

# terratest

**Geotechnical, Environmental  
& Earth Science Consultants**

**DRAFT BASIC ASSESSMENT REPORT:  
PROPOSED DEVELOPMENT OF THE BHEKUZULU,  
EPANGWENI & ENNERSDALE BULK AND RETICULATION  
WATER SUPPLY SCHEME, INKOSI LANGALIBALELE  
LOCAL MUNICIPALITY, UTHUKELA DISTRICT  
MUNICIPALITY, KWAZULU-NATAL**

**MARCH 2018**

**Terratest (Pty) Ltd Reference No. 41633**

**EDTEA Reference No: DC 23/0006/2018**

**NEAS Reference No: KZN/EIA/0000813/2018**

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<b>VERIFICATION PAGE</b>
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**TITLE:** PROPOSED DEVELOPMENT OF THE BHEKUZULU, EPANGWENI & ENNERSDALE BULK AND RETICULATION WATER SUPPLY SCHEME, INKOSI LANGALIBALELE LOCAL MUNICIPALITY, UTHUKELA DISTRICT MUNICIPALITY, KWAZULU-NATAL.

<b>PROJECT NO.:</b> 41633	<b>DATE:</b> March 2018	<b>REPORT STATUS:</b> Draft		
<b>CARRIED OUT BY:</b> <b>Terratest (Pty) Ltd, Pietermaritzburg</b>		<b>COMMISSIONED BY:</b> <b>uThukela District Municipality</b>		
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<b>SYNOPSIS:</b> Basic Assessment Report for the proposed development of the Bhekuzulu, Epangweni & Ennersdale Bulk and Reticulation Water Supply Scheme, uThukela District Municipality				
<b>KEY WORDS:</b> Reticulation, Bulks, Water Supply Scheme, Basic Assessment, Environmental Management Programme, EIA Regulations (2014, as amended), uThukela District Municipality				
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<b>QUALITY VERIFICATION</b>				
This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882.				
				
<b>VERIFICATION</b>	<b>CAPACITY</b>	<b>NAME</b>	<b>SIGNATURE</b>	<b>DATE</b>
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<b>File name:</b>	<a href="#">T:\02 ACTIVE Projects Terratest\41633 - Bhekuzulu Pipeline Expansion\1. Project\7. Reports\DBAR</a>
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## EXECUTIVE SUMMARY

Terratest (Pty) Ltd has been appointed by Sukuma Consulting Engineers (Pty) Ltd, on behalf of the uThukela District Municipality, to undertake the necessary environmental services required for the proposed development of the Bhekuzulu, Epangweni & Ennersdale Bulk and Reticulation Water Supply Scheme, Inkosi Langalibalele Local Municipality, KwaZulu-Natal. Environmental Authorisation and a Water Use Licence will be required prior to construction commencing.

The proposed project entails the construction of approximately 112km of water reticulation pipeline ranging from Ø50mm to Ø250mm and approximately 8.3km of bulk pipeline, ranging from Ø50mm to Ø100mm. The water supply scheme will service an area of approximately 70km<sup>2</sup> in extent and includes the communities of Bhekuzulu, Epangweni and Ennersdale. The proposed water supply scheme will provide individual connections to households. Wherever possible, pipes will be constructed adjacent to the road reserve to limit the impact to the receiving environment. At watercourse crossings, pipelines will be tacked to bridges where infrastructure will allow. Where this is not possible, trenching through watercourses will be required.

The outcome of the project will be to provide those communities within the project area currently without water, with adequate, safe, reliable and sustainable water services to a minimum of Reconstruction and Development Programme (RDP) Standards. This will result in an improved quality of life for the current population of ± 13 000 people. The water supply scheme is proposed to provide a projected demand of 60l/c/d within a 20-year design period.

No abstraction points are required as the proposed expansion will tie into the Bhekuzulu - Epangweni Community Bulk Water Supply Scheme, which has been authorised (Environmental Authorisation Reference No.: DC23/0012/2011) and is presently being constructed.

The public participation process undertaken involves consultation with the relevant authorities, non-government organisations (NGO's), neighbouring landowners, community members and other identified Interested and Affected Parties (IAPs). A pre-application meeting was held with the Department of Economic Development, Tourism and Environmental Affairs (EDTEA): uThukela District on 8 June 2017. Public Participation involved the establishment of eight (8) English and isiZulu site notices placed throughout the site on 23 May 2017 to notify members of the general public of the Basic Assessment Process for the proposed development. Notification letters were also distributed to the IAPs and Stakeholders. A Public Meeting was not deemed necessary as significant interest has not been shown by the community with respect to the proposed development. However, a Focus Group Meeting was held with the relevant ward councillors to notify them of the proposed development and to ensure that they notify the respective communities.

In terms of specialist input, a Heritage Impact Assessment was undertaken by UMLANDO: Archaeological Surveys & Heritage Management to determine if any items of cultural or historical value would be impacted on during construction activities. A Desktop Palaeontological Assessment was undertaken by Gideon Groenewald to determine if any palaeontological artefacts, or remains, would be impacted on during construction. A Biodiversity and Wetland Assessment was undertaken by JG Afrika (Pty) Ltd to determine

the impact that the proposed construction would have on surrounding watercourses and the surrounding biophysical environment.

No fatal flaws to development were identified by any of the specialists. The area is considered to be highly disturbed as a result of human settlement and agricultural practices.

The Draft BA Report and Environmental Management Programme (EMPr) have been circulated to registered IAPs for review and comment as part of the legislated 30 day public participation process. To date no comments have been received. Comments received on the Draft BA Report and EMPr will be consolidated and included in the Final BA Report, which will be submitted to the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs (EDTEA) for a decision on Environmental Authorisation (EA). Construction cannot commence until such time as a positive EA is obtained.

This BA Report has been drafted in accordance with the EIA Regulations (2014, as amended) and adheres to the requirements contained in Appendix 1 of GNR 326, as noted in Table 1.

**Table 1:** Content of a BA Report (2014 EIA Regulations, as amended)

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
Appendix 1, Section 3 (a)	Details of – (i) The EAP who prepared the report; and the expertise of the EAP; and (ii) The expertise of the EAP, including a curriculum vitae.	Section 2 & Appendix 1
Appendix 1, Section 3 (b)	The location of the activity, including – (i) The 21-digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; (iii) Where the required information in items (i) and (ii) is not available, coordinates of the boundary of the property or properties	Section 3
Appendix 1, Section 3 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Section 3
Appendix 1, Section 3 (d)	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered; (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 4 & 5
Appendix 1, Section 3 (e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	Section 4
Appendix 1, Section 3 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 6
Appendix 1, Section 3 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including- (i) Details of all alternatives considered; (ii) Details of the Public Participation Process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which the impacts- (aa) Can be reversed;	Section 7 Section 10 Section 10 Section 8 Section 12



2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	<p>(bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed, or mitigated.</p> <p>(vi) The methodology used in deterring and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographic, physical, biological, social, economic, heritage and cultural aspects;</p> <p>(viii) The possible mitigation measures that could be applied and level of residual risk;</p> <p>(ix) The outcome of the site selection matrix;</p> <p>(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and;</p> <p>(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.</p>	<p>Section 11</p> <p>Section 12</p> <p>Section 12</p> <p>Section 13</p> <p>Section 12</p> <p>Section 14</p>
Appendix 1, Section 3 (i)	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including-</p> <p>(i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and</p> <p>(ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.</p>	Section 12
Appendix 1, Section 3 (j)	<p>An assessment of each identified potentially significant impact and risk, including-</p> <p>(i) Cumulative impacts;</p> <p>(ii) The nature, significance and consequences of the impact and risk;</p> <p>(iii) The extent and duration of the impact and risk;</p> <p>(iv) The probability of the impact and risk occurring;</p> <p>(v) The degree to which the impact and risk can be reversed;</p> <p>(vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) The degree to which the impact and risk can be avoided, managed or mitigated.</p>	Section 13
Appendix 1, Section 3 (k)	<p>Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report.</p>	Section 9
Appendix 1, Section 3 (l)	<p>An environmental impact statement which contains-</p> <p>(i) A summary of the key findings of the environmental impact assessment;</p> <p>(ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</p> <p>(iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.</p>	Section 14
Appendix 1, Section 3 (m)	<p>Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr.</p>	Section 15
Appendix 1, Section 3 (n)	<p>Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.</p>	Section 15 & 16
Appendix 1, Section 3 (o)	<p>A description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;</p>	-
Appendix 1, Section 3 (p)	<p>A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.</p>	Section 15
Appendix 1, Section 3 (q)	<p>Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised.</p>	Section 16
Appendix 1, Section 3 (r)	<p>An undertaking under oath or affirmation by the EAP in relation to-</p> <p>(i) The correctness of the information provided in the report;</p> <p>(ii) The inclusion of the comments and inputs from stakeholders and interested and affected parties;</p> <p>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and</p>	Section 18

2014 EIA Regulations	Description of EIA Regulations Requirements for BA Reports	Location in the BAR
	(iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.	
Appendix 1, Section 3 (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	-
Appendix 1, Section 3 (t)	Where applicable, any specific information required by the Competent Authority.	-
Appendix 1, Section 3 (u)	Any other matter required in terms of section 24(4) (a) and (b) of the Act.	-

## TABLE OF CONTENTS

<b>1. INTRODUCTION</b> .....	<b>1</b>
<b>2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)</b> .....	<b>2</b>
<b>3. LOCATION OF THE ACTIVITY</b> .....	<b>2</b>
<b>4. LEGAL CONTEXT</b> .....	<b>7</b>
4.1 APPLICABLE LISTED ACTIVITIES .....	7
4.2 EDTEA PRE-APPLICATION MEETING.....	7
4.3 NATIONAL WATER ACT (ACT 36 OF 1998) .....	9
4.4 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES.....	9
<b>5. DESCRIPTION OF THE ACTIVITY</b> .....	<b>10</b>
5.1 PROJECT OVERVIEW .....	10
5.2 PROJECT DESCRIPTION.....	11
5.2.1 <i>Design Details</i> .....	11
5.2.2 <i>Watercourse Crossings</i> .....	12
5.2.3 <i>Community Participation and Governance</i> .....	12
<b>6. DEVELOPMENT MOTIVATION</b> .....	<b>15</b>
6.1 NEED .....	15
6.2 DESIRABILITY .....	15
6.3 PLANNING INITIATIVES .....	15
6.3.1 <i>KZN Provincial Growth and Development Plan</i> .....	15
<b>7. MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE</b> .....	<b>16</b>
7.1 PREFERRED SITE ALTERNATIVE.....	16
7.2 PREFERRED LAYOUT ALTERNATIVE .....	16
7.3 PREFERRED TECHNOLOGY ALTERNATIVE .....	19
7.4 NO-GO ALTERNATIVE.....	21
<b>8. DESCRIPTION OF THE BASELINE ENVIRONMENT</b> .....	<b>21</b>
8.1 TOPOGRAPHY.....	21
8.2 VEGETATION .....	22
8.3 FAUNA.....	22
8.4 GEOLOGY .....	28
8.5 HYDROLOGY (WATERCOURSES & WETLANDS).....	28
8.6 CLIMATE.....	31
8.7 CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES .....	31
8.8 SOCIO-ECONOMIC.....	31
8.9 EXISTING INFRASTRUCTURE.....	32
<b>9. SPECIALIST STUDIES</b> .....	<b>32</b>
9.1 BIODIVERSITY AND WETLAND ASSESSMENT.....	32
9.1.1 <i>Biodiversity</i> .....	33
9.1.2 <i>Watercourses</i> .....	34
9.1.3 <i>Wetlands</i> .....	37
9.1.4 <i>Conclusion and Recommendations</i> .....	38
9.2 HERITAGE IMPACT ASSESSMENT .....	39
9.2.1 <i>Conclusion and Recommendations</i> .....	39
9.3 PALAEOONTOLOGICAL IMPACT ASSESSMENT.....	40
9.3.1 <i>Conclusion and Recommendations</i> .....	41
<b>10. PUBLIC PARTICIPATION</b> .....	<b>41</b>
10.3 PUBLIC MEETING .....	41
10.5 SITE NOTICE BOARDS .....	42
10.6 COMMENTS RECEIVED.....	46
10.7 CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT .....	46
<b>11. IMPACT ASSESSMENT AND MITIGATION MEASURES</b> .....	<b>46</b>
11.1 IMPACT ASSESSMENT METHODOLOGY.....	46

11.2	MITIGATION .....	51
<b>12.</b>	<b>IMPACTS IDENTIFIED .....</b>	<b>51</b>
<b>13.</b>	<b>IMPACT ASSESSMENT .....</b>	<b>58</b>
<b>14.</b>	<b>ENVIRONMENTAL IMPACT STATEMENT .....</b>	<b>59</b>
<b>15.</b>	<b>RECOMMENDATIONS OF THE EAP .....</b>	<b>60</b>
<b>16.</b>	<b>CONSTRUCTION TIMEFRAMES .....</b>	<b>61</b>
<b>17.</b>	<b>SUBMISSION AND CONSIDERATION OF DOCUMENTATION BY THE COMPETENT AUTHORITY 61</b>	<b>61</b>
<b>18.</b>	<b>UNDERTAKING .....</b>	<b>61</b>

## FIGURES

<b>FIGURE 1:</b>	LOCALITY MAP INDICATING THE PROPOSED WATER SUPPLY SCHEME.....	5
FIGURE 2:	LAND PARCELS TO BE INTERCEPTED BY THE PROPOSED WATER SUPPLY SCHEME .....	6
FIGURE 3:	BASIC ASSESSMENT PROCESS ORGANOGRAM.....	8
FIGURE 4:	LAYOUT OF RETICULATION AND BULK PIPELINES FOR THE BHEKUZULU / EPANGWENI AND ENNERSDALE COMMUNITIES.....	13
FIGURE 5:	THE ALIGNMENT OF THE AUTHORISED BHEKUZULU BULK WATER SUPPLY SCHEME, AS ILLUSTRATED IN PURPLE, IN COMPARISON TO THE PROPOSED BHEKUZULU, EPANGWENI, ENNERSDALE WATER SUPPLY SCHEME (BULKS AND RETICULATION) AS ILLUSTRATED IN ORANGE AND YELLOW.....	14
FIGURE 6:	GRADIENT OF THE BHEKUZULU REGION, FROM WEST TO EAST.....	21
FIGURE 7:	GRADIENT OF THE EPANGWENI REGION, FROM WEST TO EAST .....	21
FIGURE 8:	GRADIENT OF THE ENNERSDALE REGION, FROM WEST TO EAST .....	22
FIGURE 9:	VEGETATION DESIGNATIONS FOR THE SITE AS PER EKZNW (2016) AND MUCINA & RUTHERFORD (2006) .....	24
FIGURE 10:	EKZNW MINSET (2010) DESIGNATIONS FOR THE GREATER PROJECT FOOTPRINT.....	25
FIGURE 11:	EKZNW CBA AND ESA DESIGNATION FOR THE GREATER PROJECT FOOTPRINT .....	26
FIGURE 12:	EZEMVELO KZN WILDLIFE TRANSFORMATION LAYER (2016) INDICATING THE PREDOMINANTLY TRANSFORMED NATURE OF THE DEVELOPMENT FOOTPRINT.....	27
FIGURE 13:	GEOLOGY OF THE GENERAL AREA .....	29
FIGURE 14:	WETLANDS AND WATERCOURSES WITHIN THE GREATER DEVELOPMENT FOOTPRINT .....	30
FIGURE 15:	A COPY OF THE NEWSPAPER ADVERT PLACED IN THE ISOLEZWE ON 18 OCTOBER 2017 .....	42
FIGURE 16:	A COPY OF THE SITE NOTICE (CONTAINING ENGLISH AND ISIZULU TEXT) PLACED THROUGHOUT THE PROPOSED DEVELOPMENT FOOTPRINT.....	43
FIGURE 17:	THE LOCATION OF THE SITE NOTICES WITHIN THE GREATER BHEKUZULU, EPANGWENI AND ENNERSDALE COMMUNITIES.....	44

## TABLES

TABLE 1:	CONTENT OF A BA REPORT (2014 EIA REGULATIONS, AS AMENDED).....	II
TABLE 2:	DETAILS OF THE EAP .....	2
TABLE 3:	LANDOWNER / PROPERTY DETAILS AS PER THE DEEDS WEBSITE .....	2
TABLE 4:	GPS CO-ORDINATES EVERY 250M ALONG THE PROJECT ALIGNMENT.....	3
TABLE 5:	SOCIO-ECONOMIC INFORMATION .....	31
TABLE 6:	DETAILS OF SPECIALIST.....	33
TABLE 7:	WATERCOURSE CROSSING COORDINATES LOCATED WITHIN THE RETICULATION PIPELINE ALIGNMENT ....	34
TABLE 8:	CO-ORDINATES OF WETLANDS LOCATED WITHIN THE RETICULATION PIPELINE ALIGNMENT.....	37
TABLE 9:	DETAILS OF SPECIALIST.....	39
TABLE 10:	DETAILS OF SPECIALIST.....	40
TABLE 11:	INTERPRETATION OF THE SIGNIFICANCE SCORING OF A NEGATIVE IMPACT / EFFECT.....	47
TABLE 12:	RATING SCALE FOR THE ASSESSMENT OF THE SPATIAL EXTENT OF A PREDICTED EFFECT / IMPACT .....	48

TABLE 13: RATING SCALE FOR THE ASSESSMENT OF THE SEVERITY / MAGNITUDE OF A PREDICTED EFFECT / IMPACT .....	49
TABLE 14: RATING SCALE FOR THE ASSESSMENT OF THE TEMPORAL SCALE OF A PREDICTED EFFECT / IMPACT .....	49
TABLE 15: RATING SCALE FOR THE ASSESSMENT OF LOSS OF RESOURCES DUE TO A PREDICTED EFFECT / IMPACT .....	49
TABLE 16: RATING SCALE FOR THE ASSESSMENT OF REVERSIBILITY OF A PREDICTED EFFECT / IMPACT .....	50
TABLE 17: RATING SCALE FOR THE ASSESSMENT OF THE PROBABILITY OF A PREDICTED EFFECT / IMPACT .....	50
TABLE 18: CONSTRUCTION PHASE IMPACTS IDENTIFIED AND ASSOCIATED MITIGATION MEASURES .....	52
TABLE 19: IMPACT ASSESSMENT FINDINGS IN RELATION TO THE PROPOSED CONSTRUCTION ACTIVITIES .....	58

## PLATES

PLATE 1: VIEW OF THE PROJECT AREA. NOTE THE DONGAS WHICH HAVE BEEN AVOIDED AS FAR AS POSSIBLE. ....	17
PLATE 2: AN EXAMPLE OF A BRIDGE ALONG WHICH RETICULATION PIPELINE WILL BE TACKED SO AS TO AVOID ANY CONSTRUCTION WITHIN THE WATERCOURSE.....	17
PLATE 3: A VIEW OF THE RECEIVING ENVIRONMENT WITHIN THE EPANGWENI COMMUNITY.....	18
PLATE 4: AN EXAMPLE OF THE ROAD NETWORK ADJACENT TO WHICH PIPELINES WILL BE LAID. ....	18
PLATE 5: THE FOOTPRINT OF A BULK PIPELINE, ADJACENT TO WHICH THE RETICULATION PIPELINE WILL BE ESTABLISHED, LIMITING THE IMPACT ON THE RECEIVING ENVIRONMENT .....	18

## APPENDICES

APPENDIX 1: EAP CV .....	63
APPENDIX 2: APPLICATION FOR ENVIRONMENTAL AUTHORISATION FORMS.....	64
APPENDIX 3: EDTEA PRE-APPLICATION MEETING MINUTES .....	65
APPENDIX 4: ENGINEERING DESIGN DRAWINGS – .....	66
APPENDIX 5: SPECIALIST REPORTS .....	67
APPENDIX 6: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr).....	69
APPENDIX 7: PUBLIC PARTICIPATION PROCESS .....	70

**PROPOSED DEVELOPMENT OF THE BHEKUZULU, EPANGWENI & ENNERSDALE BULK AND RETICULATION WATER SUPPLY SCHEME, INKOSI LANGALIBALELE LOCAL MUNICIPALITY, UTHUKELA DISTRICT MUNICIPALITY, KWAZULU-NATAL**

## **1. INTRODUCTION**

---

Terratest (Pty) Ltd has been appointed by Sukuma Consulting Engineers (Pty) Ltd, on behalf of the uThukela District Municipality to undertake the necessary environmental services required for the proposed development of the Bhekuzulu, Epangweni and Ennersdale Bulk and Reticulation Water Supply Scheme, Inkosi Langalibalele Local Municipality, KwaZulu-Natal.

The proposed project entails the construction of approximately 112km of water reticulation pipeline ranging from Ø50mm to Ø250mm and approximately 8.3km of bulk pipeline, ranging from Ø50mm to Ø100mm. The water supply scheme is approximately 70km<sup>2</sup> in extent and services the communities of Bhekuzulu, Epangweni and Ennersdale. The proposed water supply scheme will provide individual connections to households. Wherever possible, pipes will be constructed adjacent to the road reserve to limit the impact on the receiving environment. At watercourse crossings, pipelines will be tacked to bridges where infrastructure will allow. Where this is not possible, watercourse crossings will be constructed via trenching. Where route alignments overlap, the pipeline will be constructed within the existing Bhekuzulu bulk pipeline footprint (as approved under Environmental Authorisation Reference No.: DC23/0012/2011).

The outcome of the project will be to provide those communities within the project area currently without water, with adequate, safe, reliable and sustainable water services to a minimum of RDP Standards. This will result in an improved quality of life for the current population of ± 13 000 people. The water supply scheme is proposed to provide a projected demand of 60l/c/d within a 20-year design period.

No abstraction points are required as the proposed expansion will tie into the Bhekuzulu / Epangweni Community Bulk Water Supply Scheme, which has been authorised (Environmental Authorisation Reference No.: DC23/0012/2011) and is presently being constructed.

As per GNR 326 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) a Basic Assessment (BA) Process must be undertaken in such a manner that the environmental outcomes, impacts and residual risks of the proposed Listed Activities being applied for are noted in the BA Report and assessed accordingly by the Environmental Assessment Practitioner (EAP). In this regard, the requirements of the BA Process are noted in the EIA Regulations (2014, as amended), Listing Notice 1, Appendix 1 of GNR 326 and are consequently adhered to in this report (please refer to Table 1-1 of the Executive Summary). In this regard, this BA Report focuses only on construction phase impacts and mitigation measures.

Ultimately, the outcome of the BA Process is to provide the Competent Authority, the Department of Economic Development, Tourism and Environmental Affairs (EDTEA), with sufficient information to provide a decision on the Application in terms of Environmental Authorisation (EA), in order to avoid or mitigate any detrimental impacts that the activity may impose on the receiving environment.

## 2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Terratest (Pty) Ltd has been appointed by Sukuma Consulting Engineers (Pty) Ltd on behalf of the uThukela District Municipality to undertake the environmental services required for the construction works associated with this Application. Details of the qualified EAPs involved in undertaking the BA Process are included in Table 2 and the Curriculum Vitae (CV) of the relevant EAP's attached as Appendix 1.

**Table 2:** Details of the EAP

COMPANY: TERRATEST (PTY) LTD			
EAP	Qualifications & professional affiliations	Experience	Contact details
<b>Mr M. van Rooyen</b> Executive Associate	BSc, BSc Hons, MPhil. (Environmental Management), Pr. Sci. Nat, IAIAAsa	14 years	Tel: (033) 343 6789 Email: vanrooyenm@terratest.co.za
<b>Ms I. Summers</b> Senior Environmental Consultant	BSc. (Hons), MSc Environmental Science, IAIAAsa	7 years	Tel: (033) 343 6789 Email: summers@terratest.co.za

## 3. LOCATION OF THE ACTIVITY

The proposed activity is located within Wards 5, 6 and 18 of the Inkosi Langalibalele Municipality, located 30km northwest of Estcourt and 15 km south of Winterton, KwaZulu-Natal. The footprint extends into the Ennersdale and Epangweni communities and into a portion of Bhekuzulu community. The project footprint falls within the Amangwe Tribal Authority.

The main roads into the receiving communities are the P10-1 and P28-1. Several un-paved internal roads also serve the communities. A Locality Map is provided in Figure 1.

The coordinates and 21-digit Surveyor General (SG) code cadastral land parcels through which the pipe alignments run are illustrated in Table 3. Co-ordinates every 250m along the pipeline alignments are provided in Table 4. A map indicating land parcels is provided in Figure 2.

**Table 3:** Landowner / property details as per the Deeds website

SG KEY	PTN NO	LANDOWNER
N0GS00000000493600001	No data	Amahlubi Land Trust- Trustees
N0FS00000000760000004	01/04/7600	Amahlubi Land Trust- Trustees
N0GS00000000493600005	01/05/4936	Amahlubi Land Trust- Trustees
N0GS00000000493500007	01/07/4935	Amahlubi Land Trust- Trustees
N0GS00000000493600001	1/4936	Amahlubi Land Trust- Trustees
N0GS00000000642600000	RE/6426	Amahlubi Land Trust- Trustees
N0FS00000001646700000	RE/16467	No result
N0GS00000000642600007	01/07/6426	No result
N0GS00000001479300001	1/14793	Portion 1 of Farm 14793 Propriety Limited
N0GS00000000525500000	RE/5255	Ephangweni Communal Property Association AND ELC Prop Management Co.
N0GS00000000525600000	RE/5256	Ephangweni Communal Property Association AND ELC Prop Management Co.

N0GS00000001479300000	RE/14793	Mkhuleko Raymond Mkhize and Happiness Thandi Mkhize
N0GS00000000642600006	01/06/6426	Roy Registone Mbongwe and Alice Thembeni Mbongwe
N0GS00000000085700019	19/857	Regional and Land Affairs
N0GS00000000085700018	18/857	National Government of the Republic of South Africa
N0GS00000000085700000	RE/857	Etshenilengele Communal Property Association
N0GS00000000085700007	7/857	Etshenilengele Communal Property Association
N0GS00000000085700009	9/857	Lissadell Farms CC
N0GS00000000212500007	7/2125	Lissadell Farms CC
N0FS00000000210100011	11/2101	The Arde Trust
N0FS00000000210100007	7/2101	The Arde Trust
N0FS00000000210100011	11/2101	The Arde Trust
N0FS00000000210100010	10/2101	Sithole Sakhephi Julius
N0FS00000000210100010	10/2101	Sithole Sakhephi Julius
N0FS00000000210100009	9/2101	Ramjohit Rookmeen
N0FS00000000210100009	9/2101	Ramjohit Rookmeen
N0FS00000000210100008	8/2101	Hariparsad Kavitha (amongst others)
N0FS00000000210100001	1/2101	No data

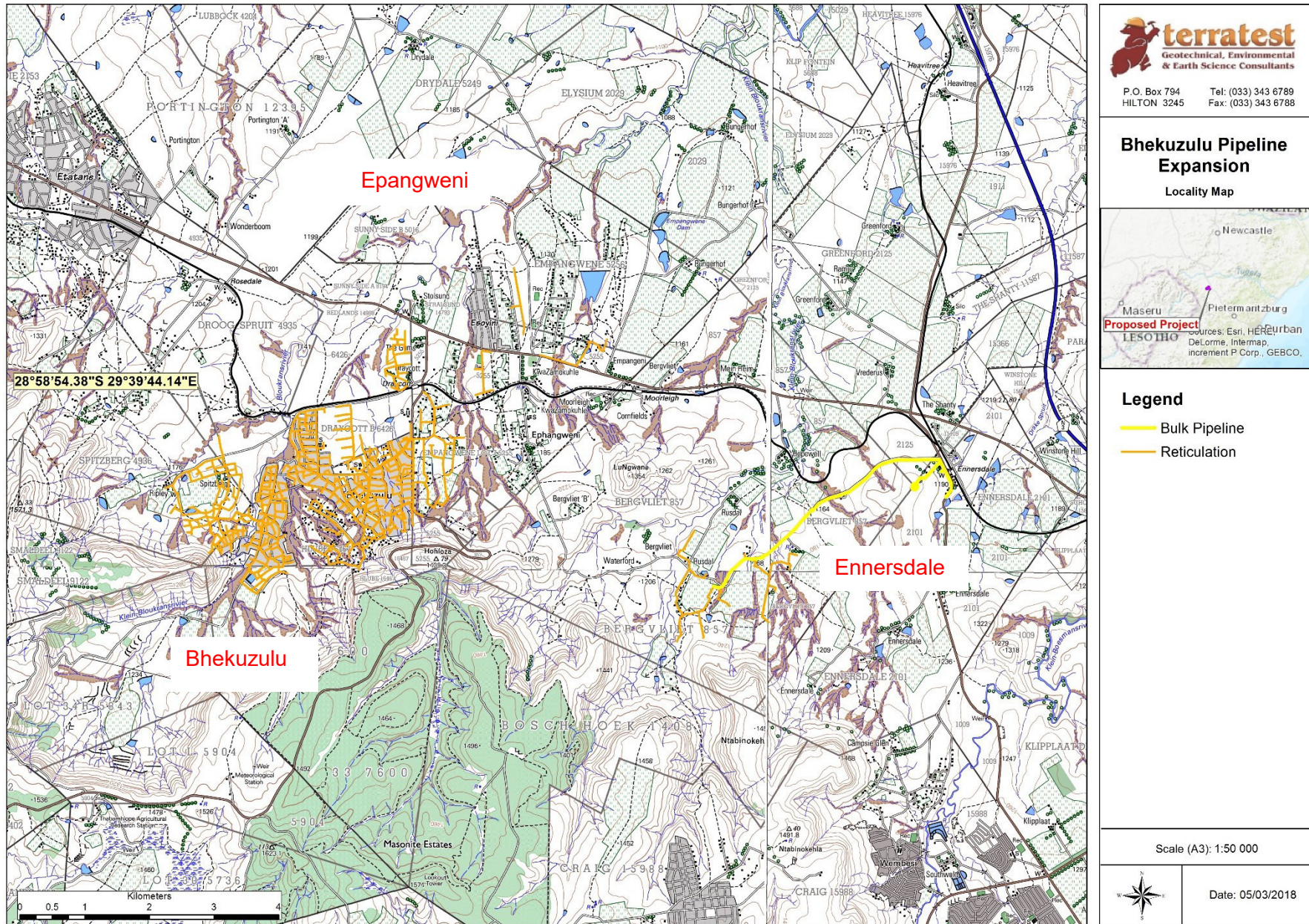
**Table 4:** GPS co-ordinates every 250m along the project alignment


	EASTERLY CO-ORDINATE	SOUTHERLY CO-ORDINATE
1	29° 44' 8.316" E	29° 0' 27.565" S
2	29° 44' 7.392" E	29° 0' 8.706" S
3	29° 44' 21.246" E	29° 0' 3.234" S
4	29° 44' 56.629" E	29° 0' 16.729" S
5	29° 44' 57.233" E	29° 0' 24.040" S
6	29° 40' 0.407" E	29° 0' 2.947" S
7	29° 44' 7.870" E	28° 59' 50.469" S
8	29° 44' 14.400" E	28° 59' 42.720" S
9	29° 40' 53.996" E	28° 59' 39.777" S
10	29° 40' 42.654" E	28° 59' 27.993" S
11	29° 41' 0.428" E	28° 59' 12.584" S
12	29° 40' 40.378" E	28° 59' 1.472" S
13	29° 40' 39.592" E	28° 58' 55.227" S
14	29° 40' 30.648" E	28° 58' 52.502" S
15	29° 40' 27.370" E	28° 58' 58.282" S
16	29° 40' 51.748" E	28° 58' 55.085" S
17	29° 40' 58.938" E	28° 58' 49.448" S
18	29° 41' 5.089" E	28° 58' 53.703" S
19	29° 41' 33.859" E	28° 58' 47.115" S
20	29° 39' 41.942" E	28° 59' 45.263" S
21	29° 39' 19.756" E	28° 59' 15.558" S
22	29° 39' 44.806" E	28° 59' 19.630" S
23	29° 39' 56.452" E	28° 59' 16.868" S
24	29° 39' 54.038" E	28° 59' 9.877" S



	<b>EASTERLY CO-ORDINATE</b>	<b>SOUTHERLY CO-ORDINATE</b>
25	29° 39' 44.807" E	28° 58' 56.720" S
26	29° 39' 32.155" E	28° 59' 9.268" S
27	29° 39' 55.015" E	28° 59' 36.466" S
28	29° 39' 47.158" E	28° 59' 35.029" S
29	29° 39' 54.357" E	28° 59' 32.097" S
30	29° 41' 7.712" E	28° 59' 29.872" S
31	29° 41' 21.330" E	28° 59' 38.695" S
32	29° 41' 27.852" E	28° 59' 30.256" S
33	29° 41' 7.345" E	28° 59' 51.838" S
34	29° 40' 51.670" E	28° 59' 50.645" S
35	29° 41' 3.823" E	28° 59' 58.768" S
36	29° 39' 20.930" E	28° 59' 23.735" S
37	29° 44' 24.721" E	29° 0' 13.408" S
38	29° 39' 30.466" E	28° 59' 32.483" S
39	29° 45' 1.399" E	28° 59' 55.963" S
40	29° 45' 13.881" E	28° 59' 51.426" S
41	29° 42' 15.032" E	28° 58' 22.725" S
42	29° 42' 14.690" E	28° 58' 17.611" S
43	29° 42' 37.801" E	28° 57' 54.954" S
44	29° 42' 34.540" E	28° 57' 38.970" S
45	29° 42' 32.912" E	28° 57' 30.978" S
46	29° 41' 41.508" E	28° 59' 3.886" S
47	29° 41' 41.422" E	28° 58' 55.767" S
48	29° 41' 53.100" E	28° 59' 12.191" S
49	29° 41' 58.187" E	28° 59' 4.917" S
50	29° 41' 54.323" E	28° 59' 21.889" S
51	29° 41' 35.591" E	28° 59' 18.073" S
52	29° 41' 35.453" E	28° 59' 2.363" S
53	29° 41' 35.577" E	28° 59' 10.481" S
54	29° 41' 42.999" E	28° 58' 31.824" S
55	29° 44' 20.886" E	29° 0' 28.266" S
56	29° 39' 47.842" E	28° 59' 47.775" S
57	29° 39' 47.222" E	28° 59' 34.935" S
58	29° 39' 54.363" E	28° 59' 31.904" S
59	29° 40' 23.152" E	28° 59' 32.272" S
60	29° 46' 38.54" E	28° 59' 02.55" S
61	29° 44' 47.39" E	28° 59' 53.61" S
62	29° 43' 25.19" E	28° 58' 05.25" S
63	29° 41' 25.11" E	28° 57' 59.32" S
64	29° 41' 28.46" E	28° 58' 31.47" S
65	29° 41' 24.76" E	28° 59' 03.68" S
66	29° 41' 09.74" E	28° 59' 20.42" S
67	29° 40' 39.23" E	28° 58' 40.17" S
68	29° 40' 43.42" E	28° 59' 18.43" S
69	29° 40' 16.26" E	28° 59' 09.49" S
70	29° 40' 09.72" E	28° 59' 42.14" S








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### Bhekuzulu Pipeline Expansion

Locality Map



Proposed Project  
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO.

**Legend**

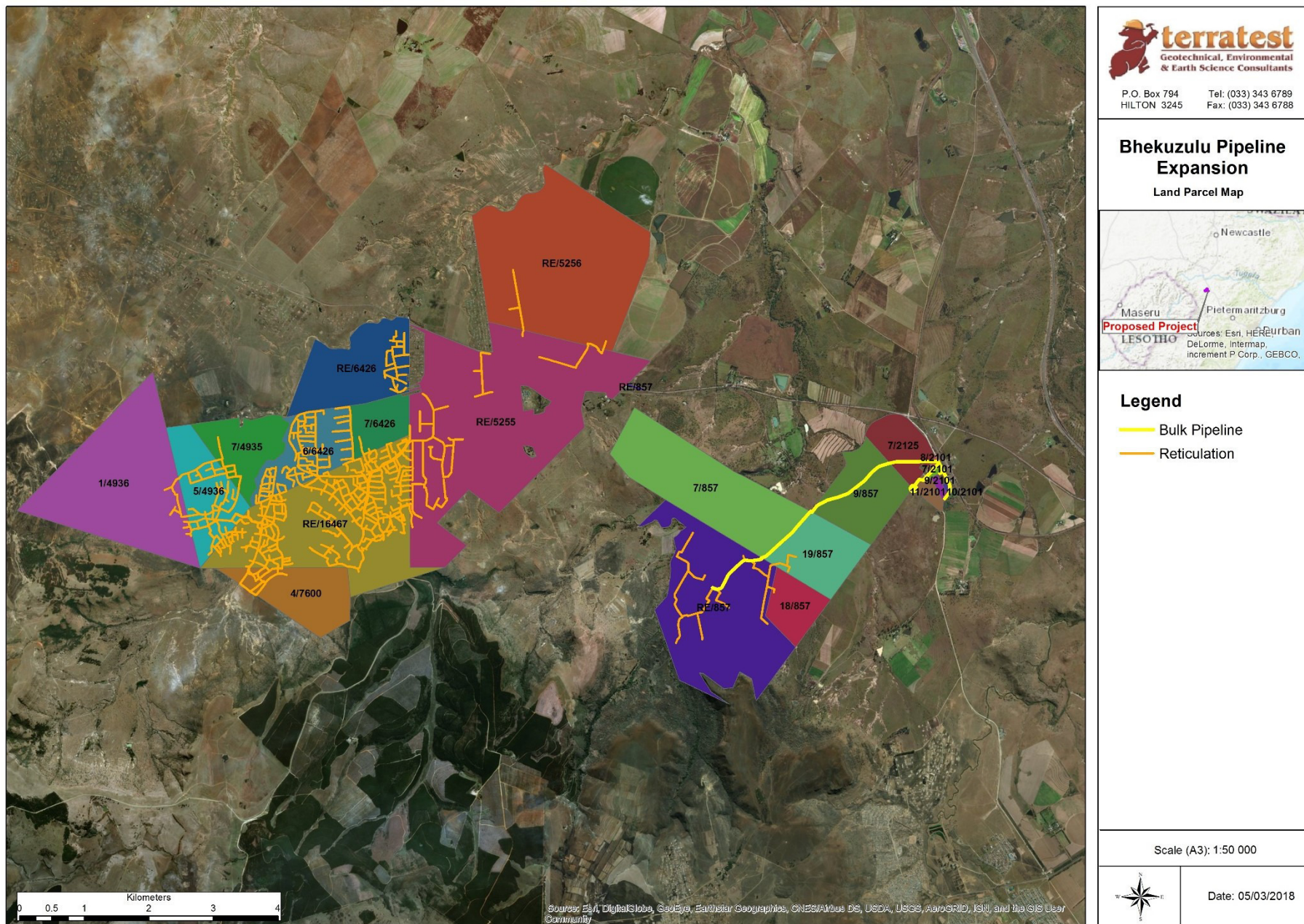
- Bulk Pipeline
- Reticulation

Scale (A3): 1:50 000

Date: 05/03/2018

Figure 1: Locality map indicating the proposed water supply scheme





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**Bhekuzulu Pipeline Expansion**  
Land Parcel Map

Newcastle  
Tugela  
Maseru  
Pietermaritzburg  
**Proposed Project**  
LESOTHO  
Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO.

**Legend**

- Bulk Pipeline
- Reticulation

Scale (A3): 1:50 000

Date: 05/03/2018

Figure 2: Land parcels to be intercepted by the proposed water supply scheme

## 4. LEGAL CONTEXT

### 4.1 APPLICABLE LISTED ACTIVITIES

In terms of the Environmental Impact Assessment (EIA) Regulations (2014, as amended), promulgated in terms of the National Environmental Management Act (Act 107 of 1998 (NEMA), certain Listed Activities are specified for which either a Basic Assessment (GNR 327 and GNR 324) or a full Scoping and EIA (GNR 325) is required.

The following Listed Activities in Government Notice 327 (Listing Notice 1) are applicable to the proposed development:

**Table 5:** Applicable Listed Activities in terms of NEMA (Act 107 of 1998)

LISTING NOTICE & ACTIVITY	LISTED ACTIVITY AND TRIGGER AS PER THE PROJECT DESCRIPTION
GNR 327 (Listing Notice 1): <b><u>Activity 12</u></b>	<p><i>"The development of (ii) infrastructure or structures with a physical footprint of 100 square metres or more where such development occurs a) within a watercourse b) in front of the development setback; or c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of the watercourse, excluding (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves."</i></p> <p>- <u>The proposed establishment of the bulk and reticulation pipeline will require 42 wetland / watercourse crossings, the cumulative footprint of which will exceed 100m<sup>2</sup>, thus triggering the above Listed Activity.</u></p>
GNR 327 (Listing Notice 1): <b><u>Activity 19</u></b>	<p><i>"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 watercourse..."</i></p> <p>- <u>The construction of the bulk and reticulation pipeline will necessitate construction through watercourses, the cumulative construction of which will require the infilling / depositing of 10m<sup>3</sup> or more of material into / out of wetlands and watercourses, thus triggering the above Listed Activity.</u></p>

Based on the above proposed activities, a Basic Assessment (BA) Process is required. The associated Environmental Authorisation (EA) Application form is attached to this Report as Appendix 2 and an organogram of the BA Process is provided in Figure 3 for reference purposes.

### 4.2 EDTEA PRE-APPLICATION MEETING

A Pre-Application Meeting was held with Ms A. Khulu and Ms N. Makhanya of the EDTEA: uThukela District on 08 June 2017. The minutes thereof are attached as Appendix 3. The purpose of the Pre-Application Meeting was to introduce the project to the EDTEA and present and confirm the relevant Listed Activities and Specialist Studies pertinent to the proposed development.



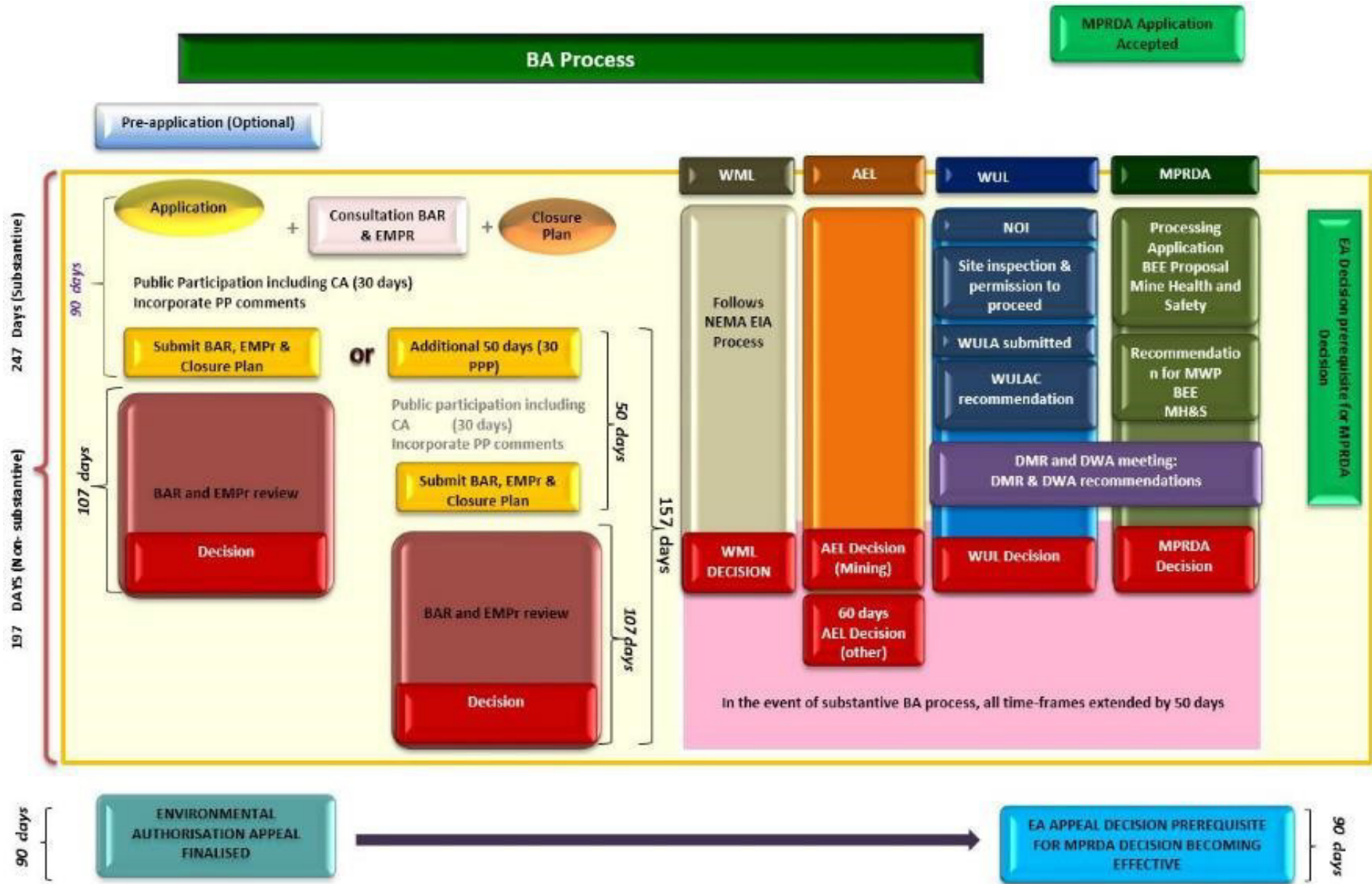


Figure 3: Basic Assessment Process Organogram.

### 4.3 NATIONAL WATER ACT (ACT 36 OF 1998)

As per the National Water Act (Act 36 of 1998), should an activity require a water use, as defined in Section 21 of the Act, a Water Use Licence or a General Authorisation registration will be required prior to the activity being undertaken. The Competent Authority in this regard is the Department of Water and Sanitation. Water uses, in terms of Section 21 of the Act include:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a stream flow reduction activity contemplated in section 36;
- e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

Terratest (Pty) Ltd has been appointed to undertake the necessary processes required to register the applicable water uses for the project. In this regard, a Pre-Application Meeting was held on 15 August 2017 with the Department of Water and Sanitation to ascertain their requirements and to confirm the Water Uses to be applied for. The Department of Water and Sanitation noted that based on the findings of the specialist wetland and watercourse assessment, a General Authorisation Registration would be required in terms of Section 39(1) of the National Water Act (Act 36 of 1998), Notice 509 of 2016. The following water uses are applicable:

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

### 4.4 APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

Table 6 provides a list of all the applicable legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA Regulations (2014, as amended).

**Table 6:** Applicable legislation, policies and/or guidelines

TITLE OF LEGISLATION, POLICY OR GUIDELINE:	ADMINISTERING AUTHORITY:	DATE:
National Environmental Management Act (Act 107 of 1998) – for its potential to cause degradation of the environment (Section 28)	Department of Environmental Affairs	1998

<b>TITLE OF LEGISLATION, POLICY OR GUIDELINE:</b>	<b>ADMINISTERING AUTHORITY:</b>	<b>DATE:</b>
Environmental Conservation Act (Act 73) – for potential environmental degradation	Department of Environmental Affairs	1989
National Water Act (Act 36 of 1998) – for potential to cause pollution of water resources defined under the Act (Section 19 and 21)	Department of Water Affairs and Forestry	1998
Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) – for protection of agricultural resources and for control and removal of alien invasive plants	National Department of Agriculture	1983
Subdivision of Agricultural Land Act, Act 70 of 1970 – for the subdivision of agricultural land	National Department of Agriculture	1970
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) – for protection of biodiversity	Department of Agriculture and Environmental Affairs & Ezemvelo KZN Wildlife	2004
The National Heritage Resources Act (Act No 25 of 1999 as amended) – for the identification and preservation of items of heritage importance	Department of Arts and Culture (Amafa KwaZulu-Natal)	1999
Integrated Environmental Management Guideline; Guideline on Need and Desirability (2017)	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 4: Public Participation in support of the EIA Regulations (2005)	Department of Environmental Affairs and Tourism	2006
Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations	Department of Environmental Affairs, Pretoria, South Africa	2017
Guideline 7: Detailed Guide to Implementation of the Environmental Impact Assessment Regulations (2006)	Department of Environmental Affairs and Tourism	2007
Environmental Conservation Act, 1989. Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials	Department of Environmental Affairs and Tourism	2008
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993): Asbestos Regulations, 2001	Department of Labour	2002
Inkosi Langalibalele Municipal By-Laws	Local Municipality	Updated accordingly

## **5. DESCRIPTION OF THE ACTIVITY**

### **5.1 PROJECT OVERVIEW**

At present, the communities of Ennersdale and Epangweni do not have access to potable water. Water is provided to these community by means of water tankers. A portion of the Bhhekuzulu community receives a very limited and inconsistent supply of water via the existing bulk network which feeds an inadequate reticulation water supply scheme. The proposed water supply scheme will service approximately 13 000

people in 2171 homesteads with adequate, safe, reliable and sustainable water services to a minimum of RDP standards.<sup>1</sup>

The uThukela District Municipality is the Water Services Authority (WSA) for the proposed development. The Department of Water Affairs and Sanitation has unconditionally approved the development and funding is via a Water Services Infrastructure Grant (WSIG).

The water supply scheme will be serviced via the existing Bhekuzulu / Epangweni Community Bulk Water Supply Scheme, which has been authorised (Environmental Authorisation Reference No.: DC23/0012/2011). Under this scheme, water is abstracted from the Little Injasuti River where it is pumped to the Loskop Water Treatment Works. From the treatment works, water will be transferred via bulk lines to the Bhekuzulu, Ennersdale and Epangweni water supply scheme.

The proposed pipe networks have been designed to cater for an ultimate demand of 60l/c/d within a 20-year design period and will supply individual metered Erf connections to each household.

## 5.2 PROJECT DESCRIPTION

### 5.2.1 Design Details

Design details include the following:

- Pipeline infrastructure, servicing an area of approximately 70km<sup>2</sup>;
- Approximately 8.3km of bulk pipeline to supply the reticulation for the Ennersdale community;
- Approximately 112km of reticulation pipeline to service the Epangweni, Ennersdale and a remainder of the Bhekuzulu communities;
- The bulk pipeline diameter will vary between Ø50mm up to Ø100mm;
- Reticulation pipe diameters will vary from Ø50mm up to Ø250 mm;
- Trench depths will vary from 1.1m to 1.5m in depth;
- Trench widths will vary from 450mm to 750mm;
- Erf connections to be provided to households in the Bhekuzulu / Epangweni communities;
- Air valves;
- Scour valves;
- Isolated valves;
- Pipeline ancillaries such as marker posts and thrust blocks; and
- Water meters on each house connection.

Construction of the water supply scheme will require the crossing of several watercourses, inclusive of drainage lines and wetlands. Construction of the bulk and reticulation lines will be conducted in a 3m wide corridor adjacent to the existing roads (see Figure 4). Portions of the pipeline will be constructed within the existing Bhekuzulu bulk pipeline footprint (as approved under Environmental Authorisation Reference No.:

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<sup>1</sup> Sukuma Consulting Engineers, 2016: *Uthukela District Municipality Bhekuzulu – Epangweni: Reticulation to Ennersdale, Epangweni and Bhekuzulu Technical Report.*



DC23/0012/2011), where ever the alignments overlap (see Figure 5). The working corridor will cater for the stockpiling of topsoil, subsoil and bedding materials. The reticulation and bulk pipelines will cross 42 wetlands and watercourses. Seven of the crossings are in the same trench as the bulk pipeline (as approved under Environmental Authorisation Reference No.: DC23/0012/2011).<sup>2</sup>

### **5.2.2 Watercourse Crossings**

Within the project footprint, 34 watercourse crossings will be required (see Section 9.1 for further details). The nature and extent of the watercourse crossings will vary dependent on the status of the receiving environment i.e. donga crossing, watercourse crossing on rock, watercourse crossing on soil etc. The engineering methodology required to cross the watercourses is however based on two specific designs, namely an 'Above Ground River, Stream or Erosion Gully Crossing' and a 'Below Ground River, Stream or Erosion Gully Crossing'. See Appendix 4 for a copy thereof.

### **5.2.3 Community Participation and Governance**

A Project Steering Committee (PSC) has been established comprising of community members who represent all of the communities of the Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme project footprint. Members were elected based on their interest in the development of their areas and the basis of their standing with the community. PSC members will be trained to enhance both their governance skills and their ability to participate fully and effectively in the implementation of the water supply scheme. Training will be undertaken during the construction of the scheme.

Wherever possible, construction activities will be undertaken using manual labour. This will enable temporary job creation and will boost the local economy during the construction period.

The Tribal Authority and identified communities acknowledge the role of women in the area. As such woman will be encouraged to be actively involved in the project.

Training will target people from within the community to build skills in pipe laying, basic plumbing skills and working with concrete for construction of valve chambers and small concrete structures. It is anticipated that 200 persons from the local community will be employed for approximately 105 600 person days.

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<sup>2</sup> Alletson, D.J., 2017: *Biodiversity and Wetland Assessment Associated with the Proposed Bulk and Fine Scale Reticulation Pipeline Routes of the Bhekuzulu Potable Water Supply Scheme in Kwazulu-Natal*. JG Afrika (Pty) Ltd.

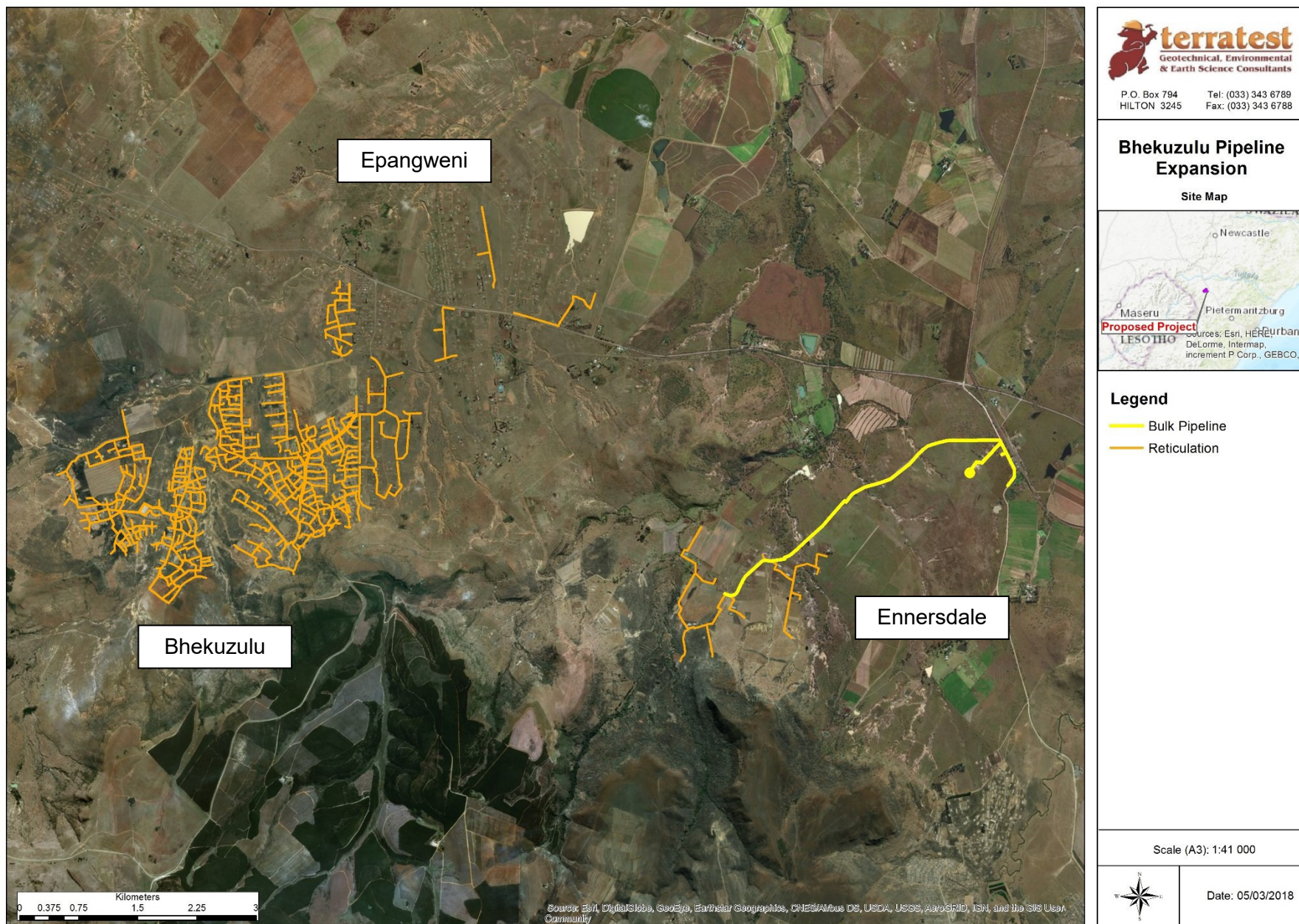
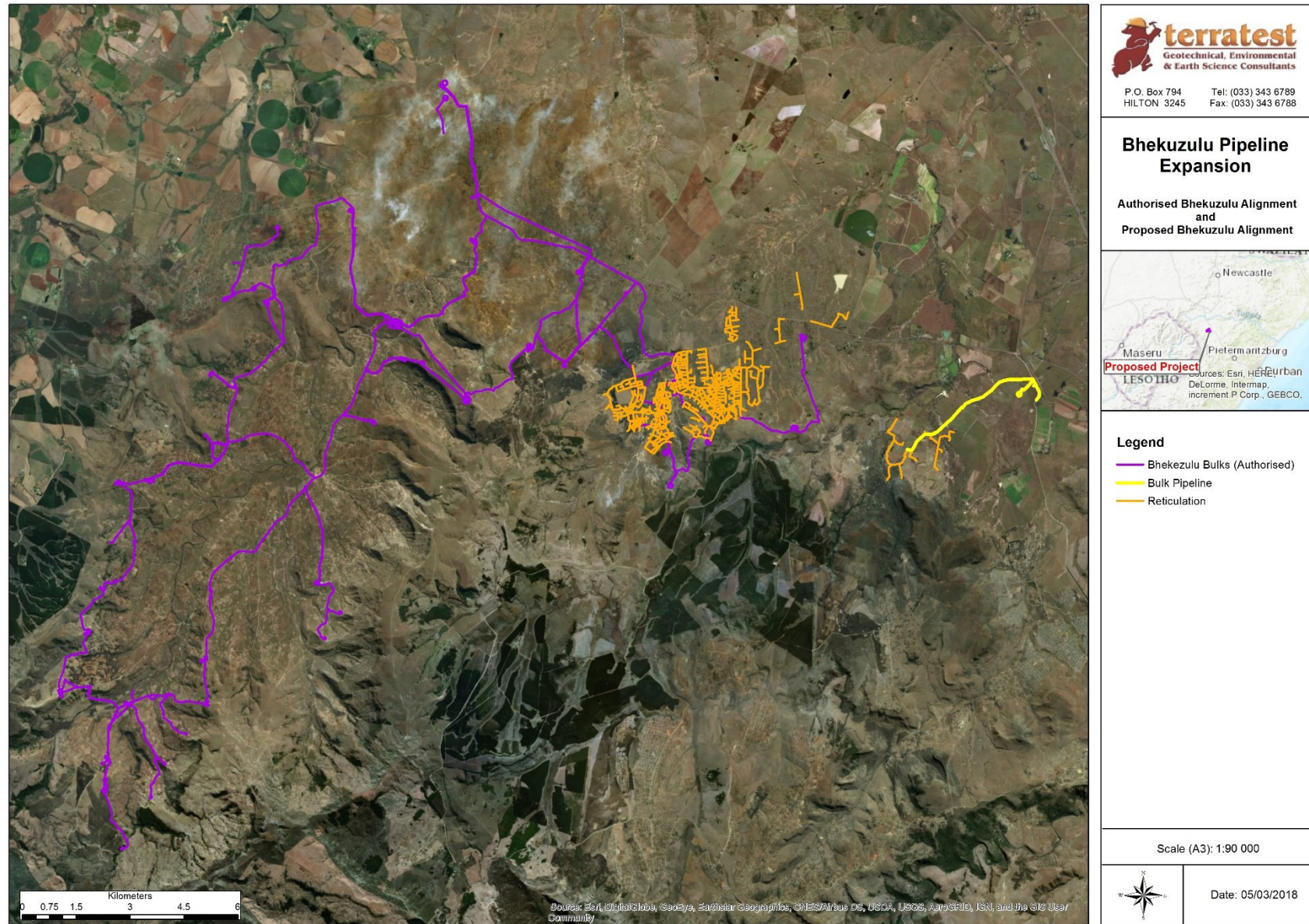


Figure 4: Layout of reticulation and bulk pipelines for the Bhekuzulu / Epangweni and Ennersdale communities





**Figure 5:** The alignment of the authorised Bhekuzulu Bulk Water Supply Scheme, as illustrated in purple, in comparison to the Proposed Bhekuzulu, Epangweni, Ennersdale Water Supply Scheme (bulks and reticulation) as illustrated in orange and yellow.

## **6. DEVELOPMENT MOTIVATION**

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### **6.1 NEED**

The needs of the receiving communities can be summarised as follows:

- An urgent need for safe potable water to the areas of Ennersdale and Epangweni which are currently reliant on tanker services for supply;
- An urgent need for safe potable water to portions of the Bhekuzulu area which currently receives a limited supply for potable water approximately 3 times a week;
- Access to reliable water sources for subsistence agriculture and domestic purposes;
- Access to safe potable water will ensure protection of the community health by limiting the transmission of water borne infectious diseases and by assisting in the maintenance of a sanitary home environment. This will greatly contribute to the enhancement of human dignity and economic opportunities by freeing people, mainly women and young children, from the responsibility of water collection and providing more time for them to engage in other activities; and
- This project will directly provide a projected population of approximately 13 540 people with water at a basic level of supply of 25l/c/d and, ultimately 60l/c/d. The implementation of the project will improve the availability, access and quality of drinking water in the Bhekuzulu, Epangweni and Ennersdale communities.

### **6.2 DESIRABILITY**

- There is a complete lack of reticulation infrastructure in Ennersdale and Epangweni communities, as well as a very limited capacity of existing infrastructure in Bhekuzulu community. Without the proposed water supply scheme, the communities will not benefit from the existing bulk water supply scheme (as approved under Environmental Authorisation Reference No.: DC23/0012/2011) which is currently being constructed to provide access to potable water;
- Socio-economic benefits would include the expected provision of 200 employment opportunities and 105 600 employment days, resulting in a direct cost in excess of R20million during the construction phase;
- The majority of the unskilled labour will be sourced from the local communities;
- Various community members will be provided with education pertinent to water conservation and management, providing institutional empowerment; and
- There are tensions created within the communities brought about by a perception that certain communities have more water available to them and as a result they are using more than their allocated allowance. This has led to vandalism and unrest in the past. A reliable network capable of supplying all areas equally is required to ensure that there is harmony amongst the beneficiaries.

### **6.3 PLANNING INITIATIVES**

#### **6.3.1 KZN Provincial Growth and Development Plan**

The Provincial Growth and Development Plan (2013) was designed to be aligned to and in synergy with the National Development Plan and is a primary overarching strategic framework for development in KwaZulu-Natal. It drives growth and development in the Province until the year 2030 and aims at addressing issues and challenges of poverty, inequality and unemployment. One of the goals, Goal 4, addresses infrastructure issues with the outcome focusing on improved water resource management.

The proposed Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme is therefore in accordance with the KZN Provincial Growth and Development Plan.

## **7. MOTIVATION FOR THE PREFERRED SITE, ACTIVITY AND TECHNOLOGY ALTERNATIVE**

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The proposed development triggers Listing Notice 1 (GNR 327), Activities 12 and 19 of the EIA Regulations, (2014, as amended).

As per GNR 326, Appendix 1(2)(b), alternatives for the proposed development are to be identified and considered. Chapter 1 of the EIA Regulations (2014, as amended) provides an interpretation of the word “alternatives”, which is to mean “*in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the -*

- a) *Property on which or location where the activity is proposed to be undertaken;*
  - b) *Type of activity to be undertaken;*
  - c) *Design or layout of the activity;*
  - d) *Technology to be in the activity; or*
  - e) *Operational aspects of the activity;*
- And includes the option of not implementing the activity.”*

Based on the above, the following alternatives are presented for the proposed development of the Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme.

### **7.1 PREFERRED SITE ALTERNATIVE**

As the proposed development services communities which have been identified specifically for their need for potable water service provision, no site alternatives have been considered. This is based on the findings which show that the Ennersdale and Epangweni communities are currently serviced by means of water tankers, whilst a portion of the Bhekuzulu community receives a very limited and inconsistent supply of water. As such, the communities of Ennersdale and Epangweni and a portion of the Bhekuzulu community are the only site alternatives considered within this assessment report.

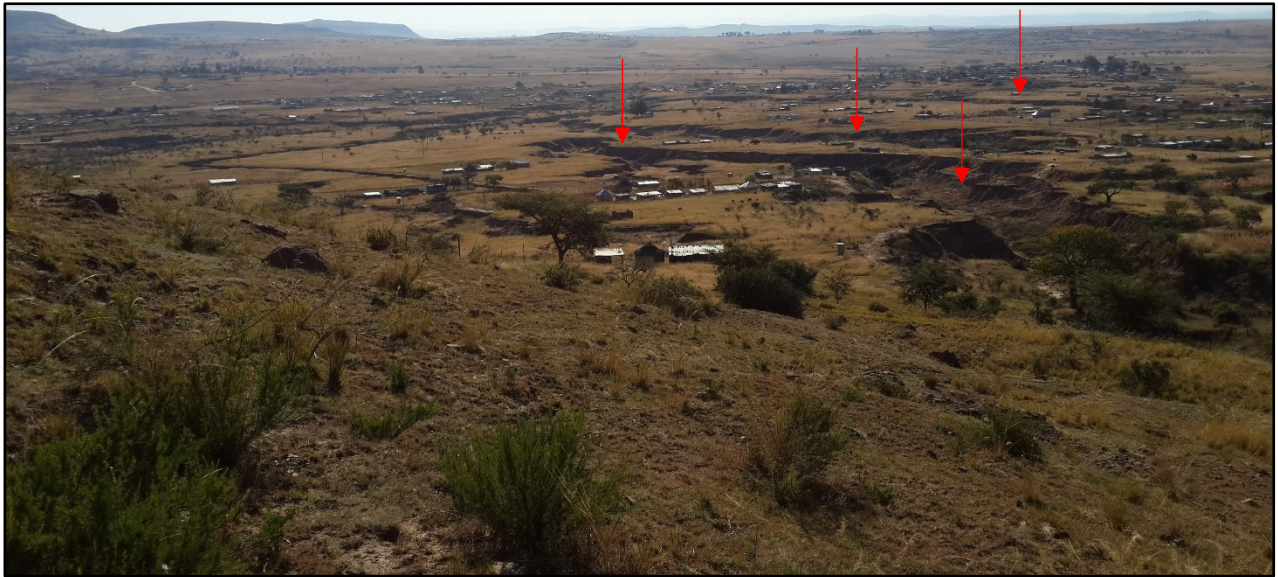
### **7.2 PREFERRED LAYOUT ALTERNATIVE**

The layout provided in Figure 3 has been produced through consultation with the engineers, EAP and wetland and watercourse specialist, and through extensive groundtruthing of the suitability of the alignments on site. Wherever possible, pipelines were routed to avoid wetlands, watercourses and dongas, whilst providing the most direct pipeline route, with the least environmental impact. The proposed network will follow the existing road network leading directly to individual homesteads within the identified communities. The option to follow



the existing road networks is deemed to be the least environmentally invasive. At watercourse crossings, pipelines will be tacked to bridges, as will be undertaken at the site illustrated in Plate 2. Where this is not possible, watercourse crossings will be required. In addition, pipelines will be constructed within the existing bulk pipeline footprint, (as approved under Environmental Authorisation Reference No.: DC23/0012/2011) where the route alignments overlap. Therefore, an area of disturbance already exists and will be utilised for the installation of the proposed new network.

Due to the considerations listed above, no other layout alternatives have been considered for the proposed network, as extensive research, groundtruthing and rerouting of alignments has been considered to-date to provide the preferred and only layout alternative. Plates 1 – 5 provide an overview of the receiving environment through which the bulk and reticulation pipelines will pass.



**Plate 1:** View of the project area. Note the dongas (illustrated with red arrows) which have been avoided as far as possible



**Plate 2:** An example of a bridge along which pipeline will be tacked so as to avoid any construction within the watercourse





**Plate 3:** A view of the receiving environment within the Epangweni community



**Plate 4:** An example of the road network adjacent to which pipelines will be laid



**Plate 5:** The footprint of an existing bulk pipeline, adjacent to which the new pipeline will be established, limiting the impact on the receiving environment

### 7.3 PREFERRED TECHNOLOGY ALTERNATIVE

The preferred technology is to utilise HDPE pipeline for the majority of the pipeline route, as opposed to steel or asbestos. The cost of an HDPE pipeline is less than that of a steel pipeline and HDPE pipelines offer a better hydrodynamic design to that of steel pipelines. The use of an asbestos pipeline was not considered as it is no longer permissible by law as per GNR 341: Regulations for the prohibition of the use, manufacturing, import and export of asbestos and asbestos containing materials (Environment Conservation Act, 1989, as amended 2008).

Steel pipelines, however, may be required on certain portions of the alignment, for example where pipelines will be doweled to the riverbed rock surface, or in instances where pipes will be elevated above rocky surfaces. Work method statements for these two construction techniques, as included in the EMPr (Appendix 6), are as follows:

#### Pipeline Stream Crossings: Above ground on rock with concrete encasements

1. The positioning of the stream crossing is to be pegged out and confirmed by the Engineer / ER;
2. The vegetation and top soil for a 3m width is to be removed and kept in a separate stock pile;
3. The invert levels are to be confirmed by the Engineer / ER and marked at the entrance, centre and exit of the stream crossing;
4. The trench excavation is to be excavated as per the invert levels, stock piling the material excavated separately from the top soil;
5. The natural stream flow is to be contained by an earthwork berm constructed by hand / labour on the upstream side of the trench, with minimum disturbance of the natural vegetation;
6. A suitable temporary pipe installation of 3 No. 160 mm diameter uPVC pipes (or larger as instructed by the Engineer / ER) are required to transfer flow from diversion berm on the upstream side of the trench to take flow over the excavated trench;
7. The excess water in the trench is to be removed by mechanical pump if necessary;
8. The rock is to be exposed and cleared, by hand excavation, at the crossing;
9. Holes are to be drilled into the rock at the correct positions for anchoring of steel reinforcement and the steel fastened in drilled holes with approved epoxy grouting for the required section of the crossing;
10. Access for safe delivery of ready mix concrete to the crossing to be approved by the Engineer / ER;
11. The concrete is to be deposited and placed directly into the pour area;
12. Liquid concrete is not to mix with the river water;
13. The mixer is not to be washed in the river once pouring is complete;
14. The TLB will commence by backfilling the trench with excavated material from the excavated material stockpile. Compaction is to be carried out with a Bomag roller or wackers;
15. The banks will be shaped according to the existing slopes on both sides;
16. The temporary berm is to be removed as well as the temporary pipes used to contain the rivers flow;
17. All topsoil and vegetation from the stockpile is to be re-instated back on top of the trench;
18. Natural flow is to be kept along the original flow path;
19. All surplus material to be stockpiled (one pile on each bank), outside of 32m of the watercourse and spoil to be relocated to approved disposal sites (approved by the EDTEA);



20. Labour to be used to ensure a proper finish according to ECO and approved by the Engineer / ER.

#### Pipeline Stream Crossings: Underground with concrete encasements

1. The positioning of the stream crossing is to be pegged out and confirmed by the Engineer / ER;
2. The vegetation and top soil for a 3m width is to be removed and kept in a separate stock pile;
3. The invert levels are to be confirmed by the Engineer / ER and marked at the entrance, centre and exit of the stream crossing;
4. The trench excavation is to be excavated as per the invert levels, stock piling the material excavated separately from the top soil;
5. The natural stream flow is to be contained by an earthwork berm constructed by hand / labour on the upstream side of the trench, with minimum disturbance of the natural vegetation;
6. A suitable temporary pipe installation of 3 No. 160 mm diameter uPVC pipes (or larger as instructed by the Engineer / ER) are required to transfer flow from diversion berm on the upstream side of the trench to take flow over the excavated trench;
7. The excess water in the trench is to be removed by mechanical pump if necessary;
8. The foundation for the gabion structure is to be exposed and cleared by hand;
9. The first row of gabions behind the pipe is to be installed with the bidim and the hand stone packed into the gabion;
10. The Klambon pipe bedding consisting of Bidim and 19mm stone is to be laid at the level of the bedding of the pipe;
11. The pipe is laid and backfilled with bedding behind the first row of gabions;
12. The reno-mattress area is to be shaped by hand excavation and the reno- mattress with Bidim placed and then hand packed with stone;
13. The pipe is laid and backfilled with bedding behind the first row of gabions;
14. Where concrete encasement is required Steps 10-13 are replaced by steps 15 and 16;
15. Access for safe delivery of ready mix concrete to the crossing to be approved by the Engineer / ER;
16. The concrete is to be deposited and placed directly into the pour area;
17. Liquid concrete is not to mix with the river water;
18. The mixer is not to be washed in the river once pouring is complete;
19. The TLB will commence by backfilling the trench with excavated material from the excavated material stockpile and compaction to be carried out with a Bomag roller or wackers;
20. The banks will be shaped according to the existing slopes on both sides;
21. The temporary berm is to be removed as well as the temporary pipes used to contain the flow;
22. All top soil and vegetation from the stockpile is to be re-instated back on top of the trench;
23. Natural flow is to be kept along the original flow path;
24. All surplus material to be stockpiled (one pile on each bank), outside of 32m of the watercourse and spoil to be relocated to approved disposal sites (approved by the EDTEA); and
25. Labour to be used to ensure a proper finish according to ECO and approved by the Engineer / ER.

The above method statements are based on site and construction experience which result in the most practicable option which limits environmental impacts as far as possible, whilst ensuring that the watercourse is returned to as natural a state, post-rehabilitation, as possible.

### 7.4 NO-GO ALTERNATIVE

The No-go alternative is to not implement the proposed Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme in the uThukela District Municipality. This would result in the receiving communities experiencing the same inconsistent and unreliable access to clean, safe drinking water (delivered via water tanker), thus having direct health impacts on the communities, whilst maintaining a reduced standard of living. In addition, the bulk lines (as approved under Environmental Authorisation Reference No.: DC23/0012/2011) into which the new pipelines will tie, would have been laid for no reason, resulting in wasted time, money, infrastructure development and resources. Lack of implementation would also possibly limit the chances of socio-economic development of the area.

If the project is implemented, the community of Bhekuzulu, Ennersdale and Epangweni will not only benefit from the supply of safe and sufficient drinking water, but also improve their health and hygiene. The implementation of the project will create job opportunities. The implementation of the proposed project will produce limited adverse environmental impacts which are intended to be mitigated through the strict implementation of the site specific EMP.

## 8. DESCRIPTION OF THE BASELINE ENVIRONMENT

### 8.1 TOPOGRAPHY

The gradient of the land at the Bhekuzulu, Ennersdale and Epangweni communities is varied and generally undulating. It is to be noted that whilst the elevation profiles illustrated in Figures 6 - 8 indicate a varied topography, a fair amount of undulation can be attributed to the numerous dongas, wetland systems and watercourses found throughout the greater site. To mitigate against these obstacles, the reticulation and bulks will run along adjacent to the existing roads wherever possible.

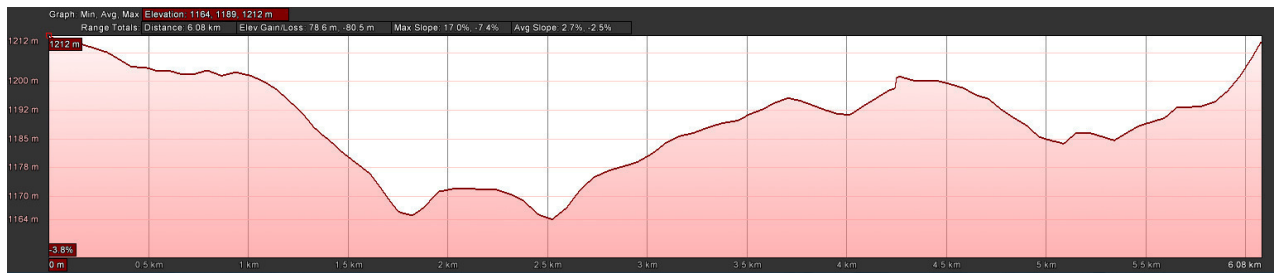


Figure 6: Gradient of the Bhekuzulu region, from west to east

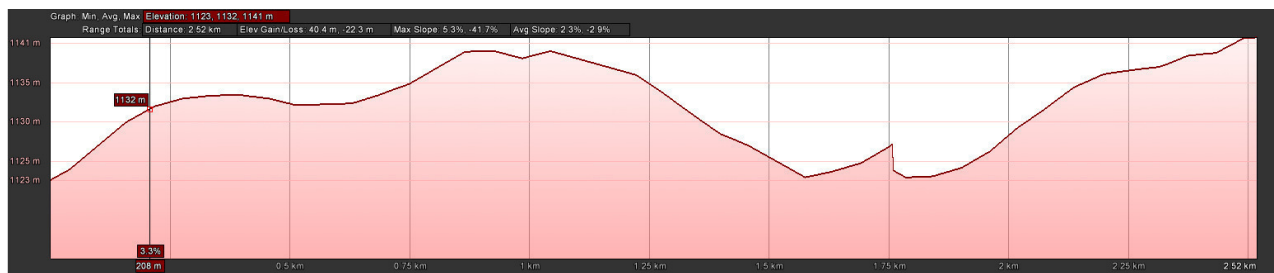
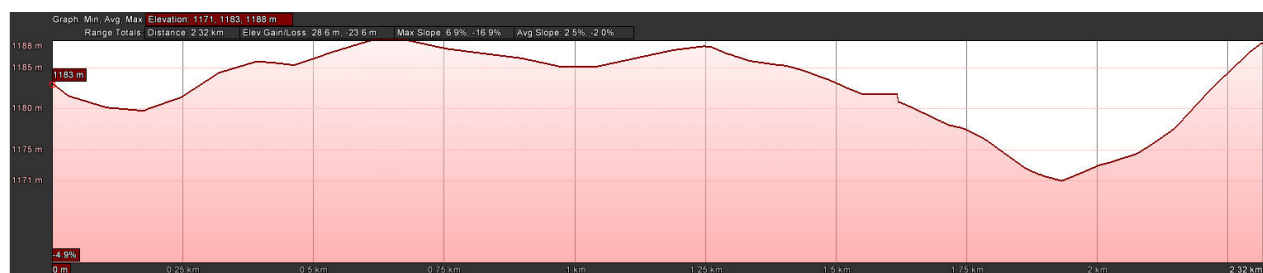


Figure 7: Gradient of the Epangweni region, from west to east



**Figure 8:** Gradient of the Ennersdale region, from west to east

## 8.2 VEGETATION

The predominant vegetation in the study area is KwaZulu-Natal Highland Thornveld (Gs 6), interspersed by Temperate Alluvial Vegetation as classified by Mucina and Rutherford (2006) and Ezemvelo KZN Wildlife (2016) (see Figure 9).

KwaZulu-Natal Highland Thornveld is found in areas of moderate rainfall (750 mm – 850 mm per annum) and is generally not rich in wetlands other than in the lower lying areas along river valleys. It consists of a series of several patches in the central-northern regions of KwaZulu-Natal, where it occurs on both dry valleys and moist upland. The most extensive area is found in the region from Ladysmith, Winterton, Estcourt and Colenso, between Mooi River and Greytown, between Pomeroy and Babanago, and further north in a triangle between Vryheid, Paulpietersburg and Louwsburg, as well as a large patch around Newcastle. Typically, KwaZulu-Natal Highland Thornveld occurs in hilly, undulating landscapes and broad valleys, supporting tall tussock grassland usually dominated by *Hyparrhenia hirta*, with occasional savannoid woodlands with scattered *Acacia sieberiana var woodii* and in small pockets with *A. karroo* and *A. nilotica*.

Alluvial vegetation is associated with freshwater wetland systems which form small and highly fragmented patches. Landscape features include shallow depressions filled with temporary water bodies supporting zoned systems of aquatic and hygrophilous vegetation of temporarily flooded grasslands and ephemeral herblands.

The EAP noted during the site inspection that the greater landscape has been transformed due to the establishment of homesteads, subsistence agricultural activities, schools, shops etc. In addition, the proposed pipelines assessed will be predominantly constructed adjacent to the existing road reserve and as such limited transformation of land will be required.

## 8.3 FAUNA

Any development has the potential to negatively impact upon the local fauna, given the intrusion of an unnatural object in a natural environment, or artificial environment. The Ezemvelo KZN Wildlife Minsent database (2010) was interrogated to search for conservation priority areas. It was found that the Bhekuzulu, Epangweni and the majority of the Ennersdale sites have no conservation priority areas, other than for some of the known wetlands in the area, which are not within the project footprint. However, the database highlighted a portion of the bulk and reticulation line within the Ennersdale area as being an Irreplaceable Critical Biodiversity Area (Figure 10). When the database was interrogated the following species of conservation status were identified:

- KwaZulu-Natal Highland Thornveld

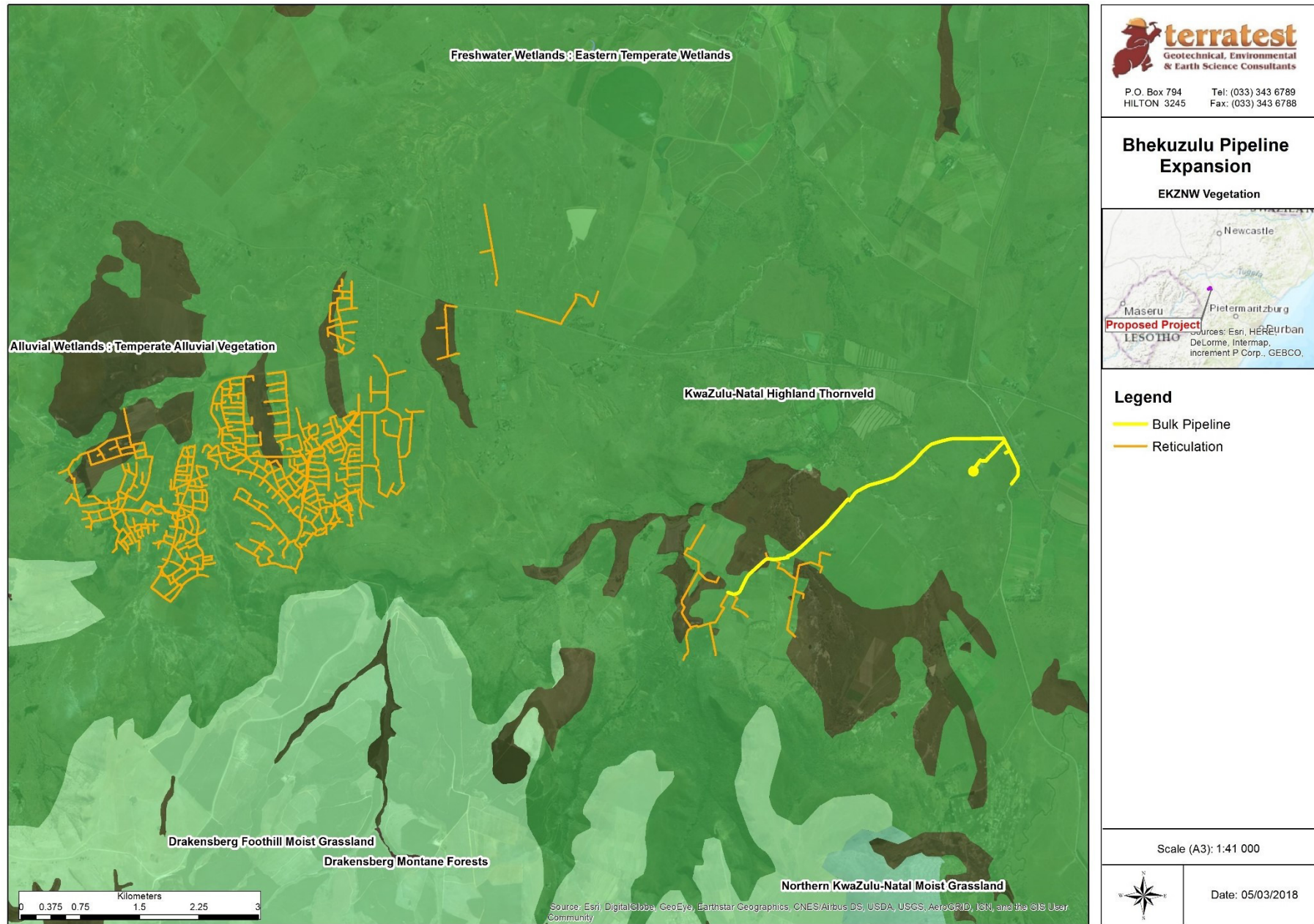
- *Proacdricus ivari* (Earthworm) (Sensitive Species; Restricted)
- *Doratogonus falcatus* (Millipede)
- *Cochlitoma simplex* (Snail)
- *Whitea alticeps* (Insect)
- *Gulella orientalis* (Mollusc)

The restricted species was not been listed. As such a query was lodged with Ezemvelo KZN Wildlife (EKZNW) who noted that the restricted species is an earthworm (*Proacdricus ivari*). When the EKZNW Critical Biodiversity Area (CBA) and Ecological Sensitive Area (ESA) database was interrogated (Figure 11), it was noted that the same portion of the alignment falls within an Irreplaceable designation. It is assumed that the species listed in the CBA/ESA database will be the same as those listed in the Minset database, and that that this will be confirmed in the feedback from EKZNW.

In terms of the impact of the proposed development on these species and vegetation types, it is to be noted that as per the site visit and the Biodiversity and Wetland Assessment, the site has been predominantly transformed due to the establishment of homesteads, subsistence agricultural activities, schools, shops etc. In addition, the proposed pipelines will be placed adjacent the road reserve wherever possible. As such the impact on the receiving environment has been limited, and will consequently be limited as much as possible.

The proposed development footprint does not fall within 5km of any protected areas or nature reserves. The project footprint is some 8km from the Moor Park Nature Reserve, 10km from the Dalton Private Nature Reserve and 12km from the Ukhahlamba Drakensburg Park.

As per the EKZNW Transformation layer (2016) (Figure 12), the majority of the development footprint falls within land that is transformed. This is due to the establishment of low density housing with subsistence-level agriculture associated with homesteads. Road networks, schools and shops have also been established within the greater development footprint. The Biodiversity Assessment (Appendix: 6) also states that the fauna in the area is already greatly reduced from its natural state. This further substantiates that the development will have limited impact on fauna.



**Figure 9:** Vegetation designations for the site as per EKZNW (2016) and Mucina & Rutherford (2006)



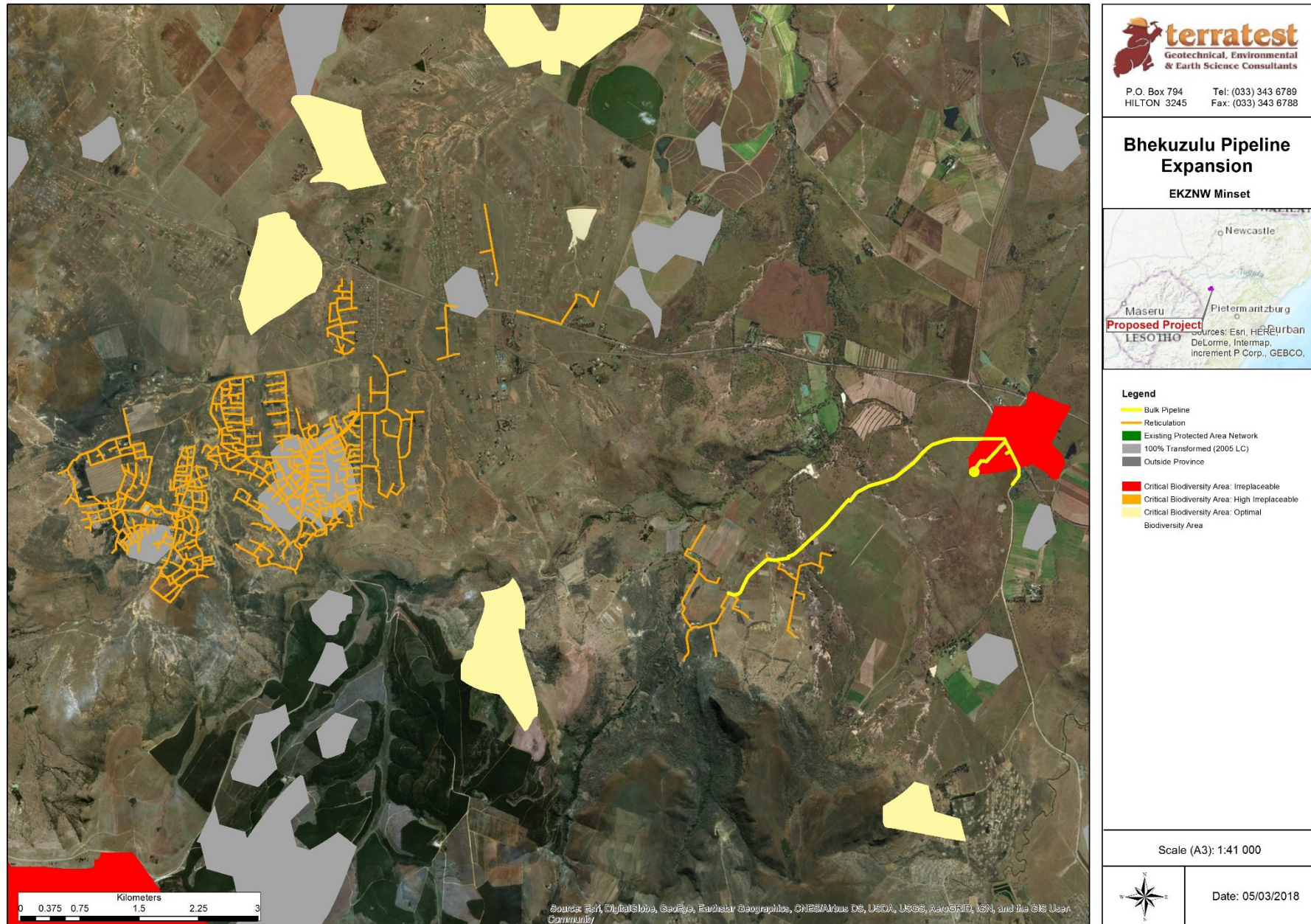


Figure 10: EKZNW MINSET (2010) designations for the greater project footprint



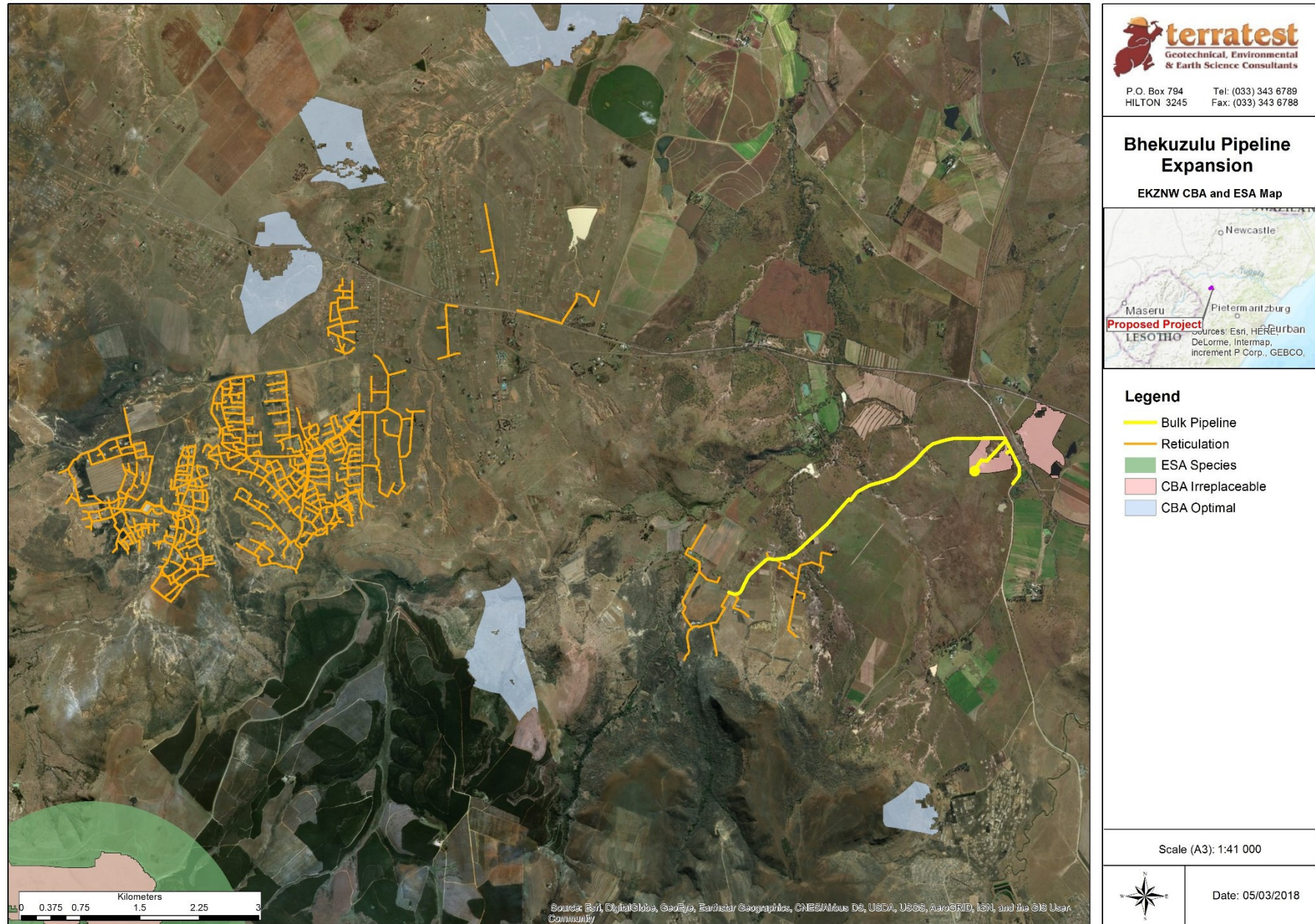


Figure 11: EKZNW CBA and ESA designation for the greater project footprint





**Figure 12:** Ezemvelo KZN Wildlife Transformation layer (2016) indicating the predominantly transformed nature of the development footprint



## **8.4 GEOLOGY**

The study area is underlain by Permian-aged rocks of the Adelaide Subgroup, Beaufort Group and Jurassic aged dolerite of the Karoo Supergroup, as well as Quaternary-aged sediments of the Masotcheni Formation. The Estcourt Formation is represented by dark-blue grey shale with subordinate siltstone and sandstone. These sedimentary rock units have been intruded by Jurassic aged dolerite dykes and sills which are preserved in the southern and western portions of the study site. Figure 13 provides an overview of the geology of the area.

## **8.5 HYDROLOGY (WATERCOURSES & WETLANDS)**

The study area is situated in the Thukela Water Management Area (WMA), Area 7 and falls within the V14C Quaternary catchment. The majority of the watercourses within Area 7 of the WMA are erosion gullies or dongas which have a seasonal water flow and have developed as a result of poor landscape management practises over a long period of time. The largest of the watercourses located within the project footprint is the Klein Bloukrans River which eventually drains into the Tugela River. The project area crosses numerous tributaries thereof.

A review of the Ezemvelo KZN Wildlife and National Freshwater Ecosystem Priority Areas (NFEPA) wetland databases show substantial wetland systems, classified as Alluvial Wetlands, in the study area (see Figure 14). A specialist Biodiversity and Wetland Assessment has been undertaken which provides further information on the hydrology of the area (see Section 9.1 and Appendix 5).

Construction of the pipelines will require the crossing of several watercourses, inclusive of drainage lines and wetlands. A wetland and watercourse specialist has identified the drainage lines and wetlands to be intercepted by the proposed alignment, see Section 9.1.

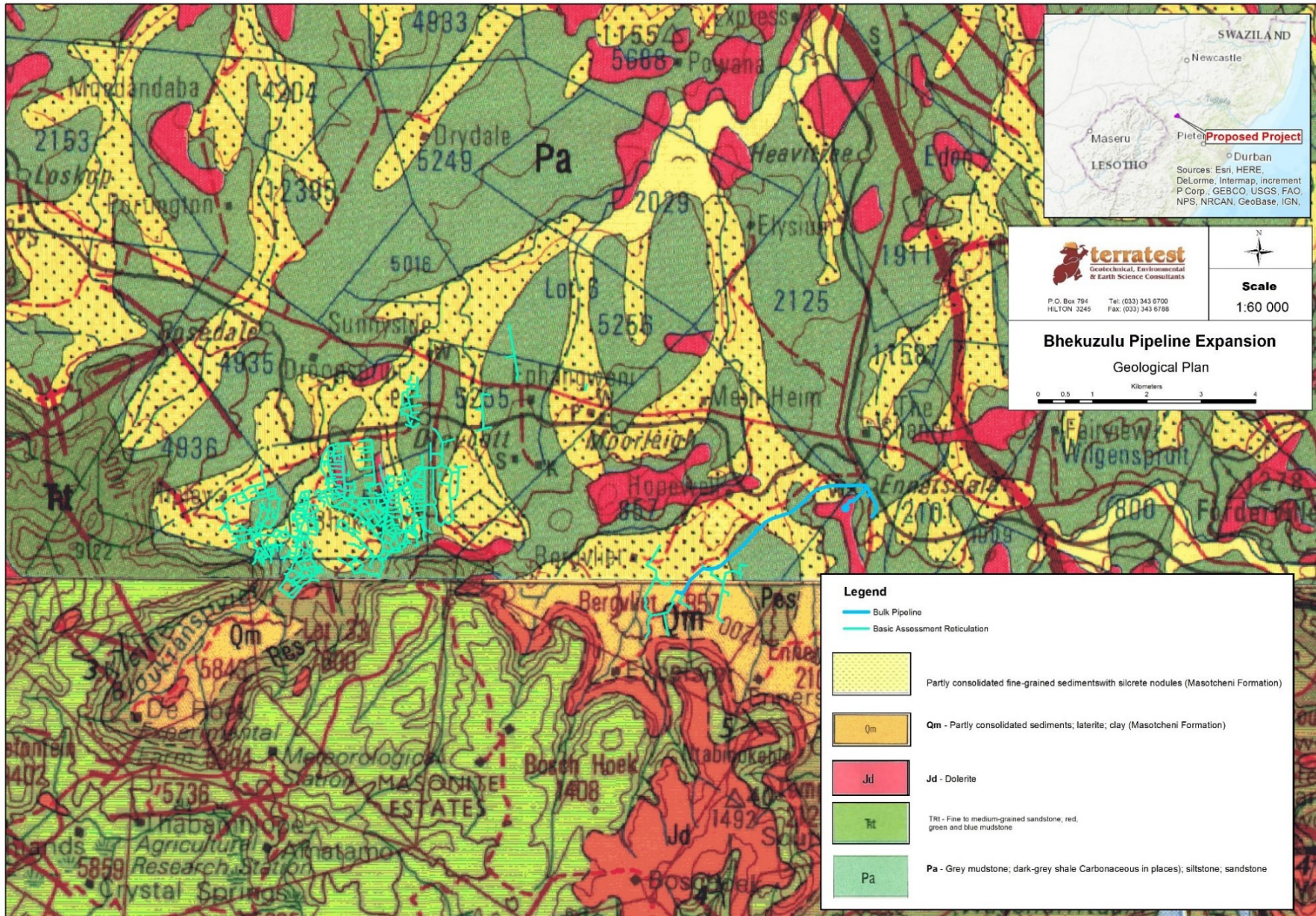


Figure 13: Geology of the general area



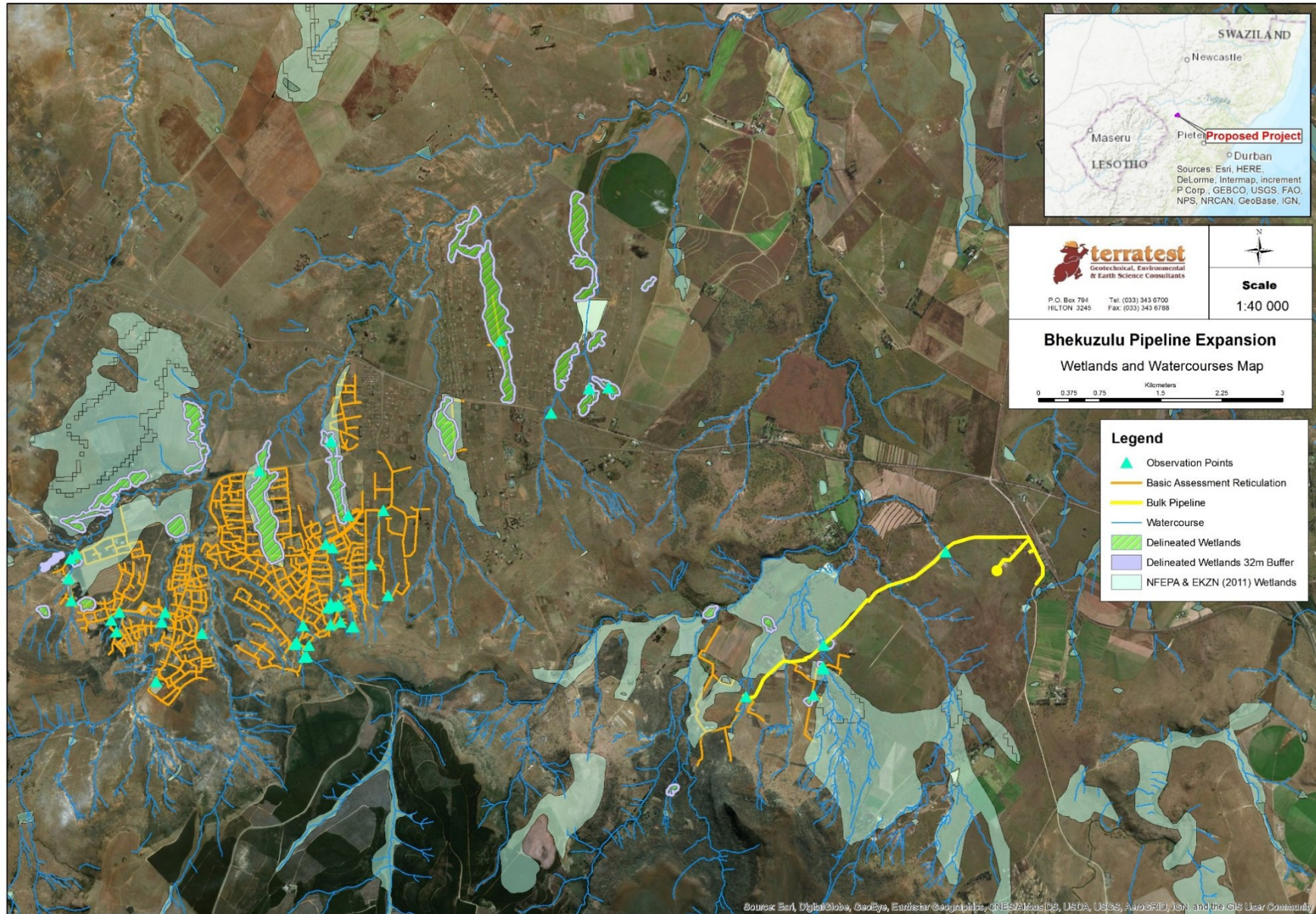


Figure 14: Wetlands and watercourses within the greater development footprint

## 8.6 CLIMATE

The area is characterised by a rainy summer season and experiences intermittent rain in winter. Much of the summer rain falls in thunderstorm events. The mean annual precipitation ranges from 650-1000mm. The annual average high in terms of temperature is 26.4°C, while the annual average low is 14.7°C.

## 8.7 CULTURAL, HISTORICAL AND ARCHAEOLOGICAL RESOURCES

A specialist Heritage Impact Assessment (HIA) was undertaken by UMLANDO: Archaeological Surveys & Heritage Management. No fatal flaws to development were identified. The HIA Report is discussed in Section 9.2 and attached as Appendix 5.

A desktop Palaeontological Assessment was undertaken by Gideon Groenewald which noted that further palaeontological studies will be required on the site during construction. The desktop Palaeontological Assessment Report is discussed in Section 9.3 and attached as Appendix 5.

Amafa aKwaZulu-Natali (Amafa), the authority responsible for KwaZulu-Natal's heritage, has been contacted regarding the proposed development and the associated HIA Report submitted to them for comment via the South African Heritage Resources Information System (SAHRIS).

## 8.8 SOCIO-ECONOMIC

The Inkosi Langalibalele Local Municipality was established via the amalgamation of Imbabazane Local Municipality and uMtshezi Local Municipality on 3 August 2016. As such, financial, employment and service delivery information is not yet available for the new municipality (Municipalities of South Africa, 2017). Historical information for the Imbabazane Local Municipality and uMtshezi Local Municipality are, however, presented in Table 5.

**Table 5:** Socio-economic information

YEAR	2016	2011
<b>Population</b>	<b>215 182</b>	<b>196 227</b>
<b>Age Structure</b>		
Population under 15	36.4%	36.2%
Population 15 to 64	59.6%	59.4%
Population over 65	4.0%	4.4%
<b>Dependency Ratio</b>		
Per 100 (15-64)	67.8	68.3
<b>Sex Ratio</b>		
Males per 100 females	89.9	87.3
<b>Population Growth</b>		
Per annum	2.10%	n/a
<b>Labour Market</b>		
Unemployment rate (official)	n/a	n/a



Youth unemployment rate (official) 15-34	n/a	n/a
<b>Education (aged 20 +)</b>		
No schooling	10.8%	16.0%
Matric	33.7%	26.3%
Higher education	7.0%	5.1%
<b>Household Dynamics</b>		
Households	46 953	41 617
Average household size	4.6	4.5
Female headed households	53.1%	51.5%
Formal dwellings	75.3%	63.3%
Housing owned	89.4%	60.4%
<b>Household Services</b>		
Flush toilet connected to sewerage	18.8%	22.5%
Weekly refuse removal	22.0%	23.7%
Piped water inside dwelling	15.5%	21.9%
Electricity for lighting	85.2%	71.1%

Of particular relevance to the proposed development is the percentage of Household Services which indicates a decline in terms of water-based services from 2011 - 2016.

## 8.9 EXISTING INFRASTRUCTURE

Various forms of infrastructure exist throughout the site and include Eskom electricity lines, road infrastructure and old disused water pipelines. It is not anticipated that this infrastructure will be negatively impacted upon as the pipe alignments will run adjacent to the road systems and will not impact upon any Eskom infrastructure. In addition, Eskom, the DoT and the uThukela District Municipality have been notified of the proposed development should any of their infrastructure exist on site but not be included within any planning documentation. Municipal planning documents and on-site infrastructure (as noted through ground truthing) has been used to determine no-go areas relating to existing infrastructure.

## 9. SPECIALIST STUDIES

### 9.1 BIODIVERSITY AND WETLAND ASSESSMENT

JG Afrika (Pty) Ltd was appointed to undertake a Biodiversity and Wetland Assessment of all wetlands and drainage lines located along the bulk and reticulation pipeline alignment, as well as to conduct an impact assessment of the proposed development on the surrounding environments. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Biodiversity and Wetland Assessment Report is attached as Appendix 5. The relevant details of the specialist who conducted the assessment are noted in Table 6.

**Table 6:** Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/s as attached in Appendix 5
Mr Jake Alletson	BSc Hons (Zoology)	Aquatic and terrestrial ecology, Environmental Impact Assessment, landscape scale, Conservation science and planning	Biodiversity and Wetland Assessment associated with the proposed fine scale reticulation pipeline routes and a length of bulk pipeline for the Bhekuzulu potable water supply scheme in KwaZulu-Natal.

### 9.1.1 Biodiversity

The natural vegetation in the area is primarily KwaZulu-Natal Highland Thornveld. However, in the built-up part of the project area where most of the pipeline will be placed, the vegetation is almost entirely eradicated as result of the past subsistence agriculture, and the presently increasing density of human settlement. No new impacts on the terrestrial vegetation are anticipated.

The fauna in the area is already greatly reduced from the natural state. Other than for livestock, no mammals were seen although droppings of rodent were noted in several places. Similarly, no reptiles were seen. A single river frog (*Amieta angolensis*) was heard calling in a small watercourse. Small passerine<sup>3</sup> birds were relatively common and no raptors were seen in the study area. This is considered uncommon as the region generally has a good population of raptors. Few invertebrates were seen.

The only species of conservation concern which were found were the Southern Bald Ibis bird (*Geronticus calvus*) which is red data listed as being regionally “Vulnerable” and the Ground Woodpecker bird (*Geocolaptes olivaceus*) which is now listed as “Least Concern” (Taylor et al, 2015). The ibis was seen at a number of sites within the project area, with the birds either being singletons or in small groups of up to six individuals. Commonly, they were feeding in grassland areas or in crop fields. The woodpecker was only seen at one site which is near a reservoir high on the slopes above the domestic pipeline network. Neither of these two species are likely to be affected by the pipelines.

#### 9.1.1.1. Impacts

- **Loss of vegetation:** The natural vegetation in the project area is already severely degraded. As such it is anticipated that the project will create few new impacts. Provided that pipeline trenches are rehabilitated and that the working area is revegetated, the greatest potential risk arises from the spread of alien weed species, with syringa (*Melia azedarach*) being the greatest threat.
- **Loss of fauna:** The fauna in the area is already greatly reduced from the natural state. Since the completed pipelines will be non-intrusive in the landscape it is not anticipated that they will create any new impacts on the fauna. The two-bird species which are of conservation concern are highly unlikely to be breeding within the footprint of the project. Disturbance to them will be restricted to the construction phase.

#### 9.1.1.2. Recommendations

- **Loss of vegetation**

<sup>3</sup> A passerine bird is a perching bird in the formal scientific order Passeriformes. These are the most familiar, typical birds and the term can be applied to more than half the world's unique bird species (<https://www.thespruce.com/passerine-385345>, Accessed 28/02/2018).

- The soil excavated from the trenches must be retained and be returned in the reverse order to which it was removed to re-establish the original soil profiles as best possible;
- A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete;
- Indigenous grass species suitable for the rehabilitation of the trenches are as follows:
  - Kweek grass (*Cynodon dactylon*): 15%
  - Love grass (*Eragrostis curvula*): 65%
  - Thatch grass (*Hyparrhenia hirta*): 20%
- The above grasses are tolerant of grazing pressure from domestic livestock. Other species which are more attractive to grazers are not recommended as they will not be able to establish. The percentage figures are the proportion of each species by mass in the seed mixture. Acceleration of grass establishment may also be done using sods collected in the areas. However, if this method is used, care must be taken that the source area is not damaged and left open to erosion; and
- Where a pipeline trench passes through sloping ground, care must be taken to ensure that the trench does not become eroded after the construction phase. Causes of erosion could be surface water flows or be some other factors such as the trench becoming a pathway for foot traffic. In either case appropriate mitigatory action must be taken and measures could include use of cross drains, stone packs and strategic planting of vegetation.

The above measures are intended to quickly cover the soil along the working area and so to prevent erosion. In time, other species will colonise from the surrounding areas possibly resulting in a slight improvement in diversity. The measures to prevent invasion of weed species, especially *Syringa*, must be adhered to, as per the EMPr (Appendix 6).

- **Loss of fauna**

- Because the fauna is already so depauperate<sup>4</sup> and as it is being impacted upon by the expansion of housing, the impacts that might arise from the installation of the pipelines are considered to be too insignificant to be meaningfully assessed. The mitigatory measures which are put forward for the vegetation and watercourses will also serve to provide habitat for fauna.

### 9.1.2 Watercourses

In total, 34 watercourse crossing points were noted throughout the project footprint, as indicated in Table 7. The health of the systems vary, but every effort has been made by the engineering design team to avoid the wetland and watercourse systems wherever possible.

**Table 7:** Watercourse crossing coordinates located within the reticulation pipeline alignment

CROSSING TYPE		POSITION	
Number	Watercourse	Latitude (S)	Longitude (E)
1	o	28°58'15.01"	29°42'59.30"
2	o	28°58'4.75"	29°43'25.31"
3	o	29°43'25.31"	29°41'45.80"

<sup>4</sup> (of a flora, fauna, or ecosystem) lacking in numbers or variety of species. (Google Dictionary, 2018).



CROSSING TYPE		POSITION	
Number	Watercourse	Latitude (S)	Longitude (E)
4	o	28°59'15.83"	29°41'38.01"
5		28°58'54.16"	29°41'43.46"
6	o	28°59'7.93"	29°41'17.34"
7	o	28°59'9.29"	29°41'20.52"
8	o	28°59'40.43"	29°41'7.35"
9	o	28°59'47.99"	29°41'3.54"
10	o	28°59'47.06"	29°41'4.38"
11		28°59'52.76"	29°41'8.97"
12	o	28°59'53.09"	29°41'7.87"
13	o	28°59'48.39"	29°41'10.01"
14	o	28°59'33.33"	29°41'18.46"
15	o	28°59'39.00"	29°41'24.29"
16	o	28°59'40.68"	29°41'30.26"
17	o	28°59'40.03"	29°41'19.86"
18	o	28°59'32.02"	29°41'23.57"
19	o	28°59'32.75"	29°41'21.89"
20		28°59'31.50"	29°41'19.73"
21	o	28°59'22.35"	29°41'27.23"
22	o	28°59'22.08	29°39'20.54"
23	o	28°59'35.55"	29°39'43.87"
24	o	28°59'38.75"	29°39'40.11"
25	o	28°59'43.29"	29°39'42.50"
26	o	28°59'31.02"	29°39'21.88"
27	o	28°59'35.53"	29°40'4.60"
28	o	28°59'39.41"	29°40'2.94"
29	o	29° 0'3.13"	29°40'0.67"
30	o	28°59'43.80"	29°40'21.34"
31	o	29° 0'7.76"	29°44'28.51"
32	o	29° 0'6.94"	29°44'59.34"
33	o	28°59'56.54"	29°45'3.84"
34	o	28°59'47.07"	29°45'3.66"

The greater number of watercourse crossings in the project area are located on dry erosion gullies (dongas). These features have developed as a result of poor landscape management practices over a long period of time. Soils in the area are typically duplex in structure and hence once the vegetation cover is lost and erosion has started, the further incision is rapid and largely irreversible other than under a regime of changed landscape activities. The sizes of the gully systems vary greatly with some being more than 100m wide while others are as small as two metres wide. The depth of the channels varies from less than one metre to more than six metres. Careful route selection has resulted in crossings of the larger systems being avoided.

Irrespective of size, the flow in the channels is commonly episodic and only happens after rainfall events. As such, they will vary from a minor trickle through to the major torrents which develop after the severe thunder storms which are relatively common during the summer months.

The watercourses which are characterised above commonly have no wetland-related (hygrophilous) vegetation associated with them. The banks are typically vertical or near-vertical and any grasses or other vegetation which may be present consists of dryland species.

A small number of watercourses were observed to have some water within the channel although the quantities were small. These systems sometimes contained growths of short sedges (*Cyperaceae*) although other hydrophilic plants such as Reeds (*Phragmites australis*), Wild Rice Grass (*Leersia hexandra*) and Knotweeds (*Panicum spp.*) were not seen anywhere other than on the margins of the few small farm dams.

Because of the overall similarity of the many watercourses in the project area, they are all clustered as being of one type and so the necessary construction and rehabilitation mitigatory measures provided below are relevant to all.

#### **9.1.2.1. Impacts**

Due to their poor ecological state, the watercourses provide relatively little habitat for aquatic biodiversity. For this reason, most impacts will be related to channel and bank stability. The risk of impacts is considerable because of the highly erodible soils evident in the area. The consequences thereof would be additional sedimentation of the system and some (limited) secondary degradation of the biodiversity.

Once the construction phase is complete and rehabilitation has been conducted, the project will leave no new cumulative impacts on the environment since it lies in an area that is already transformed and which is undergoing further changes in surface infrastructure.

#### **9.1.2.2. Recommendations**

The construction of the pipeline through, and close to the watercourses, must be done with due consideration of the stability of the banks. It is imperative that the banks be left in a stable condition at the end of the construction phase. The mitigatory measures are as follows:

- Pipeline routes through or close to watercourses must be kept to the shortest possible length;
- Bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the material concerned;
- Banks must be planted with indigenous grasses and the following mix is suggested:
  - Kweek grass (*Cynodon dactylon*): 15%
  - Love grass (*Eragrostis curvula*): 65%
  - Thatch grass (*Hyparrhenia hirta*): 20%
- The above grasses are tolerant of grazing pressure from domestic livestock. Other species which are more attractive to grazers are not recommended as they will not be able to become established. The percentage figures are the proportion of each species by mass in the seed mixture;
- The width of the working servitude within gullies must be kept to an absolute minimum and should be no wider than the tracks of the excavating machine, if one is used, and the soil stockpile. Since the substrate in the gullies is commonly alluvium, there is little need to separate topsoil and subsoil;

- Where vegetation of any sort is present in a gully it should be avoided or, at worst, be disturbed as little as possible. No indigenous trees rooted in gullies may be felled;
- Where necessary, use must be made of gabions, rock packs, or other such hard stabilising structures. However, the use of retaining walls constructed of bricks, blocks, or concrete, is not recommended as such structures are often ineffective and can accelerate erosion processes in some cases;
- The pipeline trench must be kept away from areas which are either eroding actively, or which are well into the process of stabilising themselves;
- No surplus soil or other such material may be disposed of in the watercourses; and
- Where there is a possibility of people or livestock using the pipeline trench as a means of walking into, or out of, a gully, some sort of barrier should be constructed over the trench at the edge of the gully. The barrier could consist of a pile of rocks or some other such solid structure which cannot be easily removed.

### 9.1.3 Wetlands

In total, eight wetlands will be intersected / impacted upon by the proposed pipeline footprint, as indicated in Table 8. The health and extent of the systems varies, but every effort has been made by the engineering design team to avoid the wetland and watercourse systems wherever possible.

**Table 8:** Co-ordinates of wetlands located within the pipeline alignment

CROSSING TYPE		POSITION	
Number	Wetland	Latitude (S)	Longitude (E)
1	X	28°58'5.11"	29°43'16.48"
2	X	28°58'56.35"	29°41'27.53"
2	X	28°59'40.90"S	29°41'29.40"
4	X	28°58'38.69"	29°40'47.06"
5	X	28°58'26.69"	29°41'19.46"
6	X	28°59'12.21"	29°39'23.99"
7	X	28°59'14.15"	29°39'21.48"
8	X	28°59'55.66"	29°45'3.53"

The wetlands within the water supply scheme study area generally severely degraded as result of erosion.

It is to be noted that the proposed water pipeline network includes only a limited number of sites where a wetland will be crossed from side to side. More common are points at which a pipeline spur penetrates into a wetland area in order to supply an existing home which has been built there. Whilst this situation is not desirable, it is thought that the buildings concerned are relatively new and have been built during the past two years when drought conditions may have caused the area to appear to be dry.

#### 9.1.3.1. Impacts

The wetlands within the water supply scheme study area are mostly degraded as a result of past agricultural activities which have led to loss of vegetation and subsequent erosion of the systems. It is probable that some of the large dongas in the area were initiated as wetland erosion.



Only one wetland patch has been identified as having pipelines placed within it while two others have crossings through channels at their lower ends. As the pipes will be small (50 mm to 75 mm), the trenches will be narrow and will be no more than one metre deep. The anticipated impacts relate to surface soil erosion, alteration of subsurface flows, and risk of alien weed invasion.

#### **9.1.3.2. Recommendations**

- The soil excavated from the trenches must be stockpiled with the topsoil and the subsoil being placed separately and at a point which is designated by the ECO and it outside the wetland. The soil must then be returned to the trench in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;
- In the trench, the soil must be compacted to match the porosity of the surrounds;
- The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any wetland plants which are excavated should be set aside and be kept moist until they can be returned for planting on the trench; and
- A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover over the trenches is well established and complete.

As the pipelines will either be within an existing servitude or be confined to narrow corridors within built up areas, and because virtually all the pipeline routes are within transformed areas, it was not possible to consider wetland buffers in the usual way. It is, however, recommended that the working servitudes be kept well within the planning servitude spaces.

#### **9.1.4 Conclusion and Recommendations**

The study undertaken on the biophysical environment of the proposed development on the townships of Bhekuzulu, Epangweni, and Ennersdale has not found any impacts of significance. The reasons for this are as follows:

- The project area is already highly transformed as a result of both past agricultural activities, and of the existing degree of development in the area. The transformation has resulted in either total loss or severe degradation of the vegetation, and in an associated reduction in the fauna; and
- The new water lines will largely be located adjacent to roads or within existing servitudes and so are in areas which have already been affected by the construction of the authorised Bhekuzulu Bulk Water Supply Scheme (as approved under Environmental Authorisation Reference No.: DC23/0012/2011).

Although the anticipated further impacts of the development are minimal, and no fatal flaw has been found, it is not implied that the construction of the pipelines may go ahead without appropriate caution. For this reason, a series of mitigation measures have been provided in the EMPr (Appendix 6). It is suggested that the specialist report and the EMPr are made available as a part of the construction contract documents which the contractors must agree to and sign.

Finally, it is suggested that the ECO is appointed prior to the start of construction activities, including site establishment, and that the ECO becomes thoroughly familiar with the project area and also gets to meet the community representatives in the affected areas.

## 9.2 HERITAGE IMPACT ASSESSMENT

UMLANDO: Archaeological Surveys and Heritage Management was appointed to undertake a Heritage Survey for the proposed Bhhekuzulu water reticulation system. Mitigation measures and recommendations have also been presented based on the impacts identified.

The Heritage Survey Report is attached as Appendix 5. The relevant details of the specialist who undertook the work are noted in Table 9.

**Table 9:** Details of Specialist

<b>Name of specialist</b>	<b>Education qualifications</b>	<b>Field of expertise</b>	<b>Title of specialist report/s as attached in Appendix 5</b>
Mr Gavin Anderson	M. Phil Archaeology/Social Psychology	Heritage Impact Assessment	Survey of the Proposed Bhhekuzulu, Epangweni and Ennersdale Water Supply Scheme, Estcourt, Kwazulu-Natal

A desktop survey was conducted utilising various maps and an archaeological database. The database indicates that there are archaeological sites in the general areas. The site (i.e. project footprint) includes all types of Stone Age and Iron Age sites. No systematic archaeological and heritage impact assessments have been undertaken in the study area.

During the site visit, general scatters of stone tools, as would be expected in the area, were noted. These types of sites occur across the landscape and are of low significance. The small Stone Age sites previously recorded are small open scatters that have been subsequently dispersed. These are of low significance and commonly occur on the landscape.

The Surveyor General maps reviewed indicate that the first farms in the area were proclaimed in 1852 and included Farm Boschoek and Bergvliet 857. The Farm Boschoek consisted of many small plots/stands that were surveyed in 1938. By 1942, there were several clusters of settlements in the area that have been systematically farmed for crops.

The Farm Bergvliet 857 dates back to 1868 (when first surveyed), and the original farmhouse occurs on that Surveyor General Diagram. There have been several additions to the original farmhouse and the basic structure still remains, while the rest is in ruins. In terms of the significance of the house, it would need to be assessed if affected. The pipelines do not currently affect the house directly.

### 9.2.1.1. Impacts

The small Stone Age sites scattered throughout the area are of low significance and commonly occur on the landscape. The proposed pipelines will not impact negatively upon them. In addition, the pipelines do not fall within close proximity to the Farm Bergvliet house, and as such have no impact upon it.

### 9.2.1.2. Recommendations

Mitigation for the site requires that if any middens (rubbish dumps) are exposed near the house during construction, then this needs to be reported to an HIA specialist and/or Amafa KZN.

## 9.2.1 Conclusion and Recommendations

A heritage survey was undertaken for the Bhekuzulu bulk water supply system. Archaeological sites have been recorded in the general area, however, they are open scatters of stone tools as opposed to a well-defined site. These do not require further mitigation. While there are several graves in the study area, all of these occur within the fenced off homes. They will thus not be affected by the pipeline.

### 9.3 PALAEOLOGICAL IMPACT ASSESSMENT

Gideon Groenewald was appointed to undertake a desktop survey, assessing the potential Palaeontological Impact for the proposed development of the Bhekuzulu Water Reticulation System. Mitigation measures and recommendations have been presented based on the impacts identified.

The desktop Palaeontological Assessment Survey is attached in Appendix 5. The relevant details of the specialist who undertook the work are noted in Table 10.

**Table 10:** Details of Specialist

Name of specialist	Education qualifications	Field of expertise	Title of specialist report/s as attached in Appendix 5
Mr Gideon Groenewald	PhD Geology	Biostratigraphy and Palaeontology	Desktop Palaeontological Assessment for the Proposed Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme, Imbabazane Local Municipality, Uthukela District Municipality, Kwazulu-Natal Province.

A desktop survey was conducted assessing the potential palaeontological impact of the proposed development of the Bhekuzulu, Epangweni and Ennersdale Water Supply Scheme. The proposed development occurs in an area of medium to high palaeontological sensitivity.

Based on the desktop survey undertaken, the palaeontological sensitivity of the development is related to the specific geology that underlies the development footprint. The study area is underlain by sedimentary rocks of the Permian-aged Normandien Formation, Adelaide Subgroup, Jurassic aged Dolerite and Quaternary Masotcheni Formation as well as Alluvium deposits. The proposed development site is located in a very highly sensitive palaeontological zone. All exposures or excavations might contain highly important fossil remains of Permian and Triassic age to Quaternary age, both on the middle slopes, foot slopes and along small watercourses. It is probable that Adelaide Subgroup rocks are exposed through erosion over the entire area of this development.

#### 9.3.1.1. Impacts

Due to the geology of the development footprint, and the need for extensive excavations for the pipelines, the proposed pipeline development will most likely affect the geology of the site.

#### 9.3.1.2. Recommendations

Recommendations noted in the Desktop Palaeontological Assessment Report (Appendix: 4) include:

- A Phase 1 palaeontological survey will be required prior to construction of the line.
- The EAP and ECO of the projects must be informed of the fact that highly significant fossils have been described from the Normandien Formation. The recording of fossils will contribute very significantly to our understanding of the palaeo-environments of this region.



- The developer will need to apply for a permit to damage palaeontological deposits.
- A suitably qualified Palaeontologist must be appointed to record and collect fossils according to SAHRA and AMAFA specifications as part of a Phase 1 Palaeontological Impact Assessment before and also during excavation of all the trenches, except in the few areas underlain by dolerite;
- These recommendations must form part of the EMP for the project.

### **9.3.1 Conclusion and Recommendations**

The possibility of finding significant fossils in the study area is considered to be very high. Should fossils be observed during construction, the appointed Heritage Impact Assessment consultant must be notified immediately and the fossils collected by a suitably qualified palaeontologist. A Phase 1 PIA is therefore recommended before construction starts and a Phase 2 Palaeontological Impact assessment will most probably be recommended following the initial Phase 1 assessment.

## **10. PUBLIC PARTICIPATION**

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To fulfil the necessary public participation required as part of the BA Process, the following methods of stakeholder engagement were and are in the process of being conducted by the EAP, as outlined below.

### **10.1 INTERESTED AND AFFECTED PARTIES (IAPS)**

A register of IAPs was compiled as per Section 42 of the EIA Regulations, 2014 (as amended). This included all relevant authorities, Government Departments, the Local Municipality, the District Municipality, relevant conservation bodies and non-governmental organisations (NGO's), as well as neighbouring landowners and the surrounding community. This register was regularly updated to include those IAPs responding to the newspaper advertisements, site notice boards and Notification Letters. A copy of the IAP Register is included as Appendix 7 of this report.

### **10.2 NOTIFICATION LETTER**

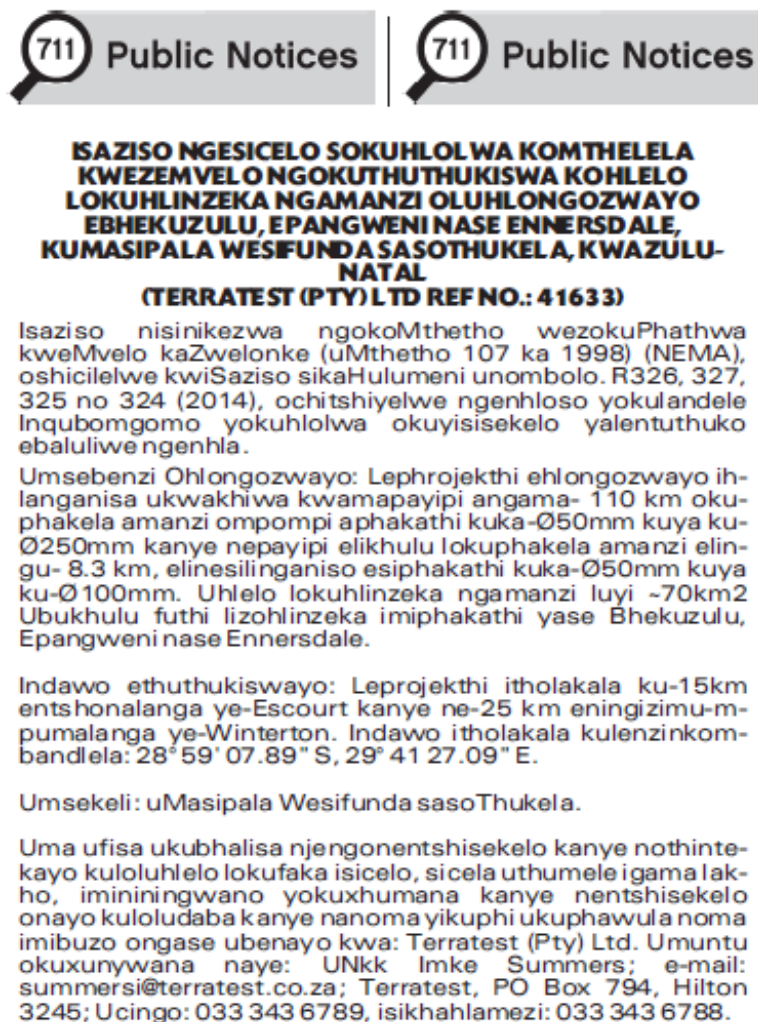
A Notification Letter was compiled in English and isiZulu and circulated to all identified IAPs by email and registered mail on 23 February 2018. The purpose of the Notification Letter was to provide preliminary information regarding the project and its location. Furthermore, the Notification Letter invited preliminary comments from IAPs and requested those notified to provide details of other potential IAPs which they may be aware of. A copy of the Notification Letter is included as Appendix 7 of this report.

### **10.3 PUBLIC MEETING**

A public meeting was not held due to limited interest in the proposed development. However, a meeting was held with the relevant ward councillors on 21 April 2017. The proposed development was discussed with the councillors and they were given the opportunity to raise any concerns associated with the development. No comments were made or concerns raised. The ward councillors were then responsible for notifying their constituents about the proposed development. A copy of the meeting register can be found in Appendix 7.

#### 10.4 NEWSPAPER ADVERTISEMENT

A newspaper advertisement (see Figure 15) was published to inform the general public of the BA Process. The advertisement was published in isiZulu on 18 October 2017 in the Isolezwe newspaper. A copy of the advertisement is included in Appendix 7 of this report.



**711 Public Notices** | **711 Public Notices**

**ISAZISO NGESICELO SOKUHLOLWA KOMTHELELA  
KWEZEMVELO NGOKUTHUTHUKISWA KOHLELO  
LOKUHLINEKA NGAMANZI OLUHLONGOZWAYO  
EBHEKUZULU, EPANGWENI NASE ENNERSDALE,  
KUMASIPALA WESIFUNDA SASOTHUKELA, KWAZULU-  
NATAL  
(TERRATEST (PTY) LTD REF NO.: 41633)**

Isaziso nisinikezwa ngokoMthetho wezokuPhathwa kweMvelo kaZwelonke (uMthetho 107 ka 1998) (NEMA), oshicilelwe kwiSaziso sikaHulumeni unombolo. R326, 327, 325 no 324 (2014), ochitshiyelwe ngenhloso yokulandele Inqubomgomo yokuhlolwa okuyisisekelo yalentuthuko ebaluliwe ngenhla.

Umsebenzi Ohlongozwayo: Lephrojekthi ehlongozwayo ihlanganisa ukwakhiwa kwamapayipi angama- 110 km okuphakela amanzi ompompi aphakathi kuka-Ø50mm kuya ku-Ø250mm kanye nepayipi elikhulu lokuphakela amanzi elingu- 8.3 km, elinesilinganiso esiphakathi kuka-Ø50mm kuya ku-Ø100mm. Uhlalo lokuhlinzeka ngamanzi luyi -70km<sup>2</sup> Ubukhulu futhi lizohlinzeka imiphakathi yase Bhhekuzulu, Epangweni nase Ennersdale.

Indawo ethuthukiswayo: Leprojekthi itholakala ku-15km entshonalanga ye-Escourt kanye ne-25 km eningizimu-mpumalanga ye-Winterton. Indawo itholakala kulenzinkombandlela: 28° 59' 07.89" S, 29° 41' 27.09" E.

Umsekelo: uMasipala Wesifunda sasoThukela.

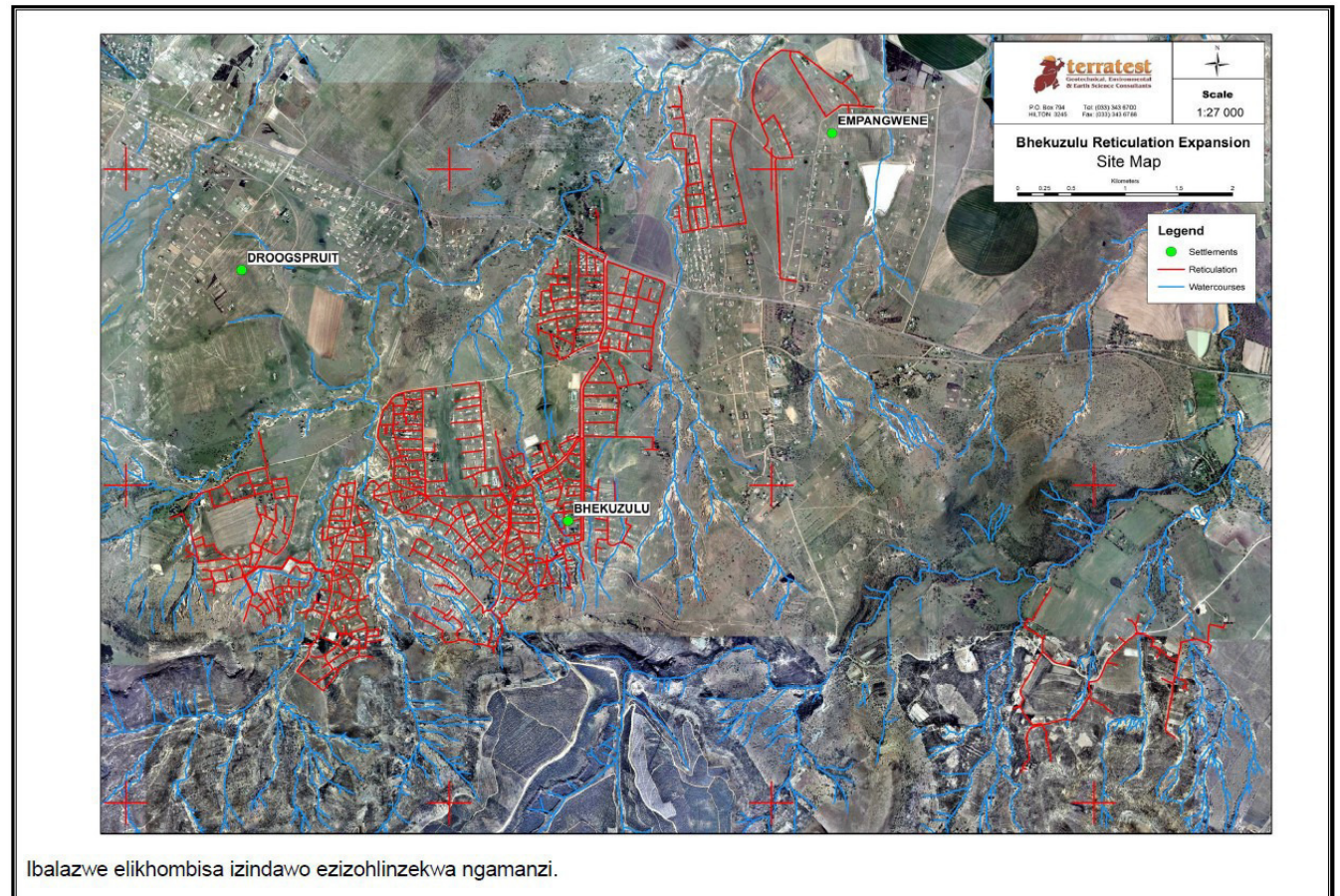
Uma ufisa ukubhalisa njengonentshisekelo kanye nothintekayo kuloluhlelo lokufaka isicelo, sicela uthumele igama lakho, imininingwano yokuxhumana kanye nentshisekelo onayo kuloludaba kanye nanoma yikuphi ukuphawula noma imibuzo ongase ubenayo kwa: Terratest (Pty) Ltd. Umuntu okuxurywana naye: UNkk Imke Summers; e-mail: summersi@terratest.co.za; Terratest, PO Box 794, Hilton 3245; Ucingo: 033 343 6789, isikhahlamezi: 033 343 6788.

**Figure 15:** A copy of the newspaper advert placed in the Isolezwe on 18 October 2017

#### 10.5 SITE NOTICE BOARDS

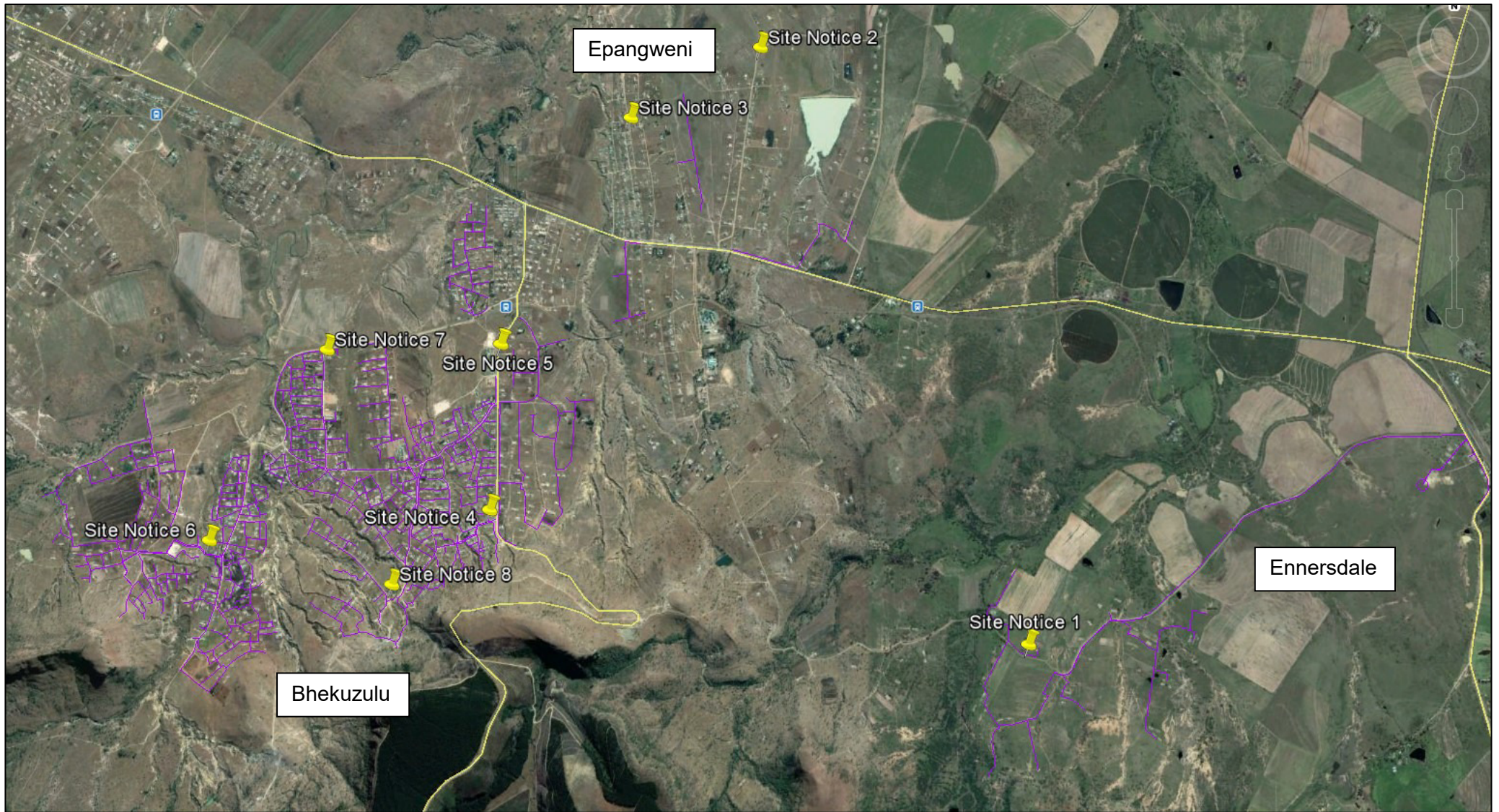
The purpose of the site notices was to inform neighbours and community members of the proposed BA Application. The details of the EAP were also provided should any member of the public require additional information, or wish to register as an IAP in the Application. Eight (8) site notice boards were placed within the development footprint on 23 May 2017. The notice boards were written in English and isiZulu. Figure 16 provides a copy of the relevant site notices, while Figure 17 provides an illustration of the location of the site notices on site. Plates 6 -13 provide proof of notices on site.

<p style="text-align: center; background-color: red; color: white; font-weight: bold; padding: 5px;">NOTICE OF BASIC ASSESSMENT PROCESS (BAR) FOR THE BHEKUZULU COMMUNITY WATER SUPPLY SCHEME EXPANSION, UTHUKELA DISTRICT MUNICIPALITY, KWAZULU-NATAL.</p> <p style="text-align: center; background-color: red; color: white; font-weight: bold; padding: 5px;">EDTEA REFERENCES: Pending</p> <p>Notice is hereby given in terms of the amended Environmental Impact Assessment (EIA) Regulations (2014) as promulgated under the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), contained in Government Notices (GN) R326, 327, 325 and 324 (as amended, 2017). In terms of NEMA, activities listed under GN R327 (Activities 12, 19) are triggered which therefore require Environmental Authorisation from the Department of Economic Development, Tourism and Environmental Affairs.</p> <p><b>LOCATION:</b> The site is located in the greater Bhokuzulu and Empangweni area. The proposed development occurs 15km-20km west of Estcourt, on either side of the P10-1. The centre co-ordinates for the proposed project are listed in the table below. Please refer to map.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1.</td><td>28° 59' 34.50" S</td><td>29° 40' 10.94" E</td></tr> <tr><td>2.</td><td>28° 59' 11.68" S</td><td>29° 41' 11.29" E</td></tr> <tr><td>3.</td><td>28° 58' 11.08" S</td><td>29° 41' 39.49" E</td></tr> <tr><td>4.</td><td>28° 57' 30.82" S</td><td>29° 42' 14.03" E</td></tr> <tr><td>5.</td><td>29° 00' 04.33" S</td><td>29° 44' 34.12" E</td></tr> </table> <p><b>PROPOSED ACTIVITY:</b> The proposed development entails the construction of approximately 150km of pipeline reticulation, with a pipe diameter of less than 0.36m. The proposed activity encompasses the construction of standpipes and Erf connections within numerous watercourse crossings and within 500m of wetlands.</p> <p><b>APPLICANT:</b> uThukela District Municipality</p> <p><b>OPPORTUNITY TO PARTICIPATE:</b> In order to ensure that you are identified as an interested and/ or affected party please submit your name, email address, and other contact information and interest in the matter, in writing, to the contact person given below.</p>	1.	28° 59' 34.50" S	29° 40' 10.94" E	2.	28° 59' 11.68" S	29° 41' 11.29" E	3.	28° 58' 11.08" S	29° 41' 39.49" E	4.	28° 57' 30.82" S	29° 42' 14.03" E	5.	29° 00' 04.33" S	29° 44' 34.12" E	<p style="text-align: center; background-color: red; color: white; font-weight: bold; padding: 5px;">ISAZISO NGENQUBO EYISEKELO YOKUHLOLA EZEMVELO NGOKWANDISWA KOHLELO LOMPHAKATHI WASE BHEKUZULU LOKUHLINZEKA AMANZI, KUMASIPALA WOMKHANDLU UTHUKELA, KWAZULU-NATAL.</p> <p style="text-align: center; background-color: red; color: white; font-weight: bold; padding: 5px;">EDTEA REFERENCES: Isalindiwe</p> <p>Lesi yisaziso ngokwemibandela ebukeziwe yokuHlola Komthelela kwezeMvelo (EIA) Umthethonqubo (2014) Omenyezelve ngaphansi koMthetho Wokuphathwa Kwezemvelo KuZwelonke, 1998 (uMthetho onguNombolo 107 ka-1998) (NEMA), oqokethwe kwizaziso zikaHulumeni (GN) R326, 327, 325 kanye 324 (ebukeziwe, 2017). Ngokwe NEMA, imisebenzi eshicilelwe ngaphansi kuka-GN R327 (Imisebenzi 12, 19) iyathinteka edingA iGunya Ngokwemvelo kuMnyango wezokuThuthukiswa koMnotho, Ukuvakasha kanye Nezemvelo ngaphambi kokuqala kwakhiwe.</p> <p><b>INDAWO:</b> Indawo itholakala eBhekuzulu nase Empangweni. Ukuthuthukiswa kwenzeka phakathi kuka 15km-20km kwintshonalanga yase Estcourt kwingxenye zombili zomgwaqo u P10-1. Umsebenzi utholakala kulezixhumanisi ezishicilelwe ngenzansi.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1.</td><td>28° 59' 34.50" S</td><td>29° 40' 10.94" E</td></tr> <tr><td>2.</td><td>28° 59' 11.68" S</td><td>29° 41' 11.29" E</td></tr> <tr><td>3.</td><td>28° 58' 11.08" S</td><td>29° 41' 39.49" E</td></tr> <tr><td>4.</td><td>28° 57' 30.82" S</td><td>29° 42' 14.03" E</td></tr> <tr><td>5.</td><td>29° 00' 04.33" S</td><td>29° 44' 34.12" E</td></tr> </table> <p><b>UMSEBENZI OHLONGOZWAYO:</b> Umsebenzi ohlongozwayo ubandakanya ukwakhiwa kweyipayi lamanzi eliyisilinganiso esingama khilomitha esiyikhulu namashumi amahlanu (150km) elinobunzani obungaphansi kuka 0.36m. Umsebenzi ohlongozwayo uzohambisana nokwakhiwa kompomi kanye namapayipi akwazi ukuthumela amanzi kuma meter box okuzokwenzeka phakathi kwezindawo ezingana zokwela umfula naphakathi kwamamitha angamakhulu ezindawo ezingamachibi.</p> <p><b>OFAKE ISICELO:</b> uMasipala woMkhandlu uThukela.</p> <p><b>ITHUBA LOKUBAMBA IQHAZA:</b> Ukuze uqinisekise ukuthi ubaliwe njengo nentshisekelo okanye/noma othintekayo sicela uthumele igama lakho, ikheli le-email kanye neminye imininwano otholakala kuyo kanye nentshisekelo yakho kuloludaba, ngokubhalela umeluleki onikeziwe ngenzansi.</p>	1.	28° 59' 34.50" S	29° 40' 10.94" E	2.	28° 59' 11.68" S	29° 41' 11.29" E	3.	28° 58' 11.08" S	29° 41' 39.49" E	4.	28° 57' 30.82" S	29° 42' 14.03" E	5.	29° 00' 04.33" S	29° 44' 34.12" E
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 <p><b>Environmental Consultant:</b> Terratest (Pty) Ltd  <b>Contact Person:</b> Ms Imke Summers  <b>Tel:</b> (033) 343 6700  <b>Fax:</b> (033) 343 6701  <b>Email:</b> <a href="mailto:summersi@terratest.co.za">summersi@terratest.co.za</a></p>	 <p><b>Umeluleki Wezemvelo</b> Terratest (Pty) Ltd  <b>Okuxhunyanwa naye:</b> Unkosazane Imke Summers  <b>Tel:</b> (033) 343 6700  <b>Fax:</b> (033) 343 6701  <b>Email:</b> <a href="mailto:summersi@terratest.co.za">summersi@terratest.co.za</a></p>																														



**Figure 16:** A copy of the site notice (containing English and isiZulu text) placed throughout the proposed development footprint.





**Figure 17:** The location of the site notices within the greater Bhekuzulu, Epangweni and Ennersdale communities





Plate 6: Site Notice 1 placed within Ennersdale



Plate 7: Site Notice 2 placed within Epangweni



Plate 8: Site Notice 3 placed within Epangweni



Plate 9: Site Notice 4 placed at Bhekuzulu



Plate 10: Site Notice 5 placed at Bhekuzulu



Plate 11: Site Notice 6 placed at Bhekuzulu



Plate 12: Site Notice 7 placed at Bhekuzulu

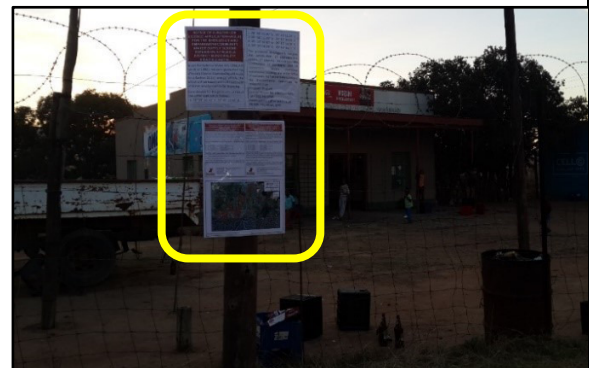


Plate 13: Site Notice 8 placed at Bhekuzulu

## 10.6 COMMENTS RECEIVED

No formal comment has been received to-date, nor has any IAP asked to be registered in the Application. Any comments received during the Public Participation Process will be consolidated and responded to in the Final BA Report to be submitted to EDTEA for review and decision making.

## 10.7 CIRCULATION OF DRAFT BASIC ASSESSMENT REPORT FOR COMMENT

Digital and / or hard copies of the Draft BA Report will be circulated to the following Key Stakeholders and IAPs for review and comment:

- EDTEA, uThukela District: Ms A. Khulu;
- Ezemvelo KZN Wildlife: Mr A. Blackmore;
- uKhahlamba Drakensberg Park, Senior Conservation Manager Central region: Mr / Ms M. Myeza;
- Department of Water and Sanitation: Ms N. Makwabasa / Mr S. Govender;
- Inkosi Langalibalele Municipality: Mr P. Mkhize;
- uThukela District Municipality: Ms P. Lite;
- Amafa Heritage: SAHRIS;
- DAEA: Macro Planning Directorate: Mr Z Dlamini;
- Department of Agriculture, Forestry and Fisheries: Mr R. Baca;
- Department of Cooperative Governance and Traditional Affairs: Mr M. de Lange; and
- Department of Transport: Ms J. Reddy / Ms M. Schmid.

All registered IAPs were notified of the availability of the Draft BA Report and the deadline for comments, being on, or before 14 April 2018. A complete copy of the report has also been uploaded onto the Terratest (Pty) Ltd website ([www.terratest.co.za](http://www.terratest.co.za)) for public review. Hard copies of the report were placed in the Tatzela Secondary School, AmaHlubi Secondary School and Geza Primary School, as per recommendation from the ward councillors. Stakeholders and IAP's have been notified of the availability of the report.

Further, it is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, including the EDTEA, must submit comments within 30 days to the EAP as per the request of the EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

## 11. IMPACT ASSESSMENT AND MITIGATION MEASURES

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### 11.1 IMPACT ASSESSMENT METHODOLOGY

The EIA Regulations (2014, as amended), prescribe requirements to be adhered to and objectives to be reached when undertaking Impact Assessments. These are noted in the following sections contained within the EIA Regulations (2014, as amended):

- Regulation 326, Appendix 1, Section 2 and Section 3 – Basic Assessment Impact Requirements; and
- Regulation 326, Appendix 2 and Appendix 3 – Environmental Impact Assessment Requirements.

In terms of these Regulations, the following should be considered when undertaking an Impact Assessment:

- A description and assessment of the significance of any environmental impact including:
  - Cumulative impacts that may occur as a result of the undertaking of the activity during the project life cycle;
  - Nature of the impact;
  - Extent and duration of the impact;
  - The probability of the impact occurring;
  - The degree to which the impact can be reversed;
  - The degree to which the impact may cause irreplaceable loss of resources; and
  - The degree to which the impact can be mitigated.

The overall significance of an impact / effect has been ascertained by attributing numerical ratings to each identified impact. The numerical scores obtained for each identified impact have been multiplied by the probability of the impact occurring before and after mitigation. High values suggest that a predicted impact / effect is more significant, whilst low values suggest that a predicted impact / effect is less significant.

The interpretation of the overall significance of impacts is presented in Table 11.

**Table 11:** Interpretation of the significance scoring of a negative impact / effect<sup>5</sup>

Scoring value	Significance
<b>&gt;35</b>	<b>High - The impact is total / consuming / eliminating</b> - In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural and economic activities of communities are disrupted to such an extent that these come to a halt. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
<b>25 - 35</b>	<b>High - The impact is profound</b> - In the case of adverse impacts, there are few opportunities for mitigation that could offset the impact, or mitigation has a limited effect on the impact. Social, cultural and economic activities of communities are disrupted to such an extent that their operation is severely impeded. Mitigation may not be possible / practical. <u>Consider a potential fatal flaw in the project.</u>
<b>20 – 25</b>	<b>Medium - The impact is considerable / substantial</b> - The impact is of great importance. Failure to mitigate with the objective of reducing the impact to acceptable levels could render the entire project option or entire project proposal unacceptable. <u>Mitigation is therefore essential.</u>
<b>7 – 20</b>	<b>Medium - The impact is material / important to investigate</b> - The impact is of importance and is therefore considered to have a substantial impact. <u>Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.</u>
<b>4 – 7</b>	<b>Low - The impact is marginal / slight / minor</b> - The impact is of little importance, but may require limited mitigation; or it may be rendered acceptable in light of proposed mitigation.

<sup>5</sup> Source: adapted from Glasson J, Therivel R & Chadwick A. Introduction to Environmental Impact Assessment, 2<sup>nd</sup> Edition. 1999. pp 258. Spoon Press, United Kingdom.



Scoring value	Significance
0 – 4	<b>Low - The impact is unimportant / inconsequential / indiscernible</b> – no mitigation required, or it may be rendered acceptable in light of proposed mitigation.

The significance rating of each identified impact / effect was further reviewed by the Environmental Assessment Practitioner (EAP) by applying professional judgement.

For the purpose of this assessment, the impact significance for each identified impact was evaluated according to the following key criteria outlined in the sub-sections below.

### NATURE OF IMPACT

The environmental impacts of a project are those resultant changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. It is an appraisal of the type of effect the activity would have on the affected environmental parameter. Its description includes what is being affected, and how.

### SPATIAL EXTENT

This addresses the physical and spatial scale of the impact. A series of standard terms and ratings used in this assessment relating to the spatial extent of an impact / effect are outlined in Table 12.

Table 12: **Rating scale for the assessment of the spatial extent of a predicted effect / impact**

RATING	SPATIAL DESCRIPTOR
7	<b>International</b> - The impacted area extends beyond national boundaries.
6	<b>National</b> - The impacted area extends beyond provincial boundaries.
5	<b>Ecosystem</b> - The impact could affect areas essentially linked to the site in terms of significantly impacting ecosystem functioning.
4	<b>Regional</b> - The impact could affect the site including the neighbouring areas, transport routes and surrounding towns etc.
3	<b>Landscape</b> - The impact could affect all areas generally visible to the naked eye, as well as those areas essentially linked to the site in terms of ecosystem functioning.
2	<b>Local</b> - The impacted area extends slightly further than the actual physical disturbance footprint and could affect the whole, or a measurable portion of adjacent areas.
1	<b>Site Related</b> - The impacted area extends only as far as the activity e.g. the footprint; the loss is considered inconsequential in terms of the spatial context of the relevant environmental or social aspect.

### SEVERITY / INTENSITY / MAGNITUDE

This provides a qualitative assessment of the severity of a predicted impact / effect. A series of standard terms and ratings used in this assessment which relate to the magnitude of an impact / effect are outlined in Table 13.



**Table 13:** Rating scale for the assessment of the severity / magnitude of a predicted effect / impact

RATING	MAGNITUDE DESCRIPTOR
7	<b>Total / consuming / eliminating</b> - Function or process of the affected environment is altered to the extent that it is permanently changed.
6	<b>Profound / considerable / substantial</b> - Function or process of the affected environment is altered to the extent where it is permanently modified to a sub-optimal state.
5	<b>Material / important</b> - The affected environment is altered, but function and process continue, albeit in a modified way.
4	<b>Discernible / noticeable</b> - Function or process of the affected environment is altered to the extent where it is temporarily altered, be it in a positive or negative manner.
3	<b>Marginal / slight / minor</b> - The affected environment is altered, but natural function and process continue.
2	<b>Unimportant / inconsequential / indiscernible</b> - The impact temporarily alters the affected environment in such a way that the natural processes or functions are negligibly affected.
1	<b>No effect / not applicable</b>

## DURATION

This describes the predicted lifetime / temporal scale of the predicted impact. A series of standard terms and ratings used in this assessment are included in Table 14.

**Table 14:** Rating scale for the assessment of the temporal scale of a predicted effect / impact

RATING	TEMPORAL DESCRIPTOR
7	<b>Long term</b> – Permanent or more than 15 years post decommissioning. The impact remains beyond decommissioning and cannot be negated.
3	<b>Medium term</b> – Lifespan of the project. Reversible between 5 to 15 years post decommissioning.
1	<b>Short term</b> – Quickly reversible. Less than the project lifespan. The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the project phases or within 0 -5 years.

## IRREPLACEABLE LOSS OF RESOURCES

Environmental resources cannot always be replaced; once destroyed, some may be lost forever. It may be possible to replace, compensate for or reconstruct a lost resource in some cases, but substitutions are rarely ideal. The loss of a resource may become more serious later, and the assessment must take this into account. A series of standard terms and ratings used in this assessment are included in Table 15.

**Table 15:** Rating scale for the assessment of loss of resources due to a predicted effect / impact

RATING	RESOURCE LOSS DESCRIPTOR
7	<b>Permanent</b> – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>or by artificial means.</u>

<b>5</b>	<b>Long term</b> – The loss of a non-renewable / threatened resource which cannot be renewed / recovered with, or through, natural process in a time span of over 15 years, <u>but can be mitigated by other means.</u>
<b>4</b>	<b>Loss of an ‘at risk’ resource</b> - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria, but cumulative effects may render such loss as significant.
<b>3</b>	<b>Medium term</b> – The resource can be recovered within the lifespan of the project. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span between 5 and 15 years.
<b>2</b>	<b>Loss of an ‘expendable’ resource</b> - one that is not deemed critical for biodiversity targets, planning goals, community welfare, agricultural production, or other criteria.
<b>1</b>	<b>Short-term</b> – Quickly recoverable. Less than the project lifespan. The resource can be renewed / recovered with mitigation or will be mitigated through natural process in a span shorter than any of the project phases, or in a time span of 0 to 5 years.

### REVERSIBILITY / POTENTIAL FOR REHABILITATION

The distinction between reversible and irreversible impacts is a very important one and the irreversible impacts not susceptible to mitigation can constitute significant impacts in an EIA (Glasson et al, 1999). The potential for rehabilitation is the major determinant factor when considering the temporal scale of most predicted impacts. A series of standard terms and ratings used in this assessment are included in Table 16.

**Table 16:** Rating scale for the assessment of reversibility of a predicted effect / impact

RATING	REVERSIBILITY DESCRIPTOR
<b>7</b>	<b>Long term</b> – The impact / effect will never be returned to its benchmark state.
<b>3</b>	<b>Medium term</b> – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than the lifetime of the project, or in a time span between 5 and 15 years.
<b>1</b>	<b>Short term</b> – The impact / effect will be returned to its benchmark state through mitigation or natural processes in a span shorter than any of the phases of the project, or in a time span of 0 to 5 years.

### PROBABILITY

The assessment of the probability / likelihood of an impact / effect has been undertaken in accordance with ratings and descriptors provided in Table 17.

**Table 17:** Rating scale for the assessment of the probability of a predicted effect / impact

RATING	PROBABILITY DESCRIPTOR
<b>1.0</b>	Absolute certainty / will occur
<b>0.9</b>	Near certainty / very high probability
<b>0.7 – 0.8</b>	High probability / to be expected
<b>0.4 - 0.6</b>	Medium probability / strongly anticipated
<b>0.3</b>	Low probability / anticipated

<b>0.2</b>	Possibility
<b>0.0 - 0.1</b>	Remote possibility / unlikely

## 11.2 MITIGATION

In terms of the assessment process, the potential to mitigate the negative impacts is determined and rated for each identified impact and mitigation objectives that would result in a measurable reduction, or enhancement of the impact, are taken into account. The significance of environmental impacts has therefore been assessed taking into account any proposed mitigation measures. The significance of the impact “without mitigation” is therefore the prime determinant of the nature and degree of mitigation required.

## 12. IMPACTS IDENTIFIED

The preferred site alternative is the establishment of a water supply scheme, including bulk and reticulation pipelines, to service the Bhekuzulu, Epangweni and Ennersdale communities. The site is considered favourable given that it will service communities in need; will predominantly fall adjacent to the road network and within an area of disturbance and will provide job opportunities and upskilling for community members. Based on the characterisation of the site, the specialist studies conducted and construction works that will be required to implement the development, the following potential impacts to the receiving environment have been identified:

- Impacts to soils during construction;
- Impacts to surrounding vegetation during construction;
- Impacts to local fauna during construction;
- Air quality deterioration and an increase in noise pollution as a result of construction activities;
- An increase in construction traffic as a result of construction activities;
- The impact of construction waste as a result of construction activities;
- Positive socio-economic impacts;
- Potential to disturb existing infrastructure during construction;
- Safety and security impacts associated with construction activities;
- Watercourse and wetland disturbance as a result of construction activities; and
- Potential disturbance to items of heritage and palaeontological significance during construction.

The impacts identified for the proposed activity and the associated mitigation measures which directly and indirectly relate to the Listed Activities being applied for, are provided in Table 18.



**Table 18:** Construction phase impacts identified and associated mitigation measures

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
Soil	<ul style="list-style-type: none"> <li>• Construction related activity such as digging of trenches for laying of pipeline can affect the soil stability causing soil erosion;</li> <li>• Insufficient stormwater management can lead to erosion, destabilisation of banks and sedimentation of the watercourses; and</li> <li>• Loss of excavated soils due to incorrect management measures.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper and timely back filling of the excavated trenches; reuse of the excavated earth and proper disposal of surplus excavated soil will be implemented;</li> <li>• The soil excavated from the trenches must be retained and be returned in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;</li> <li>• Excavated trenches must be refilled immediately after laying of pipes;</li> <li>• In the trench the soil must be compacted to match the porosity of the surrounds;</li> <li>• Soil erosion prevention measures should be implemented such as gabions, sand bags etc. whilst energy dissipaters should be constructed at any surface water outflow points. The site will be monitored weekly for any signs of off-site siltation and erosion. All areas impacted by earth-moving activities will be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding. All exposed earth will be rehabilitated promptly with suitable vegetation to stabilize the soil;</li> <li>• Where a pipeline trench passes through sloping ground, care must be taken to ensure that the trench does not become eroded after the construction phase. Appropriate mitigatory action must be taken and measures could include use of cross drains, stone packs, and strategic planting of vegetation;</li> <li>• Exposed soils are to be quickly vegetated so as to prevent erosion and the establishment of alien plants; and</li> <li>• No surplus soil or other such material may be disposed of in the watercourses / wetlands.</li> </ul>
Wetlands and watercourses	<ul style="list-style-type: none"> <li>• Due to the highly erodible soils the risk of impacts is considerable and the consequences would be additional sedimentation of the system and some (limited) secondary degradation of the biodiversity;</li> <li>• Change in the sub-surface movement / percolation of water in the wetlands can lead to the formation of preferential flow channels which can eventually emerge as surface channels and set off further erosion;</li> <li>• Damage to wetland plants, where present;</li> <li>• Bank erosion could rapidly lead to enlargement of the gullies; and</li> <li>• Large quantities of sediment could be mobilised and gully enlargement could lead to loss of terrestrial vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>• The correct replacement of the soil layers must be done. This is of key importance in wetland crossings. At such sites the compaction of the soil must also be done correctly;</li> <li>• The watercourses must be left in a stable condition post-construction. This is to be determined by the ECO in conjunction with the Engineer. If necessary, a specialist is to be called to site to confirm whether watercourse rehabilitation measures are significant;</li> <li>• The construction of the pipeline through, and close to the watercourses must be done with due consideration of the stability of the banks. It is imperative that the banks be left in a stable condition at the end of the construction phase. This will be based on the gradient of the banks, the revegetation that has taken place and the amount of stabilised material on the banks;</li> <li>• Pipeline routes through or close to watercourses must be kept to the shortest possible length;</li> <li>• Bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the material concerned;</li> <li>• Banks must be planted with indigenous grasses;</li> <li>• The width of the working servitude within gullies must be kept to an absolute minimum and should be no wider than the tracks of the excavating machine, if one is used. Since the</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<p>substrate in the gullies is commonly alluvium, there is little need to separate topsoil and subsoil;</p> <ul style="list-style-type: none"> <li>• Where vegetation of any sort is present in a gully it should be avoided or, at worst, be disturbed as little as possible. No indigenous trees rooted in gullies may be felled;</li> <li>• Where necessary use must be made of gabions, rock packs, or other such hard-stabilising structures. However, the use of retaining walls constructed of bricks, blocks, or concrete, is not recommended as such structures are often ineffective and can accelerate erosion processes in some cases;</li> <li>• The pipeline trench must be kept away from areas which are either eroding actively, or which are well into the process of stabilising themselves;</li> <li>• Where there is a possibility of people or livestock using the pipeline trench as a means of walking into, or out of, a gully, some sort of diversionary barrier should be constructed over the trench at the edge of the gully. The barrier could consist of a pile of rocks or some other such solid structure which cannot be easily removed;</li> <li>• Should the stockpiling of soils be required, the topsoil and the subsoil must be placed separately and at a point which is designated by the ECO, outside the wetland. The soil must then be returned to the trench in the reverse order to which it was removed so as to re-establish the original soil profiles as best possible;</li> <li>• In the trench the soil must be compacted to match the porosity of the surrounds;</li> <li>• The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any wetland plants which are excavated should be set aside and be kept moist until they can be returned for planting on the trench;</li> <li>• A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover over the trenches is well established and complete; and</li> <li>• As the pipelines will either be within an existing servitude or be confined to narrow corridors within built up areas, and because virtually all of the pipeline routes are within transformed areas, it was not possible to consider wetland buffers in the usual way. It is however, recommended that the working servitudes be kept well within the planning servitude spaces (i.e. 3m).</li> </ul>
Flora and fauna	<ul style="list-style-type: none"> <li>• There will be no major disturbance of vegetation and no cutting of trees in the project area. Some ground vegetation has to be cleared for construction of the pipeline;</li> <li>• Some of the topsoil and vegetation may be lost during pipelaying works; and</li> <li>• Disturbance of the site may lead to encroachment of alien plant species on-site and to the surrounding areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Minimization of vegetation clearing and careful cutting of ground vegetation will be done.</li> <li>• Alien plant encroachment must be monitored and prevented as outlined in the EMP (Appendix 6);</li> <li>• A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the trenches is well established and complete;</li> <li>• Indigenous grass species suitable for the rehabilitation of the trenches as noted in the Biodiversity Report (Appendix 5) is to be implemented;</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds; and</li> <li>Contact with fauna, particularly the Southern Bald Ibis and Ground Woodpecker is to be avoided at all costs.</li> </ul>
Air quality and noise pollution	<ul style="list-style-type: none"> <li>Potential dust generation from soil stripping, excavations, vehicle traffic on the access roads and motor vehicle fumes will have an impact on air quality;</li> <li>Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; and</li> <li>Dust and noise will be created during the construction phase, which may impact on the local community.</li> </ul>	<ul style="list-style-type: none"> <li>All construction machinery and equipment must be regularly serviced and maintained to keep noise, dust and possible leaks to a minimum, as per the requirements of the EMPr Appendix 6);</li> <li>Road dampening should be undertaken to prevent excess dust during construction;</li> <li>Operational Hours: No works shall be executed between sunset and sunrise and on the non-working and special non-working days as stated in the Contract Data unless otherwise agreed between the Engineer and Contractor;</li> <li>Construction personnel should be made aware of the need to prevent unnecessary noise such as hooting and shouting; and</li> <li>Burning of waste will be prohibited.</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Increase in construction vehicles in the area;</li> <li>Possible lane closures, traffic delays and congestion during the construction phase;</li> <li>Slow-moving construction vehicles on the surrounding roads may cause accidents; and</li> <li>If not properly maintained, increased road use to existing surrounding road infrastructure, for access purposes by construction personnel, may cause damage to the existing infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity;</li> <li>Construction worker's / construction vehicles must take heed of normal road safety regulations; thus all personnel must obey and respect the law of the road. A courteous and respectful driving manner should be enforced and maintained so as not to cause harm to any individual; and</li> <li>Any damage to surrounding roads should be repaired as soon as possible to prevent further deterioration to the road network.</li> </ul>
Waste	<ul style="list-style-type: none"> <li>There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil spills, litter from personnel on-site, sewage from ablutions etc.); and</li> <li>Waste generation could be created by the following: <ul style="list-style-type: none"> <li>Solid waste - plastics, metal, wood, concrete, stone, asphalt;</li> <li>Chemical waste- petrochemicals, resins and paints; and</li> <li>Sewage as may be generated by employees.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported;</li> <li>All solid wastes should be disposed of at a registered landfill site and records maintained to confirm safe disposal;</li> <li>Adequate scavenger-proof refuse disposal containers should be supplied to control solid waste on-site;</li> <li>It should be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction;</li> <li>Chemical waste should be stored in appropriate containers and disposed of at a licensed disposal facility;</li> <li>Portable sanitation facilities must be erected for construction personnel. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities must also be monitored and serviced regularly so as to prevent contamination of the watercourses;</li> </ul>



CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>The construction site must be inspected for litter on a daily basis. Extra care must be taken on windy days. Precautions must be taken to avoid litter from entering the watercourses;</li> <li>Soil that is contaminated with, e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site and is NOT to be deposited into the watercourses;</li> <li>It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100m of a wetland or within the 1:100 year floodline; and</li> <li>Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality etc.) and must be remediated as per the EMPr (Appendix 6).</li> </ul>
Socio-Economic	<ul style="list-style-type: none"> <li>Creation of job opportunities for skilled personnel (e.g. engineers, specialists etc.) and non-skilled personnel (e.g. labourers);</li> <li>Skills development of the local community through employment opportunities;</li> <li>Social anxiety may arise should the surrounding community not be adequately notified of the proposed activity;</li> <li>Possible economic benefits to local suppliers of building materials as goods and services may be purchased from these entities during the construction phase; and</li> <li>Hazardous disposal of solids waste and improper sanitary conditions generated by construction workers may cause pollution of the surrounding environment and affect the health of local people.</li> </ul>	<ul style="list-style-type: none"> <li>Inform the surrounding communities and general public of the proposed activity as soon as possible. This will serve to ease potential social anxiety;</li> <li>Local people should be employed where possible;</li> <li>A Community Liaison Officer could assist in raising any concerns / complaints noted by the affected community to the contractor;</li> <li>Safe disposal of waste will be undertaken and unwanted littering and discharge of waste will be prohibited;</li> <li>Contractor shall instruct all workers to act in a responsible manner within the working premises; and</li> <li>Skips in the working areas will be provided to collect waste and then finally disposed to an approved landfill site.</li> </ul>
Existing infrastructure disturbance	<ul style="list-style-type: none"> <li>If not properly designed, existing powerlines and telephone lines could be damaged during construction activities; and</li> <li>Disruption / damage to existing pipelines.</li> </ul>	<ul style="list-style-type: none"> <li>Notify appropriate stakeholders as soon as possible, e.g. Eskom;</li> <li>No-go areas must be demarcated prior to construction commencing; and</li> <li>Cognisance must be taken of existing pipelines at all times in order to prevent water disruptions and damage.</li> </ul>
Safety and security	<ul style="list-style-type: none"> <li>There is potential for construction labour to trespass onto neighbouring properties; and</li> <li>Construction personnel / construction vehicles – movement of construction personnel and vehicles may pose a potential health and safety risk to road users and local residents.</li> </ul>	<ul style="list-style-type: none"> <li>A site health and safety plan will be prepared encouraging the use of safety measure and personnel protective equipment (PPE);</li> <li>A first aid box will be kept at a proper and easily accessible place;</li> <li>The general public will be prohibited from all construction sites; and</li> <li>Any construction personnel found to be trespassing must be subjected to a disciplinary hearing.</li> </ul>
Water Resources	<ul style="list-style-type: none"> <li>Impacts on surface and ground water quality will result as result of the following:</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate stormwater / surface water management measures must be put in place before construction commences and maintained;</li> </ul>

CONSTRUCTION RELATED IMPACTS		
IMPACT	DESCRIPTION	MITIGATION
	<ul style="list-style-type: none"> <li>- Contamination of ground and surface water and soil;</li> <li>- Accidental spillages of petrochemicals from vehicles and equipment, or concrete;</li> <li>- The additional hardened surfaces created during construction will increase the amount of stormwater runoff, which has the potential to cause erosion and create turbidity;</li> <li>- Poorly managed construction sediments waste and hazardous waste will be detrimental;</li> <li>- Poor sanitation practices of construction workers; and</li> <li>• Polluted water bodies will be detrimental to aquatic life as well as to the health of people relying mainly on the river and streams as sources of water for drinking and other domestic uses.</li> </ul>	<ul style="list-style-type: none"> <li>• An appropriate number of toilets (1 toilet for every 20 workers) must be provided for labourers during the construction phase. These must be maintained in a satisfactory condition and a minimum of 100m away from any water resources and outside of the 1:100 year floodline;</li> <li>• Any contaminated water associated with construction activities must be contained in separate areas or receptacles such as Jo-Jo tanks or water-proof drums, and must not be allowed to enter into the watercourses;</li> <li>• Soil erosion prevention measures must be implemented such as gabions, sand bags etc. whilst energy dissipaters must be constructed at any surface water outflow points. The site should be monitored by the Contractor weekly for any signs of off-site siltation. All areas impacted by earth-moving activities must be re-shaped post-construction to ensure natural flow of runoff and to prevent ponding;</li> <li>• Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering surrounding watercourses;</li> <li>• Should any excavations require dewatering, this is to occur through an adequately designed silt trap prior to discharge. All silt traps are to be regularly monitored and maintained to ensure efficient and effective use;</li> <li>• Watercourse bank slopes must be planted with indigenous grasses;</li> <li>• No surplus soil or other such material may be disposed of in the channels; and</li> <li>• Wetlands: <ul style="list-style-type: none"> <li>- The soil excavated from the trenches must be retained with the topsoil and the subsoil being stockpiled separately. They must then be returned to the trench in the reverse order to which they were removed so as to re-establish the original soil profiles as best possible;</li> <li>- Compaction of the soils to match the porosity of the surrounds must be undertaken;</li> <li>- The trenches must be rehabilitated with a vegetation cover which matches that of the surrounds. It is recommended that any wetland plants which are excavated should be set aside and be kept moist until they can be returned for use on the trench; and</li> <li>- A rigorous programme of alien weed control must be implemented and sustained until the vegetation cover over the trenches is well established and complete.</li> </ul> </li> </ul>
Heritage & Palaeontology	<ul style="list-style-type: none"> <li>• Potential disruption to items of heritage and palaeontological significance.</li> </ul>	<ul style="list-style-type: none"> <li>• A Phase 1 palaeontological survey will be required prior to construction of the line. Further palaeontological work may be required during the construction phase. The developer will need to apply for a permit to damage palaeontological deposits;</li> <li>• A suitably qualified Palaeontologist must be appointed to record and collect fossils according to SAHRA and AMAFA specifications as part of a Phase 1 Palaeontological Impact Assessment before and also during excavation of all the trenches, except in the few areas underlain by dolerite;</li> </ul>

**CONSTRUCTION RELATED IMPACTS**

IMPACT	DESCRIPTION	MITIGATION
		<ul style="list-style-type: none"> <li>• The EAP and ECO of the projects must be informed of the fact that highly significant fossils have been described from the Normandien Formation; and</li> <li>• If any middens (rubbish dumps) are exposed near the house during construction, then this needs to be reported to an HIA person and/or Amafa KZN.</li> </ul>

### 13. IMPACT ASSESSMENT

**Table 19:** Impact assessment findings in relation to the proposed construction activities

	Nature of project impact	Spatial extent		Severity / intensity / magnitude		Duration		Resource loss	Reversibility		Probability		Significance without mitigation	Significance with mitigation
		Without	With	Without	With	Without	With		Without	With	Without	With		
Construction Impacts	Soil impacts	4	2	4	2	3	1	7	7	1	1	0.3	25	3.9
	Flora and fauna impacts	2	1	4	3	3	1	2	3	1	0.7	0.3	9.8	2.4
	Air quality and noise pollution impacts	2	1	3	1	1	1	1	1	1	0.7	0.2	5.6	1
	Traffic impacts	4	2	3	2	1	1	1	1	1	0.4	0.3	4	2.1
	Waste impacts	3	1	4	1	3	1	3	3	1	0.9	0.3	14.4	2.1
	Socio-economic impacts	2	2	2	2	1	1	1	1	1	0.6	0.3	4.2	2.1
	Existing infrastructure disturbance	4	1	5	1	1	1	1	1	1	0.6	0.1	7.2	0.5
	Safety and security impacts	2	1	3	2	3	1	1	3	1	0.4	0.2	4.8	1.2
	Wetland and watercourse impacts	5	3	5	4	3	1	7	4	3	1	0.4	24	7.2
	Heritage impacts	1	1	4	1	7	1	7	7	1	0.6	0.1	15.6	1.1
<b>Overall impact significance</b>												<b>11.46</b>	<b>2.36</b>	
												<b>MEDIUM</b>	<b>LOW</b>	



### 13.1 SIGNIFICANCE

Based on the outcome of the significance scoring noted in Table 19, the overall significance impact without mitigation, is considered to be MEDIUM, with a score of 11.46 with mitigation, the overall significance impact is considered to be LOW, with a score of 2.36.

The greatest impact of significance is considered to be the potential for soil impacts, whilst wetland and watercourse impacts are rated as the second highest possible impact. However, with the correct mitigation measures employed as noted in Table 18 and as per the EMPr (Appendix 6), these impacts can be significantly reduced. As such, the Preferred Site Alternative and the Preferred Technology Alternative should be adopted.

## 14. ENVIRONMENTAL IMPACT STATEMENT

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Based on the assessment undertaken, the following conclusions are made:

- In terms of the proposed development, wherever possible, reticulation and bulk lines will be installed adjacent to existing roads located within Bhekuzulu, Epangweni & Ennersdale or within the existing bulk pipeline footprint. Therefore, an area of disturbance already exists;
- The Biodiversity and Wetland Assessment, extensive groundwork, and engineering design requirements were all used to determine the preferred and only pipeline route alignment. Therefore, there is no other layout alternative for the proposed pipeline network; and
- The preferred technology alternative is the use of a UPVC pipeline in the proposed Bhekuzulu, Epangweni & Ennersdale Water Supply Scheme as it is the only feasible alternative which meets the need and desirability of the application.

Assuming all phases of the project adhere to the conditions stated in the EMPr (Appendix 6) it is believed that the impacts associated with the proposed development will have limited to no significant, adverse, long term environmental impact on the surrounding environment.

Positive impacts associated with construction include:

- Provision of adequate, safe, reliable and sustainable water service to a minimum of RDP Standards resulting in an improved quality of life to the current population of ±13 000 people;
- Promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts;
- Skills development and knowledge transfer in the Bhekuzulu, Epangweni & Ennersdale communities through job creation during the construction phase;
- Local economic growth and development (e.g. small-scale agriculture and industries);
- Compliance with Goal 4 of the KZN Provincial Growth and Development Plan;
- Education of the receiving community in term of the importance of water conservation through:
  - Promoting water use efficiency; and
  - Relaying the importance of protecting water resources and the associated supply system.

It is perceived that these positive impacts will be long term and have sustainable benefits.

It must be ensured that the construction phase, in no way, hampers the health of any of the ecological systems or items of heritage significance identified on site, and that post-construction rehabilitation leaves the surrounding environments in an as good, if not better, state.

After the construction phase of the project, the contractors must ensure that all hazardous materials are removed from the site and that rehabilitation of land / wetlands / watercourses is undertaken according to the requirements of the EMPr (Appendix 6), as well as the recommendations put forward by the Biodiversity and Watercourse Specialist (Appendix 5).

The alien plant management programmes that are implemented during the construction phase must be maintained during the construction defects liability period. It is important that drainage lines, wetlands and the working strip are monitored for alien plant infestation.

## **15. RECOMMENDATIONS OF THE EAP**

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The proposed development should not result in impacts on the natural or social environment that are detrimental, nor result in undue risks to the natural environment. The nature and types of negative impacts do not outweigh the potential benefits of this project, provided that the short term localised impacts of the construction phase are adequately mitigated. In this regard, an EMPr has been compiled and is attached to this report (see Appendix 6). It is recommended that external monthly EMPr monitoring takes place by an independent Environmental Control Officer (ECO) to ensure that the requirements of the EMPr are being correctly implemented, thus ensuring the protection of the surrounding environs during construction.

It is the recommendation of the EAP that the following management and mitigation measures be incorporated into any project approvals which may be issued:

- A rigorous programme of alien weed control must be implemented and sustained until the vegetation (grass) cover over the pipeline trenches is well established and complete;
- The recommendations of the Biodiversity and Wetland Assessment Report must be adhered to (Appendix 5). This is to include the following:
  - It is suggested that the post construction monitoring visits should be done in September, November, and March in the 12 months following completion of the project. Note, this schedule can be applied in completed areas even while construction is still under way elsewhere. Use should be made of fixed point photos and each site inspection must be followed up with a written report. These reports will be submitted to the Resident Engineer for distribution.
  - If any monitoring event, at any time of the project period, does find a fault or problem, then the issue must be investigated further and be reported on. Remedial action as is appropriate must be undertaken within a time frame specified by the ECO.
- The recommendations of the Heritage Impact Assessment and the Palaeontological Assessment must be adhered to (Appendix 5);
- Should fossils be observed during construction, the appointed Heritage Impact Assessment consultant must be notified immediately and the fossils collected by a suitably qualified palaeontologist.

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## **16. CONSTRUCTION TIMEFRAMES**

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It is requested that the Environmental Authorisation, if issued by the Competent Authority, be valid for a period of five (5) years from date of signature in order to account for any unforeseen construction plan deviations.

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## **17. SUBMISSION AND CONSIDERATION OF DOCUMENTATION BY THE COMPETENT AUTHORITY**

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It is to be noted that in terms of the EIA Regulations (2014), GNR 326 43(2) as amended, all State Departments that administer a law relating to a matter affecting the environment, specific to the Application, must submit comments within 30 days to the EAP, as per the request of the EAP. Should no comment be received within the 30-day commenting period, it will be assumed that the relevant State Department has no comment to provide.

All comments received in response to the BA Report will be attached to, summarised and responded to in a final version of the BA Report (i.e. Final BA Report), which will be submitted to the Competent Authority, (i.e. EDTEA) for consideration in terms of issuing an Environmental Authorisation.

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## **18. UNDERTAKING**

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Terratest (Pty) Ltd hereby confirms that the information provided in this report is correct at the time of compilation.

Terratest (Pty) Ltd further confirms that all comments received from Stakeholders and IAPs will be included in the Final BA Report submitted to the EDTEA. Further, a record has to-date and will continue to be kept of all comments, which will be consolidated and incorporated into all subsequent reports, either submitted for comment to IAPs, or to the EDTEA for consideration and decision-making.

**For Terratest (Pty) Ltd:**

**IMKE SUMMERS**

**SENIOR ENVIRONMENTAL CONSULTANT**

## 19. REFERENCES

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