



**ENVIRONMENTAL MANAGEMENT PROGRAMME
PROPOSED GUNJANA COMMUNITY WATER SUPPLY
SCHEME: PHASE 2, MSINGA LOCAL MUNICIPALITY,
UMZINYATHI DISTRICT MUNICIPALITY, KWAZULU-
NATAL**

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Prepared by:

TERRATEST (PTY) LTD

PO Box 794
Hilton, 3245

Telephone: (033) 343 6789

Contact: Ms L. Dralle

Email: drallel@terratest.co.za



VERIFICATION PAGE

TITLE: Environmental Management Programme

PROPOSED GUNJANA COMMUNITY WATER SUPPLY SCHEME: PHASE 2, MSINGA LOCAL MUNICIPALITY, UMZINYATHI DISTRICT MUNICIPALITY, KWAZULU-NATAL

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<p>CARRIED OUT BY: Terratest (Pty) Ltd Pietermaritzburg</p> <p>PO Box 794 Hilton 3245</p> <p>Tel: (033) 343 6789 Email: drallel@terratest.co.za</p>	<p>COMMISSIONED BY: uMzinyathi District Municipality</p> <p>PO Box 1965 Dundee 3000</p> <p>Tel: (034) 219 1500 Email: lethuxolo@umzinyathi.gov.za</p>
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AUTHORS: L. Dralle	CLIENT CONTACT PERSON: Mr L. Mthembu
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SYNOPSIS:
Environmental Management Programme for the proposed Gunjana Community Water Supply Scheme.

KEY WORDS:
Gunjana Water Pipeline, Basic Assessment, Environmental Management Programme, EIA Regulations (2014, as amended), GNR 326.

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QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2015 which has been independently certified by DEKRA Certification under certificate number 90906882.



VERIFICATION	CAPACITY	NAME	SIGNATURE	DATE
By Author	Snr Environmental Scientist	L. Dralle		12/03/2021
Checked by	Environmental Scientist	R. Patak		12/03/2021
Authorised by	Director	J. Norris		12/03/2021

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TABLE OF CONTENTS

1. INTRODUCTION	1
2. ENVIRONMENTAL ASSESSMENT PRACTITIONER	2
3. ACTIVITY INFORMATION	2
3.1 Watercourses	4
3.2 Items of heritage & palaeontological significance	7
3.3 NO-GO CONSTRUCTION AREAS	10
3.4 APPLICABILITY OF EIA REGULATIONS (2014, AS AMENDED)	12
4. IMPACT MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES	13
5. MONITORING	27
5.1 METHOD AND FREQUENCY OF MONITORING	27
5.2 ROLES AND RESPONSIBILITIES	27
5.2.1 EDTEA	27
5.2.2 APPLICANT: UMZINYATHI DISTRICT MUNICIPALITY	27
5.2.3 ENVIRONMENTAL CONTROL OFFICER.....	27
5.2.4 ENVIRONMENTAL MANAGER	27
5.2.5 CONTRACTOR.....	27
5.2.6 ORGANISATIONAL STRUCTURE.....	28
5.3 METHOD STATEMENTS	28
5.3.1 REQUIRED METHOD STATEMENTS (MS)	29
6. NON-COMPLIANCES	29
6.1 INDICATIVE LIST OF TRANSGRESSIONS	30
6.2 ENVIRONMENTAL AWARENESS TRAINING	30

TABLES

TABLE 1: Details of EAP	2
TABLE 2: Watercourse crossing coordinates	4
TABLE 3: Identified heritage features	7
TABLE 4: Pre-construction management objectives, actions and outcomes	13
TABLE 5: Construction and rehabilitation management objectives, actions and outcomes	16

FIGURES

FIGURE 1: Locality Map	3
FIGURE 2: Watercourse crossings	6
FIGURE 3: No-go areas map showing graves with 20m buffer and 40m working corridor	11
FIGURE 4: Organisational structure	28

APPENDICES

APPENDIX 1: CURRICULUM VITAE	31
APPENDIX 2: ALIEN PLANT CONTROL	32
APPENDIX 3: EMPr ACKNOWLEDGEMENT FORM	33

ENVIRONMENTAL MANAGEMENT PROGRAMME:

PROPOSED GUNJANA COMMUNITY WATER SUPPLY SCHEME: PHASE 2, MSINGA LOCAL MUNICIPALITY, UMZINYATHI DISTRICT MUNICIPALITY, KWAZULU-NATAL

1. INTRODUCTION

Terratest (Pty) Ltd has been appointed by JG Afrika (Pty) Ltd, on behalf the Umzinyathi District Municipality, to undertake the environmental services required for the proposed Gunjana Community Water Supply Scheme: Phase 2, Umzinyathi District Municipality, KwaZulu-Natal. The project involves supplying water to the community of Gunjana via communal standpipes.

This EMPr has been compiled in accordance to Government Notice (GNR) 326, Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended). In this regard, the EMPr provides mitigation measures for impacts identified in the Basic Assessment (BA) Report by defining the relevant objectives, outcomes and actions.

In accordance with the Integrated Environmental Management Guidelines published by the Department of Environmental Affairs & Tourism (DEAT) in 1992, the purpose of an EMPr is *“to describe how negative environmental impacts will be managed, rehabilitated or monitored and how positive impacts will be maximised”*.

Section 28 of NEMA (National Environmental Management Act, Act 107 of 1998) which pertains to *“Duty of care and remediation of Environmental Damage”* states that: *“(1) Every person who causes, has caused or may cause significant pollution or degradation of the environment, must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot be reasonably avoided or stopped, to minimise and rectify such pollution or degradation of the environment.”*

This EMPr must therefore form an integral part of the contract documents between the uMzinyathi District Municipality and the appointed contractor during the construction phase of the project. This document outlines the methodology and duties required, such that construction can be achieved in an environmentally sustainable manner; with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. Such mitigation measures will have a financial impact on the projects costings.

This EMPr is a dynamic document that may need to evolve during its implementation period, such that it recognises any new issues that may arise; or changes in the parameters of identified issues which can be addressed with required / amended mitigation.

The uMzinyathi District Municipality and its contractors are formally notified and are therefore required to take cognisance of the following principles throughout construction:

THE POLLUTER-PAYS PRINCIPLE

This principle provides for *“the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment.”* The Polluter Pays Principle must be rigorously applied throughout the construction phase of this project.

PROGRESSIVE REHABILITATION

Progressive rehabilitation must be undertaken throughout the construction phase of the project where areas have been impacted. Rehabilitation should commence as soon as construction is completed in the specific area and not at the end of the entire project.

2. ENVIRONMENTAL ASSESSMENT PRACTITIONER

The EMPr was prepared by Terratest (Pty) Ltd. The details of the representative Environmental Assessment Practitioner (EAP) who prepared the report is detailed in Table 1. Further, the Curriculum Vitae of the detailed EAP is provided in Appendix 1.

TABLE 1: Details of EAP

COMPANY NAME: TERRATEST (PTY) LTD			
EAP	Qualifications & professional affiliations	Experience at environmental assessments	Contact details
Ms L. Dralle Environmental Scientist	BSc. Hons Environmental Management; EAPASA; IAIAAsa	13 years	Terratest (Pty) Ltd Tel: (033) 343 6700 Email: drallel@terratest.co.za

3. ACTIVITY INFORMATION

The proposed activity is located within Wards 1, 2 and 3 of the Msinga Local Municipality, located approximately 19k north of Tugela Ferry (see Figure 1: Locality Map).

The project involves supplying water to the community of Gunjana via communal standpipes and includes the following components:

- Drilling and equipping of two boreholes;
- Construction of two reservoirs (50 KI and 350 KI);
- 8.5km of 110mm diameter steel bulk rising main with a flow rate of approximately 5.5 l/s;
- 38km of uPVC and HDPE reticulation network with diameters ranging from 50mm to 200mm;
- Standpipes;
- Break pressure tanks;
- Air, scour and isolating valves; and
- Road and donga crossings.

A 40m wide corridor of assessment has been implemented for the entire alignment, both bulk rising main and reticulation, to allow for unforeseen construction deviations if required. The construction corridor is limited to 10m wide in which all machinery and topsoil stockpiles are to be located in during construction activities. This must be implemented for both the bulk rising main and the reticulation pipelines.

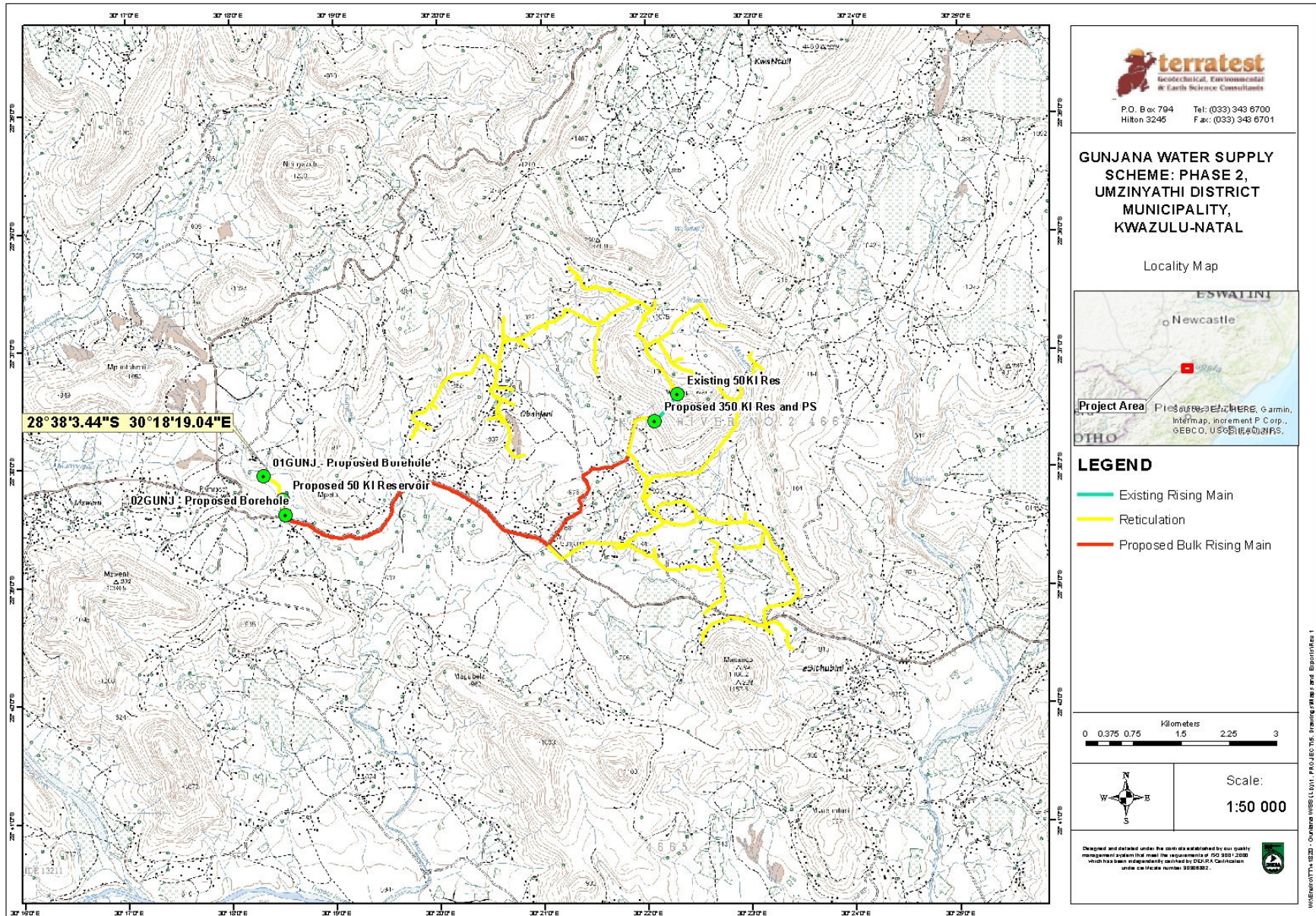


FIGURE 1: Locality Map

3.1 Watercourses

Construction will necessitate the crossing of several watercourses¹, inclusive of drainage lines on site. The specific co-ordinates of these watercourse crossings are detailed in Table 2.

TABLE 2: Watercourse crossing coordinates

CROSSING TYPE		POSITION		SPECIALIST
Site no.	Seasonality	Latitude (S)	Longitude (E)	Comment
1	Perennial	28°38'03.44"S	30°18'19.04"E	Borehole in the regulated area of the Ndlozane River
2	Non perennial	28°38'24.87"S	30°18'32.82"E	
3	Perennial	28°38'27.60"S	30°18'44.22"E	Ndlozane River
4	Perennial	28°38'22.23"S	30°19'32.52"E	Within the regulated area of the Gunjan River
5	Non perennial	28°38'18.06"S	30°19'32.30"E	
6	Perennial	28°38'13.02"S	30°19'35.74"E	Gunjane River and Regulated Area
7	Non perennial	28°38'18.36"S	30°20'22.83"E	
8	Non perennial	28°38'30.72"S	30°20'37.86"E	
9	Non perennial	28°38'38.13"S	30°21'02.04"E	
10	Perennial	28°37'57.11"S	30°21'45.37"E	Mkhamo River
11	Non perennial	28°37'34.77"S	30°21'55.94"E	Within a Regulated Area
12	Non perennial	28°36'28.92"S	30°21'40.34"E	
13	Non perennial	28°36'27.33"S	30°21'32.11"E	
14	Non perennial	28°36'23.40"S	30°21'22.29"E	
15	Perennial	28°36'48.38"S	30°21'32.11"E	
16	Non perennial	28°37'00.08"S	30°21'31.22"E	
17	Non perennial	28°36'42.60"S	30°21'24.04"E	
18	Non perennial	28°36'40.67"S	30°21'19.83"E	
19	Non perennial	28°36'42.64"S	30°21'03.48"E	
20	Perennial	28°36'52.58"S	30°20'53.02"E	Mkhamo River
21	Non perennial	28°37'00.25"S	30°20'24.47"E	
22	Non perennial	28°37'32.72"S	30°20'39.33"E	
23	Non perennial	28°37'53.80"S	30°20'46.08"E	
24	Non perennial	28°36'52.92"S	30°22'11.28"E	
25	Perennial	28°36'40.41"S	30°22'25.66"E	Mkhamo River
26	Perennial	28°37'11.29"S	30°22'57.99"E	Mkhamo River
27	Non perennial	28°37'08.96"S	30°23'05.51"E	
28	Non perennial	28°37'47.69"S	30°22'43.12"E	
29	Non perennial	28°37'58.75"S	30°22'34.55"E	
30	Perennial	28°38'25.00"S	30°22'33.73"E	Mkhamo River
31	Non perennial	28°38'28.59"S	30°22'48.22"E	2 Crossings
32	Non perennial	28°38'32.87"S	30°23'09.57"E	2 Crossings
33	Non perennial	28°39'02.81"S	30°23'27.21"E	
34a	Non perennial	28°39'31.26"S	30°23'21.71"E	

¹ As per GNR 326 of the EIA Regulations (2014, as amended) a watercourse is defined as "(a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, pan, lake or dam into which, or from which, water flows; and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998)".

CROSSING TYPE		POSITION		SPECIALIST
Site no.	Seasonality	Latitude (S)	Longitude (E)	Comment
34b	Non perennial	28°39'27.95"S	30°23'19.93"E	
35	Non perennial	28°39'20.50"S	30°23'03.85"E	
36	Non perennial	28°38'33.60"S	30°21'55.11"E	
37	Non perennial	28°38'40.47"S	30°21'52.01"E	
38	Perennial	28°38'48.07"S	30°22'13.40"E	Mkhamo River
39	Non perennial	28°38'42.42"S	30°22'38.40"E	
40	Non perennial	28°38'59.93"S	30°22'42.43"E	
41	Non perennial	28°39'13.31"S	30°22'34.39"E	
42	Non perennial	28°38'46.60"S	30°22'10.20"E	
43	Non perennial	28°38'44.76"S	30°21'13.42"E	
44	Non perennial	28°38'38.47"S	30°21'29.68"E	

Figure 2 provides a map of the watercourse crossing points. Specific construction methodologies will be required to cross any watercourse. Please refer to Tables 4 and 5.

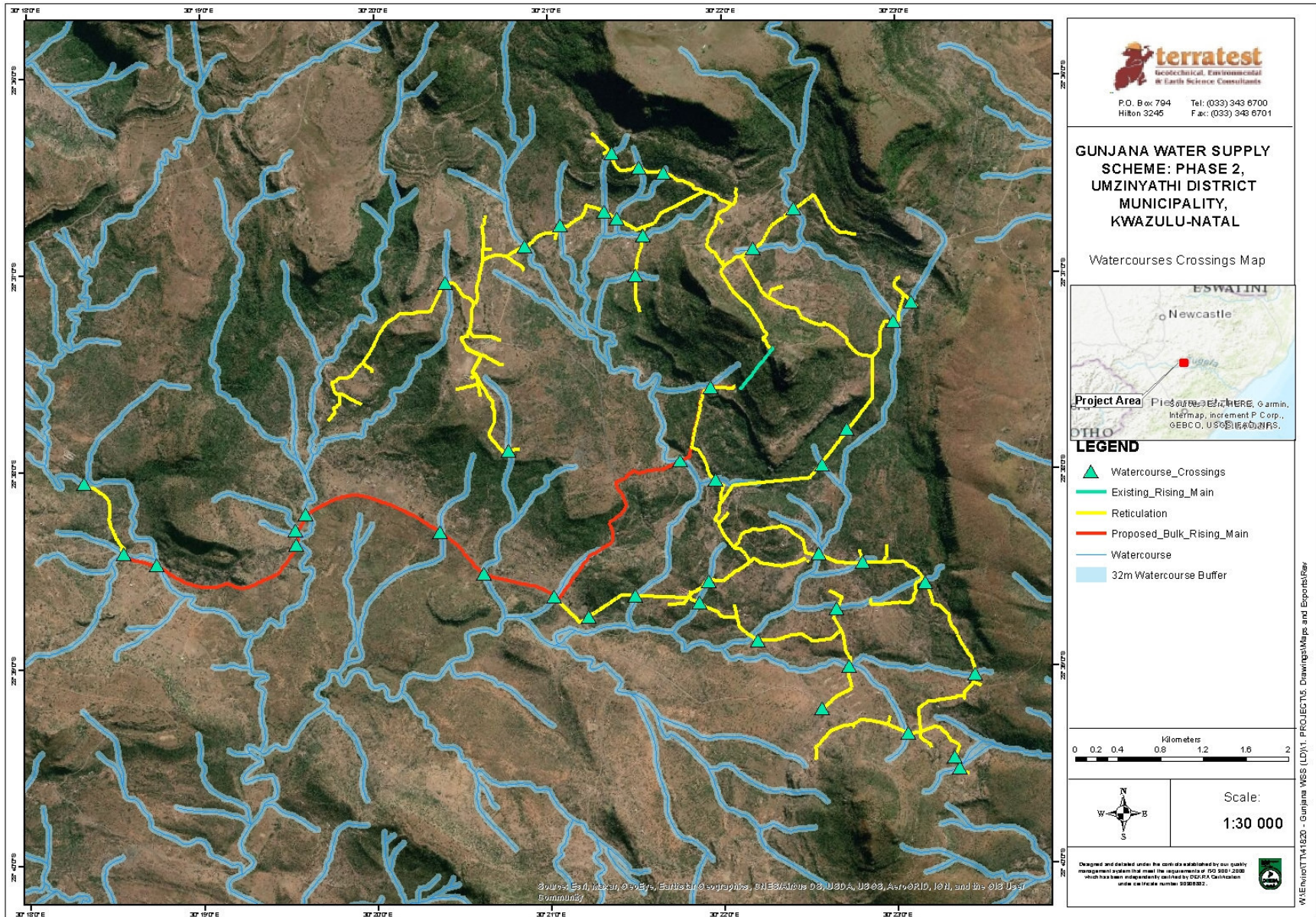


FIGURE 2: Watercourse crossings

3.2 Items of heritage & palaeontological significance

Several graves and local settlements were identified along the pipeline alignment. A full list of sensitive areas are provided in Table 3.

TABLE 3: Identified heritage features

Site no.	ID	Site description	Latitude (South)	Longitude (East)	Sensitivity
1	GUNJ001	3X grave and houses	-28.612674600	30.377214944	High
2	GUNJ002	Terrace	-28.610847000	30.376027000	Low
3	GUNJ003	Grave	-28.610330000	30.375430000	High
4	GUNJ004	grave	-28.609722222	30.365555556	High
5	GUNJ004	grave	-28.609805556	30.365972222	High
6	GUNJ005	Walling	-28.611164000	30.352098000	Low
7	GUNJ006	Central	-28.608055556	30.357694444	N/A
8	GUNJ006	Grave	-28.608095592	30.357659351	High
9	GUNJ006	Walling	-28.620527778	30.335763000	Low
10	GUNJ006	4 graves	-28.608086111	30.357550000	High
11	GUNJ006	Grave	-28.620576000	30.335814000	High
12	GUNJ007	2 grave	-28.607883000	30.356686000	High
13	GUNJ008	3 graves	-28.612630000	30.350997000	High
14	GUNJ009	Walling	-28.612938000	30.350459000	Low
15	GUNJ010	Kraal	-28.613398000	30.349563000	Low
16	GUNJ011	Shembe	-28.613111737	30.348589749	High
17	GUNJ012	Graves	-28.612681000	30.343306000	High
18	GUNJ013a	Grave	-28.617480000	30.339598000	High
19	GUNJ013b	Grave 5	-28.617913000	30.339512000	High
20	GUNJ014	3 x grave	-28.620510000	30.335692000	High
21	GUNJ014	Pottery	-28.620811000	30.336561000	Low
22	GUNJ014	Grave? x2	-28.620231000	30.336069000	High
23	GUNJ014b	grave	-28.621057000	30.336544000	High
24	GUNJ015	Grave	-28.626631000	30.341325000	High
25	GUNJ016	Grave	-28.626561811	30.344263426	High
26	GUNJ017	Grave 10	-28.627448000	30.345380000	High
27	GUNJ018	Cemetery	-28.627917000	30.345307000	High
28	GUNJ019a	Grave	-28.624056000	30.345493000	High
29	GUNJ019b	Graves	-28.622123004	30.344708237	High
30	GUNJ020.	walling	-28.614519000	30.365785000	Low
31	GUNJ020b	Walling	-28.614574000	30.365964000	Low
32	GUNJ020c	Grave	-28.614405000	30.366327000	High
33	GUNJ021	Grave	-28.614459084	30.363750078	High
34	GUNJ022	3x grave	-28.621015000	30.377859000	High
35	GUNJ022	walling	-28.620752778	30.377886111	Low
36	GUNJ022	Cairn	-28.620153000	30.377838000	High
37	GUNJ022	grave;	-28.621653000	30.378256000	High
38	GUNJ023	Grave 3	-28.637330000	30.356838000	High
39	GUNJ023	End of settlement	-28.637997582	30.356481153	N/A
40	GUNJ024	Grave by house	-28.639261252	30.355794247	High

Site no.	ID	Site description	Latitude (South)	Longitude (East)	Sensitivity
41	GUNJ025	Grave	-28.641986000	30.344586000	High
42	GUNJ026	Grave 2	-28.640495000	30.324815000	High
43	GUNJ027	Graves x2	-28.641769000	30.313760000	High
44	GUNJ028	Grave 8	-28.642706236	30.314896149	High
45	GUNJ029	Cemetery	-28.653870000	30.378316000	High
46	GUNJ030	Wall	-28.654884240	30.381348070	Low
47	GUNJ031	Grave 2	-28.655062146	30.382112862	High
48	GUNJ032	General	-28.652017000	30.390689000	N/A
49	GUNJ032b	graves	-28.651899000	30.390759000	High
50	GUNJ033	grave	-28.644334000	30.387091000	High
51	GUNJ033b	grave	-28.644311000	30.387016000	High
52	GUNJ033c	grave	-28.644389000	30.387036000	High
53	GUNJ034	Grave?	-28.642682000	30.386268000	High
54	GUNJ034	General	-28.642630000	30.386147000	N/A
55	GUNJ034c	Grave	-28.642361111	30.386111111	High
56	GUNJ034d	grave	-28.642694444	30.386388889	High
57	GUNJ035a	Grave	-28.652558000	30.387607000	High
58	GUNJ035b	Grave	-28.652334000	30.387759000	High
59	GUNJ035c	Grave	-28.652332000	30.387805000	High
60	GUNJ035d	Grave	-28.652160000	30.387897000	High
61	GUNJ036	Grave	-28.652445000	30.388351000	High
62	GUNJ037	Grave	-28.652410000	30.387191000	High
63	GUNJ037b	Grave	-28.652243000	30.386971000	High
64	GUNJ038	Grave	-28.652468000	30.386670000	High
65	GUNJ039	Grave	-28.652721000	30.386810000	High
66	GUNJ040	Grave	-28.641631000	30.368059000	High
67	GUNJ040b	Grave	-28.641768000	30.367844000	High
68	GUNJ041	Cemetery	-28.645978000	30.368252464	High
69	GUNJ042	Grave	-28.657385000	30.374844000	High
70	GUNJ043.	Cemetery	-28.654813000	30.376552000	High
71	GUNJ044	Stone walling	-28.654548000	30.377505000	Low
72	GUNJ045	Shembe shrine	-28.653188000	30.386818000	High
73	GUNJ046.	playground	-28.657596008	30.388912475	Low
74	GUNJ047	Grave	-28.615851000	30.368686000	High
75	GUNJ048	Grave x2	-28.642636871	30.315868414	High

The heritage survey initially recorded 48 heritage sites, of which most will be affected by the pipeline. These sites consisted mostly of human graves, while one site was a late Iron Age/Historical Period stone walled settlement. In this regard, the pipeline has been realigned to avoid all identified heritage sites, noting that a **20m buffer must** be implemented between the edge of any graves and the proposed development. Furthermore, all graves within 50m of a development need to be clearly demarcated prior to construction commencing. The demarcation needs to be 5m from the edge of the grave.

Specific construction methodologies will be required to work around graves and to avoided disturbance. Please refer to Tables 4 and 5.

In terms of PalaeoSensitivity, a “Chance Find Protocol” is recommended. In this regard, should any unusual finds be unearthed during construction, a Palaeontologist must be notified immediately by the Environmental Control Officer (ECO) and/or EAP and a site visit must be arranged at the earliest possible time with the Palaeontologist.

Recommendations noted in the Palaeontological Assessment Report (Appendix 2: Specialist Studies of the Basic Assessment Report) include:

- In the case of the ECO or the Site Manager becoming aware of suspicious looking palaeo-material the following is to occur:
 - The construction must be halted in that specific area and the Palaeontologist must be given enough time to reach the site and remove the material before excavation continues.
 - Mitigation will involve the attempt to capture all rare fossils and systematic collection of all fossils discovered. This will take place in conjunction with descriptive, diagrammatic and photographic recording of exposures, also involving sediment samples and samples of both representative and unusual sedimentary or biogenic features. The fossils and contextual samples will be processed (sorted, sub-sampled, labeled, boxed) and documentation consolidated, to create an archive collection from the excavated sites for future researchers.

Recommendations noted in Chance Find Protocol (Appendix 2: Specialist Studies of the Basic Assessment Report) include:

- Functional responsibilities of the Developer:
 1. At full cost to the project, and guided by the appointed Palaeontological Specialist, ensure that a representative archive of palaeontological samples and other records is assembled to characterize the palaeontological occurrences affected by the excavation operation.
 2. Provide field aid, if necessary, in the supply of materials, labour and machinery to excavate, load and transport sampled material from the excavation areas to the sorting areas, removal of overburden if necessary, and the return of discarded material to the disposal areas.
 3. Facilitate systematic recording of the stratigraphic and palaeo-environmental features in exposures in the fossil-bearing excavations, by described and measured geological sections, and by providing aid in the surveying of positions where significant fossils are found.
 4. Provide safe storage for fossil material found routinely during excavation operations by construction personnel. In this context, isolated fossil finds in disturbed material qualify as “normal” fossil finds.
 5. Provide covered, dry storage for samples and facilities for a work area for sorting, labeling and boxing/bagging samples.
 6. Costs of basic curation and storage until collected. Documentary record of palaeontological occurrences must be done.
 7. The contractor will, in collaboration with the Palaeontologist, make the excavation plan available to the appointed specialist, in which appropriate information regarding plans for excavations and work schedules must be indicated on the plan of the excavation sites. This must be done in conjunction with the appointed specialist.
 8. Initially, all known specific palaeontological information will be indicated on the plan. This will be updated throughout the excavation period.
 9. Locations of samples and measured sections are to be pegged, and routinely and accurately surveyed. Sample locations, measured sections, etc., must be recorded three-dimensionally if any “significant fossils” are recorded during the time of excavation.

10. The proposed development is on rock which is very unlikely to be fossiliferous, thus a pre-excavation field trip is not required.

3.3 NO-GO CONSTRUCTION AREAS

A No-go Areas map for the heritage sites is provided in Figure 3 indicating areas where construction is not to occur.

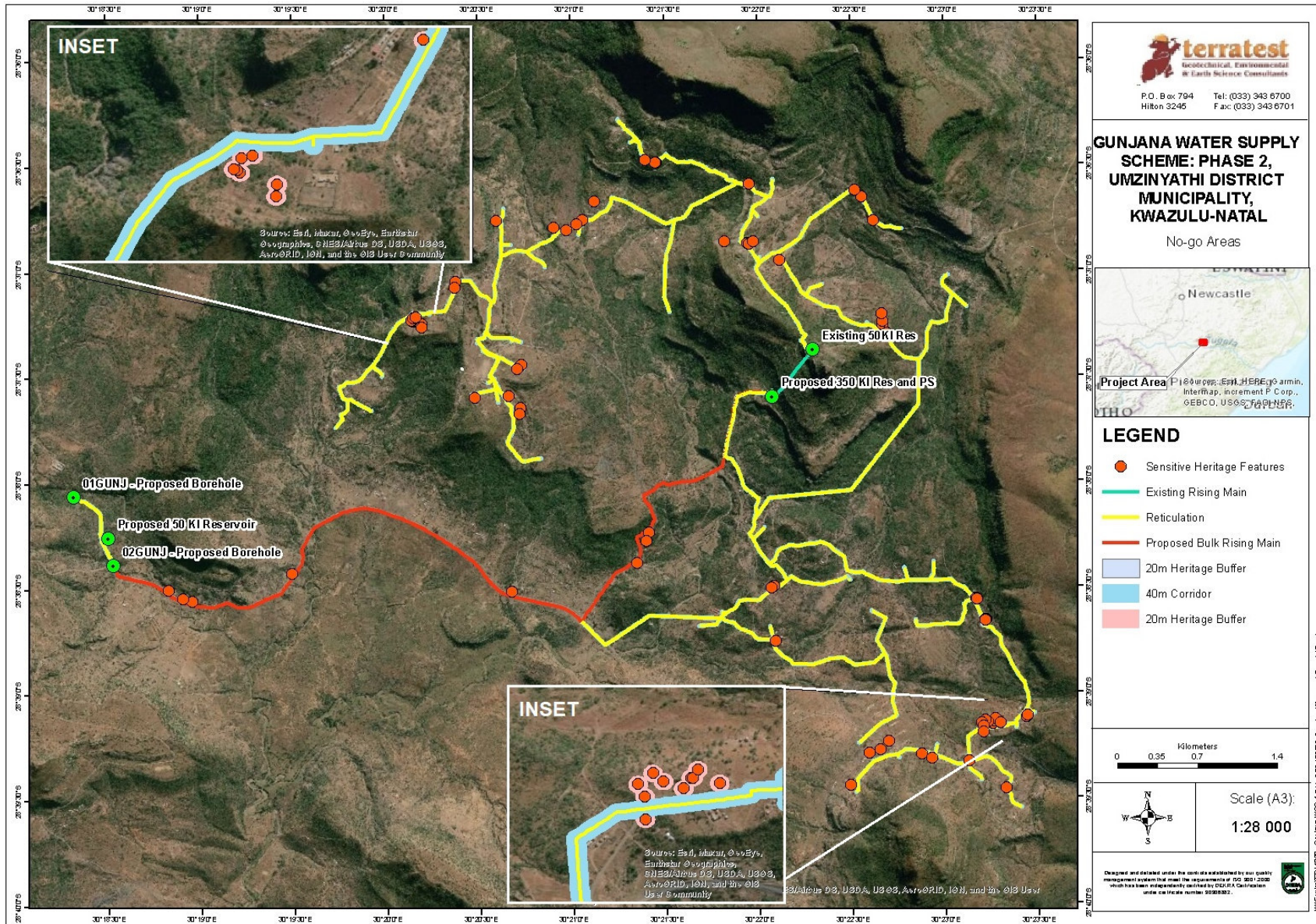


FIGURE 3: No-go areas map showing graves with 20m buffer and 40m working corridor

3.4 APPLICABILITY OF EIA REGULATIONS (2014, AS AMENDED)

In terms of the Environmental Impact Assessment (EIA) Regulations (2014, as amended), promulgated in terms of the National Environmental Management Act, 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 (GNR 327 (Listing Notice 1) and GNR 324 (Listing Notice 3), requiring a Basic Assessment (BA) Process are applicable to the proposed development:

- **GNR 327, Activity 19:** *“The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.”*
 - Construction through watercourses will result in the movement or deposition of 10m³ or more of material into or out of a watercourse. This Listed Activity is therefore triggered.

4. IMPACT MANAGEMENT OBJECTIVES, ACTIONS AND OUTCOMES

GNR 326, Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended), notes that the identified impacts of development are to be presented with the management actions and outcomes. Table 4 and Table 5 presents the required information, together with the responsible person and the frequency to which the management objectives must be monitored during the pre-construction, construction and rehabilitation phases. In this regard, the Contractor, a designated on-site Environmental Manager (EM), an independent Environmental Control Officer (ECO) and the Employer are the custodians of this EMPr.

TABLE 4: Pre-construction management objectives, actions and outcomes

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Pre-Construction Phase - Actions to be completed prior to construction				
Pre-construction activities to be implemented to avoid environmental damage.	<ul style="list-style-type: none"> • The contractor must prepare a Construction Site Development Plan to be approved by the ECO prior to establishment on site. This plan must indicate: <ul style="list-style-type: none"> – The boundaries of the site that encompass all construction related activities; – Vehicle and pedestrian access points and routes; and – Laydown area/s, offices, stockpile areas, storage areas, etc. • Haulage roads and turning areas must be identified and clearly demarcated; • Appropriate temporary traffic control and warning signage must be erected and implemented on all affected roads in the vicinity of the site; • Temporary stormwater protection measures must be established; • Methods of dust suppression must be formalised; • An Emergency Method Statement must be drafted and submitted to the ECO detailing fire, accidental leaks and spillage procedures, as well as emergency contact numbers; • Adequate spill kits and containers for spilled and contaminated material must be provided; • Waste bins with lids must be provided on site; • An appropriate number of chemical, portable, 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 be located 100m away from any water resources at a minimum, or outside of the 1:100 year floodline; • Hazardous materials/dangerous goods should be stored in a clearly marked, lockable, designated storage area; • Material Safety Data Sheets (MSDS's) must be readily available on site for all chemicals and hazardous substances to be used. Where possible and available, 	<p>Limit construction impacts on the receiving environment.</p> <p>Ensure that the contractor, construction workers and site personnel are aware of the relevant provisions of the EMPr.</p> <p>Establish and maintain a record of all complaints and claims against the project and ensure that these are timeously and effectively verified and responded to.</p> <p>Education of the construction staff with regards to environmentally sensitive areas on site.</p>	<p>Implementation: Contractor</p> <p>Inspection: EM</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: <i>Ad hoc</i></p> <p>Verification: Monthly</p>

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
	<p>MSDS's should additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes;</p> <ul style="list-style-type: none"> • Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste shall be strictly prohibited in identified no-go areas (to be confirmed on receipt of Environmental Authorisation from the EDTEA) during all phases of construction; • A Community Complaints Register shall be maintained by the Contractor detailing complaints and issues raised by community members and the manner in which the problems were resolved; • An Incidents Register must be maintained and kept at the site camp; and • Environmental training must be held to ensure all construction personnel are aware of the provisions contained in the EMPr. A record of environmental training undertaken must be kept at the site camp. 			
Site clearing and sensitive areas	<ul style="list-style-type: none"> • A Method Statement is to be developed, which will provide the details of how site clearing will be executed; • All existing infrastructure and structures, including powerlines, existing pipelines and roads are to be identified and taken cognisance of; • Sensitive areas including watercourses and drainage lines must be demarcated prior to commencement of construction activities on site; and • The construction team must be notified that graves are present along the alignment and are required to be demarcated with a 10m buffer prior to construction commencing. 	<p>Manage environmental impact associated with site clearing.</p> <p>Ensure that only areas that are specifically registered for the construction purposes are cleared.</p>	<p>Implementation: Contractor</p> <p>Inspection: EM</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: <i>Ad hoc</i></p> <p>Verification: Monthly</p>
Construction camp establishment	<ul style="list-style-type: none"> • The construction camp must be located within an existing disturbed area; • The construction camp must be located outside of the 1:100 year floodline, or 100m from a watercourse, whichever is greater; • Appropriate stormwater management must be implemented at the construction camp to prevent ponding of water or erosion; • Suitable waste bins must be provided within the construction camp; • Storage areas / containers containing hazardous substances / material must be clearly signed and fire extinguishers must be located in close proximity; • Designated areas for stockpiling of raw material must be provided. All stockpiling must be approved by the EM; 	<p>Minimise environmental impact associated with construction camp establishment.</p>	<p>Implementation: Contractor</p> <p>Inspection: EM</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: <i>Ad hoc</i></p> <p>Verification: Monthly</p>

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
	<ul style="list-style-type: none"> • Spill kits must be readily available at the construction camp and at construction areas; • Drip trays must be readily available; • Adequate toilet facilities must be provided at the construction camp for all staff; • The camp must be adequately secured; and • Water for human consumption must be available at the construction camp and at other convenient locations on site. 			

TABLE 5: Construction and rehabilitation management objectives, actions and outcomes

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
Access and traffic	<ul style="list-style-type: none"> Signs must be placed alongside access roads to identify speed limits, travel restrictions and other standard traffic control information; Speeding is prohibited. Flagmen and other traffic control measures must be implemented during the construction phase; Any clearing for access or haul roads outside the demarcated works area shall only be undertaken after approval from the Project Manager / EM; Existing roads shall be used as far as possible for construction purposes; Access roads to be maintained in a suitable condition; and All utilised access roads are to be reinstated to their original state post construction. 	Ensure that construction vehicles use only dedicated access routes to the construction site.	Implementation: Contractor Inspection: EM Verification: ECO	Implementation: Ongoing Inspection: <i>Ad hoc</i> Verification: Monthly
Management of construction camp and eating areas	<ul style="list-style-type: none"> Stormwater management must be implemented and maintained at the construction camp to avoid standing water or erosion; Designated waste bins / skips must be utilised at all times. Bins must be emptied on a regular basis; Spill kits must be readily available at the construction camp; Eating areas must be designated and demarcated. Litter must be collected on a daily basis. Refuse bins must be placed at all eating areas; Adequate ablution facilities must be provided; All construction waste must be disposed of off-site at an approved landfill site; Rehabilitation of the construction camp must commence immediately after completion of construction activities; and On completion of the project, the appointed contractor must ensure that all necessary infrastructure contained within the construction camp, including the construction plant, equipment, storage containers and temporary services used during construction are removed. 	Minimise environmental impacts associated with the construction camp and eating areas.	Implementation: Contractor Inspection: EM Verification: ECO	Implementation: Ongoing Inspection: <i>Ad hoc</i> Verification: Monthly
Preservation of vegetation and fauna	<ul style="list-style-type: none"> Construction activities must be restricted to the development footprint area only, which includes for a 10m wide working corridor; Workers must be limited to areas under construction within the pipeline servitude; No animal may be intentionally killed or destroyed and poaching and hunting is not permitted on site. Any construction personnel found to be poaching in the area must be subjected to a disciplinary hearing; 	Prevention of the introduction and spread of alien invasive species in the area due to construction activities. Preservation of existing sensitive fauna and flora	Implementation: Contractor Inspection: EM & ECO Verification:	Implementation: Ongoing Inspection: <i>Ad hoc</i> Verification:

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
	<ul style="list-style-type: none"> Trenches must be inspected regularly for fauna that may have fallen in and become trapped. All fauna identified in trenches must be rescued; Post construction, the areas disturbed outside of the pipeline servitude must be rehabilitated by appropriate landscaping, topsoil dressing, alien plant rehabilitation and vegetation establishment; Bank slopes of watercourses must be graded to the lowest possible angle and must be well below the slip angle of the material concerned; Post construction, banks must be planted with indigenous grasses; Along the servitude, 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; The soil excavated from watercourse trenches must be retained and be returned in the reverse order to which it was removed in order to re-establish the original soil profile; and An Alien Plant Control programme is appended as Appendix 2 of this report for reference purposes. 		ECO	Monthly
Prevent soil contamination	<ul style="list-style-type: none"> Hazardous materials / dangerous goods must be stored in a clearly marked, lockable, designated storage area; Hazardous materials / dangerous goods must be stored within a bunded area of a 110% of the total storage capacity of the bund; All stationery vehicles, equipment and receptacles of hazardous waste must be supplied with drip trays to prevent soil contamination; When decanting hazardous substances, drip trays must be used. Drip trays are to be cleaned out daily and material collected disposed of as hazardous waste; Should a spillage occur, absorbent sand (or an appropriate alternative as supplied in a spill kit) must be spread on the affected areas. The contaminated soil must be lifted and placed within an impermeable container or a high-density plastic bag and disposed of at a recognised disposal site; An Incident Report must be completed for spills and saved in the Environmental File; Ablution facilities are to be cleaned / emptied on a regular basis by a registered service provider; and All disturbed areas must be rehabilitated. 	<p>Avoidance of soil contamination</p> <p>Re-use of viable soils in rehabilitation</p>	<p>Implementation: Contractor</p> <p>Inspection: EM & ECO</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: <i>Ad hoc</i></p> <p>Verification: Monthly</p>

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
Prevent soil loss	<ul style="list-style-type: none"> • Soil erosion prevention measures must be implemented. This can include measures such as gabions, sand bags, berms etc. Energy dissipaters must be constructed at any surface water outflow points; • Construction areas must be monitored 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; • All exposed earth must be rehabilitated promptly with suitable vegetation to stabilize the soil. Vigorous grasses planted with fertiliser are very effective at covering exposed soil. It is important to note that the use of fertilisers must be undertaken with caution and must not be allowed, in any circumstances, to run into any watercourse to avoid any possible eutrophication impacts; • Excavated soil must be retained, with topsoil and subsoil being stockpiled separately; • Soils, including backfill material, are to be compacted to match the porosity of the surrounds as best as possible, post construction; • Trenches must be rehabilitated with a vegetation cover which matches that of the surrounds; • Topsoil and subsoil are to be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase. Stockpiles must be protected from wind and rain, as well as contamination from oil, diesel, petrol, concrete, waste water or any other material, which may inhibit later growth of vegetation; and • The soil excavated from watercourse trenches must be retained and be returned in the reverse order to which it was removed in order to re-establish the original soil profile as best possible. 	<p>Re-use of viable soil in rehabilitation.</p> <p>Prevent loss of topsoil or soils from the site during construction.</p>	<p>Implementation: Contractor & Engineer</p> <p>Inspection: EM and ECO</p> <p>Verification: ECO</p>	<p>Implementation: Pre-construction and prior to implementation of rehabilitation</p> <p>Inspection: Ad hoc and weekly as a minimum</p> <p>Verification: Monthly</p>
Material handling, hazardous substances and storage	<ul style="list-style-type: none"> • Hazardous substances and materials are those that are potentially poisonous, flammable, carcinogenic or toxic. Examples of these include: diesel, petroleum, oil, bitumen, solvent based paints and lubricants. Such substances must be managed appropriately; • All hazardous substances are to be stored in a covered, lockable bunded area and handled in accordance with the relevant MSDS; • Staff dealing with these materials / substances must be aware of their potential health and environmental impacts and follow the appropriate safety measures; 	<p>Ensure all hazardous substances are handled in accordance with the material safety data sheets (MSDS).</p>	<p>Implementation: Contractor</p> <p>Inspection: EM</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: Ad hoc and weekly as a minimum</p>

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
	<ul style="list-style-type: none"> Spill kits must be clearly marked and visible when utilising hazardous or dangerous materials to ensure that all spills are immediately contained and removed; Significant spills must be reported to the Department of Water and Sanitation (DWS) and the Department of Economic Development, Tourism and Environmental Affairs (EDTEA). Contamination assessments must follow significant spillage events to determine specific risks, impacts and mitigation actions; In the event of a fire, the appropriate fire management system, as per the MSDS and onsite emergency response plan, must be implemented; All vehicles and equipment shall be kept in good working order to reduce the likelihood of oil leaks occurring; and All stationery vehicles must be supplied with drip trays to prevent soil contamination. 			Verification: Monthly
Water resources	<ul style="list-style-type: none"> Appropriate stormwater / surface water management measures must be put in place before construction commences and maintained throughout the lifetime of the development; An appropriate number of chemical, portable 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 or outside of the 1:100 year floodline, whichever is greater; 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 any watercourse; Appropriate silt control mechanisms must be installed around all soil excavations to prevent silt from entering the surrounding watercourses; 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; Watercourse bank slopes must be graded to the lowest possible angle and must be well below the slip angle of the material concerned; Watercourse banks must be planted with indigenous grasses; 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, 	Ensure that watercourses (including the affected rivers and streams) are protected and incur minimal negative impacts to resource quality.	Implementation: All Inspection: EM Verification: ECO	Implementation: Ongoing Inspection: Ad hoc and weekly as a minimum Verification: Monthly

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<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
	<p>blocks, or concrete, is not recommended as such structures are often ineffective and can accelerate erosion processes in some cases;</p> <ul style="list-style-type: none"> • Watercourses must be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, sewage, cement, oils, fuels, chemicals, wastewater; • All general waste, construction plant equipment, surplus rock, and other foreign materials must be completely removed from site post-construction; • The soil excavated from watercourse trenches must be retained and be returned in the reverse order to which it was removed in order to re-establish the original soil profile as best possible. <p>Damage to the watercourses through soil erosion:</p> <p>The pipeline crossing sites that pass through the bed of a watercourse must be protected against soil erosion. The following must be implemented:</p> <ul style="list-style-type: none"> • The crossings must be located away from areas dominated by soft soils. • The trench in the channel bed must be refilled in such a manner so as to match the surrounding conditions. Thus, a rocky channel trench will be covered by rocks while a sediment channel trench will be covered by sediment. The purpose of the recommendation is to avoid establishing a discontinuity which might lead to enhanced erosion at the site. • The banks on either side must be sloped back to an angle at which they will be stable. This angle will be variable depending on the soils, but will commonly be less than 45°. • The banks must be stabilised by means of rock packs or some similar means. Grass, such as Couch Grass (<i>Cynodon dactylon</i>) should be planted on the site. • The trench area at the top of the channel should be covered with rocks so as to discourage livestock from using the trench as a pathway through the channel thus preventing soil erosion. • Where the pipeline is to cross a watercourse channel on concrete piers, every effort should be made to minimise the number of piers actually in the channel. The purpose of the recommendation is to minimise the likelihood of the piers creating turbulent water flows which would accelerate soil erosion. <p>Spillage of hydrocarbons into the watercourses:</p>			

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Construction and Rehabilitation Phase				
	<p>Hydrocarbons are toxic to aquatic fauna and, even although most of the watercourse channels are usually dry, the following must be implemented to prevent substances from being washed to a downstream perennial system:</p> <ul style="list-style-type: none"> • Where fuels and oils are stored in the construction camp, they must be in a bunded area which contains at least 110% of the volume of fuel or oil being stored. • All refuelling of vehicles should be done in the construction camp or at a nearby filling station. • If refuelling or oiling of machines must be done at the construction site, then they must be at least 15m away from any drain or watercourse and a spill tray must be placed under the machine to catch any accidental spills. • Should a spill or leak take place onto the ground at any place, the contaminated soil must be collected and be properly stored in a leak-proof container prior to being taken to an approved disposal facility. • Once the area is clean, topsoil must be returned, and the area must be revegetated with a cover of indigenous grass or grasses. <p>Deposition of soil or other material into the channels:</p> <p>The following measures must be implemented:</p> <ul style="list-style-type: none"> • No loose soil or other material may be deposited into a watercourse other than to refill a pipeline trench. • No soil, gravel, or other construction materials may be stockpiled or spoiled within 10 m of a watercourse. <p>Introduction of waste from the contractor's camp into the watercourse channels:</p> <p>To prevent any pollution of any sort from the contractor's site camp, the following must be adhered to:</p> <ul style="list-style-type: none"> • The camp may not be within 50m of any watercourse. • The camp must be enclosed within a security fence. • All toxic substances, including hydrocarbons, must be stored in bunded spaces with a volume of least 110% of the substance stored within it. • A Hazmat kit must be on hand at all times to deal with any spills of hazardous substances. • Vehicle servicing or workshop areas must be under a roof and must have an impermeable floor. Drums must be provided for used oils and other materials 			

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Construction and Rehabilitation Phase				
	<p>such as oil-soaked rags. The drums may only be emptied at an approved disposal facility. Waybills must be obtained as proof of proper disposal.</p> <ul style="list-style-type: none"> • Drums with lids must be on hand at all times to provide for temporary storage of contaminated soil or similar materials prior to removal to an approved disposal facility. Waybills must be obtained as proof of proper disposal. • Ideally no personnel other than security guards will stay on the premises overnight. • Toilets for personnel must be provided both in the camp and in the pipeline working areas. Pit toilets may not be used and so chemical toilets are called for. These must be serviced frequently by a registered contractor. • On site toilets must be at least 50m away from any watercourse. They must be chemical toilets and must be serviced frequently by a registered contractor. • Skips must be provided for bulky wastes. • Domestic and smaller wastes may be collected in bins which have lids. • All waste containers must be emptied regularly and timeously. The contents must go to appropriate approved disposal sites and way bills must be obtained and be filed in the camp office. • No wastes of any sort may be burned in the camp or elsewhere. • Provision must be made for closure of the camp at the end of the project, and for rehabilitation of the site in a manner that is compatible with its earlier condition. 			
Preserve air quality	<ul style="list-style-type: none"> • Heavy vehicles and machinery must be serviced regularly to minimise exhaust fumes; • Soil stockpiles must be located in areas to limit the erosive effects of wind. This will serve to limit dust impacts; • Removal of vegetation must be avoided until such time as soil stripping is required. This will serve to limit dust impacts; • Water or an appropriate environmentally friendly soil stabiliser, must be utilised to suppress dust; • Equipment must be operated within its specifications and capacity and must not be overloaded; and • The entire contractors' vehicles must be fitted with effective exhaust silencers and must comply with Road Traffic Act (Act 29 of 1989) when any such vehicle is operated on a public road. 	<p>Reduce air quality impacts.</p> <p>Reduce on-site dust.</p>	<p>Implementation: Contractor & Engineer</p> <p>Inspection: EM</p> <p>Verification: ECO</p>	<p>Implementation: Ongoing</p> <p>Inspection: Ad hoc and weekly as a minimum</p> <p>Verification: Monthly</p>

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Construction and Rehabilitation Phase				
Prevent noise pollution	<ul style="list-style-type: none"> • Potential increase in noise from the operation of machinery and equipment, as well as the construction vehicle traffic; • Ensure that the potential noise source will conform to the South African Bureau of Standards recommended code of practice, SANS Code 0103:1983, so that it will not produce excessive or undesirable noise when it is released; and • All the Contractors' equipment shall be fitted with effective exhaust silencers and shall comply with the South African Bureau of Standards recommended code of practice and the South African National Standard (SANS) Code 0103:1983, for construction plant noise generation. 	<p>No ambient noise impacts relating to plant operations.</p> <p>Compliance to municipal by-laws.</p> <p>No nuisance conditions created.</p>	<p>Implementation: Contractor</p> <p>Inspection: EM & ECO</p> <p>Verification: ECO</p>	<p>Implementation: Monthly or at the prescribed vehicle/plant manufacturers specifications</p> <p>Daily for management measures</p> <p>Inspection: <i>Ad hoc</i> and weekly as a minimum</p> <p>Verification: Monthly</p>
Prevent visual unsightliness	<ul style="list-style-type: none"> • Watering roads to prevent dust from construction vehicles (where required); • Should lighting be required, it must be undertaken in such a manner as to preclude the lighting from becoming intrusive; and • Screening of highly reflective material must be undertaken. 	<p>The prevention or the mitigation of unsightliness.</p>	<p>Implementation: Contractor</p> <p>Inspection: EM & ECO</p> <p>Verification: ECO</p>	<p>Implementation: Monthly or at the prescribed vehicle/plant manufacturers specifications</p> <p>Daily for management measures</p> <p>Inspection: <i>Ad hoc</i> and weekly as a minimum</p>

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<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
				Verification: Monthly
Prevent the spread of waste	<ul style="list-style-type: none"> All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to become windblown, be accessible to animals, or be placed in piles adjacent to the skips / bins; All waste receptacles are to have lids; Separation and recycling of different waste materials must be supported; No burying, dumping or burning of waste materials, vegetation, litter or refuse shall occur on site; All solid waste must be disposed of at the nearest licensed landfill and safe disposal certificates must be obtained and kept on site at all times during construction; A daily litter collection programme must be implemented; Contaminated soil must be treated as hazardous waste and disposed of at a permitted waste disposal site. The affected area is to rehabilitated immediately; Ablution facilities on site need to be regularly serviced by a licenced service provider on a weekly basis. The contractor is to encourage all staff and sub-contractors to use these facilities. The use of the surrounding environment for urination or defaecation is strictly prohibited; Handling of hazardous liquids shall be done over drip trays to intercept spills; Generators and fuel storage bowsers must be contained within drip trays or appropriately banded; Excess excavated material shall not be allowed to accumulate on site; and On completion of the project all construction waste shall be disposed of at a registered waste disposal site. 	No environmental contamination associated with waste.	Implementation: Contractor Inspection: EM & ECO Verification: ECO	Implementation: Daily and <i>ad hoc</i> Inspection: <i>Ad hoc</i> and weekly as a minimum Verification: Monthly
Safety and security	<ul style="list-style-type: none"> First aid must be available on site; Smoking is prohibited in the vicinity of flammable substances; Fire extinguishers must be available and easily accessible at all times; Emergency contact details must be displayed on site; Any construction personnel found trespassing must be subjected to a disciplinary hearing; 	Prevent unnecessary incidents.	Implementation: Contractor Inspection: EM & ECO Verification:	Implementation: Daily and <i>ad hoc</i> Inspection:

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Construction and Rehabilitation Phase				
	<ul style="list-style-type: none"> 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 must be enforced and maintained so as not to cause harm to any individual; Open trenches must be adequately demarcated and must be checked daily to ensure the adopted demarcation method is still operational. The use of warning signs are also encouraged; The pipeline working corridor (maximum of 10m) must be demarcated with snow netting / danger tape or similar to mitigate the risk of livestock accidents and to prevent public ingress; and Material stockpiles must be stable to avoid collapse and possible injury to workers. 		ECO	<i>Ad hoc</i> and weekly as a minimum Verification: Monthly
Socio-economic	<ul style="list-style-type: none"> Inform the surrounding communities of the proposed activity as soon as possible. This will serve to ease potential social anxiety; Local community members must be employed where possible; A Community Liaison Officer must be employed to assist in raising any concerns / complaints noted by the affected community and landowners to the contractor; The contractor must replace any damaged infrastructure as a result of construction activities; Photographs must be taken before and after construction activities to ensure that infrastructure is reinstated to the same condition post construction; and Open trenches are to be fenced to prevent ingress of livestock and human safety threats. 	Creation of job opportunities for skilled and non-skilled personnel Skill development of the local community through employment opportunities Protect agricultural practices	Implementation: Contractor Inspection: EM & ECO Verification: ECO	Implementation: Daily and <i>ad hoc</i> Inspection: <i>Ad hoc</i> and weekly as a minimum Verification: Monthly
Prevent unnecessary loss of heritage and palaeontological artefacts	<ul style="list-style-type: none"> The KwaZulu-Natal Heritage Act (2008) requires that all operations exposing archaeological, historical residues or graves must cease immediately pending an evaluation by the heritage authorities; If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately; The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Construction Engineer of such discovery which in turn must contact a registered archaeologist and AMAFA. Work may only resume once clearance is given in writing by the archaeologist and AMAFA. 	Protection of heritage and palaeontological resources	Implementation: Contractor Inspection: EM & ECO Verification: ECO	Implementation: Daily and <i>ad hoc</i> Inspection: <i>Ad hoc</i> and weekly as a minimum Verification: Monthly

Impact management objectives of an EMPr	Impact management actions of an EMPr	Impact management outcomes of an EMPr	Monitoring	
<i>A thing aimed at or sought, a goal</i>	<i>The process of doing something, typically to achieve an aim</i>	<i>The way a thing turns out; a consequence</i>	<i>Responsibility</i>	<i>Frequency</i>
Construction and Rehabilitation Phase				
	<ul style="list-style-type: none"> All grave sites need to be clearly demarcated before construction begins. There must be 20m fenced buffer from the edge of a human grave which must be considered a no-go area. Furthermore, all graves within 50m of a development need to be clearly demarcated prior to construction commencing. The demarcation needs to be 5m from the edge of the grave. 			

5. MONITORING

5.1 METHOD AND FREQUENCY OF MONITORING

- An independent, external ECO must audit the construction site during the construction phase of the project on a bi-monthly basis, unless otherwise specified by the EDTEA;
- A monthly construction Environmental Audit Report is to be drafted by the ECO and submitted to the Applicant / Employer for review and implementation prior to the following site audit; and
- The relevant party (i.e. ECO or Applicant, as designated by the Environmental Authorisation) has the responsibility to submit the site audit report to the EDTEA: Compliance and Monitoring Department for the duration of the construction period.

5.2 ROLES AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different, but vital role to ensure sound environmental management during the construction phase. The stakeholders are discussed below:

5.2.1 EDTEA

The EDTEA is the designated provincial authority responsible for authorising the EMPr related to the project. The EDTEA has overall responsibility for ensuring that the Applicant complies with the Conditions of the Environmental Authorisation and EMPr.

5.2.2 APPLICANT: UMZINYATHI DISTRICT MUNICIPALITY

Under South African environmental legislation, the Applicant is accountable for the potential impacts of the activities that are undertaken and is responsible for managing these impacts. The uMzinyathi District Municipality as the Applicant/Employer therefore has overall environmental responsibility to ensure that the implementation of this EMPr complies with the relevant legislation and the Conditions of the Environmental Authorisation.

5.2.3 ENVIRONMENTAL CONTROL OFFICER

An appointed independent ECO will monitor and review the on-site environmental management and implementation of this EMPr by the contractor throughout the project. This will be done by conducting site audits and issuing monthly audit reports to the Applicant and EDTEA's Compliance Monitoring and Enforcement Section, as applicable.

The EDTEA requires that the ECO be at the forefront of all environmental management issues.

5.2.4 ENVIRONMENTAL MANAGER

The Environmental Manager, or his appointee, will conduct daily inspections of the site to identify potential non-compliances and potential negative impacts to the environment. The inspections will take the form of an inspection sheet and will be kept as a record. Findings thereof will be made available to the ECO and raised in construction meetings for mitigation or avoidance measures.

5.2.5 CONTRACTOR

This refers to the main contractor(s) appointed by the Applicant for the construction of the project, or a portion of the project. The main contractor(s) will be responsible for complying with the EMPr commitments and any other legislative requirements, as applicable to the contractors' appointment for the proposed development.

The contractor/s will also be responsible for drafting method statements appropriate to activities under his direct control.

The contractor must ensure that all employees under their appointment receive appropriate training prior to the commencement of construction, taking cognisance of this EMPr and the Conditions of the Environmental Authorisation.

5.2.6 ORGANISATIONAL STRUCTURE

Details of the organisational structure are presented in Figure 4. The structure illustrates the reporting procedures for all stakeholders responsible for the implementation of this EMPr.

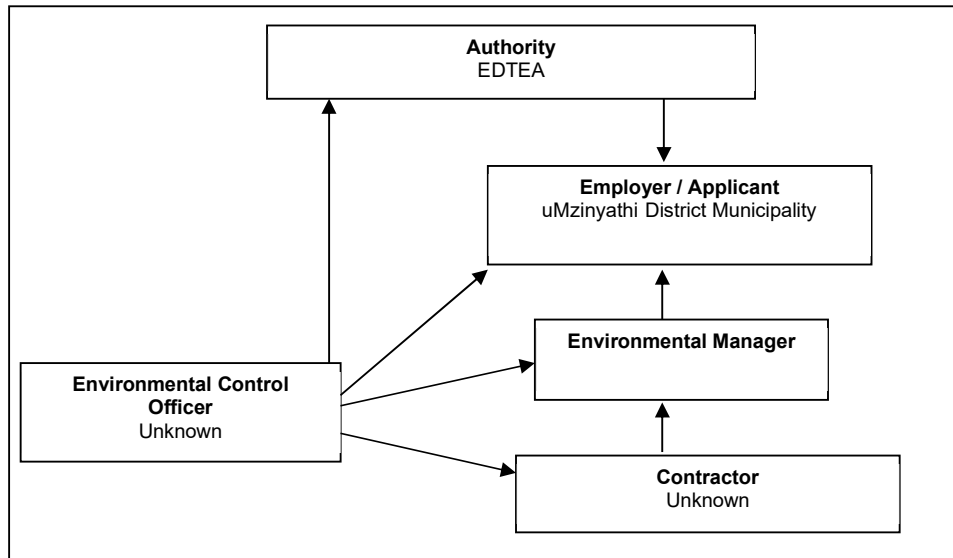


FIGURE 4: Organisational structure

An EMPr Acknowledgement Form is provided as Appendix 3, committing all parties involved to sound environmental practices during construction.

5.3 METHOD STATEMENTS

Method Statements are written submissions by the contractor to the ECO in response to the requirements of this EMPr, or to a request by the ECO. The contractor shall be required to prepare Method Statements for several specific construction activities and/or environmental management aspects.

The contractor shall not commence the activity for which a Method Statement is required until the ECO has approved the relevant Method Statement.

Method Statements must be submitted at least 20 working days prior to the date on which approval is required to the ECO. The ECO must in turn accept or reject the Method Statement within 10 working days of receipt.

Failure to submit a Method Statement may result in suspension of the activity concerned until such time as a Method Statement has been submitted and approved.

An accepted Method Statement shall not absolve the contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved Method Statement shall be rehabilitated at the contractor's expense.

The Method Statements shall cover relevant details with regards to:

- Construction procedures and location of the construction site / camp;
- Start date and duration construction;
- Materials, equipment and labour to be used;
- How materials, equipment and labour would be moved to and from the site, as well as on site during construction;
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of construction;
- Emergency procedures in case of any reasonably potential accident / incident which would occur during construction; and
- Compliance/non-compliance with any EMPr specification and motivation if non-compliant.

5.3.1 REQUIRED METHOD STATEMENTS (MS)

Based on the specifications in this EMPr, the following Method Statements (MS) are required as a minimum:

MS1: Site layout and establishment

MS2: Hazardous substances

MS3: Traffic accommodation

MS4: Solid waste control system

MS5: Wastewater control system

MS6: Watercourse crossings

MS7: Stormwater Control

MS8: Fire control and emergency procedures

6. NON-COMPLIANCES

The contractor shall comply with the environmental specifications and requirements on an on-going basis and any failure on his part to do so will entitle the ECO to impose a penalty.

In the event of non-compliance, the following recommended process can be followed:

- The ECO shall issue a notice of non-compliance to the contractor, stating the nature and magnitude of the contravention.
- The contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The contractor shall provide the ECO with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the contractor failing to remedy the situation within the predetermined timeframe, the ECO shall refer the matter to the EM, who:
 - Has the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures; and / or
 - Impose a monetary penalty based on the conditions of contract (if applicable).
- In the case of a non-compliance giving rise to physical environmental damage or destruction, the EM shall be entitled to undertake, or to cause to be undertaken, such remedial works as may be required to make good such damage and to recover from the contractor the full costs incurred in doing so.
- In the event of a dispute or difference of opinion between any parties arising out of the interpretation of the conditions of the EMPr, or a disagreement regarding the implementation or method of

implementation of conditions of the EMPr, any party shall be entitled to require that the issue be referred to specialists for arbitration.

6.1 INDICATIVE LIST OF TRANSGRESSIONS

Where the Contractor and/or his/her Sub-contractor(s) inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he/she shall be liable to pay a penalty fine over and above any other contractual consequences.

The contractor is deemed not to have complied with this EMPr if:

- Within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention;
- Environmental damage ensues due to negligence on the contractor's and/or his/her sub-contractor's part;
- The contractor and/or his/her sub-contractor fail to comply with the corrective or other instructions issued by the EM within a specific time; or
- The contractor and/or his/her sub-contractor fail to respond adequately to complaints from the public.

Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

6.2 ENVIRONMENTAL AWARENESS TRAINING

The contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMPr and Conditions of the Environmental Authorisation (not yet issued).

The presentation shall be conducted, as far as possible, in the employees' language of choice.

As a minimum, training shall include:

- Explanation of the importance of complying with the EMPr;
- Discussion of the potential environmental impacts of, and environmental risks presented by, construction activities;
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when carrying out their activities; and
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

The contractor shall keep records of all environmental training sessions, including names, dates and the information presented. These records will be presented at the ECO on request during his/her audits.

APPENDIX 1: CURRICULUM VITAE



CURRICULUM VITAE

LIZ DRALLE



Profession	Environmental Assessment Practitioner
Position in Firm	Senior Environmental Scientist
Area of Specialisation	Environmental
Qualifications	BSc (Hons) (Env Mgmt), BSc (Geog), EAPASA
Years of Experience	13 Years
Years with Firm	6 Years

SUMMARY OF EXPERIENCE

Liz Dralle (nee Allan) graduated from the University of KwaZulu-Natal, Pietermaritzburg, with a BSc Honours (*cum laude*) degree in Environmental Management. The focus of her studies included Geographical Information Systems (GIS), Environmental Impact Assessments (EIA), Geomorphology, Coastal Geomorphology, Biogeography, Natural Resource Management, Sustainable Land Use, Climate Change and City Planning. Her Honours dissertation project involved an investigation into the possible benefits of Velvet Grass as a soil erosion control medium.

On completion of her degree, Liz was employed by Azelia Environmental Consultants cc, in the capacity of Environmental Consultant, specializing in agricultural and linear Basic Assessments. She was based in Nottingham Road, KZN Midlands. After one year at Azelia Environmental Consultants, Liz moved to Durban, where she was employed in the capacity of Environmental Scientist with SRK Consulting (Pty) Ltd. At SRK Consulting (Pty) Ltd, Liz was involved in a multitude of Environmental Impact Assessments (EIAs), focusing mainly on Industrial EIAs. Liz was also involved in several Equator Principle projects and also undertook the role as Environmental Control Officer (ECO) for several monitoring projects.

In 2010, Liz was approached by Environmental Impact Management Services (Pty) Ltd, to act as full time ECO for the Transnet New Multi-Purpose Pipeline (NIMPP) Project, running from the Port of Durban to Johannesburg. Liz's role was to undertake daily Environmental Site Audits of her designated area, which started from Ashburton, just outside of Pietermaritzburg, to the Tugela River crossing on the N3, in total, a length of 15 km. Further responsibilities included borrow pit identification, Public Participation in the form of monthly Community Liaison Forums, one-to-one interaction with affected landowners, as well as designated Land Liaison Officers. Contractor interaction was required on a daily basis, as well as specialist interaction, specific to the rehabilitation of wetlands, post construction.

After a year on the NIMPP Project, Liz joined JEC Environmental Services cc in the capacity of Environmental Consultant. Here Liz undertook several EIAs, focusing mainly on the agricultural sector in the form of piggy and cultivation of virgin land applications, as well as biogas installations. Liz also undertook several Waste Management Licence Applications.

In May 2014, Liz joined Jeffares & Green (Pty) Ltd, now JG Afrika (Pty) Ltd in the position of Environmental Scientist and was promoted to Senior Environmental Scientist, in 2017. At JG Afrika (Pty) Ltd, Liz is responsible for undertaking a range of Mining Permit and Mining Right Applications pertinent to the Mineral and Petroleum Resources Development Act (Act 28 of 2002), as well as applications made in terms of the National Environmental Management Act (Act 107 of 1998) and the National Water Act (Act 36 of 1998).

Liz is a registered Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA) and is an Institute of Environmental Management and Assessment (IEMA) certified Environmental Auditor. She also prescribes to the International Association for Impact Assessment South Africa (IAIASa) code of conduct and has been a member since 2007.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

EAPASA - Registered Professional with the Environmental Assessment Practitioners Association of South Africa – Registration No. 2019/717.
IAIASa - Member of the International Association for Impact Assessment – Membership No. 2154.

EDUCATION

1999 – Matric – Pietermaritzburg Girls' High School
2000 – Diploma in Business Computing – Varsity College, Pietermaritzburg
2005 – BSc (Geographical Sciences) – University of KwaZulu-Natal
2008 – BSc Hons (Environmental Management) Cum laude - University of KwaZulu- Natal

SPECIFIC EXPERIENCE

JG AFRIKA (PTY) LTD (PREVIOUSLY JEFFARES & GREEN (PTY) LTD)

2014 – Date
Position – Senior Environmental Scientist

Mining Applications

- Application for a Mining Permit, Thandizwe Shale Quarry, Pietermaritzburg, KZN. Client – Mr N. Moosa.
- Expansion of the Midmar Crushers, KZN. Client – Midmar Crushers (Pty) Ltd.
- Amendment of the BluRock Quarry EMP, Estcourt, KZN. Client – BluRock Quarry (Pty) Ltd.
- Amendment of the Ixopo Crushers EMP, Ixopo, KZN. Client – Ixopo Crushers (Pty) Ltd.
- Amendment of the LaFarge EMP, Tongaat, KZN. Client – La Farge (Pty) Ltd.
- Establishment of a staged mobile crushing plant within the current footprint of the Amasundu Gravel cc quarry pit. Client – Amasundu Gravel cc.
- Application for Sand Mining Permit, Eston, KwaZulu-Natal. Client – RS Transport (Pty) Ltd.
- Midmar Crushers EMP Amendment KZN. Client – Midmar Crushers (Pty) Ltd.
- Application for Prospecting Right, Midmar Crushers, KZN. Client – Midmar Crushers (Pty) Ltd.
- Application for Sand Mining Permit, Mtot River, KZN. Client – Mrs B. Naliker.
- Application for Sand Mining Permit, Upper Tugela River, KZN. Client – Madinka 76 cc.
- Environmental Management Plan for Kulucetle Mining, KZN. Client - Kulucetle Mining.

Environmental Impact Assessments

- Construction of the Greater Kilmorn Water Supply Scheme, Ngwagwane River, Harry Gwala District Municipality, KZN. Client – iMvula Engineers cc.
- Upgrade of the Road P419, Harry Gwala District Municipality, KZN. Client – ilifa Africa Engineers (Pty) Ltd on behalf of the KZN Department of Transport.
- Construction of the KwaHlokhloko Bulk Water Supply Scheme, King Cetshwayo District Municipality. Phase 2, KZN. Client - King Cetshwayo District Municipality.
- Construction of the KwaHlokhloko Bulk Water Supply Scheme. King Cetshwayo District Municipality. Phase 3, KZN. Client - King Cetshwayo District Municipality.
- Estcourt Industrial Water Pipeline upgrade, Inkosi, Langalabaale Local Municipality, uThukela District Municipality, KZN. Client – uThukela District Municipality.
- Construction of the Weniubezi Bulk Water Supply Scheme, Inkosi, Langalabaale Local Municipality, uThukela District Municipality, KZN. Client – uThukela District Municipality.
- Upgrade of the Mkhophule Irrigation Project, Masinga Local Municipality, KZN: KZN Department of Rural Development and Land Reform.
- Development of the Nkunungumthe Irrigation Scheme, Nkandla Local Municipality, KZN: Client - KZN Department of Rural Development and Land Reform.
- Development of the Midlands Biogas and Fertiliser Plant, Pietermaritzburg, KZN: Client – Midlands Biogas and Fertiliser.
- Construction of the Marine Parade Soakaway, Durban Beachfront, KZN: Client – EThekweni Municipality.
- Development of Pier 1, Phase 2, Salisbury Island Infill, Port of Durban, EThekweni Metropolitan, KZN: Client – Transnet SOC Limited.
- Proposed regional landfill site, Umgungundlovu District Municipality, KZN: Client - Umgungundlovu District Municipality.

- Relocation of assets on Salisbury Island, Port of Durban, EThekweni Metropolitan, KZN: Client - Transnet SOC Limited.
- Development of a Simes Handling and Bulk Water Storage Facility at Mamatwan Mine, near Hotazel, Northern Cape: Client – South32 Hotazel Manganese Mines
- Construction of the Lombardeskop Pipeline, Ladysmith, KZN: Client – WNM Consulting (Pty) Ltd.
- Construction of the ideal Shavings Poultry Breeders Facility, Dargle, Umgweni Local Municipality, KZN: Client - Ideal Shavings
- Construction of three footpaths, Ward 53: Zimbabwe Community, Amaoti area, KwaMashu, EThekweni Municipality, KZN: Client - Nankoo Engineers (Pty) Ltd.
- Construction of three roads, Ward 57: Moscow Community, Amaoti area, KwaMashu, EThekweni Municipality, KZN: Client - Nankoo Engineers (Pty) Ltd.
- Construction of the Woodhouse Road pedestrian bridge, Scottsville, Pietermaritzburg, KZN: Client – Henwood and Nxumalo (Pty) Ltd.
- Upgrade of the Ndumo Ring Road, Ndumo, Northern KZN: Client - RHDHV (Pty) Ltd.
- Construction of the Ladysmith Ring Road, KwaZulu-Natal: Client – Aescm (Pty) Ltd on behalf of SANRAL.
- Transformation of agricultural land on 92 subdivisions, Mount Verde, Hilton, Umgweni Local Municipality, KZN: Client – Mt. Verde Estate.
- Residential Development on the Old Dairy Site, Hilton College, Hilton, Umgweni Municipality, Umgweni Local Municipality, KZN: Client - Hilton College.
- Amendment to the proposed Greater Mpofana Bulk Water Supply Scheme, Umgungundlovu District Municipality: Realignment of a portion of the authorised pipeline: Client - Umgweni Water.

Waste Management Licence Applications

- Identification of a new landfill site for the Alfred Duma Local Municipality, Ladysmith, KZN: Client – Alfred Duma Local Municipality.
- Goswell Developments Waste Management Licence Variation Application, Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Development of the Midlands Biogas and Fertiliser Plant, Pietermaritzburg, KZN: Client – Midlands Biogas and Fertiliser.
- Decommissioning of the Goswell Developments Landfill Site, Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Proposed regional landfill site, Umgungundlovu District Municipality, KZN: Client - Umgungundlovu District Municipality.
- Development of a Simes Handling and Bulk Water Storage Facility at Mamatwan Mine, near Hotazel, Northern Cape: Client - South32 Hotazel Manganese Mines.

Water Use Licence Applications

- Upgrade of the P419, Harry Gwala District Municipality, KZN: Client – Ilifa Africa Engineers (Pty) Ltd on behalf of the KZN Department of Transport.
- Khombe River Bridge, KZN: Client – Ibongo Consulting Engineers (Pty) Ltd.
- Upgrading of the D168, KZN: Client – Emzansi Engineers (Pty) Ltd.
- Construction of the KwaHlokhloko Bulk Water Supply Scheme, King Cetshwayo District Municipality: Phase 2, KZN: Client - King Cetshwayo District Municipality.
- Construction of the KwaHlokhloko Bulk Water Supply Scheme, King Cetshwayo District Municipality: Phase 3, KZN: Client - King Cetshwayo District Municipality.
- Umdoni Point Retirement Village General Authorisation Application on the Farm Aliceville No. 2147, Pennington, KwaZulu-Natal: Client – Zamoni: 129 (Pty) Ltd.
- Escourt Industrial Water Pipeline upgrade, Inkosi: Langalibalele Local Municipality, General Authorisation Application: Client – uThukela District Municipality.
- Construction of the Ladysmith Ring Road, KwaZulu-Natal, General Authorisation Application: Client – Aescm (Pty) Ltd on behalf of SANRAL.

EMIPs

- The Farm Eweni No. 15381-FT, the Farm Ezuweni No. 15380-FT, and Portion 18 of the Farm Malden No. 13797, Umgungundlovu District Municipality, KwaZulu-Natal: Client – Skema Holdings (Pty) Ltd.
- Development of Fuel Filling Station, Bridge City, KwaMashu, EThekweni Municipality, KZN: Client – Azelia Environmental Consultants (Pty) Ltd.

- Fuel Filling Station, 13 Hope Street, Kokstad, KZN: Client – New Adventure Investments 38 (Pty) Ltd.
- Fuel Filling Station on 540 Sibhubu Road, Imbali, Pietermaritzburg, KZN
- Fuel Filling Station on Malilabathini Road, Ceza, Ulundi, KZN: Client – Mr. Buthelezi.
- Fuel Filling Station on 79/81 Victoria Road, Pietermaritzburg, KZN: Client - New Adventure Investments 38 (Pty) Ltd.

Environmental Control Officer duties

- Goswell Developments Landfill Permit Audit (2018), Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Goswell Developments Waste Management Facility Audit (2018), Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Escourt Industrial Water Pipeline upgrade, Inkosi: Langalibalele Local Municipality, uThukela District Municipality, KZN: Client – uThukela District Municipality.
- Construction of the Wembezi Bulk Water Supply Scheme, Inkosi: Langalibalele Local Municipality, uThukela District Municipality, KZN: Client – uThukela District Municipality.
- Construction of Cell 4B, Phase 1, Oatlands Landfill, Ray Nkonyeni Local Municipality, KZN – Client: Ray Nkonyeni Municipality.
- Construction of Cell 4B: Phase 2, Oatlands Landfill, Ray Nkonyeni Local Municipality, KZN – Client: Ray Nkonyeni Municipality.
- Construction of the Eteza Interchange, Northern KZN: Client - Worsley Parsons (Pty) Ltd.
- Construction of the Midlands Biogas Midlands Biogas and Fertiliser Plant, uMshwathi Local Municipality, KwaZulu-Natal – Client: Midlands Biogas and Fertiliser.
- Goswell Developments Landfill Permit Audit (2017), Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Goswell Developments Waste Management Facility Audit (2016), Cato Ridge, EThekweni Municipality, KZN: Client – Goswell Developments (Pty) Ltd.
- Upgrade and construction of Bhekuzulu/Epangweni Community Water Supply Scheme, KZN: Client - Worsley Parsons (Pty) Ltd.
- Waste Management Licence Audit at Goswell Developments, Cato Ridge, KZN: Client - Goswell Developments (Pty) Ltd.
- Biennial Environmental Audit at Goswell Developments, Cato Ridge, KZN: Client - Goswell Developments (Pty) Ltd.
- Permit Compliance Audit Report (July 2015) for the Goswell Developments Aluminium Disposal Site, Cato Ridge, KZN: Client - Goswell Developments (Pty) Ltd.
- Permit Compliance Audit Report (October 2016) for the Goswell Developments Aluminium Disposal Site, Cato Ridge, KZN: Client - Goswell Developments (Pty) Ltd.
- Environmental Due Diligence Assessment for the Belgie Breeder Facility located near Bloemfontein, Free State – Client: Sovereign Foods (Pty) Ltd.
- Environmental Due Diligence Assessment for the Beigie Hatchery Facility located near Bloemfontein, Free State – Client: Sovereign Foods (Pty) Ltd.
- Environmental Due Diligence Assessment for the Boishabelo Abattoir and Rendering Plant located near Bloemfontein, Free State – Client: Sovereign Foods (Pty) Ltd.
- Environmental Due Diligence Assessment for the Kelly's View Breeder Facility located near Bloemfontein, Free State – Client: Sovereign Foods (Pty) Ltd.
- Environmental Due Diligence Assessment for the Nutri-feeds Mill located near Bloemfontein, Free State – Client: Sovereign Foods (Pty) Ltd.

Environmental Screening

- Development of a dedicated leachate treatment plant, Oatlands Landfill Site, Port Shepstone, Ray Nkonyeni Local Municipality, KwaZulu-Natal – Client: Ray Nkonyeni Municipality.
- Proposed Wembezi Water Conservation and Demand Management Bulk Water and Reticulation scheme upgrade, Inkosi: Langalibalele Local Municipality, KwaZulu-Natal – Client: JG Afrika (Pty) Ltd
- Construction of a house and associated infrastructure on Portion 33, Mt. Verde Estate, KZN: Client - Mr. Bromage.
- Site Assessment on Portion 405/885 of the Farms Vaalkop and Dadelfontein No. 885, for the proposed development of a Light Industrial Park, Umsias Road, KwaZulu-Natal: Client - AquaTrans (Pty) Ltd.
- Upgrading of footpaths and roads, Ward 59, Moscow, EThekweni Metropolitan, KZN: Client - Nankoo Engineers (Pty) Ltd.

- Upgrading of footpaths and roads, Ward 60: Ivy Close, EThekweni Metropolitan, KZN: Client - Nankoo Engineers (Pty) Ltd.
- Upgrading of footpaths and roads, Ward 02: Jan Roz, EThekweni Metropolitan, KZN: Client - Nankoo Engineers (Pty) Ltd.
- Upgrading of footpaths and roads, Ward 68: Lungelani, La Mercy, EThekweni Metropolitan, KZN: Client - Nankoo Engineers (Pty) Ltd.
- Upgrading of footpaths and roads, Ward 61: Ndilyomlini, Tongaat, EThekweni Metropolitan, KZN: Client - Nankoo Engineers (Pty) Ltd.

JEC ENVIRONMENTAL SERVICES CC

2011 - 2014

Position – Environmental Scientist

Environmental Impact Assessments

- Construction of a 160 sow piggery on Erf 189, Weenen, KZN: Client - Agribusiness Development Agency.
- Relocation of Existing Wood Pole Turning and CCA Treatment Plant from Schroeders to Cramond, Umshwathi Municipality, KZN: Client - F.A.R. Timbers cc.
- Clearance of 40 hectares of indigenous grassland ('veld') for cultivation, KwaSani Local Municipality, KwaZulu-Natal: Client - Flemington Farming.
- Clearance of 35 hectares of indigenous grassland ('veld') for the cultivation of annual crops such as radishes and maize, KwaSani Local Municipality, KwaZulu-Natal: Client - Clowes Farming.
- Construction of a new Water Reservoir and Water Retention infrastructure, Thendele Community, Mpfana Local Municipality, KwaZulu-Natal: Client - Jeffares & Green (Pty) Ltd.
- Establishment of an Effluent Treatment Plant, 14 Oldfield Road, Mkondeni, Msunduzi Local Municipality, Umgundlovu District Municipality: Client - Ramsay Engineering (Pty) Ltd.
- Construction of the Acaciavale – eZakheni Link Road, Ladysmith, Emnambithi Municipality, KZN: Client - EVN Africa Consulting Services (Pty) Ltd.
- Construction of a Biogas Facility at Baynesfield Estate Piggery, Richmond Municipality, KZN: Client - Joseph Baynes Estate.
- Expansion of Piggery Operations on Portion 21 Hardig and Rem of Farm Rhonesterpoort 455, Modimolle Municipality, Waterberg District, Limpopo Province: Client - Greyling Vark Bordeny (Pty) Ltd.

Waste Management Licence Applications

- Merrvale Compost Waste Management Licence, uMgeni Municipality, KZN: Client - Nutrex Earth Matters.
- Waste Management Licence for Tongaat Hulett's Amatikulu Mill, KZN: Client - Tongaat Hulett's Ltd.
- Construction of a 160 sow piggery on Erf 189, Weenen – Client: Agribusiness Development Agency.
- Proposed construction of a Biogas Facility at Raynesfield Estate Piggery, Richmond Municipality, KZN: Client - Joseph Baynes Estate.
- Waste Management Licence application for the existing Mfolozi Waste Transfer Station in KwaMbonambi, Mfolozi (previously Mbonambi) Local Municipality, northern KZN: Client - Mfolozi Local Municipality.
- Expansion of Piggery Operations on Portion 21 Hardig and Rem of Farm Rhonesterpoort 455, Modimolle Municipality, Waterberg District, Limpopo Province: Client - Greyling Vark Bordeny (Pty) Ltd.

Environmental Control Officer duties

- Environmental Audit for the expansion of the Baynesfield Estate Piggery, Richmond Municipality: Client - Joseph Baynes Estate.

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES (PTY) LTD

2010 - 2011

Position – Environmental Control Officer

Environmental Auditing

- Daily Environmental Control Officer duties for the construction and installation of the New Multi-Purpose Pipeline (NMPP) – Client: Transet SOC Limited.

SRK CONSULTING SOUTH AFRICA (PTY) LTD

2007 - 2010

Position – Environmental Scientist

Environmental Impact Assessments

- Incorporation of Flyash into NPC-Cimpor products, Newcastle, KZN: Client - Natal Portland Cement (Pty) Ltd.
- Construction and Operation of a Second Cement Mill at NPC – Cimpor – Simuma Facility, near Port Shepstone, KZN: Client - Natal Portland Cement (Pty) Ltd.
- Storage and Utilisation of Alternative Fuels and Resources at Natal Portland Cement's Simuma Facility, Port Shepstone, KZN: Client - Natal Portland Cement (Pty) Ltd.
- Establishment of a flood attenuation facility in the Palmiet River catchment, Padfield Park, Pinetown, KZN: Client - EThekweni Municipality.
- Construction and Operation of a Calciner at Foskor and a Rapidwall Plant at ERF1906, Alton, Richards Bay, KZN: Client - Foskor Limited.
- Environmental Management Plan for the Mondli Odour Abatement project, Richards Bay, KZN: Client – Mondli Limited.
- Installation of Underground Storage Tanks at the Car Rental Facilities at the King Shaka Airport, La Mercy, KZN: Client - Natural Resources Institute.
- Decommissioning of MSWA Plant, Dow AgroSciences, Verulam, KZN: Client - Dow Chemicals.
- Installation of the SEA Cable System, KZN North Coast, South Africa - Client: SEACOM / NEOTEL;
- Installation of an Underground Storage Tank for "Non-Aromatic" White Spirits, Pinetown, KZN: Client - Sara Lee (Pty) Ltd.
- Construction of the Wembezi interchange at National Route 3 and Main Road 29, Wembezi / Estcourt, KZN: Client - Jeffares & Green (Pty) Ltd.

Environmental Control Officer duties

- Post-construction auditing of the various cable stations constructed for the use of the SEACOM telecommunications cable: Client - SEACOM / NEOTEL.
- Due diligence audit of the Tyco Cable Laying Vessel of the SEA Cable System: Client - SEACOM / NEOTEL.
- Environmental Compliance Audit for the Installation of Aboveground Storage Tanks, Phoenix, EThekweni Municipality: Client - ABI (Pty) Ltd.

AFZELIA ENVIRONMENTAL CONSULTANTS CC

2006 - 2007

Position – Environmental Scientist

Environmental Impact Assessments

- Construction of Baronberg Estate' on the Farm Blair Atholl No. 15735, Mooi Mpofoana Municipality, KZN: Client - Baronberg cc.
- Cleopatra Extension, KZN Midlands: Client – Cleopatra (Pty) Ltd.
- Construction of Chicken Houses on Hanbury Farms, Farm No 4, Ashley Grange, D174, Memvale / Mophomani, KZN: Client - Hanbury Chickens (Pty) Ltd.
- eSikheshini community access road upgrade, Ingwe Local Municipality, Sisonke District Municipality, KZN: Client - Ingwe Local Municipality.
- "Hillside" development on the Remainder of Portion 99 (of 25) of the Farm Cowrie No. 1930, Nottingham Road, uMngeni Local Municipality, KZN: Client - Rawdons Country Estate.
- Development of a water pipeline from Sundumbili reticulation reservoir A to Mandeni Bulk Gravity Main and on to Rocky Ridge Reservoir, including an additional pipeline to the Tugela Water Treatment Works, Mandeni, Iembe Municipality, KZN: Client - SSI (Pty) Ltd.
- Resort and Spa Development on the North Bank of the Thukela Mouth, Portion 1 of Ayinkindaba No. 11678, Portion 5 of 3 of Ayinkindaba No. 11678, and Portion 2 and 3 of Reserve No. 7A No. 15826, Mandeni Local Municipality, KZN: Client - Private developer.
- "Tugela Tides" resort on the North Bank of the Thukela Mouth, on remainder of Portion 3 of Ayinkindaba No.11678, and portion 4 or 3 of the farm Ayinkindaba No.15826, Mandeni Local Municipality, KZN: Client – Private developer.

- Upgrading of the Umzimkhulu pedestrian bridge, Sisonke District Municipality, KZN - Client: Umzimkhulu Municipality.
- Development of a poultry enterprise on the Remainder of Wilde Perde Vlei no. 1004, Winterton, uThukela Municipality, KwaZulu-Natal - Client: Private developer.

DEVELOPMENT

COURSES

- 2016 - Microsoft Project 2013 Essentials: Bytes People Solutions
- 2009 - Tree Identification Short Course: Indiflora cc
- 2008 - IEMA Environmental Auditor Course (ISO 14001): Crystal Clear Consulting
- 2007 - Solid Waste Management: Durban Solid Waste
- 2002 - Introduction to Counselling, Psychology South Thames College, London, England

EAPASA

Unit 19 Oxford Office Park
3 Bauhinia Street
Highveld Techno Park
Centurion
0157

Tel: (+27) 12 880 2154

Email: registrat@eapasa.org / Website: www.eapasa.org

Mrs Liz Dralle
9 Wylie Crescent
Weimbley
Pietermaritzburg
3201

Sent by email to: drallel@igafrika.com

Dear Mrs Dralle

Registered Environmental Assessment Practitioner: Number 2019/717

Elizabeth Ann Dralle: South African ID 810702 0095 084

The Environmental Assessment Practitioners Association of South Africa (EAPASA) herewith certifies that Elizabeth Ann Dralle is a Registered Environmental Assessment Practitioner (EAP) in accordance with the prescribed criteria of Regulation 15.(1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Your registration is duly authorised by EAPASA as the single Registration Authority for EAPs in South Africa (appointed as per Regulation No. 104, Gazette No. 41434 of 8 February 2018, in terms of section 24H(3)(a) of the NEMA). Your status as a Registered EAP is displayed in the 'EAP Register' - please find your name and contact email address at <https://registration.eapasa.org/registered-practitioners>

Your registration is effective for a period of five years from 5 October 2019, and expires on 5 October 2024. The renewal of your registration in 2024 will be contingent on you having met the requirements of EAPASA's Continuing Professional Development (CPD) policy during each year of registration.

As a Registered EAP you are required to uphold the EAPASA Code of Ethical Conduct and Practice in your professional endeavours, towards the goal of quality assurance in environmental assessment practice.

Please accept my congratulations on your registration.

Best regards

Dr Richard Hill
Registrar

Date: 5 October 2019

Board Members: Ms Snowy Makhuu (Chairperson), Mr Khangwelo Desmond Muiseliso (Vice-Chairperson),
Mr Nisako Baloyi, Mr Zama Dlamini, Mr Syabonga Gqalungile, Ms Jacqui Hox, Ms Sibusiso Hlela,
Mr Malcolm Moses, Mr Phumudzo Neliswa, Mr Dannie Neumann, Ms Keshini Rughnoobee.
Registrar: Dr Richard Hill
NPO Reg. No. 122-986

APPENDIX 2: ALIEN PLANT CONTROL

Best practice measures that should be undertaken during clearing include the following:

- (i) Cut plants as low to ground as possible.
- (ii) All alien plants must be removed carefully and exposed soil should be covered with cut vegetation or leaf litter that is free of weed seeds to ensure that regrowth will not occur.
- (iii) Press any loosened soil down carefully and firmly and mulch with plant material where possible.
- (iv) All alien seeds, fruit bulbs, tubers and stems must be collected and placed in a sealable container/plastic bag for disposal at a landfill site.
- (v) The roots system of mature trees including alien invasive play an important role in stabilising soil and therefore the up-rooting of large mature specimen of trees is not advocated. It is better to fell the trees and paint the stump with the relevant herbicides.

Control methods

METHOD	DESCRIPTION
MECHANICAL METHOD	
Hand pulling/ hoeing	<ul style="list-style-type: none"> Hand pulling is most effective with small (30cm), immature or shallow rooted plants. Shake the excess sandy material from the plant, this makes the plant easier to stockpile and lighter to transport. However, make sure there is no seed on the plant first to eliminate the spread of seed while shaking.
Chopping/ cutting/ slashing	<ul style="list-style-type: none"> This method is most effective for plants in the immature stage, or for plants that have relatively woody stems/ trunks. This is an effective method for non-re-sprouters or in the case of re-sprouts (coppicing) it must be done in conjunction with chemical treatment of the cut stumps. <p>Note</p> <ul style="list-style-type: none"> Cut/slash the stem of the plant as near as possible to ground level. Paint re-sprouting plants (i.e. Black Wattle, Lantana and Port Jackson willow) with an appropriate herbicide immediately after they have been cut. Stockpile removed material into piles as prescribed.
Felling	<ul style="list-style-type: none"> De-branch trees and where possible remove all material. Where possible large trees that are to be felled such that they fall uphill. Cut the tree down as low as possible to the ground. Apply herbicide immediately (no later than 30mins) to the cambium layer. Ensure all the cuts in the cambium layer are treated.
Ring barking	<ul style="list-style-type: none"> Remove bark in a 30-40cm centimetre band and leave the tree to die Can be used with or without chemicals but is more successful when herbicide is used

APPENDIX 3: EMPr ACKNOWLEDGEMENT FORM**PROPOSED GUNJANA COMMUNITY WATER SUPPLY SCHEME: PHASE 2, MSINGA LOCAL MUNICIPALITY, UMZINYATHI DISTRICT MUNICIPALITY, KWAZULU-NATAL**

Record of signatures providing acknowledgment of being aware of, and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental management, mitigation and rehabilitation measures for the project outlined above, and the environmental conditions contained in the civil and other construction contract documents.

APPLICANT / EMPLOYER:

Signed: Date:

IMPLEMENTING AGENT:

Signed: Date:

CONTRACTOR:

Signed: Date:

EMPLOYER'S REPRESENTATIVE / ENVIRONMENTAL MANAGER

Signed: Date:

SUB - CONTRACTOR:

Signed: Date: