase. Owing to the localised nature of the project, low intensity of construction traffic and existing road infrastructure, limited dust suppression is anticipated.



**Figure 2: Watercourse Crossing 3 - Layout**

### **1.3.2 Concrete Culvert Pipe Crossings (2) WC2 and WC4:**

#### **1.3.2.1 Watercourse Crossing 2 (WC2)**

Watercourse Crossing 2 proposed pipe culvert comprises 2 x 900mm Ø x 15m length concrete pipes with headwalls and gabions to suit and reno mattress as scour protection at outlet.

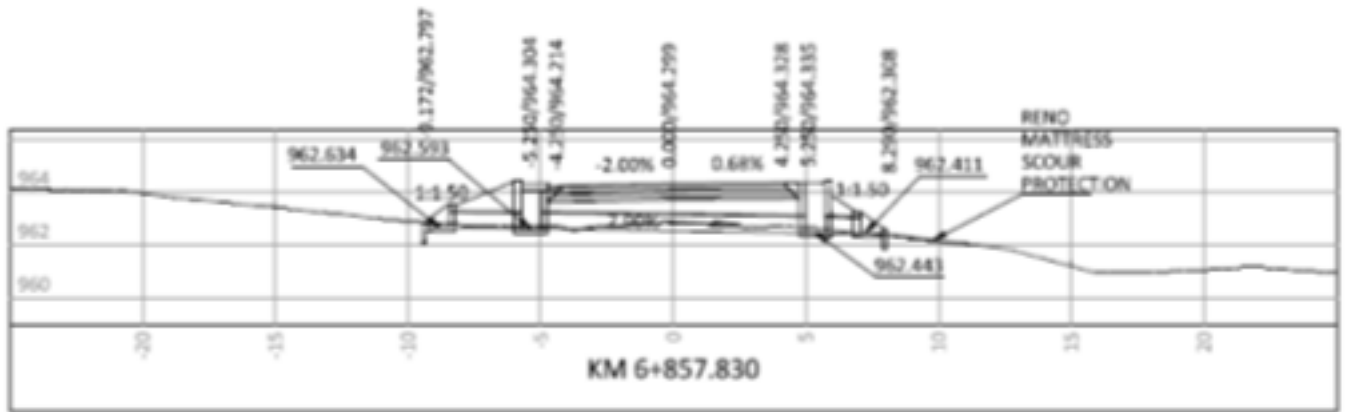


Figure 3: Watercourse Crossing 2 - Detail

### 1.3.2.2 Watercourse Crossing 4 (WC4)

**Watercourse Crossing 4** proposed pipe culvert comprises 2 x 900mm Ø x 15m length concrete pipes with headwalls and gabions to suit and reno mattress as scour protection at outlet.

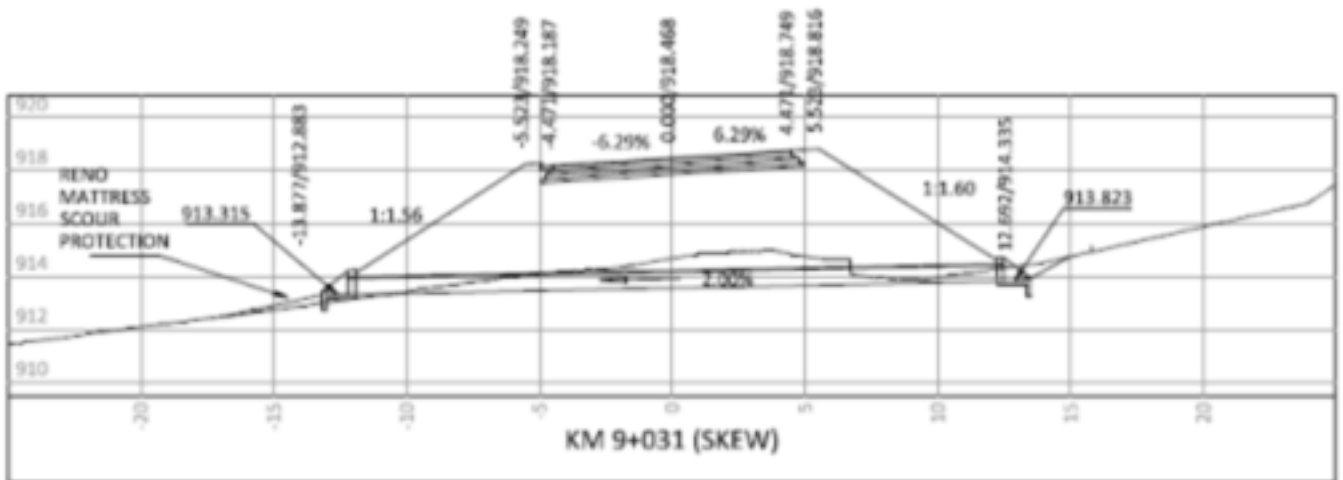


Figure 4: Watercourse Crossing 4 - Detail



Recent photographs of the study site are included below.



**Plate 1: At Start point of P278 Road along the P156 Road looking north-east along the P278 Road.**



**Plate 2: On the P278 Road overlooking Watercourse Crossing 1 looking north-east.**



**Plate 3: Central intersection of the P278 Road with Seven Oaks Road/Fawnleas Road, 800m north-east of New Hanover central.**



**Plate 4: On the P278 Road overlooking Watercourse Crossing 2 looking north-east.**



**Plate 5: On the P278 Road overlooking Watercourse Crossing 3 looking east.**



**Plate 6: On the P278 Road overlooking Watercourse Crossing 4 looking north.**



**Plate 7: At the end point of the P278 Road, along the P158 Road overlooking the T junction looking west along the P278 Road.**





## 1.4 Description of the Scope of the Proposed Activity

The proposed development triggers identified activities in terms of Listing Notice 1 Government Notice No. 327 and Listing Notice 3 Government Notice No. 324, as amended 2017, of the National Environmental Management Act, 1998 (No. 107, 1998).

Description of Listed Activity	Applicability
<p><b><u>Listing Notice 1</u></b> No. 327, as amended, 2017</p> <p><b>Activity 19.</b> The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from –</p> <p>(i) a watercourse.</p>	<p>The construction of the four proposed concrete portal culvert structures and pipe culvert structures, will require the infilling, depositing, and excavation of more than 10m<sup>3</sup>, therefore, Activity 19 is triggered.</p>
<p><b><u>Listing Notice 3</u></b> No. 324, as amended, 2017</p> <p><b>Activity 12.</b> The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>The road and culvert structures will require the clearance of an area of 300 square metres or more of indigenous vegetation in KwaZulu-Natal in a sensitive area identified in the Umgungundlovu District Municipality Environmental Management Framework, therefore, Activity 12 is triggered.</p>
<p><b><u>Listing Notice 3</u></b> No. 324, as amended, 2017</p> <p><b>Activity 18.</b> The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.</p>	<p>The road will be widened by more than 4 metres in KwaZulu-Natal in a sensitive area identified in the Umgungundlovu District Municipality Environmental Management Framework, therefore, Activity 18 is triggered.</p>
<p><b><u>Listing Notice 3</u></b> No. 324, as amended, 2017</p> <p><b>Activity 23.</b> The expansion of-</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; Where such expansion occurs-</p> <p>(a) <i>Within a watercourse;</i> (b) <i>In front of a development setback adopted in the prescribed manner; or</i> (c) <i>If no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p>	<p>The road and culvert structures will be expanded by 10 square metres or more, within a watercourse, in KwaZulu-Natal in a sensitive area identified in the Umgungundlovu District Municipality Environmental Management Framework, therefore, Activity 23 is triggered.</p>

## 1.5 Approach

In order to meet the objectives of the environmental assessment study, the following activities were undertaken:

- Consultation with representatives of Umshwati Local Municipality to establish the nature and extent of the proposed activity
- Identification of legislation, regulations and guidelines pertaining to the proposed activity
- A baseline desktop survey
- Site visits to the area to determine the nature of the affected environment and to identify potential issues of concern
- An identification and assessment of the physical, biological, social, economic and cultural aspects of the environment that may be affected by the proposed activity
- The identification and assessment of any feasible and reasonable alternatives
- Identification and liaison with key Interested and Affected Parties, (IAPs)
- Advertisement in the local press, placement of notices on site, distribution of pamphlets and Background Information Documents (BIDs); and,
- The compilation of this document, the Basic Assessment Report.

Please Note: The Public Participation Process for the project and comment timeframes have been extended because of the Covid 19 Lockdown and National State of Disaster in South Africa since 26<sup>th</sup> March 2020.

### Thereafter:

- Circulation of the Draft Basic Assessment Report for comment
- Updating of the Draft Basic Assessment Report to Final to include all comments received after circulation of the draft document.

It is likely that these timeframes will be further extended with the Covid 19 Lockdown and National State of Disaster in South Africa since 26<sup>th</sup> March 2020.

## 2 Need and Desirability of the Proposed Development

The project aims to provide safer vehicular and pedestrian access for all road users. Watercourse crossing 1 is located on a non-perennial tributary of the Manzanyma River which drains in a north easterly direction to meet the Pambanyoni River 4.8km downstream, while Watercourse crossings 2, 3 and 4 traverse non-perennial tributaries of the Mtizane River, which drain in a north easterly direction to meet the Khamanzi River 8.5km to the north. The project aim is to upgrade and improve the existing 11km of gravel road to all-weather black top road as well as improve and upgrade two pipe culvert crossings and two bridge structures. The old structures will be replaced and upgraded in order to improve safety and access for the local community and all road users. The project area extends into Wards 1, 3 and 7 of the Umshwati Local Municipality, uMgungundlovu District Municipality. The Noodsberg Sugar Mill is located along the southern section of the road on the south-eastern side. This mill has associated heavy machinery, trucks, equipment and sugar cane trucks delivering to the mill and transporting away from the mill, with some vehicles utilising the P278 Main Road to do so. The proposed road upgrade would improve road safety for all road users, in particular when large trucks and machinery or equipment are being transported. Dust from the gravel road would be significantly reduced and the improved road surface would result in less wear and tear for vehicles of residents/workers or frequent road users.

The proposed Upgrade of Main Road P278 to black top road will provide an improved formal link to existing gravel access roads between farms, farming facilities, settlements and towns in the surrounding area, as well as improved and more efficient access to hospitals, emergency services and the extended road network through the implementation and establishment of the P278 Road Upgrade project. The improvement and upgrade of the four existing road watercourse crossings will also help to reduce embankment erosion and sedimentation and improve road safety for all road users.

## 3 Preferred Site, Activity and Technologies

As the preferred site already has the existing P278 gravel road extending from the P156-1 in the south-west to the P158 in the north-east crossing a non-perennial tributary of the Manzanyma River at Watercourse Crossing 1 and three non-perennial tributaries of the Mtizane River at Watercourse Crossings 2, 3 and 4, it is preferable to develop this site, as opposed to developing an entirely new road and servitude. The existing P278 gravel road is located, for the most part, within an existing road servitude. Small sections of realignment are required at intersections and along the road length as well as at Watercourse Crossing 3, and these realignment sections will require small sections of expropriation, outside of the existing road servitude. It is also preferable to develop the existing road crossing sites, rather than developing at an entirely new location crossing at an alternative position, with associated clearing and access from either side of the proposed culvert or bridge. The proposed Upgrade of Main Road P278 which includes 4 watercourse crossing upgrades will provide a more efficient link to the surrounding road network and area and to towns, settlements and communities and hospitals and emergency services within the area of Dalton.

The preferred site has an existing gravel road with four existing watercourse crossings, three of which are old pipe culvert crossings and one an old bridge, (Watercourse Crossing 3). The proposed Upgrade of Main Road P278 and the four watercourse crossing points will help to ensure adequate and safe crossing areas during high rainfall and flood events. The proposed upgrade of the existing road from gravel to black top road, including small sections of realignment, four new watercourse crossing upgrades and improvement and upgrade to minimum design standards will provide a safer and more reliable road for all road users. Alternative methodologies may be available; however, the proposed method is deemed the most cost-effective and sustainable solution. Please see Appendix B for detailed design.

## **4 Alternatives**

### **4.1 Site Alternatives**

No alternative sites have been considered as the proposed Upgrade of Main Road P278 and four watercourse crossings are site specific so as to service the communities of Wards 1, 3 and 7 of the Umshwati Local Municipality, and the surrounding areas. The proposed road upgrade and four watercourse crossings will provide an improved vehicular link for all road users in the Dalton area, as well as a more efficient route to the extended regional transportation network.

### **4.2 Technological/Design Alternatives**

Design, layout and configuration of South African roads is standard and these standards are utilised by developers such as the Department of Transport; alternatives are likely to be inferior.

The current gravel road and watercourse crossings might be considered an alternative option which could be repaired and expanded, however, the gravel road and existing watercourse crossings would require regular repair and maintenance and the road alignment would remain the same, as well as the road surface and the same issues resulting from vehicle use would be likely to reoccur. The road, as well as the watercourse crossings would eventually require a more permanent solution which does not require regular repair or maintenance. Repairing the existing watercourse crossing structures and the road length might be less costly in the short term, but potentially more costly long term, as regular repair and maintenance would be required. The cost to human safety and all road users during this timeframe must also be considered. The road is a main link road and a sugar cane factory is located along the road length, in the southern portion.

In addition, the repair or replacement of the existing watercourse crossing structures would have similar environmental impacts in terms of the aspects affected, although on a potentially smaller scale. For these reasons, the repair or replacement of the existing watercourse crossing structures with the same infrastructure is not considered feasible, and has, thus, not been assessed, as it is unlikely that this would provide a safer road and watercourse crossing structures for all road users and the local people of the area.

### **4.3 No-Go Alternative**

Leaving the gravel road and the watercourse crossing structures in their current condition is regarded as the No-Go Alternative. This alternative would have the least direct impact on the environment, as none of the construction related impacts would occur. Indirectly however, this alternative may eventually result in injury, or the loss of life during heavy rainfall events. This alternative may also result in the complete erosion of the watercourse crossing structures and embankments as well as the road surface and edges and the eventual wash-away of the road surface and entire watercourse crossing structures. This would then necessitate costly emergency repairs. The road is frequently utilised by both heavy vehicles and passenger vehicles and there is a need to improve the road and road safety for all users as part of the government and the municipality's responsibility to its constituents. The No-Go Alternative has, therefore, not been assessed.

### **4.4 Preferred Alternative**

Considering the site and the technological alternatives which are available, and the feasibility of each, the preferred alternative is, therefore, the site and preferred technological alternative as proposed in the development proposal description ([Section 1.3](#)). As the only feasible option, only the preferred alternative has been assessed.

## 5 Public Participation Process

### 5.1 Objectives of the Public Participation Process

The objectives of the public participation process (PPP) are to:

- Identify and inform potential IAPs of the proposed development
- Provide them with the opportunity to register any issues or concerns regarding the proposal, and
- Identify mitigatory and management options to address issues and concerns raised, where appropriate.

### 5.2 Details of the PPP

In undertaking the public participation process, all known, relevant facts pertaining to the proposed project were made available to registered and identified IAPs so that they could participate in a meaningful manner. The approach included:

- Ongoing technical liaison with relevant local municipal officials and the project facilitators regarding the proposed development
- Preparing a Background Information Document, (BID), for circulation to IAPs. (Refer to Appendix D)
- Identifying potential IAPs during discussions with the project facilitators and representatives
- Giving written notice to organs of the state (municipality, DWS) having jurisdiction over the proposal
- Giving written notice to Non-Governmental Organisations (NGO), Community Based Organisations (CBO) etc. who might have an interest in the proposal
- Placing an advert in a local newspaper, (Maritzburg Sun Newspaper on the 03/12/2019), calling for IAPs not previously identified to identify themselves and make an input into the process, (see copy of advert in Appendix D). Owing to the Covid 19 Lockdown and National State of Disaster in South Africa since 26<sup>th</sup> March 2020, the environmental process for the project has been significantly delayed. Therefore, two additional advertisements will be placed, one in The Witness newspaper and one in the Isolezwe newspaper.
- Site Notices have been placed at the road start and endpoints and the central intersection with the P159. (refer to Appendix D for Site Notice Photographs and placement details).
- Keeping IAPs informed, keeping a register of all IAPs and allowing them the opportunity to make comment on the proposed activity, (see table below of registered IAPs).
- The Draft Basic Assessment will be made available for 30 days to all identified Stakeholders and placed at the Dalton Library, at 7 Klip Avenue, Dalton, Kwazulu-Natal, South Africa, for comments.
- The Public Participation Process for the project and comment timeframes have been extended because of the Covid 19 Lockdown and National State of Disaster in South Africa since 26th March 2020.

The public participation process will be all inclusive and all Interested and Affected Parties will be notified and provided with opportunities to comment.

**The following IAPs were identified or identified themselves:**

Please refer overleaf.

Organisation	Contact Person	Contact Details
Department of Water and Sanitation (DWS)	Ms S Ramburan Mr S. Govender Ms N. Mokoena Ms Zama Hadebe	<a href="mailto:ramburans@dws.gov.za">ramburans@dws.gov.za</a> <a href="mailto:GovenderS2@dwa.gov.za">GovenderS2@dwa.gov.za</a> <a href="mailto:mokoenan@dws.gov.za">mokoenan@dws.gov.za</a> <a href="mailto:hadebeZ@dws.gov.za">hadebeZ@dws.gov.za</a>
Department of Agriculture Forestry and Fisheries (DAFF) Forestry Regulations and Support	Ms N. Sontangane Jeffrey Mai	<a href="mailto:nandiphas@nda.agric.za">nandiphas@nda.agric.za</a> <a href="mailto:JeffreyMAI@daff.gov.za">JeffreyMAI@daff.gov.za</a> <a href="mailto:KarenM@daff.gov.za">KarenM@daff.gov.za</a>
EKZN Wildlife	Andy Blackmore Nerissa Pillay Dinesree Thambu Dominic Wieners Jenny Longmore	<a href="mailto:andy.blackmore@kznwildlife.com">andy.blackmore@kznwildlife.com</a> <a href="mailto:thambud@kznwildlife.com">thambud@kznwildlife.com</a> <a href="mailto:Jenny.Longmore@kznwildlife.com">Jenny.Longmore@kznwildlife.com</a> <a href="mailto:Phindile.Langazane@kznwildlife.com">Phindile.Langazane@kznwildlife.com</a> <a href="mailto:Dominic.Wieners@kznwildlife.com">Dominic.Wieners@kznwildlife.com</a>
Eskom	M. Nicol	<a href="mailto:nicolm@eskom.co.za">nicolm@eskom.co.za</a>
Telkom SA SOC Limited Network Engineering and Build Eastern Region Wayleave Management Section	R. Rampershad R. Couch	<a href="mailto:RampeRR@telkom.co.za">RampeRR@telkom.co.za</a> <a href="mailto:RaymondC@openserve.co.za">RaymondC@openserve.co.za</a> <a href="mailto:wayleaves2@telkom.co.za">wayleaves2@telkom.co.za</a>
Transnet Pipelines	Thami Hadebe Jeff Scrooby	<a href="mailto:Thami.Hadebe@transnet.net">Thami.Hadebe@transnet.net</a> <a href="mailto:Jeff.Scrooby@transnet.net">Jeff.Scrooby@transnet.net</a>
Transnet	Cynthia Nong Kimberley Moodley	<a href="mailto:Cynthia.Nong@transnet.net">Cynthia.Nong@transnet.net</a> <a href="mailto:Kimberly.Moodley@transnet.net">Kimberly.Moodley@transnet.net</a>
uMshwathi Local Municipality <a href="http://www.umshwathi.gov.za">www.umshwathi.gov.za</a> 1 Main Road, New Hanover 3230, KwaZulu-Natal Private Bag X29, Wartburg, 3233 Tel: 033 816 6800 Fax: 033 502 0286 Email: <a href="mailto:info@umshwathi.gov.za">info@umshwathi.gov.za</a> Tel: Zinzi: 082 608 3007 Sibahle: 083 335 4552	Zinzi	<a href="mailto:zinziswas@umshwathi.gov.za">zinziswas@umshwathi.gov.za</a>
Umgungundlovu Municipality Tel: 033 897 6763 (MM office) Tel: 033 897 6811 Mandisa	Mandisa Khomo	<a href="mailto:mandisa.khomo@umdm.gov.za">mandisa.khomo@umdm.gov.za</a>
uMshwathi Local Municipality 082 881 1911	Ward Councillor Ward 1 Deputy Mayor Cllr Dlamini	
uMshwathi Local Municipality 082 612 0599	Ward Councillor Ward 3 Cllr Nzama	
uMshwathi Local Municipality 082 479 7396	Ward Councillor Ward 7 Cllr Mbatha Ntuli	
AMAFA	Bernadet Pawandiwa Annie van de Venter Radford	<a href="mailto:bernadetp@amafapmb.co.za">bernadetp@amafapmb.co.za</a> <a href="mailto:amafaddps@amafapmb.co.za">amafaddps@amafapmb.co.za</a>
Dalton Library, at 7 Klip Avenue, Dalton, Kwazulu-Natal, South Africa Phyllis David, 083 982 1407. Dalton Library 033 816 6800, ask for Dalton Library.	Barbara Fey Phyllis David	Barbara Fey <a href="mailto:wartburg.lib@gmail.com">wartburg.lib@gmail.com</a>

Organisation	Contact Person	Contact Details
<u>Landowner</u> Portion 11 Of The Farm Lot 50 No. 1865 Portion 2 Of The Farm Lot 55 No. 1796 Portion 9 Of The Farm Lot 50 No. 1865 Neil Wittig Family Trust No. 1628/94	Neil Wittig	082 645 8705 <a href="mailto:enwtrust@gmail.com">enwtrust@gmail.com</a>
<u>Landowner</u> Portion 14 Of The Farm Dalton No. 2366 Portion 8 Of The Farm Dalton No. 2366 ME Schroeder Trust No. IT 1559/97	Kevin Schroder	084 601 6147 <a href="mailto:kevin@mkschroder.co.za">kevin@mkschroder.co.za</a>
<u>Landowner</u> Portion 10 Of The Farm Dalton No. 2366 Soltau Farm Trust No. IT 2272/95	Werner Schroder	082 772 4344 <a href="mailto:admin@wrfarming.co.za">admin@wrfarming.co.za</a>
<u>Landowner</u> Portion 35 Of The Farm Dalton No. 2366 Eugen Thies Family Trust No. IT 2506/94	Eugene Thies	082 824 1137 <a href="mailto:ethies@ipfone.co.za">ethies@ipfone.co.za</a>
<u>Landowner</u> Portion 30 Of The Farm Dalton No. 2366 Lilienthal Property Holdings cc Np CK 86/07628/23	Kevin Schroder	084 601 6147 <a href="mailto:kevin@mkschroder.co.za">kevin@mkschroder.co.za</a>
<u>Landowner</u> Portion 26 Of The Farm Dalton No. 2366 Wonderfontein Farm Trust No. 9061/92	Ronald Schroder	
<u>Landowner</u> Remainder Of The Farm Paderborn No. 1323 Stegen Property Trust No. IT 46/2001	Jimmy Stegen	084 588 2210 <a href="mailto:stegen@mweb.co.za">stegen@mweb.co.za</a>
<u>Landowner</u> Portion 1 Of The Farm Paderborn No. 1323 RM Mark Family Trust No 3712/94	Mark Meyer	082 373 3183 <a href="mailto:mfarmingtrust@gmail.com">mfarmingtrust@gmail.com</a>
<u>Landowner</u> Portion 3 Of The Farm Lot 55 No. 1796 Sharp Move Trading 32 CC	Johann Eckhard Klipp Walter Peter Klipp	
<u>Landowner</u> Remainder of the Farm Jaagbaan No 17524 Illovo Sugar (South Africa) Proprietary Limited	Illovo Sugar (South Africa) Proprietary Limited	
<u>Landowner</u> Portion 4 Of The Farm Dalton No. 2366 Lilienthal Freese Trust-Trustees	Walter Bernard Freese	
<u>Landowner</u> Portion 24 Of The Farm Dalton No. 2366 Land Bank	Land Bank Johannes Otto Schroder	
Illovo Sugar (South Africa) (Pty) Ltd	Fanie Horn	072 895 3645 <a href="mailto:fhorn@illovo.co.za">fhorn@illovo.co.za</a>
Farm Manager For Mr Heiner Freese	Martin Schroder	082 802 3999
<b><u>Borrow Pits</u></b>		
<u>Landowner</u> (BP1) Portion 14 of The Farm Paardfontein No. 1299	Ralph Appelt	082 373 3203

Organisation	Contact Person	Contact Details
<u>Landowner</u> (BP2) Portion 14 of The Farm Paardfontein No. 1299	Lilienthal Property Holdings cc Heiner Freese	082 373 3203 083 627 1824
<u>Landowner</u> (BP3) Portion 2 of The Farm Bockenhoudfontein No. 1289	Four Feet Farming cc Ed Barry	082 359 6347 <a href="mailto:fourfeet@edelnet.co.za">fourfeet@edelnet.co.za</a>

### 5.3 Summary of the Issues Raises by IAPs

Comments received have been included in the Comments and Response Report (CRR) (Appendix D). These comments are documented individually with a response to each identified issue also provided in the CRR.



## 6 The Receiving Environment (All Alternatives)

### 6.1 Geographical and Physical Environments

#### 6.1.1 Topography and Drainage

The site topography and drainage are affected by the underlying geology of the area. The study area consists of generally hilly and rolling landscape dissected by undulating valley areas. The approximate centre point of the site can be found at co-ordinates: 29°19'44.17"S; 30°42'10.98"E. To the north, flat rolling plateau tops and steep slopes commonly forming table mountains are dominating landscape features.

Watercourse Crossing 1 in the southern portion of the road, is located directly on a non-perennial tributary of the Manzanyma River which drains in a north easterly direction to meet the Pambanyoni River 4.8km downstream to the north-west. There is a marsh area located north of Watercourse Crossing 1, at a distance of approximately 550m. There are also farm dams located along the Manzanyma River, both to the north and south of the watercourse crossing point and two larger dams, the Oebisfelde Dam and the Mbalana Dam located on the Pambanyoni River to the north and north-west, at a distance of approximately 5km from the watercourse crossing point. The Pambanyoni River then feeds into the perennial Khamanzi River 9km to the north.

Watercourse crossings 2, 3 and 4 are located directly on non-perennial tributaries of the Mtizane River, which drains in a north easterly direction to meet the Khamanzi River 8.5km to the north. There are some small farm dams located south of Watercourse Crossing 2, along the perennial section of this river, at approximately 2km away. The Albert Falls Dam is located 23km south-west of the road start point. The road route is relatively flat with steeper sections at the watercourse crossing points.

The site is located at approximately 990 masl, on gently undulating slopes, varying from 911 masl at the lowest point in the north, at Watercourse Crossing 3 to the highest point at the road start along the P156 Road at 1 009masl. A high point of 1 018 masl is found to the north-west of the road in the southern section and 1 030masl in the north, along the northern section of the road. A high point of 1 00masl is found to the south-east of the P278 Road in the southern portion with another high point of 1 011 masl to the south of the northern end point of the P278 Road along the P158 Road.

#### 6.1.2 Hydrology

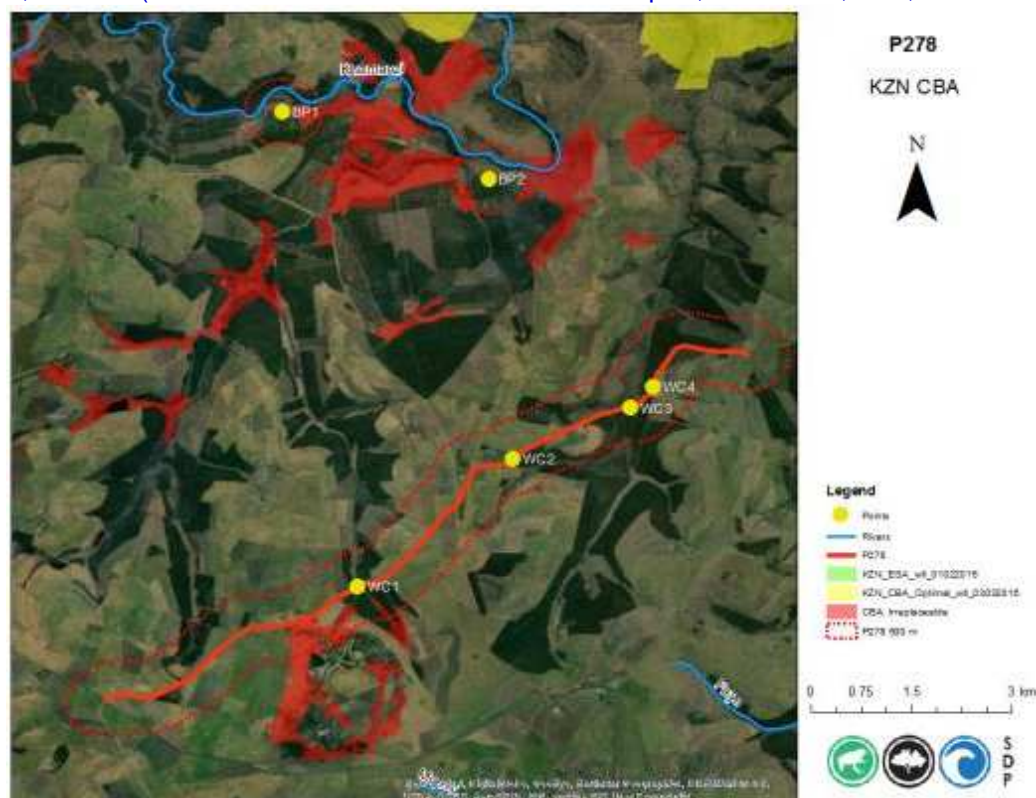
The P278 is an existing gravel road near Dalton, uMshwathi Local Municipality. The road crosses 4 watercourses, identified as WC 1, 2, 3 and 4. The receiving environment is dominated by agricultural land uses, specifically sugar cane cultivation and timber plantation. The P278 is located within Quaternary Catchment U40C, (uMvoti River), and a small portion of U20G and U40E. All the affected watercourses are located in Quaternary Catchment U40C.

National Freshwater Ecosystem Priority Areas, (NFEPA), and watercourses are present within 500m of the P278 and the watercourse/wetland associated with WC1 has been identified by the NFEPA data. The NFEPA wetland data indicates the presence of channelled valley bottom wetlands and seep wetlands in the vicinity of the project area. The channelled valley bottom wetlands indicated are dams that are located on a channelled/unchannelled valley bottom wetland systems. The seep wetlands near the Noodsberg Sugar Mill are also associated with a dam. No wetland systems are identified by the NFEPA data for WC 2, 3 and 4.

Refer to Figure 5 overleaf.



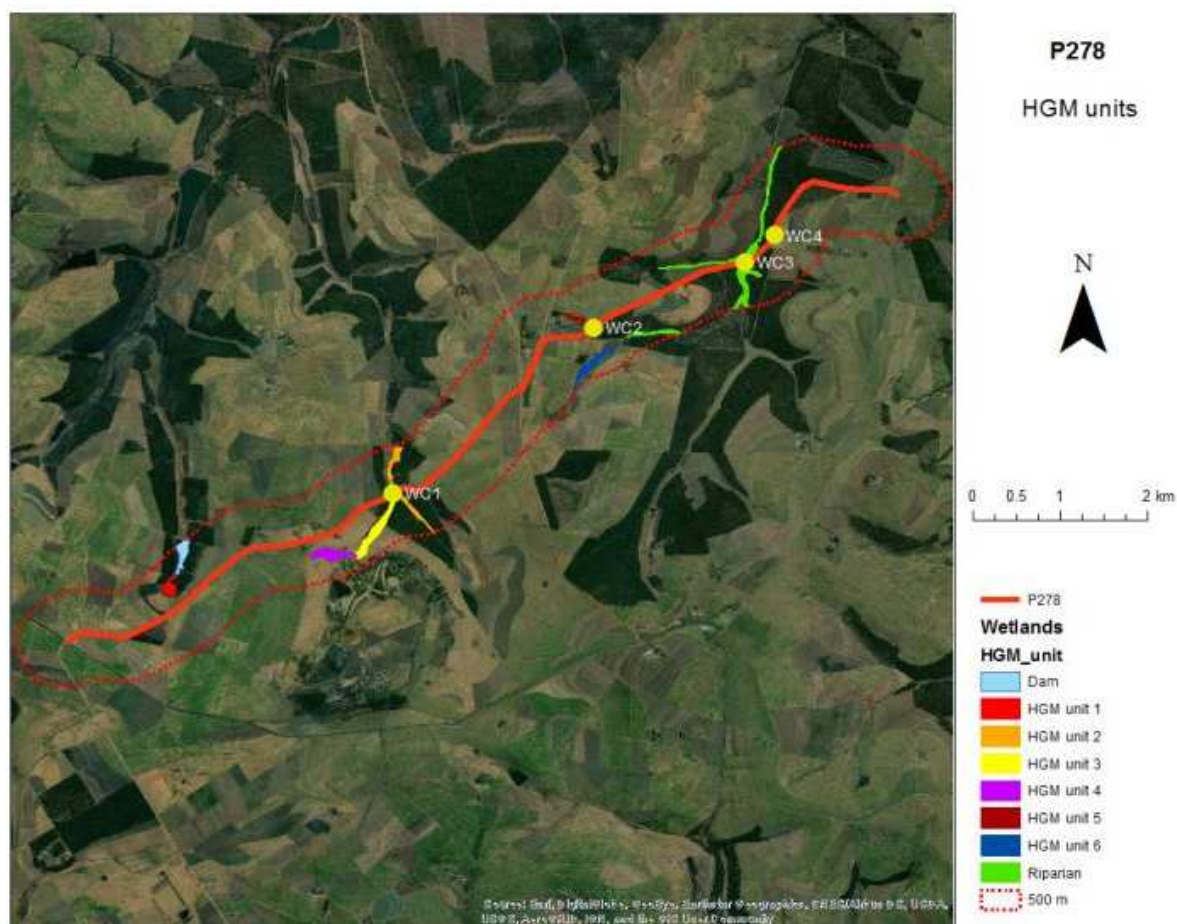
**Figure 5. NFEPA wetlands within the study area.** The watercourse/wetland associated with WC1 has been identified by the NFEPA data. No wetland systems are identified by the NFEPA data for WC 2, 3 and 4. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)



**Figure 6. CBA "Irreplaceable" zones within the project area.** Zones are associated with the wetlands surrounding the Noodsberg Sugar Mill and, further north associated with the Khamanzi River. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)

**Table 4. Classification of the 10 HGM units identified within the study area.**

HGMunit	Level 3	Level 4a	Area (m <sup>2</sup> )	Wetland system
1	Valley bottom	Valley head seep	20092	1
2	Valley bottom	Valley head seep	49344	2
3	Valley bottom	Channelled valley bottom	65193	2
4	Valley bottom	Channelled valley bottom	46621	2
5	Slope	Hillslope seep	17172	3
6	Valley bottom	Channelled valley bottom	43532	3



Draft Basic Assessment for the Proposed Upgrade of Main Road P278

The Present Ecological Status, (PES), Ecological Importance and Sensitivity, (EIS), and functionality of these wetlands are summarised in Table 6 below. WC 3 is the Mtizane River, a small perennial stream, while WC 4 is a degraded drainage line. An extensive but degraded riparian habitat is associated with the Mtizane River. The state of the riparian habitat associated with WC 3 and 4 is classified as “greatly” and “critically” modified respectively.

**Table 5: A summary of the wetland assessment results for the affected wetlands.**

HGM unit	PES	EIS	Functionality
3	D	Moderate	Intermediate
4	D	Moderate	Moderately Low to Intermediate
5	B	Moderate	Intermediate to Moderately High

The water quality results varied between WC 1, 2 and 3. The poorest water quality was recorded at WC 1. Overall, the state of the water quality at each of the three sites analysed is summarised as:

- WC 1 – Largely Modified
- WC 2 – Largely Natural
- WC 3 – Largely Natural

Identified impacts associated with the proposed road upgrade include the following:

- Habitat disturbance (Construction Phase)
- Increased stormwater runoff (Operational Phase)
- Wetland impacts (Operational Phase)
- Water quality impacts (Construction Phase)

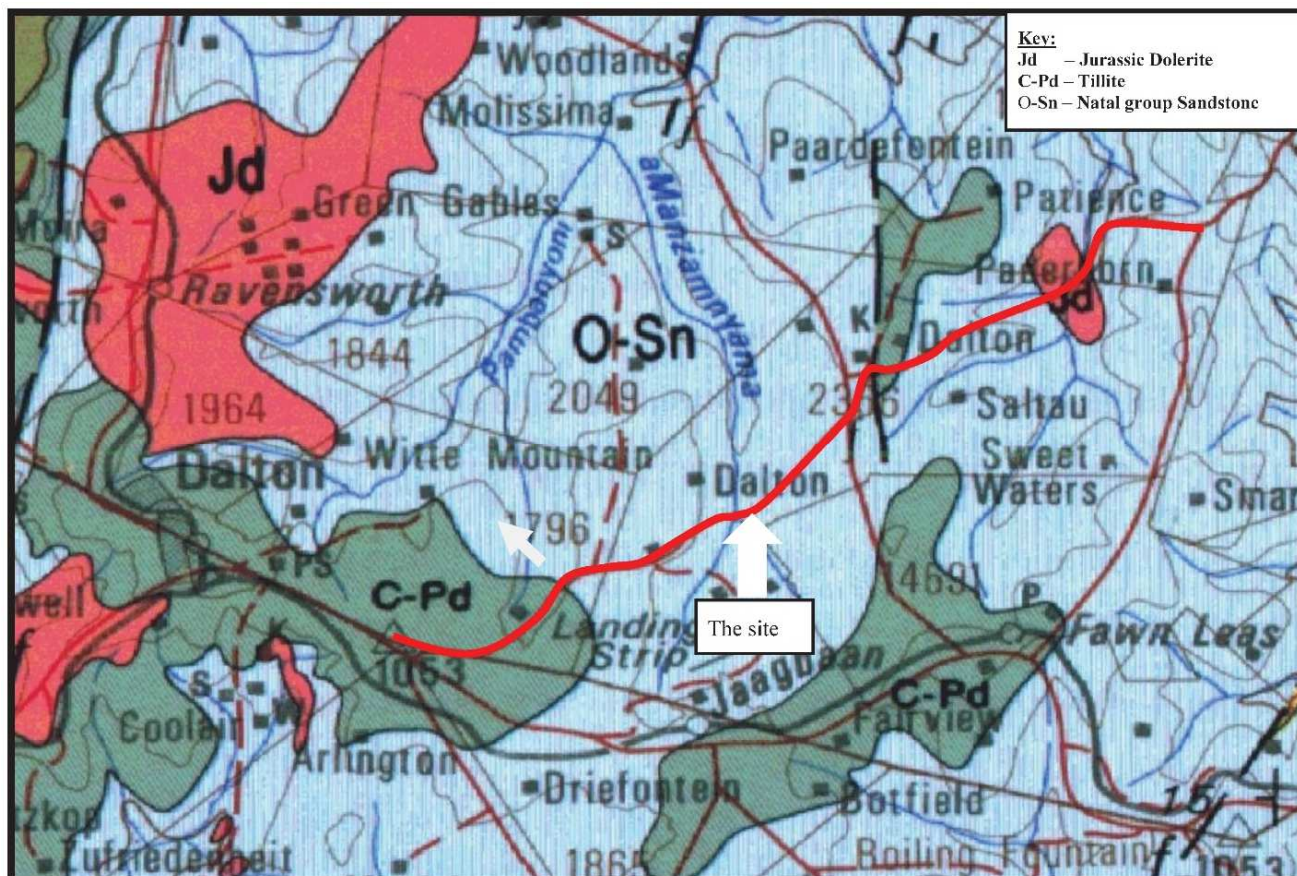
All are considered to be of a low significance after mitigation. Based on the findings of the wetland assessment the P278, (and the proposed upgrade), is unlikely to affect the hydrology and ultimately the integrity of the wetlands or watercourses significantly as other factors such as timber, agriculture and mill effluent are more influential and will continue to remain influential. Some aspects of the upgrade, such as new crossings, may improve drainage beneath the road and will be improvements on the *status quo*. Consideration of the DWS Risk Matrix indicates that the project is a low risk activity, and although wetlands and watercourses will be disturbed, the road and associated crossings are existing and construction activities will take place in the road reserve, were the wetlands/watercourses have already been modified.

### **6.1.3 Geology and Soils**

The geology of the southern portion of the road is described as Ordovician Natal Group sandstones with shallow, nutrient-poor, sandy soils including Glenrosa and Mispah forms. The geology of the northern portion of the road is described as Apedal and plinthic soil forms derived mostly from Ecca Group, (Karoo Supergroup), shale and minor sandstone, while the geology of the two Borrow Pit sites is described as Acid, leached, heavy soils derived from Karoo Supergroup sediments, including significant Dwyka tillites and intrusive Karoo dolerites. Glenrosa and Mispah soils also occur.

Refer to Extract of Regional Geological Map Sheet “2930 Durban”, overleaf.





**Figure 8: Extract of Regional Geological Map Sheet "2930 Durban" (Council for Geoscience, 1988)**

#### Geology and Soils – Specific Site Conditions

A shallow water table (less than 1.5m deep) occurs on site.

Dolomite, sinkhole or doline areas were not found on site.

Seasonally wet soils (often close to water bodies) occur on site.

Unstable rocky slopes or steep slopes with loose soil were not found near the site. Some rock outcrops were found directly adjacent to the road. Geotechnical Investigation Report, Shriram Geotechnical consulting, May 2020.

Dispersive soils (soils that dissolve in water) may occur on site.

Soils with high clay content occur on site. Geotechnical Investigation Report, Shriram Geotechnical consulting, May 2020

No other unstable soil or geological features were noted on site.

Areas sensitive to erosion were noted

#### 6.1.3.1 Groundwater

The Geotechnical Investigation Report, Shriram Geotechnical consulting, May 2020, indicates that groundwater seepage was encountered on site in the vicinity of Watercourse Crossing 1. The report also states that it is also possible that during or after heavy or prolonged rainfall, that increased groundwater can be expected and shallow groundwater activity in the form of temporary perched seepage zones can also be expected along the interface between the fills, transported soils and/or *in situ* soils, towards the interface between the *in situ* soils and the underlying bedrock; and/or within soils that are bound by materials of a higher permeability.

A high occurrence of a perched groundwater condition and/or surface water flows is assessed to increase near the low-lying or drained areas associated with the stream drainage lines near the watercourse crossing points. Seasonal variations in surface/seepage flows are also anticipated in response to regional and local rainfall patterns. Results of a Founding Report, Geosure, November 2019.

#### 6.1.4 Climate

The northern half of project site area, falls within KwaZulu-Natal Sandstone Souveld and the climate for the area of Dalton, is described as receiving summer rainfall with some rain in winter, approximately 700-1 200mm of rain

per year, with most rainfall occurring during summer. Mist is common and important in providing additional moisture to the area. Frost is very infrequent. The mean monthly maximum and minimum temperatures for Dalton are 35.6°C in October and 0.9° in July respectively.

The climate diagram for KwaZulu-Natal Sandstone Sourveld is provided below:



Blue bars - median monthly precipitation.

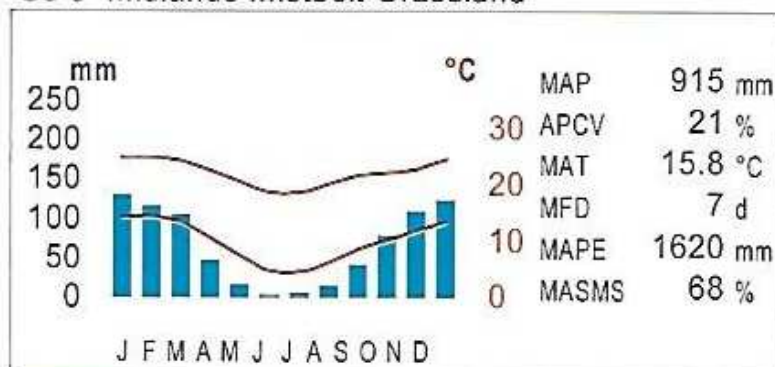
Upper and lower red lines – mean daily maximum and minimum temperature

MAP – Mean Annual Precipitation

MAT – Mean Annual Temperature

The southern portion of the project site area falls within Midlands Mistbelt Grassland and the climate data for this area is described as having summer rainfall with a range of 730-1280mm per year, with the heavy and frequent occurrence of mist which provides significant amounts of additional moisture. Some of the rain is in the form of cold frontal activity, mainly in winter, spring and early summer. Thunderstorms are common in both summer and autumn. The minimum temperature recorded in this region in June was -10.8°C. Frosts are generally moderate but occasional severe frost may also occur. Further climatic conditions include short-term drought spells, hail and hot north-western berg winds occurring particularly in spring and early summer. The climate diagram for Midlands Mistbelt Grasslands is provided below:

**Gs 9 Midlands Mistbelt Grassland**



Blue bars - median monthly precipitation.

Upper and lower red lines – mean daily maximum and minimum temperature

MAP – Mean Annual Precipitation

MAT – Mean Annual Temperature

## 7 Biological Environment

### 7.1 Flora and Fauna

According to The Vegetation of South Africa, Lesotho and Swaziland, the vegetation in the study area can be classified as traversing two different vegetation types, namely the KwaZulu-Natal Sandstone Sourveld, (Svs5), in the southern portion, and extends into the Midlands Mistbelt Grassland, (Gs9) vegetation type in the north. KwaZulu-Natal Sandstone Sourveld, consists short, species-rich grassland with scattered low shrubs and trees, such as *Proteaceae*, with *Protea*, *Leucospermum* and *Faurea* being locally common species. For the majority of the length of the Main Road P278, the road traverses sugar cane fields and some tree plantations, with some sections of alien invasive weeds generally located near to the proposed watercourse crossing upgrade areas. The vegetation noted along the proposed road edge comprises of cut grass with some brush along the edges of the agricultural fields and hygrophilous material at river stream edges. Sections of alien invasive weeds noted along the route, include: *Acacia mearnsii*, *Solanum mauritianum*, *Lantana camara* and *Melia azedarach*, (*Syringa*). Midlands Mistbelt Grassland vegetation in the north features forb-rich tall sour veld, *Themeda triandra* grasslands which have been transformed by the invasion of native Ngongoni grass, (*Aristida junciformis*), with only a few patches of the original species rich grasslands that remain.

A portion of the site is situated within a Critical Biodiversity Area (CBA) zone. Please refer to Appendix A – Mapping and Appendix C – Specialist Reports.

The proposed P278 Road upgrade traverses a Critical Biodiversity Area 1, (CBA 1), located approximately 500m south-west of Watercourse Crossing 1.

The TSCP of Biodiversity Priority Area 1 for the study area, lists terrestrial surface species including: *Senecio exuberans* Rare (Endangered), a perennial herb with thickened woody rootstock, up to 1.5 m tall when in flower, found in mistbelt grasslands and *Leucospermum gerrardii*, Soapstone Pincushion Rare, (Not Threatened), is an evergreen, mat-forming shrub of mostly about 30 cm high and up to 1 m in diameter, with branches originating from an underground rootstock. It has narrow leaves, sometimes with three or four teeth near the tip, and prominent, raised, netted to parallel veins. *Eremidium erectus* (Wingless grasshopper) which is endemic to KwaZulu-Natal, is also listed.

The vegetation within the study area has, for the most part, been highly disturbed, cleared and modified through anthropogenic activities for commercial agriculture as well as the development of road infrastructure. Some small sections of indigenous vegetation remain on site, together with areas of predominantly alien invasive weed infestation.

#### **Alien Invasive weeds/Exotic Plant Invasion**

Outside of managed agricultural areas, exotic invasion is prominent. Exotic invasion is particularly common along watercourses and the periphery of wetland areas. In addition to the three exotic tree species cultivated in the area, *Rubus cuneifolius* is a prominent invader. A list of identified exotic plant species is provided below in Table 6 below.

**Table 6. Exotic vegetation identified within the riparian area and wetland units.**

Species	Common Name	Category (NEMBA)
<i>Acacia mearnsii</i>	Black wattle	2
<i>Anredera cordifolia</i>	Madeira vine	1b
<i>Bidens pilosa</i>	Blackjack	Not listed
<i>Eucalyptus grandis</i>	Blue gum	1b

<i>Cirsium vulgare</i>	Thistle	1b
<i>Pennisetum clandestinum</i>	Kikuyu	a. 1b in Protected Areas and wetlands in which it does not already occur. b. Not listed elsewhere
<i>Pinus patula</i>	Pine	2
<i>Rubus cuneifolius</i>	American bramble	1b
<i>Trifolium repens</i>	White clover	Not listed
<i>Plantago lanceolata</i>	Buckhorn plantain	Not listed

(Adapted from: Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)

## Fauna

The project area is situated between commercial agricultural farms, where sugar cane and forestry are most common. Watercourses intersecting the road and smaller drainage features provide refuge for smaller terrestrial and aquatic fauna. For the most part, the proposed road upgrade follows the existing road alignment, which should also help to reduce fauna disturbance.

### 7.1.1 Wetland and Riparian Delineation - Watercourse Crossings

Six HGM units were identified within 500 m of the P278 of which 2 are directly affected by the road crossing at WC 1 and one at WC 2, (Refer to Figure 7). The classification of each of the HGM units is provided in Table 4. The watercourses affected by the P278 at WC 3 and 4 were classified as riparian in nature. The remaining 3 HGM units occur within 500 m of the P278 but will not be affected by the road upgrade.

#### 7.1.1.1 Watercourse Crossing 1 - crosses a wetland system

There are two HGM units present at WC 1 – HGM units 3 and 4. HGM units 3 and 4 are both channelled valley bottom wetland units, (Figure 9 overleaf). HGM unit 4 is split by the P278, while HGM unit 3 joins HGM 4 close to the P278. The channels of each unit are well defined. The channel associated with HGM unit 3 supports seasonal flow, while that associated with the lower portion of HGM unit 4 holds surface water permanently, (flow may not necessarily be present). During the site visit, the channels of both units were waterlogged, (Figure 10 overleaf). Hygrophilous vegetation is well established in the channel area of HGM unit 4. *Cyperus latifolius*, *Typha capensis*, *Juncus effusus* and *Phragmites australis* are dominant. The outer extent of both HGM units is consistent with temporary wetland conditions. Hygrophilous vegetation is limited to depressions (*Juncus effusus*) while the remainder of the area, (where not under plantation), supports facultative plant species. These include *Trifolium repens* (exotic), *Plantago lanceolata* (exotic), *Chenopodium album* (exotic), *Erucastrum austroafricanum*, *Cyperus esculentus* and *Paspalum urvillei*. The channel of HGM unit 3 supports clusters of *J. effusus* and *Zantedeschia aethiopica*. The outer temporary zone was under plantation. Due to the past shading, the vegetation cover is sparse and has not fully recovered. The upper extent of HGM unit 3 is not affected by plantation and vegetation cover within the outer temporary zone is dense. Invasion by *Rubus cuneifolius* is present and an informal road crossing separates the upper and lower portions of the unit, (Figure 11 overleaf).



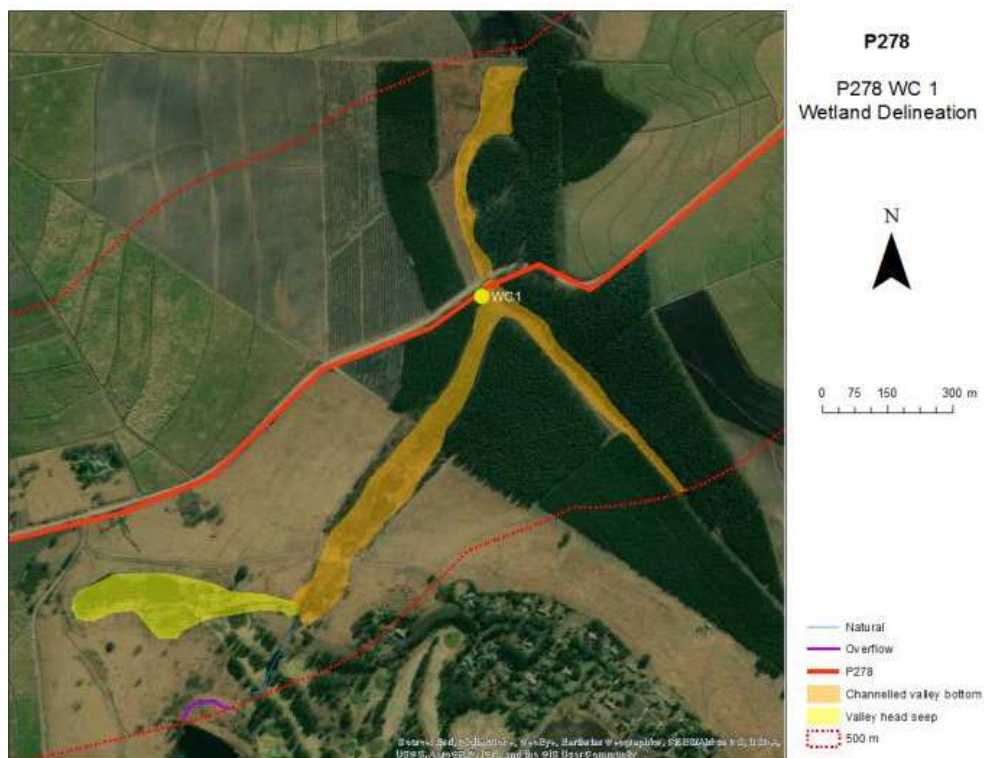


**Figure 9. Top and bottom: The upstream portion of HGM unit 4 and the lower portion of HGM unit 3. Note the distinct channel and open water. Timber (*Pinus patula*) is a dominant land use within the catchment of HGM unit 4. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**



**Figure 10. Top: Hygrophilous vegetation associated with the channel area of HGM unit 4 immediately downstream of the existing crossing.**

**Bottom: Hygrophilous vegetation associated with the channel upstream of the existing crossing.**



**Figure 11. The extent of the channelled valley bottom wetland system that is made up of HGM unit 3 and 4 and shown in Figure 7. Note the extent of timber plantation adjacent to the wetland system. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**



### 7.1.1.2 Watercourse Crossing 2

The wetland system at WC 2 is made up of a hillslope seep wetland, (HGM unit 5), upstream of the P278 and a manipulated, (canalised), drainage line downstream of the P278. HGM unit 5 is a seasonal wetland that is dominated by *Cyperus latifolius*. *Typha capensis* and *Zanthesca aethiopica* are present. The fern, *Pteridium aquilinum* occurs along the periphery. Soils within the wetland unit are spongy and following rain are expected to become waterlogged. A drainage channel has been established along the upstream edge of the P278 to aid drainage into the culvert. Seepage from the wetland unit into the drainage channel occurs. This unit appears natural, but the upper extent has been manipulated and it receives stormwater from the adjacent settlement and upper catchment road crossing.

The drainage channel downstream of the P278 crossing follows a formal path, as is clearly evident in Figure 13 overleaf. It appears as if the alteration was made to facilitate the establishment of the adjacent *Acacia mearnsii* plantations. This wetland and drainage line system feed into the upper Mtizane River, which drains towards the P278 (WC 3).



**Figure 12. Top: HGM unit 5 upstream of the crossing at WC 2. Middle: The vegetation present in HGM unit 5 – *Cyperus latifolius* and *Pteridium aquilinum*. Bottom: The nature of WC 2 downstream of the crossing. Note the *A. mearnsii* plantation and narrow, trench like channel. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**



**Figure 13. The nature and extent of the wetland units in the vicinity of WC 2. HGM unit 5 is located immediately upstream of the P278. HGM unit 6 is the unaffected channel valley bottom wetland visible to the south. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**

#### 7.1.1.3 Watercourse Crossing 3 and 4

At WC 3, the P278 crosses the Mtizane River, a perennial stream, (channel width <2m, Figure 14). The channel is incised and a clear macro bank is present. The vegetation present is riparian in nature, although large portions of the riparian zone has been transformed to timber. Downstream of the crossing, the riparian zone and remaining terrestrial vegetation had been burned. Remaining riparian vegetation consists of tall grasses and exotic invasion. *Rubus cuneifolius* is prominent downstream of the crossing. New growth of *Anredera cordifolia* was observed during the site visit. Marginal vegetation is short and consists of herbs such as *Plantago lanceolata*, sedges such as *Juncus effusus* and grasses such as *Paspalum urvillei*. Downstream of the crossing, a broad alluvial terrace along the eastern bank is present (Figure 15). This has been ploughed and no natural vegetation remains. Germination of *Cyperus esculenta* was apparent.

The watercourse at WC 4 is a drainage line that has been substantially affected by agricultural activities and exotic invasion (Figure 15). The upper portion has been completely cleared and burned and the regrowth of *R. cuneifolius* was observed. *Acacia mearnsii* stumps were observed. The channel area is incised and flow is ephemeral. The lower section, within the plantation area, is choked with *R. cuneifolius*, with the occasional *Solanum mauritianum*.

The extent of the riparian habitat associated with the WC 3 and 4 crossings is shown in Figure 16 overleaf.



**Figure 14. Top: The nature of the riparian habitat downstream of the WC 4 crossing. The vegetation has been disturbed by recent agricultural activities and burning. Bottom: The nature of the active channel and riparian habitat upstream of the WC 4 crossing. The active channel is incised and *P. patula* plantation is present adjacent to the channel. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**



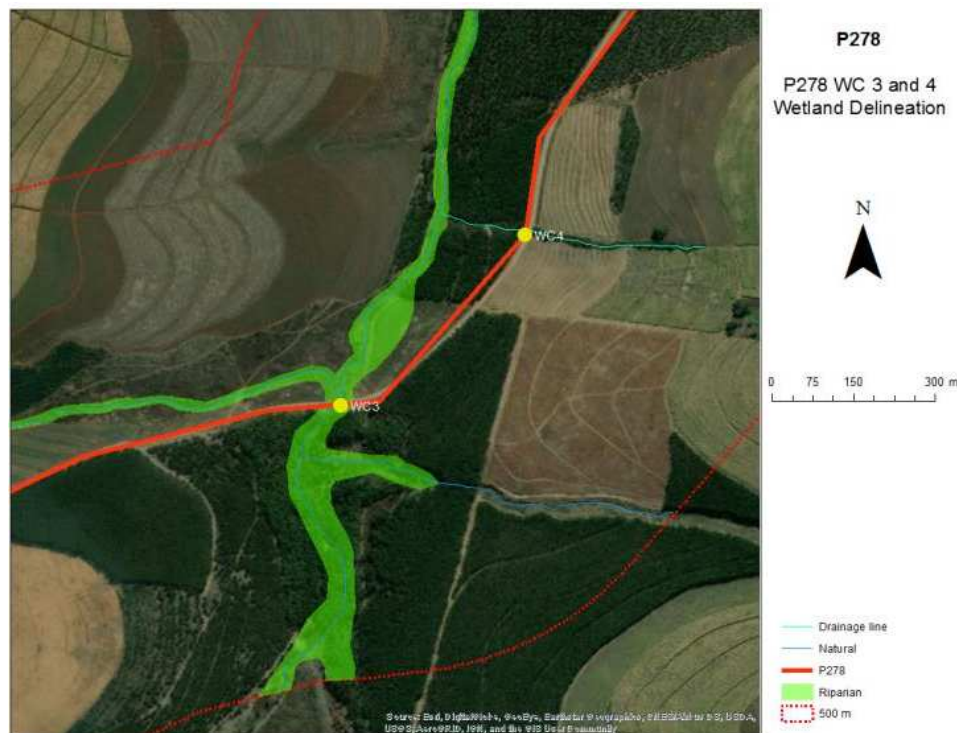


**Figure 15. Top: A broad alluvial floodplain is present downstream of the WC 4 crossing. The floodplain has been transformed by agriculture.**

**Middle: The upper portion of WC 4. No riparian vegetation is present due to clearing and burning. This is assumed to have occurred during the harvesting of the adjacent sugar cane.**

**Bottom: The lower section of WC 4. The watercourse has been severely invaded by *R. cuneifolius*, with adjacent *P. patula* plantation.**

**(Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**



**Figure 16. The extent of the riparian habitat associated with the Mtizane River at WC 3 and the drainage line at WC 4.**  
(Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)

#### 7.1.1.4 Other HGM units within 500 m

HGM units 1, 2 and 6 are located within 500 m of the P278, but will be unaffected by the proposed upgrade. HGM unit 1 is a valley head seep wetland that has been affected by the establishment of artificial drainage channels, dumping and agricultural activities. A dam is present downstream of the HGM unit. The lower extent of the unit is expected to be affected by back flooding when the dam is full. *Cyperus latifolius*, *Typha capensis* and *Paspalum urvillei* are dominant vegetation (Figure 17).

HGM unit 2 is a valley head seep that is situated within an actively farmed area. The unit is seasonal in nature and the dominant vegetation includes clumps of *Juncus effusus* and *Pennisetum clandestinum*.

HGM unit 6 is a channelled valley bottom wetland that makes up the head waters of Mtizane River. The unit has been manipulated by agricultural activities including a crossing and sugar cane cultivation. Exotic invasion is prominent particularly by *Rubus cuneifolius*.



**Figure 17. HGM unit 1. *Cyperus latifolius* is visible within a channel, while the surrounding seasonal and temporary wetland portions support dense *P. urvillei* and *P. clandestinum* cover.**  
(Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)

## 7.1.2 Wetland Assessment

### 7.1.2.1 Wet-Ecoservices

#### 7.1.2.1.1 P278 Road

The results of the WET-Ecoservices assessment are presented below in Table 7 below. Based on the scores for each of the 15 ecoservices, the functionality of each of the HGM units can be summarised as:

- HGM unit 3 - Intermediate
- HGM unit 4 – Moderately low to intermediate
- HGM unit 5 – intermediate to moderately high

**Table 7. WET-Ecoservices scores for the affected HGM units – units 3, 4 and 5.**

HGM Unit	3	4	5
HGM Unit Type	CVB	CVB	HS
Size (m <sup>2</sup> )	65193	46621	17172
Parameter			
<i>Flood Attenuation</i>	1,8	1,8	2,4
<i>Stream Flow Regulation</i>	1,8	2,0	1,8
<i>Sediment Trapping</i>	1,4	1,7	2,2
<i>Phosphate Removal</i>	2,2	1,7	2,4
<i>Nitrate Removal</i>	2,4	2,0	2,7
<i>Toxicant Removal</i>	2,3	1,8	2,3
<i>Erosion Control</i>	2,6	2,6	3,0
<i>Carbon Storage</i>	1,0	1,3	1,7
<i>Maintenance of Biodiversity</i>	0,9	0,9	1,3
<i>Supply for Human Consumption</i>	0,2	0,3	0,3
<i>Provision of Harvestable Natural Resources</i>	0,2	0,2	0,2
<i>Provision of Cultivated Foods</i>	0,4	0,2	0,2
<i>Cultural Significance</i>	0,0	0,0	0,0
<i>Characteristics Contributing to Tourism Value</i>	0,3	0,1	0,4
<i>Education and Research</i>	0,8	1,0	1,3

HGM unit 5 is the only unit that is providing an ecoservice at a “high” level, based on the assessment tool’s rating criteria. This is the “Erosion Control” ecoservice. The “high” rating is due to the location of the unit on a hillslope that is potentially susceptible to erosion and the density of vegetation coverage. The unit, although potentially modified by surrounding agricultural activities appears to absorb excess runoff. The presence of water in the drainage channel downstream of the P278 suggests that water is released gradually from the HGM unit. The seasonal nature of the HGM unit aids this function, as during the early summer period, the unit has capacity to absorb catchment runoff and release this gradually, reducing the risk of erosion. Predictably, the other biophysical ecoservices scored in the “moderately high” range as their efficacy is linked to vegetation cover and saturation.

In contrast to HGM unit 5, the assessment for units 3 and 4 indicated reduced ecoservice provision. HGM unit 3 received a “moderately high” rating for 4 ecoservices, while unit 4 received a “moderately high” rating for only 1 ecoservice. The saturation of both units is affected by extensive timber plantations. This has had a negative influence on the ability of the units to provide biophysical ecoservices, particular HGM unit 4. The upper portion of HGM unit 3 is not under plantation, hence more natural saturation levels prevail in the upper area and the overall biophysical functionality is perceived to be better than HGM unit 4, based on the assessment scores. HGM unit 3 receives water

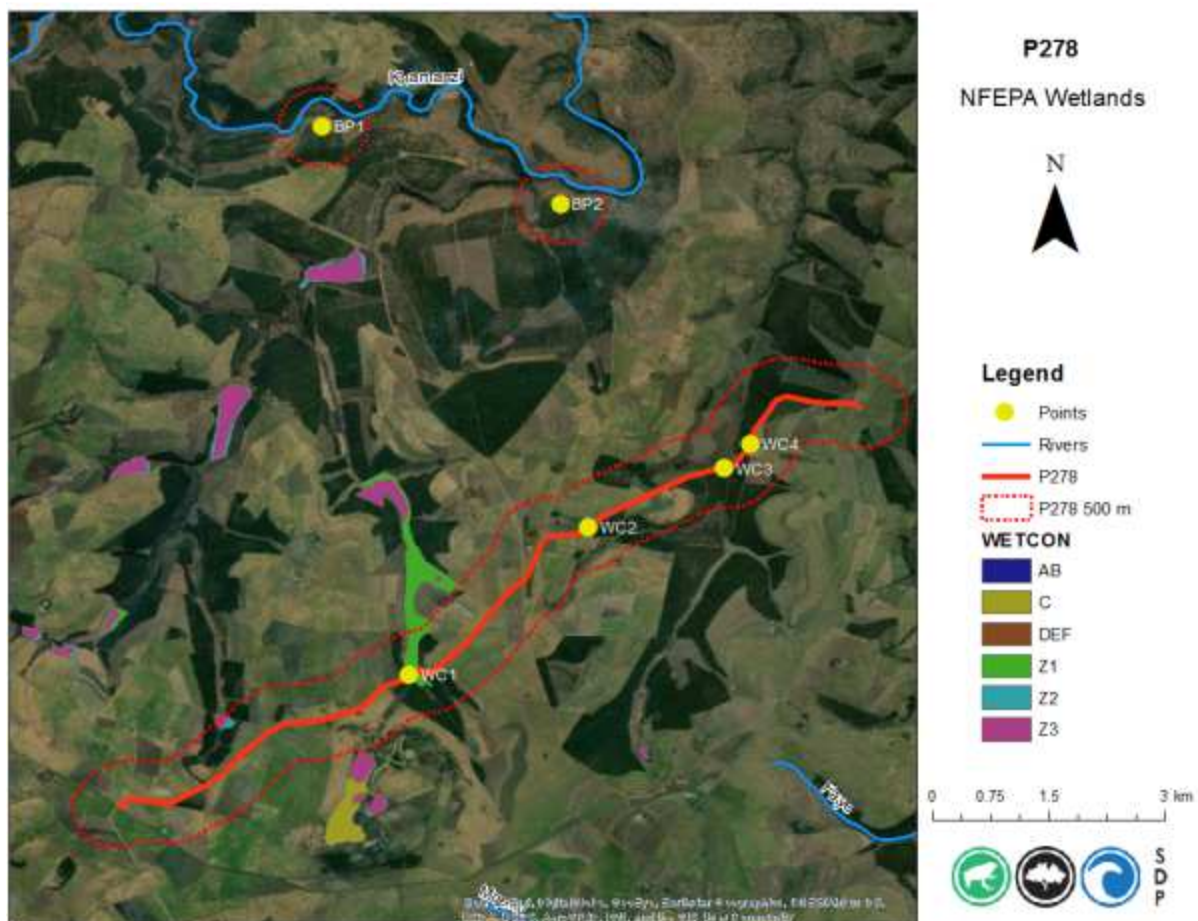


from a storage dam, in the Noodsberg Sugar Mill complex. The dam receives water from the mill. The quality of the water is unknown, but is expected that the quality is poor with high nutrient levels. The opportunity score for HGM unit 3 is thus relatively high, increasing the overall score for most of the biophysical ecoservices. This indicates that the biophysical ecoservices serve an important scrubbing and buffering function.

None of the three HGM units present any significant biodiversity features and socio-economic importance is very low. All of the HGM units are located on private farmland. HGM unit 5 presents an inflated “Education and Research” score, however this is attributed to the accessibility of the unit, rather than specific physical attributes.

### 7.1.2.2 Wet-Health

Review of the NFEPA data indicates that the majority of the identified wetlands within the general project area are heavily to critically modified (Figure 18 below. Table 8 overleaf). The data highlights the presence of a number of artificial dams, while the aerial imagery indicates the presence of extensive sugar cane cultivation and timber plantations. These are the primary vectors of change and the nature of each of the 2 affected wetland systems is discussed in more detail below.



**Figure 18. NFEPA wetlands and corresponding condition assigned by the NFEPA database. (Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020)**

**Table 8. NFEPA condition and corresponding PES category and descriptions (Nel et al 2011).**

PES equivalent	NFEPA condition	Description	% of total wetland area*
Natural or Good	AB	Percentage natural land cover $\geq$ 75%	47
Moderately modified	C	Percentage natural land cover 25-75%	18
Heavily to critically modified	DEF	Riverine wetland associated with a D, E, F or Z ecological category river	2
	Z1	Wetland overlaps with a 1:50 000 'artificial' inland water body from the Department of Land Affairs: Chief Directorate of Surveys and Mapping (2005-2007)	7
	Z2	Majority of the wetland unit is classified as 'artificial' in the wetland locality GIS layer	4
	Z3	Percentage natural land cover $<$ 25%	20

\* This percentage excludes unmapped wetlands, which includes those that have been irreversibly lost due to draining, ploughing and concreting

#### 7.1.2.2.1 P278 Road

##### **Wetland system 2 (HMG units 3 and 4):**

This wetland system has been assigned a PES rating of "D", or "largely modified" (Table 9 overleaf). The most significant factor contributing to this rating is hydrology. The hydrology of both HMG units is affected by timber plantations, while HMG unit 3 receives additional inputs, via an upstream dam, from the Noodsberg Sugar Mill. The entire catchment of HMG unit 4 is under timber plantation, which is a substantial flow reduction landuse. The saturation of the unit tends towards seasonal and temporary, while, given the gradient and size of the catchment, the unit should exhibit a more substantial permanent wetland zone. With the exception of the lower extent of the channel, the majority of vegetation within the unit is facultative.

HMG unit 3 is affected by the same flow reduction factors described above (timber plantation) but is also affected by an upstream dam. The flow reduction influence is however offset to some degree by inputs from the sugar mill. The dam is effectively a storage/maturation system for effluent from the mill. This mitigates the flow reduction impact of the plantation to some degree, however, the hydrology remains highly modified.

Apart from some minor scour and sedimentation in the vicinity of the P278 crossing, the geomorphology of both units is largely intact with no erosion or sedimentation evident. The nature of the vegetation community is largely modified as a result of encroachment by plantation and exotic plant species. The lower portion of HMG unit 3 was under plantation, while exotic species such as *Plantago lanceolata* and *Trifolium repens* are widespread in HMG unit 4.

**Table 9. WET-Health assessment scores and associated PES rating for wetland system 2 – HGM units 3 and 4.**

HGM unit	ha	HGM unit extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact score	Change score	Impact score	Change score	Impact score	Change score
3	6.5	58.0	7.0	0.0	0.9	-1.0	5.6	-1.0
4	4.7	42.0	9.0	0.0	1.5	-1.0	4.5	-1.0
Area weighted scores			7.8	0.0	1.2	-1.0	5.1	-1.0
PES Category			E	→	B	↓	D	↓
Aggregated PES		5.2	D					

**Wetland system 3 (HGM unit 5):**

The remaining extent of this hillslope seep wetland is considered to be in a “largely natural” condition (Table 10 below). The establishment of the P278 and the canalisation of the downstream section within the plantation, have potentially reduced the wetland footprint by as much as 50 %. This is a historical change and quantifying the historical loss in this instance is difficult. As such, the PES considers the extant wetland portion and what will be affected by the road upgrade.

Based on the nature remaining extent, the hydrology of the HGM unit appears intact with minor additional inputs emanating from roads in the upper catchment and a homestead. The geomorphology of the remaining portion of the HGM unit is largely intact. Manipulations are present along the boundary with the P278 to aid drainage beneath the road and along a short section of the eastern wetland edge near the power line. No other erosion or sedimentation was noted. The vegetation community is intact but of low diversity and dominated by *C. latifolius*. This is attributed to relatively uniform saturation conditions, rather than disturbance or modifications. Encroachment and some loss of peripheral wetland as a result of sugar cane cultivation has occurred.

**Table 10. WET-Health assessment scores and associated PES rating for wetland system 3 – HGM unit 5.**

HGM unit	ha	HGM unit extent (%)	Hydrology		Geomorphology		Vegetation	
			Impact score	Change score	Impact score	Change score	Impact score	Change score
5	1.7	100.0	1.0	0.0	0.5	-1.0	3.2	-1.0
Area weighted scores			1.0	0.0	0.5	-1.0	3.2	-1.0
PES Category			B	→	A	↓	C	↓
Aggregated PES		1.5	B					

**7.1.2.3 Ecological Importance and Sensitivity (EIS)**

The EIS for both wetland systems is “moderate”. Both systems occur in the same area and are affected by similar impacts and land uses. Neither systems support a high diversity of wetland flora or fauna, primarily as a result of surrounding disturbances. The integrity of both systems has been influenced by land use changes. This has brought about changes to the physical characteristics and ultimately the functionality of the systems. Wetland system 1 is sensitive to hydrological changes, as is illustrated by the observed impacts in the catchment and perceived changes in saturation and alternatively vegetation cover. This is supported further by reduced functionality attributed to those ecoservices linked to hydrological characteristics, such as saturation. Neither system is formally protected, but they do both fall within privately owned land and are afforded a default level of protection by the landowners.

**Table 11. The EIS rating and criteria scores for Wetland System 1 and 2.**

	Wetland System 1		Wetland System 2	
Determinant	Score	Confidence	Score	Confidence
<b>PRIMARY DETERMINANTS</b>				
Rare & Endangered Species	1	3	1	3
Populations of Unique Species	1	3	1	3
Species/taxon Richness	2	3	2	3
Diversity of Habitat Types or Features	2	3	1	3
Migration route/breeding and feeding site for wetland species	1	2	1	2
Sensitivity to Changes in the Natural Hydrological Regime	3	2	2	3
Sensitivity to Water Quality Changes	2	2	2	2
Flood Storage, Energy Dissipation & Particulate/Element Removal	2	3	3	3
<b>MODIFYING DETERMINANTS</b>				
Protected Status	1	4	1	4
Ecological Integrity	2	3	2	3
<b>TOTAL</b>	17	28	16	29
<b>MEDIAN</b>	1.7	2.8	1.6	2.9
<b>OVERALL ECOLOGICAL SENSITIVITY AND IMPORTANCE</b>	<b>Moderate</b>		<b>Moderate</b>	

### 7.1.3 Riparian assessment

#### 7.1.3.1 P278 Road

##### 7.1.3.1.1 WC 1

Not applicable as WC 1 crosses a wetland system. See wetland assessment section.

##### 7.1.3.1.2 WC 2

Downstream of the P278, a modified channel flows through an area of *Acacia mearnsii* plantation. The riparian habitat associated with the channel is very limited and consists of a narrow band of tall grasses and exotic herbs such as *Bidens pilosa*. The remainder of the area is under plantation. Due to the channel modification, the reference state is unknown, but the system may have been a continuation of HGM unit 5. This suggests a substantial change in character resulting in the critical loss of wetland/riparian habitat as well as loss of ecosystem functionality. The ecological category "F" or "critically modified" has been assigned to this channel section.

**Table 12. Results of the VEGRAI Level 3 assessment for the downstream section of WC 2.**

LEVEL 3 VEGRAI (%)	8.3
<b>VEGRAI EC</b>	<b>F</b>
AVERAGE CONFIDENCE	2.5

#### 7.1.3.1.3 WC 3

The riparian habitat associated with the Mtizane River and associated tributaries varies in nature from timber plantation to graminoid dominated with exotic invasion (*Rubus cuneifolius*, *Anderdera cordifolia* and *Acacia mearnsii*). The active channel is incised and some areas have been affected by scour and collapse - typical of channel areas affected by exotic vegetation. An adjacent alluvial flood terrace is present downstream of the P278 crossing, but this has been ploughed and prepared for cultivation. Burning has also taken place downstream of the crossing. The disturbances and land use changes have substantially affected riparian vegetation cover and diversity. As a result, an ecological category of "E" or "greatly modified" has been assigned.

**Table 13. Results of the VEGRAI Level 3 assessment for WC 3.**

LEVEL 3 VEGRAI (%)	32.2
<b>VEGRAI EC</b>	<b>E</b>
AVERAGE CONFIDENCE	2.5

#### 7.1.3.1.4 WC 4

The riparian habitat associated with this drainage line is highly altered. Upstream of the P278, the riparian vegetation has been cleared and burned. *Rubus cuneifolius* regrowth was observed. Downstream of the P278, the channel area is invaded by *R. cuneifolius*. No natural riparian vegetation remains. The channel is severely eroded. An ecological category of "F" or critically modified" has been assigned.

**Table 14. Results of the VEGRAI Level 3 assessment for WC 4.**

LEVEL 3 VEGRAI (%)	0.0
<b>VEGRAI EC</b>	<b>F</b>
AVERAGE CONFIDENCE	2.5

### 7.1.4 Water Quality

The water quality results are provided in Table 15 overleaf. WC 1, 2 and 3 were sampled. WC 4 had insufficient water to provide a suitable sample for analysis. Results of interest have been highlighted in yellow.

The following interpretations are provided:

- Dissolved Iron concentrations exceeded the General Limit in WC 1 and 2, with WC 2 presenting the highest concentration. This may be due to the accumulation of iron leachate in the remaining open water following a dry winter period. It is expected that once normal flow conditions return, the concentration will become diluted.
- Dissolved Manganese follows a similar trend as described above for Dissolved iron.
- Chemical Oxygen Demand was highest in WC 1. Based on the limits provided in Table 18, the COD value recorded in WC 1 is comparable to treated effluent and polluted rivers.
- Ammonia concentration is highest in WC 1 and exceeds both the Aquatic and Domestic TWQR.
- Nitrate was highest in WC 3. Based on Table 16, the nitrate concentration is comparable with a mesotrophic system. Filamentous algae was also observed. The source of the nitrate is most likely agricultural and as a result of catchment surface runoff.
- Oxygen Absorbed was highest for WC 1. This is in line with the COD values recorded.
- Total Dissolved Solids was highest in WC 1 and was 2 to 3 times higher than WC 2 and 3. It also exceeds the Domestic Use TWQR.
- WC 2 recorded no *E. coli* colonies, while WC 1 and 3 recorded concentrations exceeding the Aquatic systems TWQR.

Table 15. Water quality results for WC 1, 2 and 3. The TWQR for aquatic systems and domestic use have been provided.

Parameter	Units	TWQR (Aquatic systems)	TWQR (Domestic use) mg/l	General Limit (waste water discharge into a watercourse)	WC 1	WC 2	WC 3
<b>Dissolved Iron</b>	µg Fe/l	The iron concentration should not be allowed to vary by more than 10 % of the background dissolved iron concentration for a particular site or case, at a specific time.	0 - 0.1	0.3 (mg/l)	625	1353	94
<b>Dissolved Manganese</b>	µg Mn/l	180 µg/L	0 - 0.05	0.1 (mg/l)	529	1249	35
<b>Chemical Oxygen Demand (Total)</b>	mg O <sub>2</sub> /l	Not Available	Not Available	75	96	32	24
<b>Biological Oxygen Demand (Total)</b>	mg O <sub>2</sub> /l	Not Available	Not Available	ns	<10	<10	<10
<b>Electrical Conductivity at 25 °C</b>	mS/m	Not Available	Not Available	70 mS/m above intake to a maximum of 150 mS/m	96,4	26,7	34,9
<b>Ammonia</b>	mg N/l	0.007	0 - 1	6	4,39	<0,11	<0,11
<b>Nitrate</b>	mg N/l	Not to exceed 15% of background value	0 - 6	15	0,11	0,10	1,60
<b>Nitrite</b>	mg N/l	Not to exceed 15% of background value	0 - 6	15	<0,01	<0,01	<0,01
<b>Turbidity</b>	NTU	Not Available	0 - 1	ns	85	37	7,9
<b>Oxygen Absorbed</b>	mg O <sub>2</sub> /l	Not Available	Not Available	ns	32	8	23
<b>pH at 25 °C</b>	pH units	pH values should not be allowed to vary from the range of the background pH values for a specific site and time of day, by >0.5 of a pH unit, or by >5%	6.0 - 9.0	5.5 - 9.5	6,8	7,8	7,8
<b>Orthophosphate</b>	mg P/l	Not to exceed 15% of background value	Not Available	10	0,05	<0,04	<0,04
<b>Sulphate</b>	mg/l	ns	0 - 200	ns	<0,21	<0,21	5,85
<b>Total Solids at 105 °C</b>	mg/l	Not to exceed 15% of background value	0 - 450	ns	652	210	238
<b>E. coli</b>	colonies/100 ml	130	0	<1000	192	<1	225
<b>Total Coliforms</b>	colonies/100 ml	ns	0	ns	3600	2910	2500



**Table 16. Nutrient concentrations and corresponding trophic conditions.**

Average Summer Effects Inorganic N Concentration (mg/l)	Average Summer Effects Inorganic P Concentration (µg/l)	Effects
< 0.5	< 5	Oligotrophic conditions; usually moderate levels of species diversity; usually low productivity systems with rapid nutrient cycling; no nuisance growth of aquatic plants or the presence of blue-green algal blooms.
0.5 - 2.5	5 - 25	Mesotrophic conditions; usually high levels of species diversity; usually productive systems; nuisance growth of aquatic plants and blooms of blue-green algae; algal blooms seldom toxic.
2.5 - 10	25 - 250	Eutrophic conditions; usually low levels of species diversity; usually highly productive systems, nuisance growth of aquatic plants and blooms of blue-green algae; algal blooms may include species which are toxic to man, livestock and wildlife.
> 10	> 250	Hypertrophic conditions; usually very low levels of species diversity; usually very highly productive systems; nuisance growth of aquatic plants and blooms of blue-green algae, often including species which are toxic to man, livestock and wildlife.

**Table 17. BOD values and equivalent water quality condition. (Source: <https://www.pharmaguideline.com/2013/06/determination-of-biological-oxygen.html>)**

BOD Level in mg/liter	Water Quality
1 - 2	<b>Very Good:</b> There will not be much organic matter present in the water supply.
3 - 5	<b>Fair:</b> Moderately Clean
6 - 9	<b>Poor:</b> Somewhat Polluted - Usually indicates that organic matter present and microorganisms are decomposing that waste.
100 or more	<b>Very Poor:</b> Very Polluted - Contains organic matter.

**Table 18. Expected COD values for water resources and effluent. (Source: <https://www.proteus-instruments.com/parameters/chemical-oxygen-demand-cod-sensors/>)**

Water type	Expected COD
Rivers	5 – 50 mg L <sup>-1</sup>
Treated effluent and polluted rivers	25 – 250 mg L <sup>-1</sup>
Primary/secondary effluent	250 – 750 mg L <sup>-1</sup>
Raw municipal sewage	500 – 1200 mg L <sup>-1</sup>
Contaminated industrial effluent	1000 – 50000 mg L <sup>-1</sup>

**Table 1 - Typical COD levels found in natural waters and sewage/effluent**

Overall, the water quality of each of the three watercourses can be classified as:

- WC 1 – Largely modified, EC: D
- WC 2 – Largely natural, EC: B
- WC 3 – Largely natural, EC: B

Data adapted from: Wetland & Surface Water Assessment Report, Whitehead, SDP, October 2020.

## 7.2 Socio-Economic Environment

The uMshwathi Local Municipality, KZN221 is a Category B municipality situated within the uMgungundlovu District, immediately adjacent to Pietermaritzburg, in the KwaZulu-Natal Province. It is the largest municipality of seven in the district. The municipality is named after the uMshwathi River that runs through the municipal area.

The municipality is located in an area that was largely under the control of tribal authorities until very recently. However, in the remaining portion there are towns built by German immigrants some 150 years ago. In the 1850s, 13 cotton planter families from Osnabruck unter Bergthell left Germany and settled in the area. They were followed by missionaries and other colonists, mostly from Hanover, who also settled in the region, founded New Hanover and Wartburg, and brought with them not only the Lutheran faith but the German language and culture. Wartburg itself is named after the castle in Eisenach, where Dr Martin Luther translated the bible into German. The village crest also depicts the immigrants' arrival by sailing ship, the Luther Rose, and the call to 'pray and work'.

The land is mostly agricultural, although urban development is to be found in the main towns. The communities living in the underdeveloped areas have extremely limited access to basic physical and social requirements and very few economic opportunities. The present authority structures are, as yet, unable to provide for the improvement of basic living conditions urgently required by the rural inhabitants. The municipal area is 1 866km<sup>2</sup>, with the main towns being: Cool Air, Dalton, New Hanover and Wartburg.

The main economic sectors are agriculture, manufacturing and tourism.

### 7.2.1 Economy

The uMshwathi LM economy is focused on the agricultural sector and other economic activities primarily related to this sector, thus, sectoral employment trends mirror these economic trends, with the greatest percentage of people being employed in the farming sector.

### 7.2.2 Manufacturing

Manufacturing activities are mainly related to agricultural processing activities, most notably sugar and timber processing activities, and to a lesser extent processing and manufacturing of food, with major industries such as Illovo Sugar Mill in Noodsberg, a maize mill and tannin producing plant of UCL Company Limited in Dalton and feedlots of Triple A, Crafcor and Argyle poultry.

### 7.2.3 Commercial and Social Services

The uMshwathi Local Municipality comprises of four major urban centres: New Hanover, Wartburg, Dalton, and Cool Air, with Wartburg and New Hanover the main economic and administrative centres in the uMshwathi Municipality, including: the municipal offices, Provincial Government offices, major schools, police stations, a magistrate's court and a large variety of commercial and retail outlets. These nodal areas are linked by good transportation/ road networks which all link to the major transportation routes within the Municipality i.e. the R33 (Old Greytown Road) and the R614 (Wartburg Road). The R33 provides a high degree of accessibility between urban centres and also with the surrounding Municipalities of Umvoti, Msinga and Endumeni, within the Umzinyathi District.

The municipality is flanked by the Mvoti River to the north-east and the Umgeni River to the south-west which forms part of the municipal southern boundary. The Albert Falls Dam is located along the south-west municipal boundary, while the Midmar Dam is located approximately 15km south-west of Albert Falls Dam. The Karkloof Nature Reserve is located along the western municipal boundary, the Cumberland Nature Reserve to the south-west and the Blinkwater Nature Reserve along the north-west municipal boundary.

The city of Pietermaritzburg is located south-west of the uMshwathi Local Municipality area, Greytown to the north and Tongaat to the south-east near the Indian Ocean.

The total population of the uMshwathi Local Municipality in 2011, based on Stats SA's most recent Census, was estimated to be 106 374 and population growth showed a negative trend at that stage. The SA Stats website estimated population in 2016 was 111 645, which indicated possible growth. Land use surrounding the proposed road upgrade development area consists of predominantly commercial farming activities, with most jobs associated with farming enterprises. The socio-economic structure along the proposed road route upgrade length can, therefore, be classified as primarily medium income.

Unfortunately, the economy, manufacturing, commerce and social services within the uMshwathi municipal area as well as further afield and nationally may be affected by the impact of the Covid 19 national disaster.

### 7.3 Culture and Heritage Environments

No sites of cultural significance were noted within the site or within close proximity to the site and no further Heritage management is required for the site. Most of the road upgrade occurs in areas of no palaeontological sensitivity, except for the first kilometre on the western side. This section is of medium sensitivity, however, the road upgrade will not be excavating into the ground, thus it will not affect any palaeontological layers. The project details and reports will, however, be submitted to AMAFA for comment.

In line with Section 38(1) of the National Heritage Resources Act, Act 25 of 1999, (NHRA), the project triggers the activities identified and an Heritage Impact Assessments (HIAs) as required by the National Environmental Management Act 107 of 1998 as amended (NEMA), in compliance with Section 38 of the National Heritage Resources Act 25 of 1999 (NHRA) has been completed. Section 38(1) of the NHRA may require such an assessment in case of:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
  - the construction of a bridge or similar structure exceeding 50m in length;
  - any development or other activity which will change the character of a site –
- (i) exceeding 5 000m<sup>2</sup> in extent; or
- (ii) involving three or more existing erven or subdivisions thereof; or
- (iii) involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
- (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority (PHRA);
- ☐ the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or
  - ☐ any other category of development provided for in regulations by SAHRA or a PHRA.

The proposed P278 Main Road Upgrade is 11 km in length and includes four watercourse crossing upgrades, an Heritage Impact Assessment has, therefore, been completed and is included under Appendix C.

#### KWAZULU NATAL AMAFA AND RESEARCH INSTITUTE<sup>1</sup>, (KARI), ACT 05, 2018

*“General protection: Structures.—*

- ☐ *No structure which is, or which may reasonably be expected to be older than 60 years, may be demolished, altered or added to without the prior written approval of the Council having been obtained on written application to the Council.*
- ☐ *Where the Council does not grant approval, the Council must consider special protection in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.*
- ☐ *The Council may, by notice in the Gazette, exempt—*
- ☐ *A defined geographical area; or*
- ☐ *defined categories of sites within a defined geographical area, from the provisions of subsection where the Council is satisfied that heritage resources falling in the defined geographical area or category have been identified and are adequately protected in terms of sections 38, 39, 40, 41 and 43 of Chapter 9.*
- ☐ *A notice referred to in subsection (2) may, by notice in the Gazette, be amended or withdrawn by the Council.*

*General protection: Graves of victims of conflict.—No person may damage, alter, exhume, or remove from its original position—*

- ☐ *the grave of a victim of conflict;*
- ☐ *a cemetery made up of such graves; or*
- ☐ *any part of a cemetery containing such graves, without the prior written approval of the Council having been obtained on written application to the Council.*
- ☐ *General protection: Traditional burial places.—*
- ☐ *No grave—*
- ☐ *not otherwise protected by this Act; and*
- ☐ *not located in a formal cemetery managed or administered by a local authority, may be damaged, altered, exhumed, removed from its original position, or otherwise disturbed without the prior written approval of the Council having been obtained on written application to the Council.*

*The Council may only issue written approval once the Council is satisfied that—*

- ☐ *the applicant has made a concerted effort to consult with communities and individuals who by tradition may have an interest in the grave; and*
- ☐ *the applicant and the relevant communities or individuals have reached agreement regarding the grave.*

*General protection: Battlefield sites, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites.—*

- ☐ *No person may destroy, damage, excavate, alter, write or draw upon, or otherwise disturb any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.*
- ☐ *Upon discovery of archaeological or palaeontological material or a meteorite by any person, all activity or operations in the general vicinity of such material or meteorite must cease forthwith and a person who made the discovery must submit a written report to the Council without delay.*
- ☐ *The Council may, after consultation with an owner or controlling authority, by way of written notice served on the owner or controlling authority, prohibit any activity considered by the Council to be inappropriate within 50 metres of a rock art site.*
- ☐ *No person may exhume, remove from its original position or otherwise disturb, damage, destroy, own or collect any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site without the prior written approval of the Council having been obtained on written application to the Council.*
- ☐ *No person may bring any equipment which assists in the detection of metals and archaeological and palaeontological objects and material, or excavation equipment onto any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, or meteorite impact site, or use similar detection or excavation equipment for the recovery of meteorites, without the prior written approval of the Council having been obtained on written application to the Council.*
- ☐ *The ownership of any object or material associated with any battlefield site, archaeological site, rock art site, palaeontological site, historic fortification, meteorite or meteorite impact site, on discovery, vest in the Provincial Government and the Council is regarded as the custodian on behalf of the Provincial Government.”*

## 8 Environmental Impact Assessment of the Proposed Activity

### 8.1 Geographical and Physical Environments

#### 8.1.1 Topography and Drainage

The topography of the area will not be affected because of the site specific nature of the proposed development.

Drainage will be affected during construction and post construction if not correctly managed. The proposed development will be within four watercourses for the proposed four watercourse crossing structure upgrades, and will thus affect the flow of the non-perennial tributary of the Manzanyma River during construction of Watercourse Crossing 1 and for Watercourse Crossings 2, 3 and 4 which are located directly on non-perennial tributaries of the Mtizane River, will affect the flow of the non-perennial tributaries of the Mtizane River during construction. This will be managed through the use of temporary stream diversion, if required. The flow will not be stopped at any time, and, where possible, the majority of the construction work will take place within the dry season.

#### 8.1.2 Hydrology

Whitehead, (2020), explains that sugar cane cultivation and timber are prominent and established agricultural land uses within the project area and that the timber plantations consist of *A. mearnsii*, *E. grandis* and *P. patula*, all of which are considered to have a significant impact on water resources and are flow reduction land uses. Agricultural land uses are extensive and have resulted in the complete transformation of the terrestrial environment within the study area. The only exceptions are wetland habitats and watercourses, where conditions are not suitable for cultivation.

At WC 1, WC and WC 3, excavation and infilling of permanent, seasonal and temporary wetland will take place resulting in permanent changes to the wetland habitat and a loss of some wetland vegetation. The extent of disturbance will, however, be limited to the road servitude. The habitat associated with WC 4 consists primarily of exotic invasion (*Rubus cuneifolius*) and the drainage line is ephemeral in nature.

HGM units 3, 4 and 5 will be directly affected by the upgrade of the P278. HGM units 1 and 6 will not be affected. In addition to the disturbance of vegetation and habitat disturbance, as described above, localised hydrological changes will occur. The current crossings over HGM units 3, 4 and 5 are inadequate and flow is constrained. Upgrading the crossings may alleviate the constraints allowing for more natural flow patterns. The benefits will, however, be localised and will be subject to the severity of disturbance that occurs during the construction phase.

Despite localised disturbance and possible changes in flow patterns, the findings of the WET-Health assessment suggest that the P278, (and the proposed upgrade), is unlikely to significantly affect the integrity of any of the wetlands as other factors such as timber plantations, agricultural activities and effluent from the mill are believed to be more influential and impose changes at a catchment scale. The impact of the road upgrade on the wetlands is thus believed to be of low significance.

There may be increased stormwater runoff, during the Operational Phase of the road upgrade project. Currently the runoff from the existing gravel road flows into rudimentary furrows along the side of the road and is directed into the adjacent cane land or timber plantations. The road upgrade will result in a more impermeable surface and a more formal stormwater disposal system. The watercourses and wetlands are natural low points and all stormwater from the road in the vicinity of the crossings, will be released into these natural drainage systems. The most likely impact will be scour at the outfall point, while a slight increase in flow downstream of the discharge point will occur. Both may result in localised deepening of the channel and the destabilisation of the channel banks.

During the construction phase, temporary stormwater management measures must be implemented as described in 8.1.3 Erosion Controls. The control of stormwater during the operational phase is a concern, as long term

negative effects may arise as result of the increase in unregulated stormwater entering the watercourses from the road. Formal stormwater control measures must be implemented that allow stormwater to be collected, attenuated and disposed of in a manner that will not promote erosion or scour. The use of attenuators, such as chambers and gabion mattresses are recommended for installation at points of release of stormwater into any of the watercourses.

The water quality of the three watercourses appears variable and is influenced by the surrounding land uses. The water quality of the watercourses is expected to be affected during the construction phase, where excavation and disturbance will result in increased turbidity. *E. coli* concentrations may also increase as a result of having informal sanitation infrastructure. Hydrocarbon contamination may occur as a result of spillages or leaking plant. The impacts will, however, be temporary and are expected to cease once construction is complete.

Impacts on localised hydrology can be mitigated through consideration of certain design features during the detailed planning of the crossings. Ideally, the proposed structure should not significantly affect the flow of water, thereby minimising impacts brought about by attenuation and turbulence. It is recommended that consideration be taken of the following in the design of the crossing structures:

- Allow for high flows (1:10 year flood or similar) to pass unimpeded beneath the crossing
- Columns/culverts must offer as little resistance to flow as possible. For example, the use of pylon supports or a single large box culvert, rather than numerous box culverts or stacked pipe culverts.
- Given the width of the active channel, supports should be positioned outside of the active channel.
- Consideration of the direction of flow. The structure should not cause the flow of the watercourse/wetland to deviate.

### **8.1.3 Geology and Soils**

The proposed development will have little to no negative impact on the geology and soils of the area. Construction activities may temporarily increase erosion during excavation for bridge culverts, with stream sedimentation and may also result in soil compaction both within, and alongside the watercourses. Access to culvert base areas and access across the non-perennial tributary of the Manzamnyama River during construction of Watercourse Crossing 1 and access across the non-perennial tributaries of the Mtizane River for Watercourse Crossings 2, 3 and 4 may increase erosion and sedimentation during construction. The relevant mitigation measures to help to reduce this impact, will be incorporated into the project EMP.

Erosion controls must be implemented to prevent the expansion of existing gulleys or the formation of new erosion gulleys. Priority areas for erosion control are areas where there is an obvious gradient and the flow of water can be expected. Measures must include at least the use of sandbags and silt curtains. Sandbags/silt curtains must be placed in the active channel during construction, immediately downstream of the P278, where work is being undertaken within or close to a watercourse. These will capture material washed into the watercourse during construction. Material can then be removed. The integrity of the sandbags/silt curtains will need to be monitored on a daily basis and repaired or replaced when necessary.

### **8.1.4 Climate**

No measurable affect is anticipated.

## **8.2 Biological Environments**

### **8.2.1 Flora and Flora**

According to Whitehead 2020, the road upgrade will require widening which is expected to be minimal to facilitate construction and establish the required curbing and drainage. This widening is expected to be confined to the existing road reserve, for the most part and, therefore, the loss of habitat should be minimal.

Some loss of wetland and riparian habitat is, however, expected at the crossing sites, particularly at WC 1, 2 and 3, where established and largely natural wetland and riparian habitat will be disturbed in order to facilitate the



upgrade of the crossings. The habitat associated with WC 4 consists primarily of exotic invasion (*Rubus cuneifolius*) and the drainage line is ephemeral in nature.

At WC 1, excavation and infilling of permanent, seasonal and temporary wetland will take place resulting in permanent changes to the wetland habitat and a loss of wetland vegetation. The extent of disturbance will, however, be limited to the road servitude.

At WC 2, the disturbance of wetland vegetation will take place upstream of the P278, where wetland habitat is present, (HGM unit 5). Downstream of the crossing, the watercourse has been channelled and flows through an *Acacia mearnsii* plantation. Habitat loss on the downstream side will be minimal, due to the lack of established wetland or riparian habitat. As with WC 1, excavation and infilling will occur, permanently altering the nature of the system in the vicinity of the crossing. The disturbance footprint will, however, be restricted to the road reserve.

At WC 3, the road crosses the Mtizane River. The drainage line which is crossed at WC 2 is a tributary of the headwater system of the same river. Habitat loss at the WC 3 crossing site will include the disturbance of the active channel area, aquatic habitat and riparian vegetation, albeit of a degraded nature. Plantation makes up much of the non-marginal zone upstream of the crossing, while the downstream non-marginal zone is invaded by *Rubus cuneifolius*.

HGM units 3, 4 and 5 will be directly affected by the upgrade of the P278. HGM units 1 and 6 will not be affected. In addition to the disturbance of vegetation and habitat disturbance, as described above, localised hydrological changes will occur. The current crossings over HGM units 3, 4 and 5 are inadequate and flow is constrained. Upgrading the crossings may alleviate the constraints allowing for more natural flow patterns. The benefits will, however, be localised and will be subject to the severity of disturbance that occurs during the construction phase.

Despite localised disturbance and possible changes in flow patterns, the findings of the WET-Health assessment suggest that the P278, (and the proposed upgrade) is unlikely to significantly affect the integrity of any of the wetlands as other factors such as timber plantations, agricultural activities and effluent from the mill are believed to be more influential and impose changes at a catchment scale. The impact of the road upgrade on the wetlands is thus believed to be of low significance.

The proposed development is likely to have a localised impact on the site vegetation, potentially resulting in additional alien invasive plants becoming established on site and downstream from the site, particularly if no site environmental management and rehabilitation measures are implemented.

Exotic invasion is particularly common along watercourses and the periphery of wetland areas. In addition to the three exotic tree species cultivated in the area, *Rubus cuneifolius* is a prominent invader.

The road reserve and all areas affected by construction activities, (including riparian and channel bank areas), must be sculpted and revegetated. The most suitable method of revegetation is through the use of a grass mix that includes *Eragrostis tef*, a fast growing pioneer grass. Once the grass cover is established, a once off removal of all alien invasive plants from the construction footprint should be undertaken. Long term alien invasive plant management within the road reserve must be implemented as part of the Kwazulu-Natal Department of Transport's provincial road maintenance plan.

### **8.2.2 Terrestrial Fauna**

The proposed development is unlikely to significantly affect indigenous fauna, which if present, will likely retreat from the area during construction.

### 8.3 Socio-Economic Environment

#### 8.3.1 Social

The proposed construction upgrade of Main Road P278 and Associated Borrow Pits will benefit the local community, as it will provide safer vehicular and pedestrian access for all road users. The project aim is to upgrade and improve the existing 11km of gravel road to all-weather black top road as well as improve and upgrade two pipe culvert crossings and two bridge structures in order to improve safety and access for the local community and all road users. Dust from the gravel road would be significantly reduced and the improved road surface would result in less wear and tear for vehicles of residents/workers or frequent road users and the proposed four watercourse crossing point upgrades will help to ensure adequate and safe crossing areas during high rainfall and flood events. The existing road has been serving the community for a number of years and the minimum design standards on the existing alignment have been met, thus the road route can remain the same and it will not be necessary to change the alignment. The local community may also benefit through the provision of temporary employment opportunities during the construction phase. The safety of the local inhabitants must be considered during construction and access to the construction area must be regulated.

Please refer to Proposed Development Socio-Economic Statistics below.

Proposed Development Socio-Economic Statistics	
Expected capital value of the activity on completion:	R 150 000 000.00
Expected yearly income that will be generated by or as a result of the activity:	
The activity will contribute to service infrastructure.	
The activity is a public amenity.	
Number of new employment opportunities that will be created in the development phase of the activity:	100 people
Expected value of the employment opportunities during the development phase:	R 7 920 000.00
Percentage of this which will accrue to previously disadvantaged individuals:	100 %
Number of employment opportunities that will be created during the operational phase of the activity:	0
Expected current value of the employment opportunities during the first 10 years:	R 7 920 000.00
Percentage of this will which accrue to previously disadvantaged individuals:	100%

#### 8.3.2 Traffic

Access to the site will be gained via the existing tar roads, either the P156-1 to the south-west, or the P159 to the north-east. It is anticipated that the common transportation route will be from the south of the site and the P156-1, as this is the shortest route to the nearest commercial centre in Dalton. The size of the trucks transporting goods to and from the site will not exceed the size of the trucks utilised in the construction of the existing roads in the area. The trucks will also comply with local road regulations and weight specifications. The number of trucks gaining access to the site is not known at this stage.

If the speed, (and weight), limits on the haulage roads are adhered to, no impacts different from the impact of the current traffic are envisaged. This will include the generation of noise, dust and potential safety issues.

#### 8.3.3 Heritage and Cultural Environment

No sites of heritage or cultural significance were noted within the site or within close proximity to the site; the proposed development is, therefore, unlikely to affect these resources and no further heritage management is required for the site. Most of the road upgrade occurs in areas of no palaeontological sensitivity, except for the first kilometre on the western side. This section is of medium sensitivity, however, the road upgrade will not be excavating into the ground, thus it will not affect any palaeontological layers. The project details and reports will, however, be submitted to AMAFA for comment.

In line with Section 38(1) of the National Heritage Resources Act, Act 25 of 1999, (NHRA), the project triggers activities identified and an Heritage Impact Assessment, (HIA), as required by the National Environmental Management Act 107 of 1998, as amended, (NEMA), in compliance with Section 38 of the National Heritage Resources Act 25 of 1999, (NHRA), has been completed.

Section 38(1) of the NHRA may require such an assessment in case of:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
  - the construction of a bridge or similar structure exceeding 50m in length;
  - any development or other activity which will change the character of a site –
- (i) exceeding 5 000m<sup>2</sup> in extent; or
- (ii) involving three or more existing erven or subdivisions thereof; or
- (iii) involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
- (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority (PHRA);
- ☐ the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or
- ☐ any other category of development provided for in regulations by SAHRA or a PHRA.

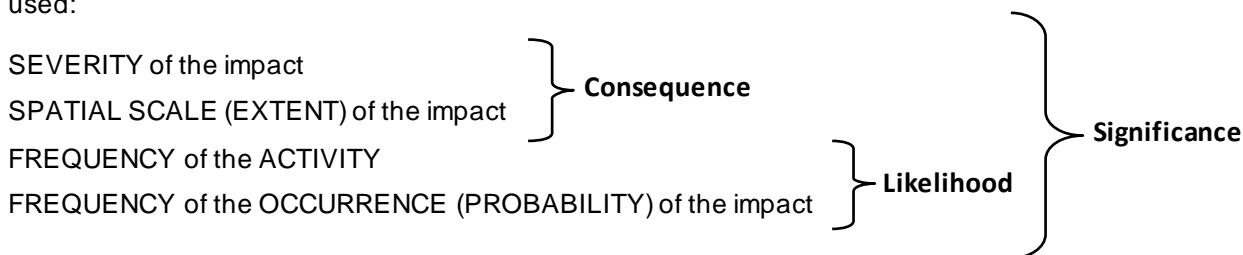
The proposed P278 Main Road Upgrade is 11 km in length and includes four watercourse crossing upgrades, an Heritage Impact Assessment has, therefore, been completed and is included under Appendix C.

## 9 Environmental Risk Assessment Methodology

The purpose of the Environmental Risk Assessment, (ERA), is to identify the potential environmental risks and impacts associated with the installation of the proposed P278 Main Road Upgrade. This provides a basis to identify the key risk drivers and make informed decisions on the way forward in order to help to ensure that these risks do not result in unacceptable social, environmental or reputational risk.

### 9.1 Risk Assessment Methodology

The potential environmental impacts associated with the proposed development have been evaluated using a recognised semi-quantitative risk assessment methodology. This methodology has been developed to ensure all procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment as set out in National Environmental Management Act (No. 107 of 1998) [NEMA] 24(4b) are met. In order to assess the significance as objectively as possible, the following criteria have been used:



This system derives environmental significance on the basis of the consequence of the impact on the environment and the likelihood of the impact occurring. **Tables 19 to 23** describe the process in detail. The significance rating of potential risks is outlined in **Table 23**. Significance is calculated as the product of consequence and likelihood.

### 9.2 Determining Consequences

In terms of this project, consequence is determined based on the consideration of a combination of severity, extent and duration of the environmental impact. Consequence is determined as the average of the three values (i.e. (severity + extent + duration) / 3) (**Table 19**).

**Table 19: Assessment of Consequences**

Rating	Description		
	Severity	Spatial Extent (Scale)	Duration
1	Negligible / non-harmful / minimal deterioration	Within immediate area of activity	Less than 1 month / quickly reversible
2	Minor / potentially harmful / measurable deterioration	Surrounding area within project boundary	Less than 1 year / quickly reversible
3	Moderate / harmful / moderate deterioration	Beyond project boundary	More than 1 year / reversible over time
4	Significant / very harmful / substantial deterioration	Regional / provincial	More than 10 years / reversible over time / life of project or facility
5	Irreversible / permanent	National / international	Beyond life of project of facility / permanent

### 9.3 Determining Likelihood

Likelihood considers the frequency of the activity together with the probability of an environmental impact associated with that activity occurring. Likelihood is determined as the average of the two values (i.e. (frequency + probability / 2) (**Table 20**).

**Table 20: Assessment of Likelihood**

Rating	Description	
	Frequency	Probability
1	Less than once a year	Almost impossible
2	Once in a year	Unlikely
3	Quarterly	Probable
4	Weekly	Highly likely
5	Daily	Definite

### 9.4 Determining Overall Impact Significance

Overall significance is determined using professional judgement based on a clear understanding of the nature of the impact, its severity, the duration and degree to which the impact can be reversed as well as the extent of the impact. These aspects define the impacts consequence which must be considered against the likelihood of the impact occurring in order to assign an overall significance of the impact. Significance ratings of the identified impacts have been based on the implementation of mitigation measures as per the proposed Environmental Management Plan, (EMPr).

The status of the impact must be defined, and the impact can either be positive, neutral or negative. A positive impact is where an activity will have a social / environmental / economic benefit. A neutral impact is when an activity will have no effect. A negative impact is when an activity will be harmful socially / economically / environmentally. Significance should be assigned according to the definitions in the table below (**Table 21**).

**Table 21: Description of Impact Significance**

Rating	Significance	Description
L (1 – 4.9)	<b>Insignificant</b>	A potential issue which was found to have no impact when evaluated
LM (5 – 9.9)	<b>Very Low</b>	Impacts will be site specific and temporary with no mitigation necessary
M (10 – 14.99)	<b>Low</b>	Impact will have a minor influence on the biophysical and/or social environment, and will not have an influence on the decision.
MH (15 – 19.9)	<b>Medium</b>	Impact will have a moderate influence on the biophysical and/or social environment, and it should have an influence on the decision unless it is mitigated.
H (20 – 25)	<b>High</b>	Impact will have a major influence on the biophysical and/or social environment, and would influence the outcome regardless of any possible mitigation.

## 10 Environmental Impact Assessment Matrix

The purpose of the environmental impact assessment, (EIA) is to identify the potential impacts and associated risks posed by the project on the environment. The outcomes of the EIA will provide a basis to identify the key risk drivers and make informed decisions on the way forward in order to ensure that these risks do not result in unacceptable social, environmental or reputational risk to the KwaZulu-Natal Department of Transport.

The potential environmental impacts in terms of NEMA are assessed in the risk matrix below (**Table 22**) according to the criteria described in the consequences, likelihood and significance tables provided above. The reasons for selecting each is covered under the qualification of the potential impact; the associated recommendations, findings and / or mitigation measures are also provided.

**Table 22: Environmental Impact Risk Matrix (Refer overleaf)**



Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (CxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
											<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul>
<b>10.1 Geographical and Physical Environments (Preferred Alternative)</b>											
Decrease in surface water quality	A decrease in surface water quality is expected during the construction phase owing to an accumulation of suspended sediment and excess sediment deposition from potential sediment release associated with the construction methodology.	2	2	2	2	2	2	2	4	-	<p>The proposed construction methodology is considered "best practice" as it makes use of the most appropriate technologies. Notwithstanding the above, mitigation and rehabilitation measures and recommendations will be incorporated into the Environmental Management Programme. For example: Construction within the active channel will require temporary stream diversion to help reduce erosion and sedimentation. Any excavations or excavated material must be protected from erosion if it is anticipated that it will remain exposed for any length of time. Stockpiles of this material must be positioned away from the watercourse, keeping the topsoil and the sub-soil separate (where applicable). As a result, a long-term decrease in surface water quality is not expected; the impact is likely to be very low (negative). <b>Insignificant.</b></p>
	<b>With mitigation:</b>	2	2	1	1.6	1	2	1.5	-	2.4	

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
Impact on surface water flow	Alteration of surface flow conditions owing to physical obstruction of the bridge and culvert structures. The proposed bridge and culvert structures will create some flow disturbance, but should not significantly impede flow.	4	3	4	3.6	5	4	5	16.2 MH	-	The installation of the Main P78 Road and four watercourse crossings, (2 bridges and 2 pipe culvert structures), is not expected to significantly affect surface water flow during the construction phase. This phase is expected to be short in duration, and management measures must be employed during the construction phase to help to ensure that the surface water flow is maintained as far as possible.
	<b>With mitigation:</b>	3	2	3	2.6	4	4	4	-	10.4 M	The impact post mitigation is expected to be low, (negative). This impact can be reduced further if construction takes place within the dry months.  Consideration of specific design criteria. The proposed watercourse crossing structures, including 2 bridges and 2 pipe culvert crossings, appear to be in line with these design criteria.
Increased sedimentation	Increased sedimentation of the watercourses owing to disturbances / alterations to the bed and banks could potentially cause an increase in transportation and deposition of sediments to the watercourse, leading to a reduction in water quality.	2	2	2	2	2	2	2	4 LM	.	The probability for this impact to occur will be increased during high rainfall periods. The potential impact of sedimentation is expected to be of a very low significance if the recommendations in the EMP are implemented. In addition, construction will be limited to the dry (low rainfall) winter months. Based on the above, the potential impact on surface water resources is likely to be very low, (negative).
	<b>With mitigation:</b>	2	1	1.5	1.5	2	2	2	.	4.5 L	<b>Insignificant.</b>

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (CxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
Decrease in groundwater water quality	The installation method could result in contamination of ground water arising from the construction plant, oils/grease, cement, building materials etc.	3	3	3	3	3	3.5	3.25	9.75 LM	.	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul> <p>There is the potential for contamination of groundwater owing to uncontrolled releases of cement, hydraulic fluid, oil, diesel during construction. The potential impact of groundwater contamination is expected to be of a <b>very low, (negative)</b> significance if the recommendations in the EMPr are not implemented and <b>very low</b> after mitigation. Please refer to recommendations regarding hazardous material and spill management in the EMPr.</p>
	<b>With mitigation:</b>	2	2	2	2	2.5	2.5	2.5	.	5 LM	
Decrease in soil and groundwater water quality	The development of a construction site could result in damage to soil and ground water contamination.	3	2	2	2.3	3	3	3	7 LM	.	

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (CxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
	With mitigation:	2	2	2	2	2	2	2	.	4 L	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul>
											<p>The clearing and development of the site may cause soil compaction and contamination, and ultimately erosion, as well as ground water contamination as a result of the movement of heavy vehicles and the uncontrolled release of hydrocarbons, cement and other hazardous materials. Bunded areas must be set up from the outset to help to ensure all spillages are contained. Any spillages must be immediately cleaned up and disposed of at the nearest registered landfill only, with proof of correct disposal. During construction continuous monitoring of containers, bunded areas, surface runoff and air emissions must be undertaken by a responsible person. The proposed development areas must be kept to a minimum where possible. At the site camp and ingress and egress points of the two bridges and two pipe culverts, topsoil should be removed from the proposed construction site prior to establishment. The compacted soil must be ripped up, the topsoil replaced, and rehabilitated with indigenous vegetation once construction has been completed. This impact is of <b>very low, (negative)</b> significance without mitigation, and of very low, (no) significance if mitigated. <b>Insignificant.</b></p>

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
Increased soil erosion	The installation method may exacerbate erosion of the non-perennial tributary of the Manzanyma River banks and bed for Watercourse Crossing 1 and for Watercourse Crossing 2, 3 and 4 the non-perennial tributaries of the Mtizane River banks and bed.	3	3	2	2.6	4	3	3.5	9.1 LM	.	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul> <p>There is the potential for soil erosion to occur because of excavation activities within the non-perennial tributary of the Manzanyma River and the non-perennial tributaries of the Mtizane River during construction. The probability for this impact to occur is increased during high rainfall periods. The impacts from erosion are expected to be <b>very low</b> pre-mitigation and <b>very low</b> if the soil erosion and surface water protection measures recommended in the EMP are implemented, <b>(negative)</b>. In addition, construction of the crossings will be limited to the dry winter months.</p>
	<b>With mitigation:</b>	2	2	2	2	3	3	3	.	6 LM	
Compaction of soils	Compaction of the soils from heavy vehicles.	2	2	2	2	3.5	3	3.25	6.5 LM	.	



Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
	With mitigation:	2	1	2	1.7	3	3	3	.	5.1 LM	<p>Compaction of soils in and along the edges of the watercourses must be minimised as far as possible. Areas excluded from development, (riparian and wetland zones), must be clearly demarcated and indicated to construction staff. Compacted soil must be broken up, raked loosely, and then re-vegetated or packed with large boulders and stones, (within the river bed). Use of gabions and reno mattresses must also be considered. The impact is thus expected to be <b>very low (negative)</b> both pre and post mitigation.</p> <p>Crossing of the rivers must be avoided as far as possible to help limit impact. If crossing is necessary, simple surface and temporary structures to limit damage to the rivers must be utilised. Reno mattresses, gabion baskets and biodegradable sandbags may be utilised. No plastics must be utilised. At completion, ALL imported material must be cleared up. All waste must be correctly disposed of with proof of correct disposal.</p>

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
											<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul>
<b>10.2 Biological Environments (Preferred Alternative)</b>											
Ecological impacts – river banks and beds	Modifications to the channel banks and beds from the construction process may result in a loss of wetland habitat.  Wetland habitat adjacent to the existing crossings will be disturbed and potentially lost during construction. The additional permanent habitat loss will be minimal, as the site is disturbed by the existing crossings.	5	2	4	3.6	4	5	4.5	16.5 MH	.	Revegetation of adjacent areas disturbed during construction must be implemented. Limit the construction footprint. Implement erosion and sediment control measures. The topsoil must be removed and stockpiled / stored separately from the underlying sub-soil prior to construction on the banks of the watercourses. The backfill process must ensure that the material is returned in the same order that it was removed i.e. the sub-soil replaced first, followed by the topsoil material closer to the surface. The impact is thus expected to be <b>Moderate, (negative)</b> , pre mitigation and <b>low</b> post mitigation.
	<b>With mitigation:</b>	2	1	4	2.3	4	3	3.5	.	5.8 M	
Ecological impacts – alien invasive vegetation	Disturbance of vegetation and the encroachment of alien invasive plant species	4	4	4	4	4	4	4	16 M	.	

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (CxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
	With mitigation:	3	3	4	3.33	3	3	3	.	10 LM	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul>
											<p>It is critical that vegetation is established over disturbed areas immediately after construction is complete. All indigenous groundcover must be carefully removed, planted up into bags or containers and maintained in an on-site "nursery" facility, shade cloth roof and walls, plus regular watering and maintenance until such time as they can be replanted as close to area of source as possible. All groundcover that were removed during the initial phases of construction along the river banks must be replanted on completion of construction, as close to area of source as possible. An approved local indigenous grass seed mixture must be applied in conjunction with the sods, if it is deemed that establishment of the vegetation from the sods is unlikely to be successful. Pre mitigation the impact is expected to be <b>medium and post mitigation low, (negative).</b></p>

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (CxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
Ecological impacts – loss of habitat	<p>Loss of sections of habitat.</p> <p>Habitat loss is expected to be limited to localised areas around the actual watercourse crossing areas. Permanent loss will be associated with areas affected by the base slab and structures, while temporary disturbance will result owing to trampling or vehicular movement.</p>	5	3	4	4	5	4	4	18M H	.	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul>

With mitigation:												
		4	3	3	3.3	5	3	4	.	13.2 M		<p>The proposed working area must be clearly demarcated prior to the commencement of the works. The width of the working area within the four watercourses must be kept to a strict minimum to ensure that impacts on the freshwater systems and the four watercourses are minimised. All activities must be restricted to within the demarcated working areas.</p> <p>The reinstatement of the watercourses and banks must be carried out immediately after the bridges and culverts have been installed. The backfill material must be returned in the same order that it was removed i.e. the sub-soil replaced first, followed by the topsoil material closer to the surface. Re-vegetation must be carried out immediately after backfilling, and the establishment of alien invasive plants must be prevented. The use of engineered mechanisms, (reno mattresses and gabion baskets), biodegradable sandbags and/or large rocks and boulders, will also assist in stabilising the soil and riverbeds and banks. Revegetation of the disturbed riparian areas as well as alien invasive plant removal must be implemented. The instream habitat lost owing to the base slabs and structures is an inherent impact and cannot be practically mitigated. Therefore, the emphasis must be to ensure that the remaining areas are correctly rehabilitated and that they return to optimum functionality.</p> <p>The impact is then expected to be kept within the <b>medium range, (negative)</b>, pre-mitigation, and <b>low</b> if mitigation measures are employed.</p>
<b>10.3 Socio-Economic Environment, (Preferred Alternative)</b>												
Potential Safety and security impact	Exposure of local residents, (and livestock), to potentially dangerous site conditions, (open excavations), during construction	4	3	2	3	3	3	3	9 LM	.		<p>The proposed crossing will expose the local residents to potentially dangerous conditions during the construction phase, if excavations are left accessible and unguarded during construction hours and after</p>



Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
	<b>With mitigation:</b>	2	3	2	2.3	3	2	2.5	.	5.8 LM	hours. Local residents must be informed of the proposed construction activities and warned to stay away. Wherever possible the site must be fenced off. Communication keeping the local residents/IAPs informed will be important throughout the construction phase. The impact is likely to be <b>very low, (negative)</b> pre and post mitigation.
Changes in the social fabric	The influx of construction workers may create social issues such as conflict, conflict for work, changes in financial outlook, changes in domestic cohesion.	3	3	2	2.6	3	3	3	8 LM	.	The proposed development will expose the local residents to potential conflict situations if construction work is only available to some, and if social and domestic cohesion is compromised. It is suggested that the construction workers be advised of these pitfalls in order to help avoid them. This impact is expected to be of <b>very low, (negative)</b> significance both pre and post mitigation.
	<b>With mitigation:</b>	2	2	2	2	3	2	2.5	.	5 LM	
Improved social amenity	The construction of the proposed two portal culvert bridges and two pipe culvert crossings will provide improved and safer access for residents, pedestrians, school children and all road users.	5	3	4	4	4	4	4	16 MH	.	The current old bridge crossings and pipe culvert crossings may become difficult and dangerous to cross during high rainfall and flood events, the construction of the proposed two new portal culvert bridges and two pipe culvert crossings will improve safety and access for local residents, pedestrians, farmers school children and all road users. This is a <b>positive</b> impact of <b>Medium</b> Significance.
	<b>With mitigation: Not required</b>										Vehicles utilising the proposed new road will have to adhere to speed limits.

Qualification of Potential Impacts (Nature)		Severity	Extent	Duration	Consequence (S+E+D)/3	Frequency	Probability	Likelihood (F+P)/2	Significance (No Mitigation) (cxL)	Significance (With Mitigation)	Impact Assessor Comments and Recommendations:
Construction Phase Waste, and Effluent,	Waste may be produced during the construction phase	3	3	3	3	5	4	4.5	13.5 M	.	<ul style="list-style-type: none"> <li>- Degree to which impact can be managed</li> <li>- Possible Mitigation Measures and level of residual risk</li> <li>- Positive and Negative Impacts</li> </ul> <p>A small quantity of waste in the form of construction rubble, overburden and general waste may be created during the construction phase. This will be disposed of appropriately at the nearest registered waste disposal site. <b>Low</b> impact is expected during construction and <b>very low</b> post mitigation.</p>
	<b>With mitigation:</b>	2	2	2	2	4	3	3.5	.	7 LM	
Construction Phase Emissions and Noise	Noise and Dust may be created by the construction vehicles and machinery	3	3	3	3	4	3	3.5	10.5 M	.	<p>Noise and dust may be created by construction vehicles during the construction phase, (the access roads are dirt and gravel roads). This must be prevented by ensuring that the vehicles travel at reduced speeds. Wetting the roads and dusty areas down is an option but must only be considered as a last resort in extreme cases. Noise must be reduced through the use of silencers and correctly maintained equipment.</p> <p>These impacts are likely to be of short and intermittent duration, and are not considered intolerable. There are residents, a church, farmers and farm facilities located close to the site, so noise and dust must be correctly managed. The impact is thus <b>low</b> during construction and <b>very low, (negative)</b>, post mitigation.</p>
	<b>With mitigation:</b>	2	2	2	2	3	2	2.5	.	5 LM	

## 10.4 Cumulative Impacts

The majority of the impacts were found to be of a medium to low negative significance, prior to mitigation. Cumulatively, the impacts assessed are not expected to significantly alter the environmental condition, especially if the mitigation measures are employed.

## 10.5 Degree to which the Impacts can be reversed

All the significant impacts identified can be reversed, other than the permanent impact of the installation of the proposed Upgrade of Main Road P278. In some instances, a positive outcome is anticipated such as improved, safer vehicular and pedestrian access across the Manzanyma River and Mtizane River, as well as the two new upgraded pipe culvert structures. All road users will benefit from the improved and upgraded road.

## 10.6 Degree to which Impacts may cause Irreplaceable Loss of Resources

None of the impacts will result in an irreplaceable loss of resources.

## 10.7 Outcome of the Site Selection Matrix

The preferred site and technology/design was assessed. The proposed development is site specific as an efficient link across the non - perennial tributaries of the Manzanyma River and Mtizane River. The two portal culvert bridge crossings and the two pipe culvert crossings have been sited and designed to optimise the upgrade and improvement of the existing Main Road P278 gravel road and to improve the safety of all motorists, road users and pedestrians.

# 11 Environmental Impact Statement

## 11.1 Assumptions, Uncertainties and Gaps in Knowledge

Detailed description of the construction methodology, (aside from the diagrams provided in Appendix B) was not available.

## 11.2 Summary of Findings

### 11.2.1 Summary of the Positive and Negative Impacts and Risks

#### Table 23: Summary of Impacts and Risks (Preferred Alternative)

Please refer to Table 23 overleaf.

**Table 23: Summary of Impacts and Risks, (Preferred Alternative)**

Potential Environmental Impacts	Qualification of Potential Impacts (Nature)	Impact Significance
Decrease in surface water quality	A decrease in surface water quality is expected during the construction phase owing to an accumulation of suspended sediment and excess sediment deposition from potential sediment release from erosion associated with the construction activities.	<b>Very low (negative)</b> during and with mitigation measures <b>Very low (negative). Insignificant.</b>
Impact on surface water flow	Alteration of surface flow conditions owing to physical obstructions.	The potential impact on surface water resources is likely to be <b>medium (negative)</b> prior to mitigation. The impact post mitigation is expected to be <b>low (negative)</b> .
Increased sedimentation	Increased sedimentation of the watercourses owing to disturbances / alterations to the river bed banks could potentially cause an increase in transportation and deposition of sediments to the watercourses, leading to a reduction in water quality.	<b>Very low</b> significance if the recommendations in the EMPr are implemented. The potential impact on surface water resources is likely to be <b>very low (negative)</b> prior to mitigation. <b>Insignificant.</b>
Decrease in groundwater water quality	The installation method could result in contamination of ground water arising from the construction plant, oils/grease, cement, building materials etc.	The potential impact of groundwater contamination is expected to be of a <b>very low (negative)</b> significance if the recommendations in the EMPr are not implemented and <b>very low</b> after mitigation.
Decrease in soil and groundwater water quality	The development of a construction site could result in damage to the soil and ground water contamination.	This impact is of <b>very low (negative)</b> significance without mitigation, and of no significance if mitigated. <b>Insignificant.</b>
Increased soil erosion	The installation method may exacerbate erosion of the river banks and bed.	The potential impact on surface water resources is likely to be <b>very low (negative)</b> both pre and post mitigation.
Compaction of soils	Compaction of the soils from heavy vehicles.	The impact is expected to be <b>very low (negative)</b> both pre and post mitigation.
Ecological Impact – temporary loss of habitat	Disturbance of the aquatic ecosystem and loss of adjacent wetland fringes as a result of a construction activities.	The impact is expected to be <b>Moderate (negative)</b> without mitigation and <b>low</b> with mitigation. <b>Low.</b>
Ecological impacts – river banks and beds	Modifications to the channel banks and beds from the construction process.	The impact is expected to be <b>low (negative)</b> , pre-mitigation and <b>low</b> post mitigation.
Ecological impacts – alien invasive vegetation	Disturbance of vegetation and the encroachment of alien invasive plant species.	Pre-mitigation, the impact is expected to be <b>medium (negative)</b> . The post mitigation impact is expected to be <b>low</b> .
Ecological impacts – loss of habitat	Loss of sections of habitat.	The impact is expected to be kept within the <b>medium range (negative)</b> pre-mitigation, and <b>low</b> if mitigation measures are employed.

**Table 23: Summary of Impacts and Risks, (Preferred Alternative)**

Potential Environmental Impacts	Qualification of Potential Impacts (Nature)	Impact Significance
Potential Safety and security impact	Exposure of local residents, farmers and road users, (and livestock) to potentially dangerous site conditions, (open excavations) during construction	The impact is likely to be <b>very low (negative)</b> pre and post mitigation.
Changes in the social fabric	The influx of construction workers may create social issues such as conflict, conflict for work, changes in financial outlook, and changes in domestic cohesion.	This impact is expected to be of <b>very low (negative)</b> significance both pre and post mitigation.
Improved social amenity	The construction of the proposed two new portal culvert bridges and two pipe culvert crossings over the Manzanyma River and the Mtizane River will provide improved and safer access for residents, farmers and all road users.	This is a <b>positive</b> impact of <b>Medium</b> Significance.  Vehicles utilising the road will have to adhere to the speed limits.
Construction Phase Waste, Effluent, Emissions and Noise	Waste may be produced during the construction phase	<b>Low</b> impact during construction and <b>very low (negative)</b> impact post mitigation.
	Noise and Dust may be created by the construction vehicles and machinery	<b>Low</b> impact during construction and <b>very low (negative)</b> impact post mitigation.

### 11.3 Key Impact Management Measures

#### 11.3.1 Mitigation Measures to be included in EMPr

Mitigation measures as presented in the Risk Assessment, (**Table 11**) (amongst others) above will be included in the EMPr.

#### 11.3.2 Mitigation Measures Identified in Specialist Reports

- “Wetland and Riparian/Aquatic Assessment Report for the Proposed P278 Road Upgrade”, Sustainable Development Projects, (SDP), October 2020
- “Heritage Survey of the Upgrading of Main Road 278 and Two Borrow Pits, including Palaeontological Sensitivity”, Umlando, Gavin Anderson, March 2020
- “Results of a Founding Investigation for Two Proposed culverts along Gravel Road P 278 Phase 1 (km 0+000 to km 11+000), near Dalton, KwaZulu-Natal”, Geosure (Pty) Ltd, November 2019
- “Report on the Geotechnical Investigation Carried Out for the Upgrade of Road P278 in KwaZulu-Natal”, Shriram Geotechnical Consulting (Pty) Ltd, May 2020



## 11.4 Aspects Conditional to the Findings

No conditional aspects have been identified.

## 11.5 Reasoned Opinion on Proposed Development

The Basic Assessment Study has made extensive use of desktop and field data, and input from IAPs, and reveals typical impacts associated with the proposed Upgrade of Main Road P278 which includes a crossing over a non-perennial tributary of the Manzanyma River, (Watercourse Crossing 1), and three crossings of non-perennial tributaries of the Mtizane River, (Watercourse Crossings 2, 3 and 4).

The impact of the proposed development on the receiving biophysical environment will be permanent, (lifetime of the facility), but low provided the development is implemented as proposed, and all reasonable steps to implement the proposed development using standard best practices and that the proposed mitigations included in a comprehensive Environmental Management Programme, (EMPr), are put in place and correctly adhered to.

The operational maintenance of the proposed Upgrade of Main Road P278 and four watercourse crossings is vital to ensure the longevity of the development, as well as to help reduce potential operational impacts on the geophysical, biophysical and social environments.

The road will have to have strict speed and safety measures in place to ensure that speed limits are adhered to and so as to ensure the safety of all road users.

The information contained in this report and the documentation attached hereto is sufficient to make a decision in respect of the activity applied for.

## 12 Conclusion

The proposed development site and surroundings reveal signs of previous disturbance owing to current and previous uses and anthropogenic changes. From a biophysical perspective, the most significant factor to take into consideration is the disturbance of the non-perennial tributary of the Manzanyma River and the non-perennial tributaries of the Mtizane River at the portal culvert crossing points and the pipe culvert crossing points during the construction phase. This includes storm-water runoff and potential erosion during construction and prior to rehabilitation of the non-perennial tributary banks taking effect. The combination of these factors is a matter of some concern and allowances for these issues must be made in the comprehensive EMPr that must be put in place for the construction and operation of the infrastructure.

Considering the impacts associated with the proposed development, the following recommendations are provided:

- The requirement for additional specialist studies is not anticipated
- Implementation must follow the proposed EMPr and adhere to standard best practices
- All proposed mitigations or reasonable alternatives must be adopted
- During implementation continuous monitoring of containers, bunded areas, surface runoff and air emissions must be undertaken by a responsible person, appointed or approved by the Department of Economic Development, Tourism and Environmental Affairs, to ensure that specifications are being duly regarded
- Regular construction monitoring will be required to measure compliance with mitigation measures and the project EMPr

Provided that the recommendations and mitigation measures as proposed in this report and in the EMPr are implemented, it is the opinion of the EAP that the development may proceed as envisaged.

## 13 Timeframes

### 13.1 Environmental Authorisation Timeframes (if no Operational aspect)

- Period for which Environmental Authorisation is required: 5 years
- Date on which the Activity will be concluded: Unknown at this stage
- Date on which the Post Construction Monitoring Requirements will be finalised: Unknown

## 14 EAP Affirmation

Oath / Affirmation by the EAP:

*The Environmental Assessment Practitioner hereby confirms that the information provided in this report is to our knowledge, correct, and includes all comments and inputs from IAPs, EAP responses to these comments, and recommendations from specialists (where relevant).*

## 15 Financial Provisions

Details of any financial provisions for Rehabilitation, (where applicable), ongoing post decommissioning management of negative impacts: **Not available at this stage.**

Rehabilitation of the site will take place during and after construction during the environmental management process of the development. The cost of this process must be factored into the construction cost.

## 16 Any Other Specific Information

Additional information is provided in the attached appendices. Any further information can be requested from the EAP as necessary.

## References

Mucina, L. & Rutherford, MC (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute. Pretoria.

“Wetland and Riparian/Aquatic Assessment Report for the Proposed P278 Road Upgrade”, Sustainable Development Projects, (SDP), October 2020

“Heritage Survey of the Upgrading of Main Road 278 and Two Borrow Pits, including Palaeontological Sensitivity”, Umlando, Gavin Anderson, March 2020

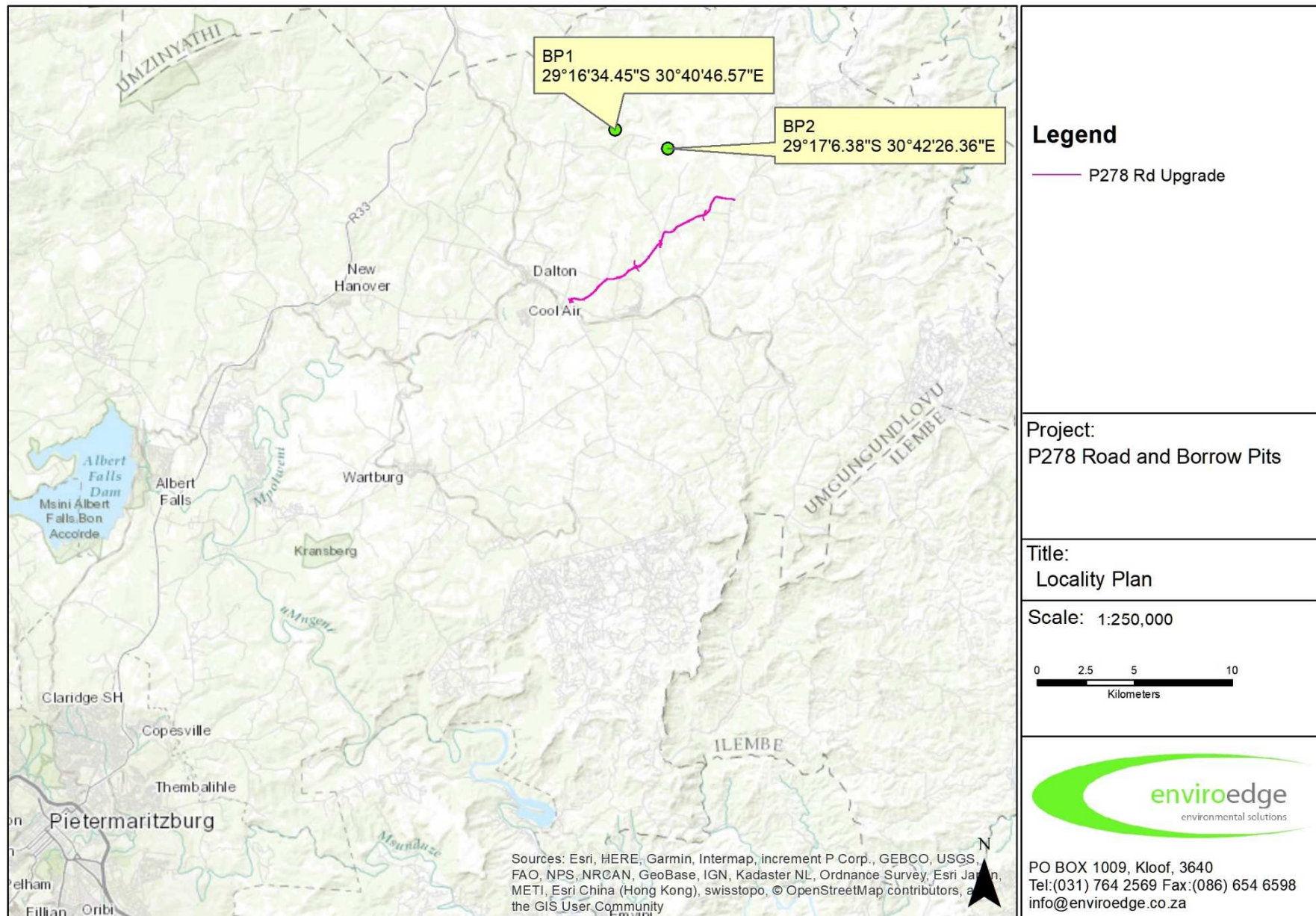
“Results of a Founding Investigation for Two Proposed culverts along Gravel Road P 278 Phase 1 (km 0+000 to km 11+000), near Dalton, KwaZulu-Natal”, Geosure (Pty) Ltd, November 2019

“Report on the Geotechnical Investigation Carried Out for the Upgrade of Road P278 in KwaZulu-Natal”, Shriram Geotechnical Consulting (Pty) Ltd, May 2020

[uMshwathi Local Municipality, Address: \(https://municipalities.co.za/overview/1091/umshwathi-local-municipality\)](https://municipalities.co.za/overview/1091/umshwathi-local-municipality)

## Appendix A – Mapping

- Figure 19: Locality Plan
- Figure 20: Topocadastral Plan
- Figure 21: Site Plan (Preferred Layout Alternative)
- Figure 22: Cadastral Map
- Figure 23: Watercourses and NFEPA Map
- Figure 24: Quaternary Catchment Map
- Figure 25: EKZNW Critical Biodiversity Areas (2010)
- Figure 26: SANBI Vegetation Plan      **Error! Bookmark not defined.**
- Figure 27: CBA “Irreplaceable” zones within the project area
- Figure 28: NFEPA wetlands within the study area, 500m boundary illustrated
- Figure 29: The location and extent of the 6 HGM units that are located within 500m of the P278
- Figure 30: NFEPA wetlands and corresponding condition assigned by the NFEPA database



**Figure 19: Locality Plan**



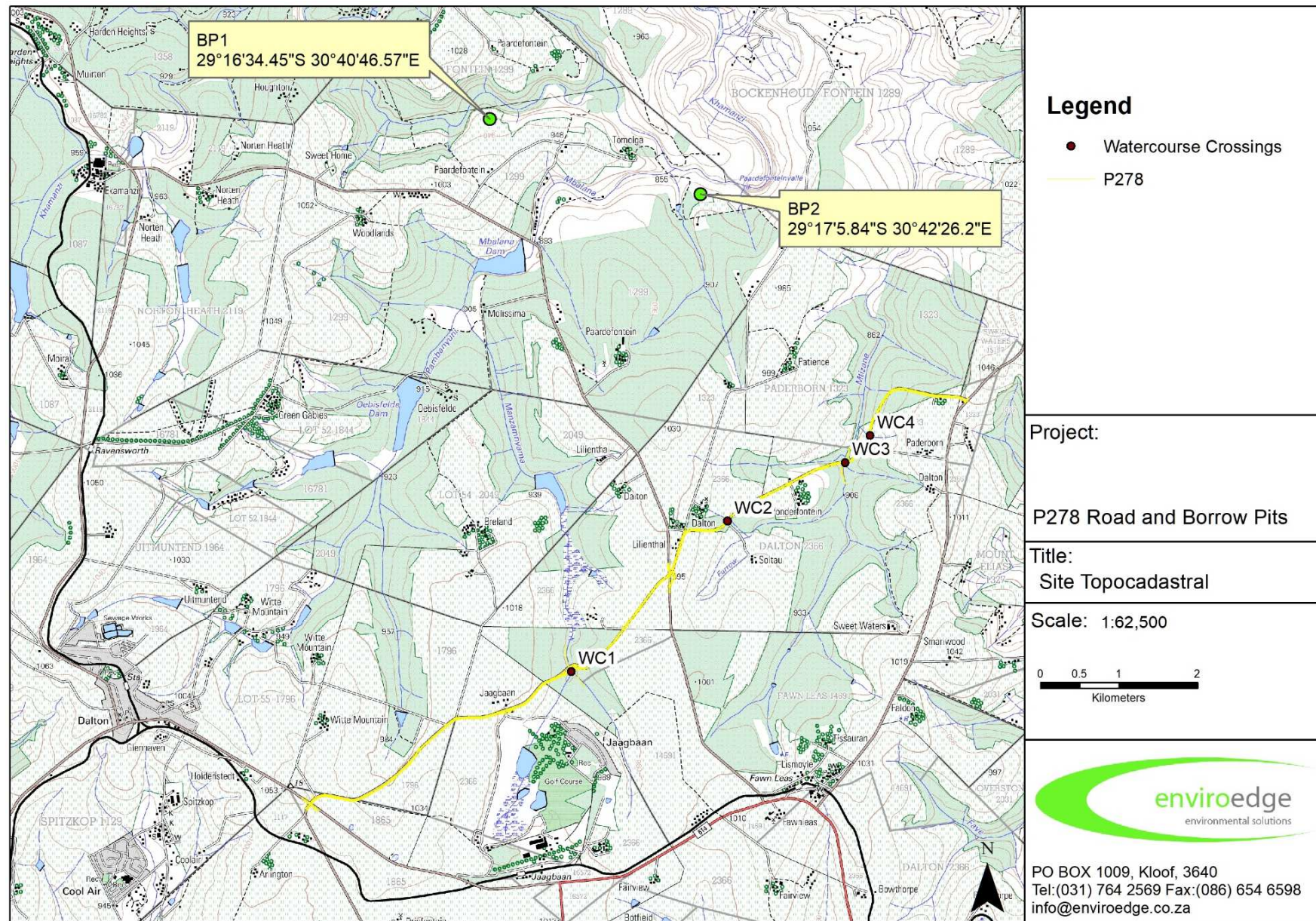
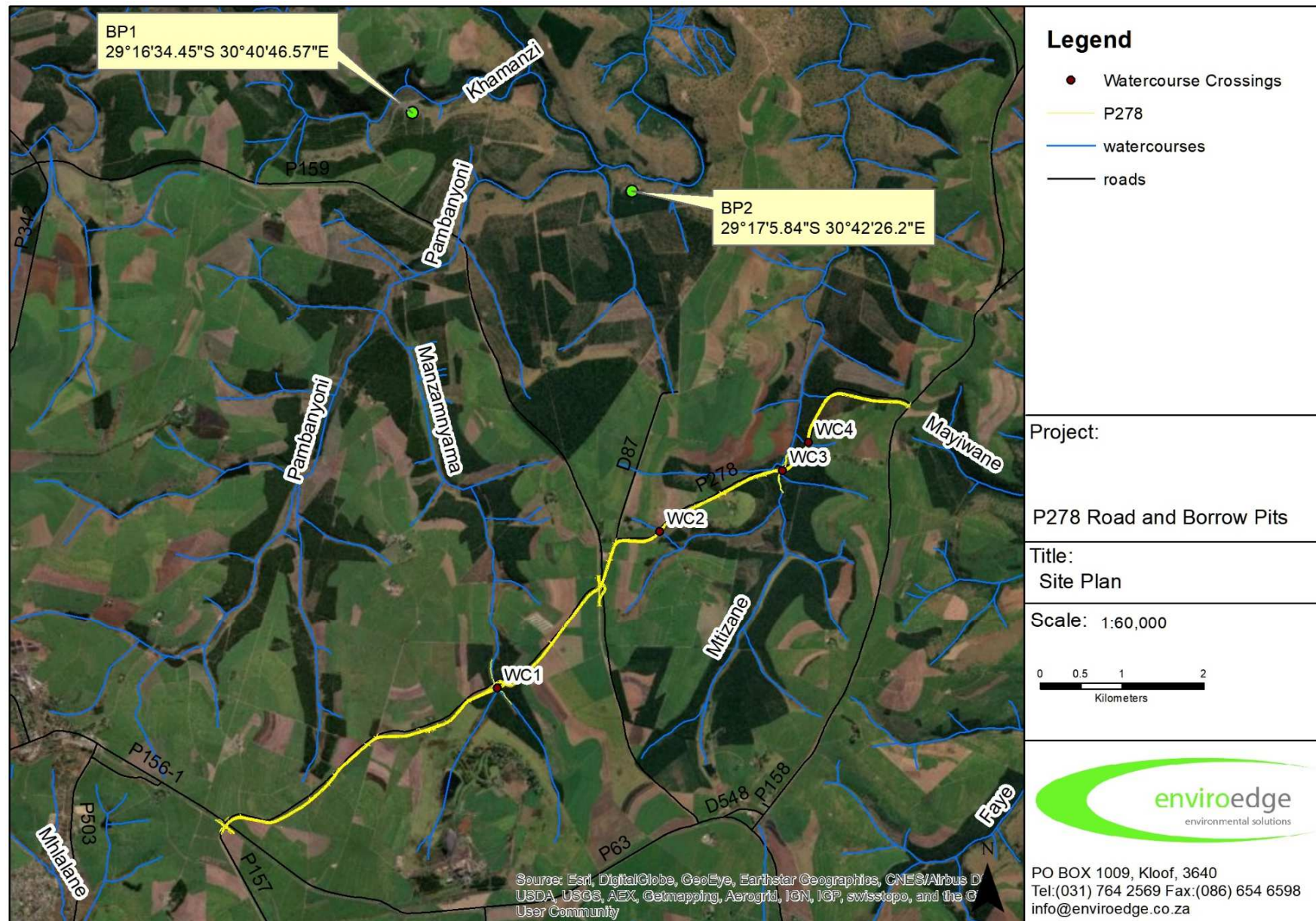


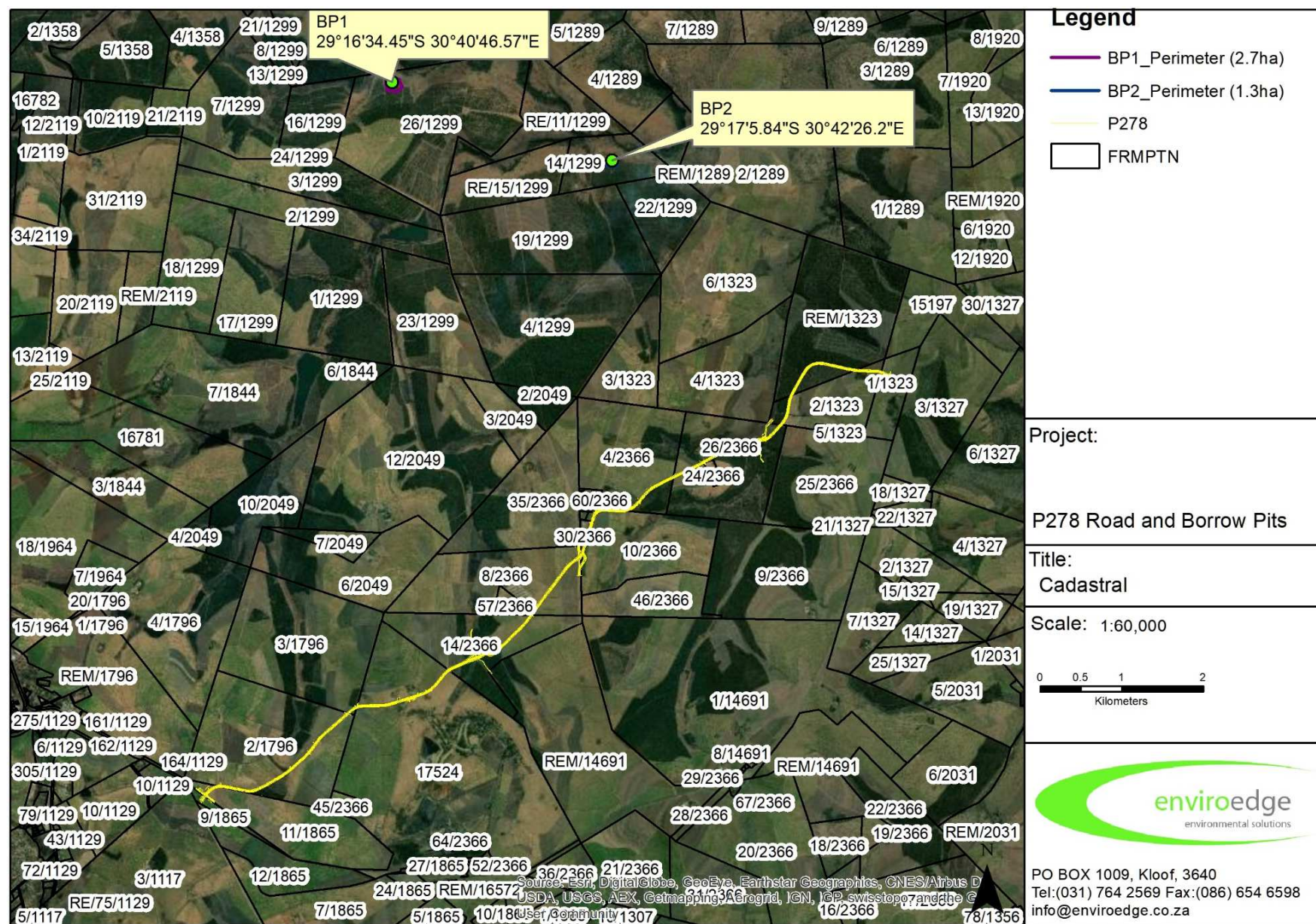
Figure 20: Topocadastral Plan



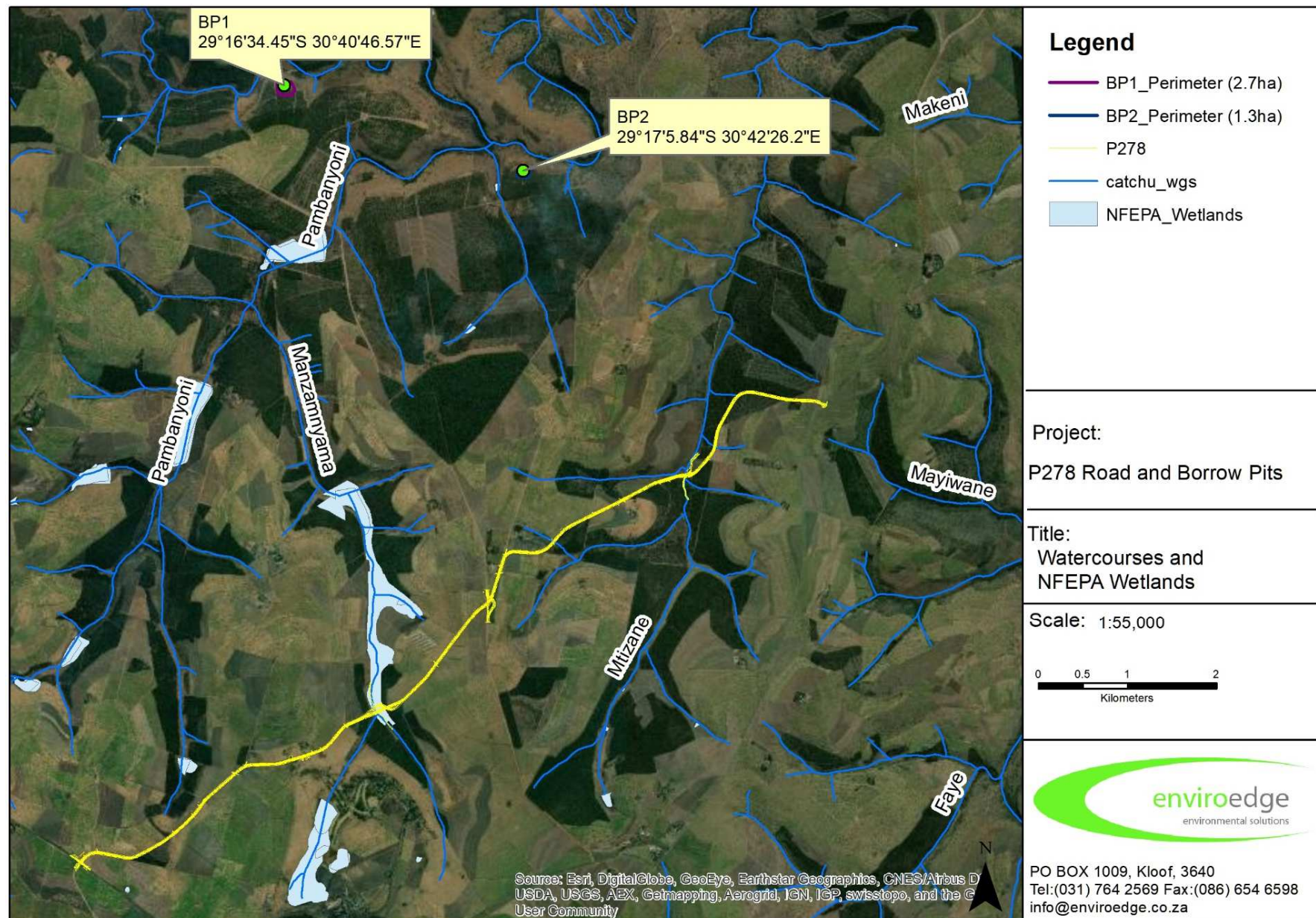


**Figure 21: Site Plan (Preferred Layout Alternative)**









**Figure 23: Watercourses and NFEPA Map**



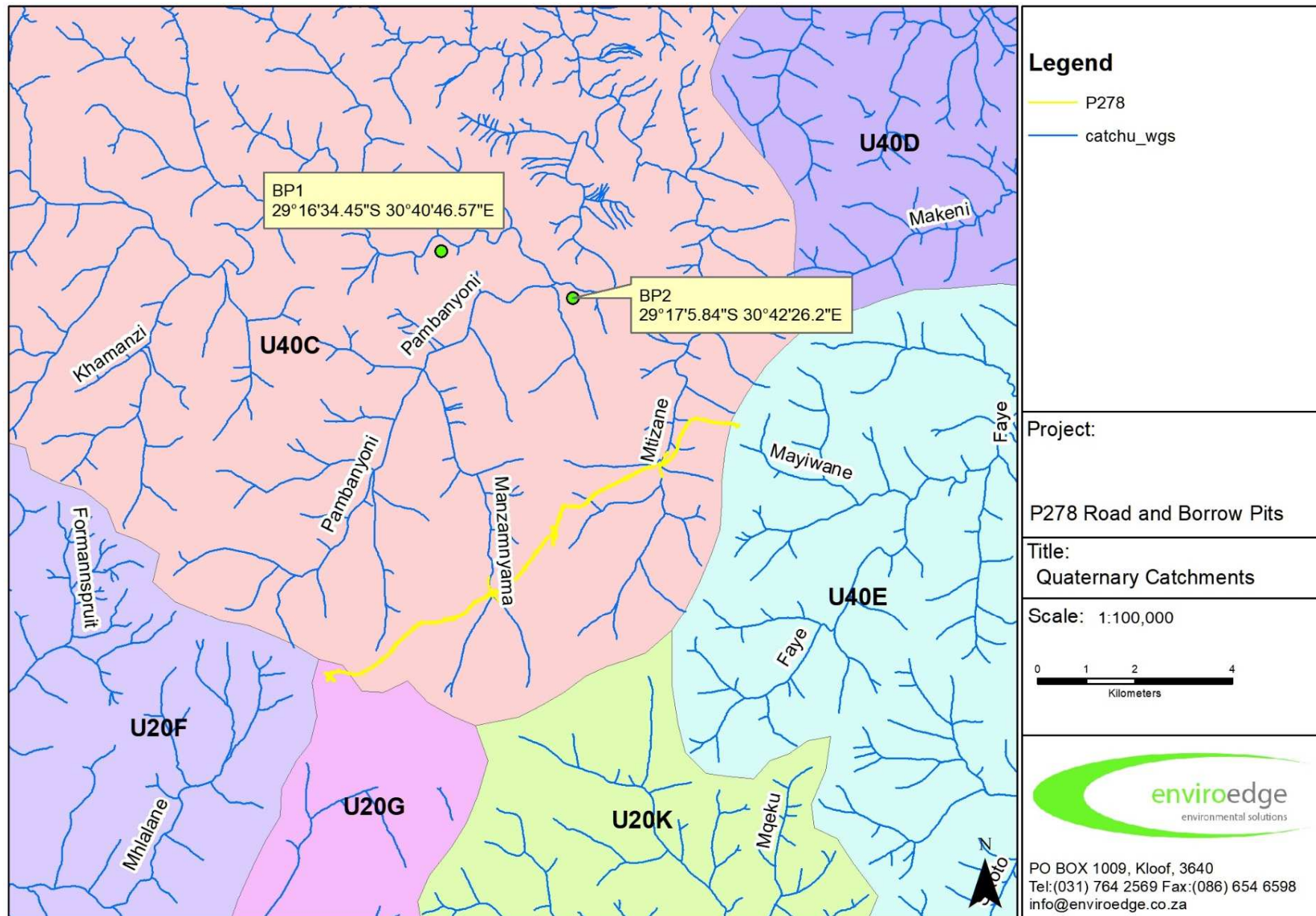


Figure 24: Quaternary Catchment Map



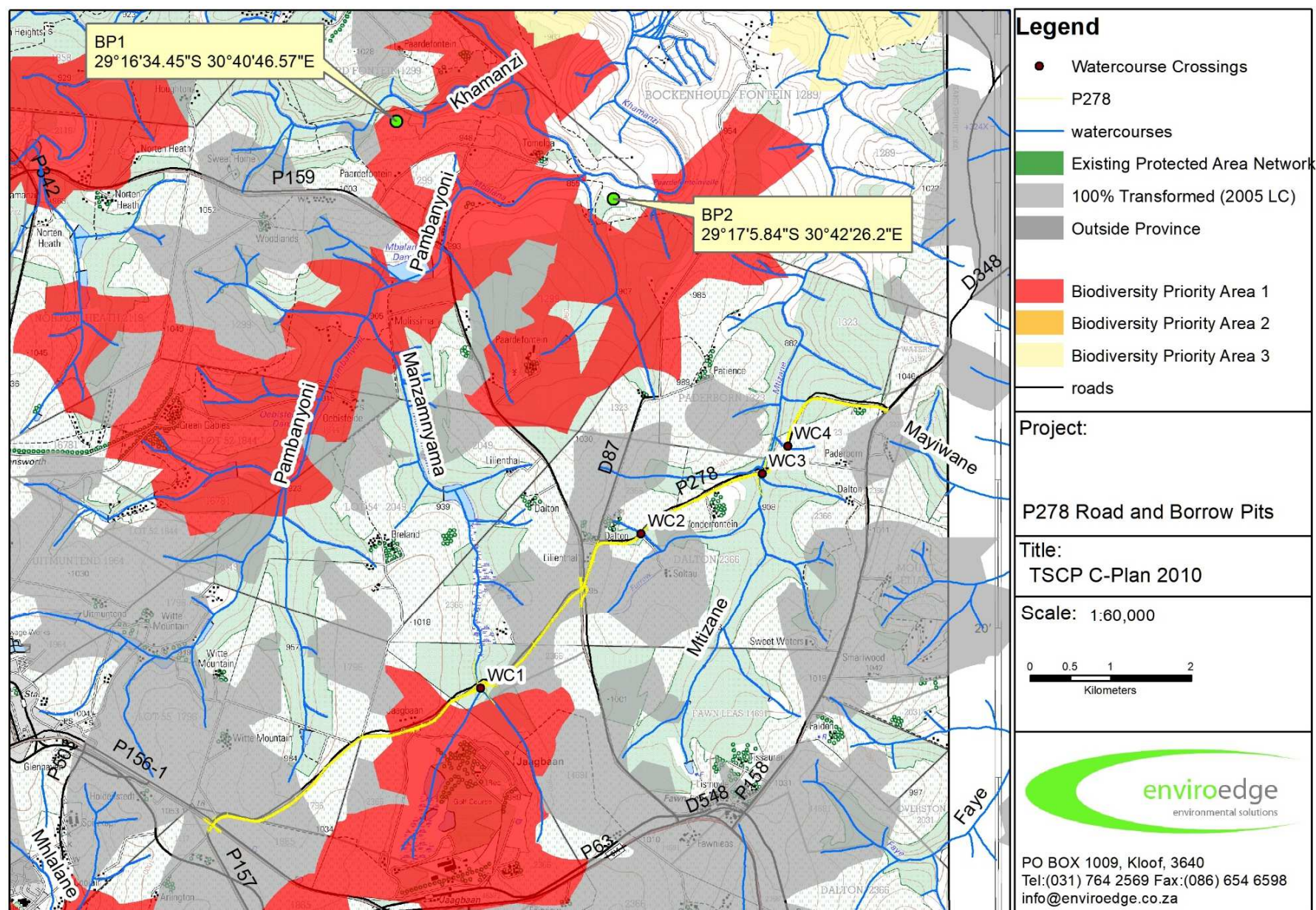


Figure 25: EKZNW Critical Biodiversity Areas (2010)



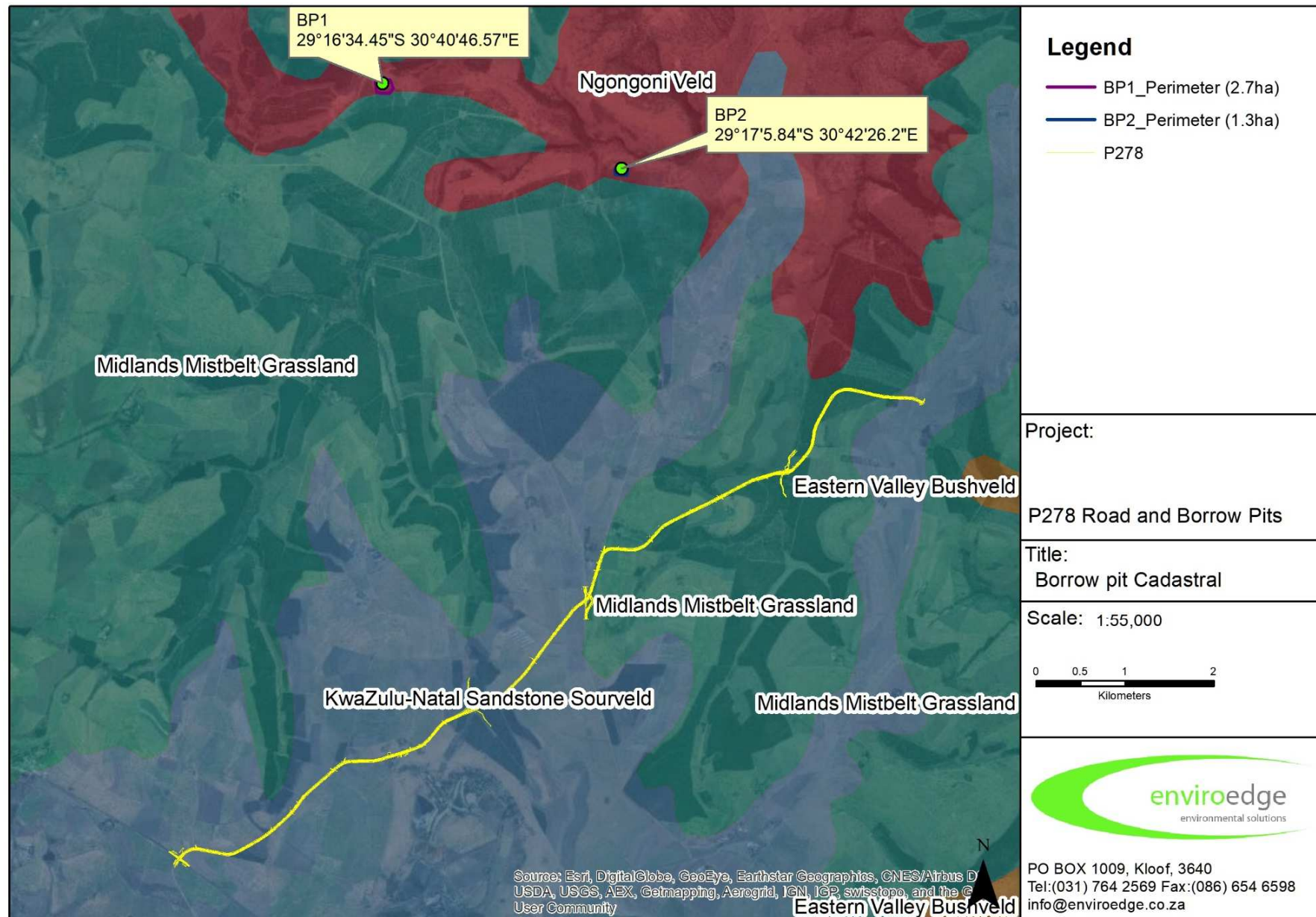
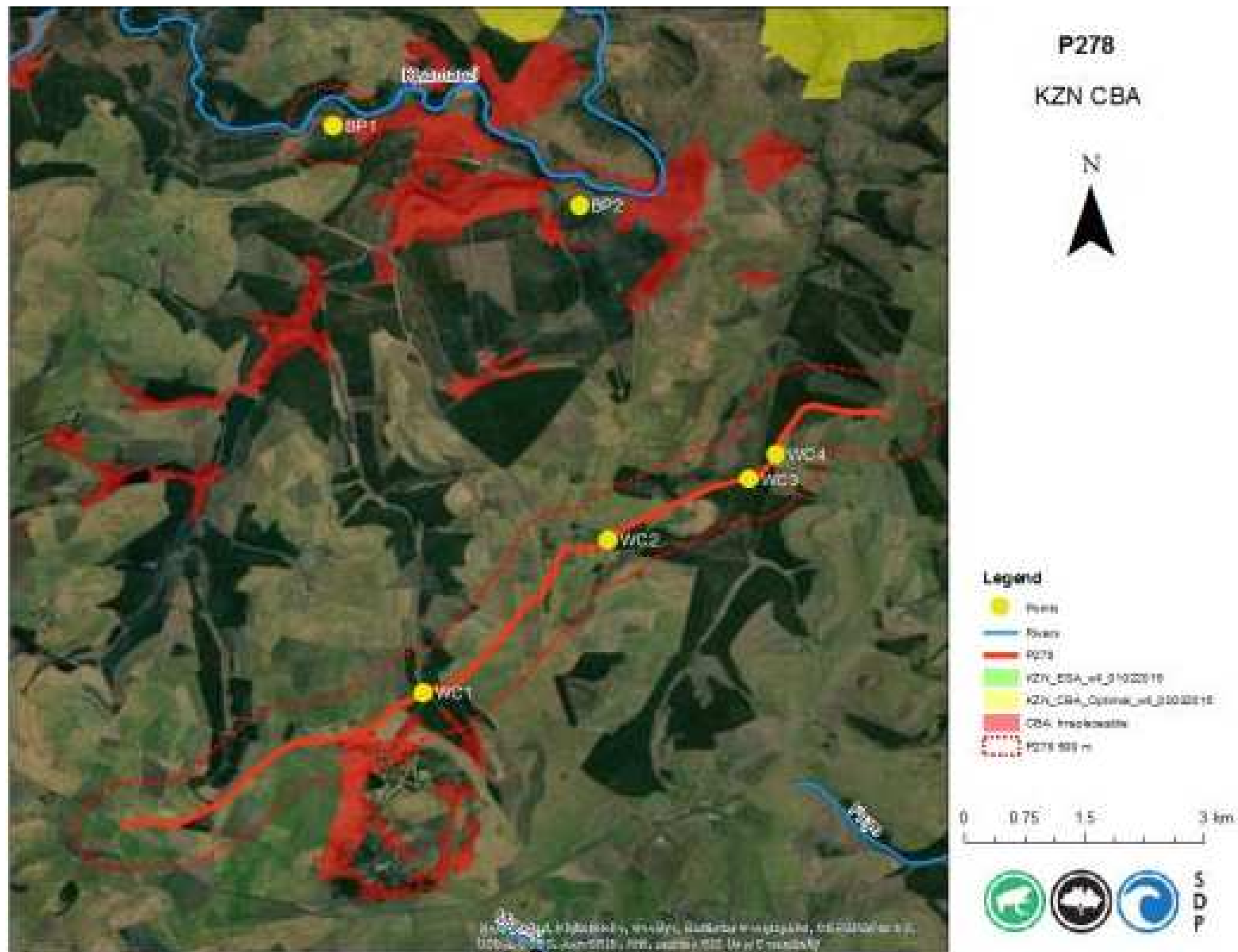


Figure 26: SANBI Vegetation Plan





**Figure 27: CBA “Irreplaceable” zones within the project area. Zones are associated with the wetlands surrounding the Noodsberg Sugar Mill and associated with the Khamanzi River.**

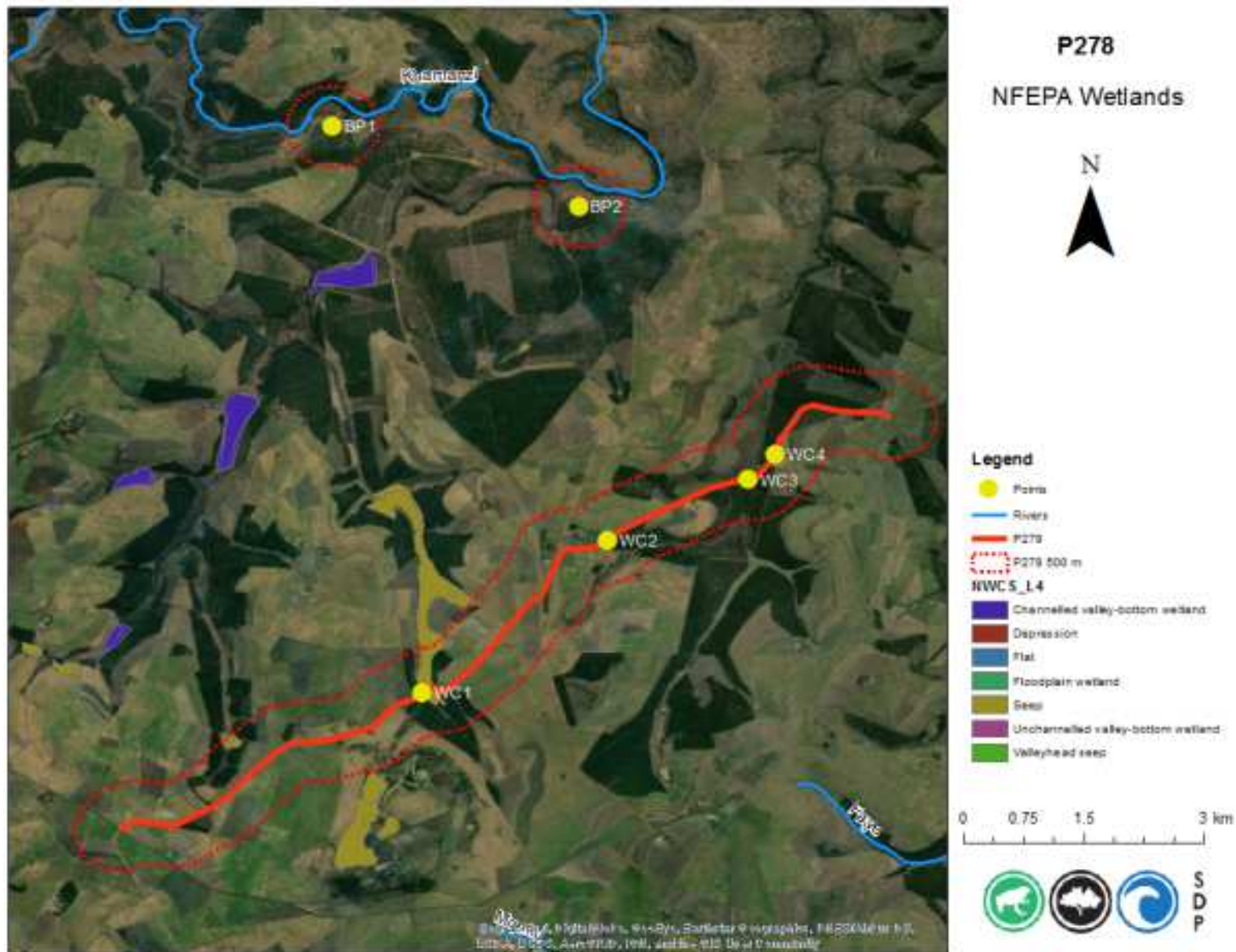


Figure 28: NFEPA wetlands within the study area, 500m boundary illustrated

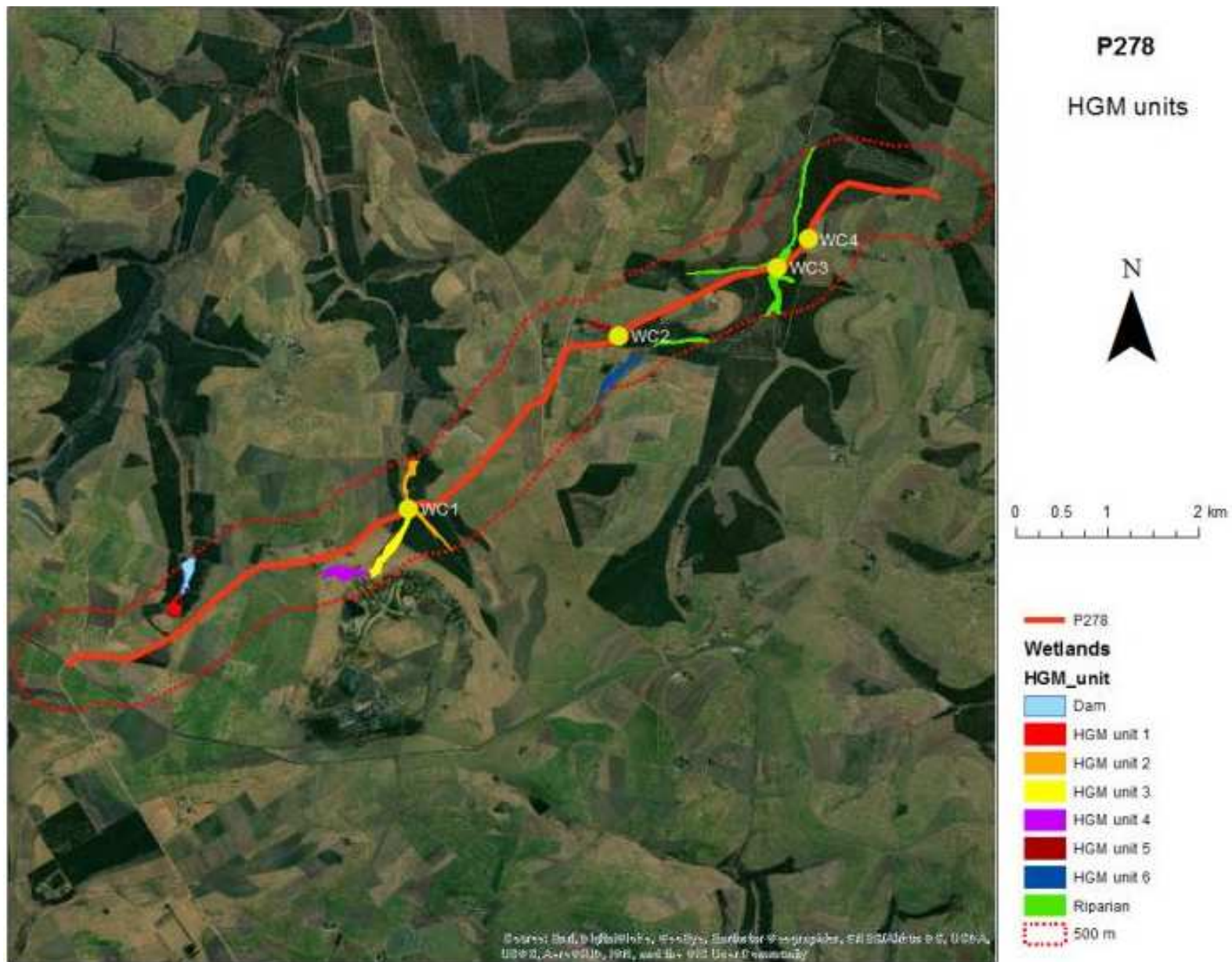


Figure 29: The location and extent of the 6 HGM units that are located within 500 m of the P278.



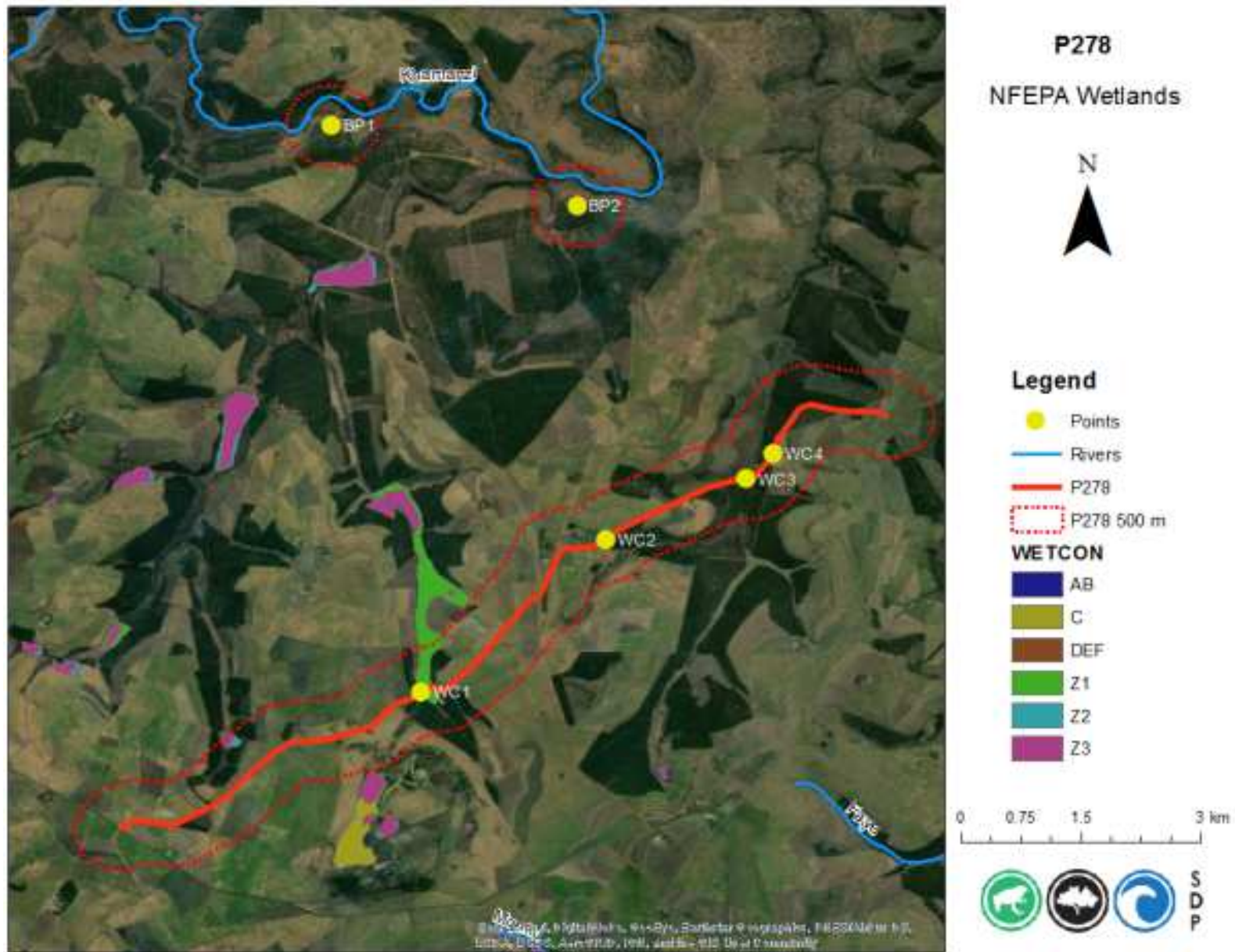


Figure 30: NFEPA wetlands and corresponding condition assigned by the NFEPA database.

## **Appendix B – Development Proposal (Diagram)**

Main Road P278 Watercourse Crossing 1, 2, 3 and 4:





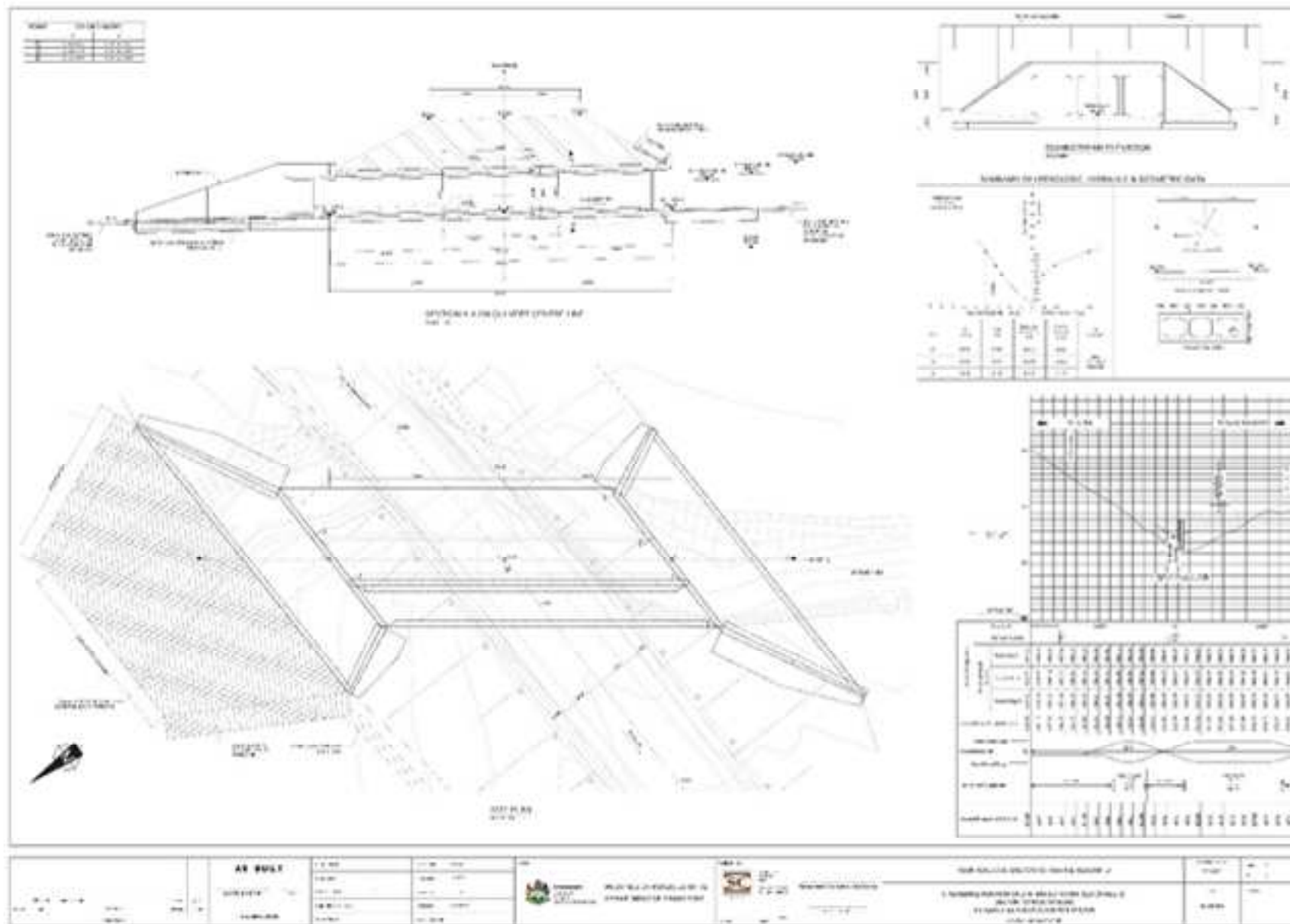


Figure 2: Watercourse Crossing 3 – Layout

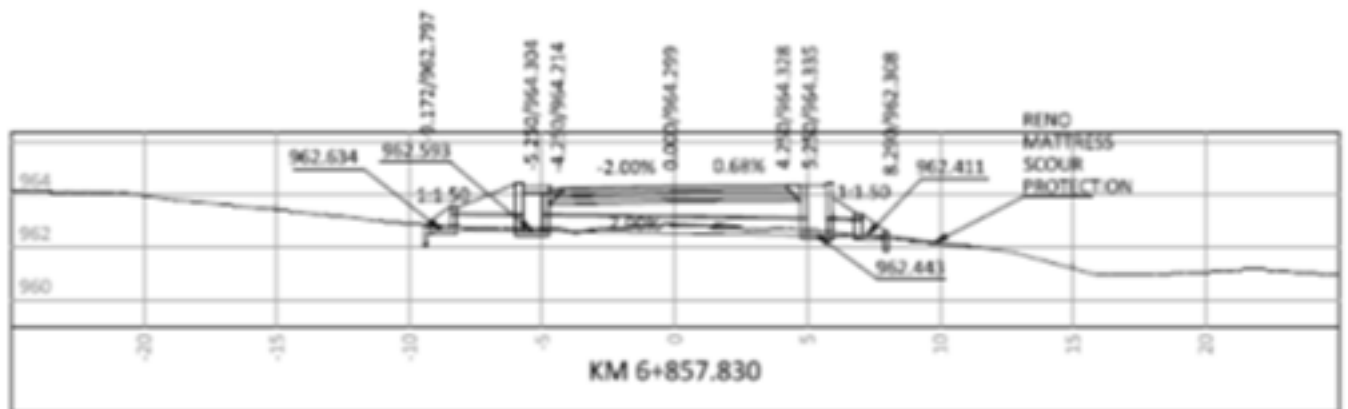


Figure 3: Watercourse Crossing 2 – Detail

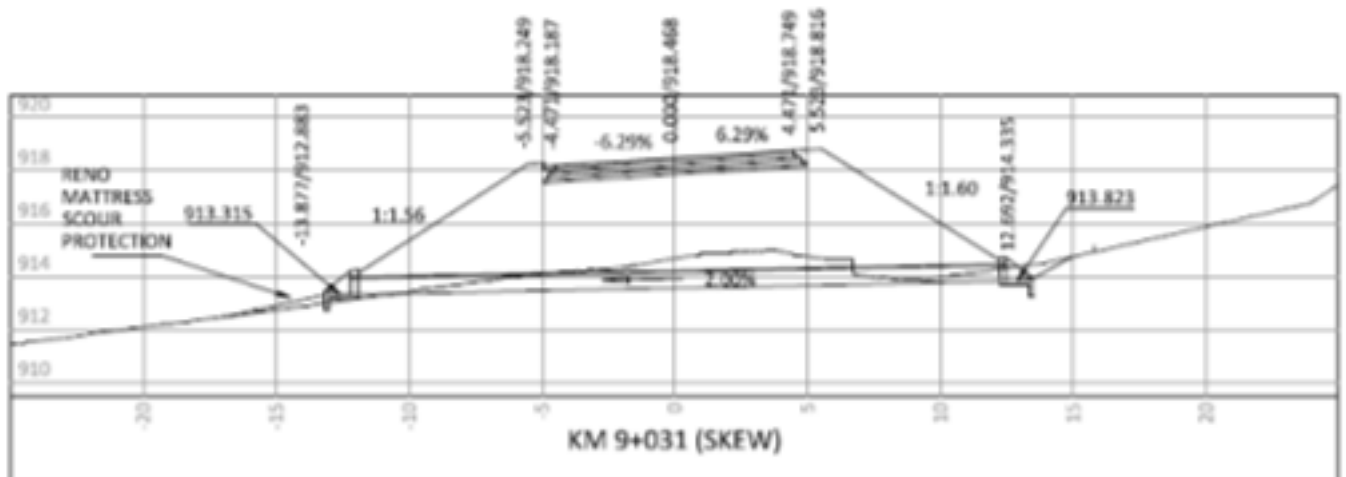


Figure 4: Watercourse Crossing 4 – Detail

## **Appendix C – Specialist Investigations**

- Wetland and Riparian/Aquatic Assessment Report for the Proposed P278 Road Upgrade, Sustainable Development Projects, (SDP), October 2020
- Heritage Survey of the Upgrading of Main Road 278 and Two Borrow Pits, including Palaeontological Sensitivity. Umlando, Gavin Anderson, March 2020
- Results of a Founding Investigation for Two Proposed culverts along Gravel Road P 278 Phase 1 (km 0+000 to km 11+000), near Dalton, KwaZulu-Natal, Geosure (Pty) Ltd, November 2019
- Report on the Geotechnical Investigation Carried Out for the Upgrade of Road P278 in KwaZulu-Natal, Shriram Geotechnical Consulting (Pty) Ltd, May 2020

## **Appendix D – Public Participation**

- Copy of Newspaper Advertisement
- Site Notices
- Background Information Document (BID)
- Correspondence with IAPs
- Stakeholder Meeting Minutes
- Comments and Response Report

# **Main P278 Road Upgrade**

## **Comments and Response – Interested and Affected Parties**

**March 2021**

Organisation	Contact Person	Contact Details
Department of Water and Sanitation (DWS)	Ms S Ramburan Mr S. Govender Ms N. Mokoena Ms Zama Hadebe	<a href="mailto:ramburans@dws.gov.za">ramburans@dws.gov.za</a> <a href="mailto:GovenderS2@dwa.gov.za">GovenderS2@dwa.gov.za</a> <a href="mailto:mokoenan@dws.gov.za">mokoenan@dws.gov.za</a> <a href="mailto:hadebeZ@dws.gov.za">hadebeZ@dws.gov.za</a>
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Transnet	Cynthia Nong Kimberley Moodley	<a href="mailto:Cynthia.Nong@transnet.net">Cynthia.Nong@transnet.net</a> <a href="mailto:Kimberly.Moodley@transnet.net">Kimberly.Moodley@transnet.net</a>
uMshwathi Local Municipality <a href="http://www.umshwathi.gov.za">www.umshwathi.gov.za</a> 1 Main Road, New Hanover 3230, KwaZulu-Natal Private Bag X29, Wartburg, 3233 Tel: 033 816 6800 Fax: 033 502 0286 Email: <a href="mailto:info@umshwathi.gov.za">info@umshwathi.gov.za</a> Tel: Zinzi: 082 608 3007 Sibahle: 083 335 4552	Zinzi	<a href="mailto:zinziswas@umshwathi.gov.za">zinziswas@umshwathi.gov.za</a>
Umgungundlovu Municipality Tel: 033 897 6763 (MM office) Tel: 033 897 6811 Mandisa	Mandisa Khomo	<a href="mailto:mandisa.khomo@umdm.gov.za">mandisa.khomo@umdm.gov.za</a>
uMshwathi Local Municipality 082 881 1911	Ward Councillor Ward 1 Deputy Mayor Cllr Dlamini	
uMshwathi Local Municipality 082 612 0599	Ward Councillor Ward 3 Cllr Nzama	
uMshwathi Local Municipality 082 479 7396	Ward Councillor Ward 7 Cllr Mbatha Ntuli	
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Dalton Library, at 7 Klip Avenue, Dalton, Kwazulu-Natal, South Africa Phyllis David, 083 982 1407. Dalton Library 033 816 6800, ask for Dalton Library.	Barbara Fey Phyllis David	Barbara Fey <a href="mailto:wartburg.lib@gmail.com">wartburg.lib@gmail.com</a>



Organisation	Contact Person	Contact Details
<u>Landowner</u> Portion 11 Of The Farm Lot 50 No. 1865 Portion 2 Of The Farm Lot 55 No. 1796 Portion 9 Of The Farm Lot 50 No. 1865 Neil Wittig Family Trust No. 1628/94	Neil Wittig	082 645 8705 <a href="mailto:erwtrust@gmail.com">erwtrust@gmail.com</a>
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<u>Landowner</u> Portion 26 Of The Farm Dalton No. 2366 Wonderfontein Farm Trust No. 9061/92	Ronald Schroder	
<u>Landowner</u> Remainder Of The Farm Paderborn No. 1323 Stegen Property Trust No. IT 46/2001	Jimmy Stegen	084 588 2210 <a href="mailto:stegen@mweb.co.za">stegen@mweb.co.za</a>
<u>Landowner</u> Portion 1 Of The Farm Paderborn No. 1323 RM Mark Family Trust No 3712/94	Mark Meyer	082 373 3183 <a href="mailto:mfarmingtrust@gmail.com">mfarmingtrust@gmail.com</a>
<u>Landowner</u> Portion 3 Of The Farm Lot 55 No. 1796 Sharp Move Trading 32 CC	Johann Eckhard Klipp Walter Peter Klipp	
<u>Landowner</u> Remainder of the Farm Jaagbaan No 17524 Illovo Sugar (South Africa) Proprietary Limited	Illovo Sugar (South Africa) Proprietary Limited	
<u>Landowner</u> Portion 4 Of The Farm Dalton No. 2366 Lilienthal Freese Trust-Trustees	Walter Bernard Freese	
<u>Landowner</u> Portion 24 Of The Farm Dalton No. 2366 Land Bank	Land Bank Johannes Otto Schroder	
Illovo Sugar (South Africa) (Pty) Ltd	Fanie Horn	072 895 3645 <a href="mailto:fhorn@illovo.co.za">fhorn@illovo.co.za</a>
Farm Manager For Mr Heiner Freese	Martin Schroder	082 802 3999
<u>Landowner</u> (BP1) Portion 14 of The Farm Paardfontein No. 1299	Ralph Appelt	082 373 3203

Organisation	Contact Person	Contact Details
<u>Landowner</u> (BP2) Portion 14 of The Farm Paardfontein No. 1299	Lilienthal Property Holdings cc Heiner Freese	082 373 3203 083 627 1824
<u>Landowner</u> (BP3) Portion 2 of The Farm Bockenhoudfontein No. 1289	Four Feet Farming cc Ed Barry	082 359 6347 <a href="mailto:fourfeet@edelnat.co.za">fourfeet@edelnat.co.za</a>

Organisation	Contact Person	Contact Details
Department of Water and Sanitation	Ms S Ramburan Mr S. Govender Ms N. Mokoena Ms Zama Hadebe  BID Sent: 02 March 2020	<a href="mailto:ramburans@dws.gov.za">ramburans@dws.gov.za</a> <a href="mailto:GovenderS2@dwa.gov.za">GovenderS2@dwa.gov.za</a> <a href="mailto:mokoenan@dws.gov.za">mokoenan@dws.gov.za</a> <a href="mailto:hadebeZ@dws.gov.za">hadebeZ@dws.gov.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Department of Agriculture Forestry and Fisheries (DAFF) Forestry Regulations and Support	Ms N. Sontangane Jeffrey Mai  BID Sent: 02 March 2020	<a href="mailto:nandiphas@nda.agric.za">nandiphas@nda.agric.za</a> <a href="mailto:JeffreyMAI@daff.gov.za">JeffreyMAI@daff.gov.za</a> <a href="mailto:KarenM@daff.gov.za">KarenM@daff.gov.za</a>  PMBResourceCentre@daff.gov.za Tel: 033 392 7739 Fax: 033 342 8783 P/Bag X 9029, Pietermaritzburg, 3200
<b>Comments: 06 March 2020:</b> <i>This letter serves as a notice of receipt for the above document received on 02 March 2020. Kindly note that the document will be processed within 30 days from the date of receipt, provided that all requested information is submitted to the department timeously. Should any further information be required, please do not hesitate to contact this office.</i> <i>Yours faithfully</i> <b>Ms N. Sontangane</b> <b>Forestry regulations and support KwaZulu-Natal forestry management</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
EKZN Wildlife	Andy Blackmore Nerissa Pillay Dinesree Thambu Dominic Wieners Jenny Longmore  BID Sent: 02 March 2020	<a href="mailto:andy.blackmore@kznwildlife.com">andy.blackmore@kznwildlife.com</a> <a href="mailto:thambud@kznwildlife.com">thambud@kznwildlife.com</a> <a href="mailto:Jenny.Longmore@kznwildlife.com">Jenny.Longmore@kznwildlife.com</a> <a href="mailto:Phindile.Langazane@kznwildlife.com">Phindile.Langazane@kznwildlife.com</a> <a href="mailto:Dominic.Wieners@kznwildlife.com">Dominic.Wieners@kznwildlife.com</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Eskom	M. Nicol BID Sent: 020March 2020	<a href="mailto:nicolm@eskom.co.za">nicolm@eskom.co.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Telkom SA SOC Limited Network Engineering and Build Eastern Region Wayleave Management Section	R. Rampershad R. Couch  BID Sent: 02 March 2020	<a href="mailto:RampeRR@telkom.co.za">RampeRR@telkom.co.za</a> <a href="mailto:RaymondC@openserve.co.za">RaymondC@openserve.co.za</a> <a href="mailto:wayleaves2@telkom.co.za">wayleaves2@telkom.co.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Transnet Pipelines	Thami Hadebe Jeff Scrooby  BID Sent: 02 March 2020	<a href="mailto:Thami.Hadebe@transnet.net">Thami.Hadebe@transnet.net</a> <a href="mailto:Jeff.Scrooby@transnet.net">Jeff.Scrooby@transnet.net</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Transnet	Cynthia Nong Kimberley Moodley  BID Sent: 02 March 2020	<a href="mailto:Cynthia.Nong@transnet.net">Cynthia.Nong@transnet.net</a> <a href="mailto:Kimberly.Moodley@transnet.net">Kimberly.Moodley@transnet.net</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		

uMshwathi Local Municipality <a href="http://www.umshwathi.gov.za">www.umshwathi.gov.za</a> 1 Main Road, New Hanover 3230, KwaZulu-Natal Private Bag X29, Wartburg, 3233 Tel: 033 816 6800 Fax: 033 502 0286 Email: <a href="mailto:info@umshwathi.gov.za">info@umshwathi.gov.za</a>  Tel: Zinzi: 082 608 3007 Sibahle: 083 335 4552  uMshwathi Local Municipality 082 881 1911 Ward Councillor Ward 1 Deputy Mayor Cllr Dlamini  uMshwathi Local Municipality 082 612 0599 Ward Councillor Ward 3 Cllr Nzama  uMshwathi Local Municipality 082 479 7396 Ward Councillor Ward 7 Cllr Mbatha Ntuli	Zinzi  BID Sent: 02 March 2020 and distributed to the Ward Councillors	<a href="mailto:zinziswas@umshwathi.gov.za">zinziswas@umshwathi.gov.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Umgungundlovu Municipality Tel: 033 897 6763 (MM office) Tel: 033 897 6811 Mandisa	Mandisa Khomo  BID Sent: 02 March 2020	<a href="mailto:mandisa.khomo@umdm.gov.za">mandisa.khomo@umdm.gov.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
AMAFA	Bernadet Pawandiwa Annie van de Venter Radford  BID Sent: 02 March 2020	<a href="mailto:bernadetp@amafapmb.co.za">bernadetp@amafapmb.co.za</a> <a href="mailto:amafaddps@amafapmb.co.za">amafaddps@amafapmb.co.za</a>
<b>Comments: No comments received.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Dalton Library, at 7 Klip Avenue, Dalton, Kwazulu-Natal, South Africa Phyllis David, 083 982 1407. Dalton Library 033 816 6800, ask for Dalton Library.	Barbara Fey Phyllis David  BID Sent: 03 September 2020	Barbara Fey <a href="mailto:wartburg.lib@gmail.com">wartburg.lib@gmail.com</a>
<b>Comments: 07 September 2020:</b>		
<b>Barabara Fey responded with the correct telephone numbers and contact people for the Dalton Library.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Noodsberg Sugar Mill	Fanie Horn  BID Sent: 10 March 2020	<a href="mailto:fhorn@illovu.co.za">fhorn@illovu.co.za</a> cell: 072 895 3645
<b>Comments: Mr Horn has received the BID email. Mr Horn has sent the information to the grower reps and their Safety Department.</b>		
<b>Response: Noted and included in the Draft Basic Assessment Report.</b>		
Farm Manager For Mr Heiner Freese Farm Owner Karmar Farming Trust	Martin Schroder BID Sent: 21 January 2021	<a href="mailto:martin@mkschroder.co.za">martin@mkschroder.co.za</a> 082 802 3999

<b>Comments:</b> Mr Schroder has received the BID email. Mr Schroder requested to be registered as an IAP for the project. Mr Schroder has been registered as an IAP for the project. <b>Site Visit 22-01-2021:</b> Mr Schroder concerned about speeding on a new upgraded road through the farmlands. The road will be straightened up in some sections and they will lose trees and farmland. They are also concerned about rehabilitation post construction, finished levels and drainage and about the upgrade including such big intersections. <b>Additional copies of the BID were provided to Mr Schroder to hand out if requested.</b>		
<b>Response:</b> Mr Schroder's comments will be forwarded to the project engineers.		
Farm Owner	Stof van Breda BID Forwarded by Mr Martin Schroder on 25 January 2021	<a href="mailto:stof@gom.co.za">stof@gom.co.za</a> 082 496 2696
<b>Comments:</b> Mr van Breda requested to be registered as an IAP for the project. Mr Schroder has been registered as an IAP for the project.		
<b>Response:</b> Noted and included in the Draft Basic Assessment Report.		
Farm Owner  ERW Trust Neil Wittig Family Trust PO Box 404 DALTON 3236	Ed Wittig BID Forwarded by Mr Martin Schroder on 25 January 2021	<a href="mailto:erwtrust@gmail.com">erwtrust@gmail.com</a> 082 558 1752
<b>Comments:</b> Mr Ed Wittig requested to be registered as an IAP for the project. Mr Wittig said that the person that will represent Neil Wittig Family Trust is Ed Wittig. Mr Ed Wittig for ERW Trust has been registered as an IAP for the project.		

## **Appendix E – Site Photographs**

- Current Site Photographs



**Main P278 Road - Photographs**

**Plate 1: At Start point of P278 Road along the P156 Road looking north-east along the P278 Road.**



**Plate 2: On the P278 Road overlooking Watercourse Crossing 1 looking north-east.**



**Plate 3: Central intersection of the P278 Road with Seven Oaks Road/Fawnleas Road, 800m north-east of New Hanover central.**



**Plate 4: On the P278 Road overlooking Watercourse Crossing 2 looking north-east.**



**Plate 5: On the P278 Road overlooking Watercourse Crossing 3 looking east.**



**Plate 6: On the P278 Road overlooking Watercourse Crossing 4 looking north.**



**Plate 7: At the end point of the P278 Road, along the P158 Road overlooking the T junction looking west along the P278 Road.**



## **Appendix F – Environmental Management Programme**