APPENDIX I1:

PRE-CONSTRUCTION EMPr

PROPOSED UMKHOMAZI WATER PROJECT PHASE 1

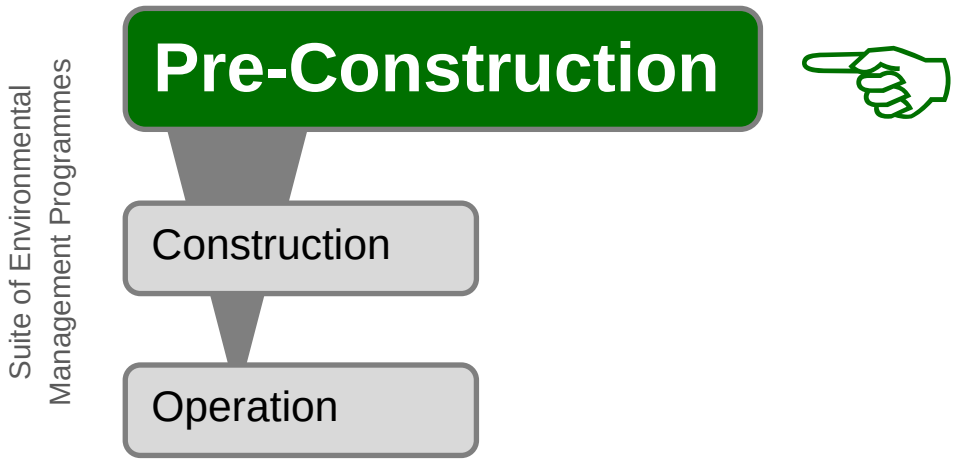
Potable Water Component

PRE-CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

FINAL

November 2016

DEA Ref. No.: 14/12/16/3/3/3/95



TITLE AND APPROVAL PAGE

Project Name:	***Proposed uMkhomazi Water Project Phase 1 - Potable Water Component***
Report Title:	***Draft Pre-Construction Environmental Management Programme***
Authors:	***D. Henning, C. Chidley, N. Naidoo***
Authority reference no.:	***DEA Reference - 14/12/16/3/3/3/95***
Umgeni Water report reference no.:	
Status of report:	***Final***
Date of issue:	***November 2016***

Consultants: *Nemai Consulting*
Approved for Consultants by:

……
N Naidoo
Study Leader

UMGENI WATER
Approved for Client by:

……
G. Subramanian
Planning Services

Prepared by Nemai Consulting
for Umgeni Water

AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
July 2016	Draft for Authorities and Public Review	0	
November 2016	Final for Authorities' and Public Review	1	

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS & ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
DAFF	Department of Agriculture, Forestry and Fisheries
DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DEA	Department of Environmental Affairs
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DoT	Department of Transport
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KZN Wildlife
EMC	Environmental Monitoring Committee
EMPr	Environmental Management Programme
GN	Government Notice
Ha	Hectare
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Party
km	Kilometre
km^2	Square kilometre
KZN	KwaZulu-Natal
ℓ	Litres
LM	Local Municipality
m	Metre
m^2	Square meters
m^3	Cubic metre
mm	Millimetre
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NWA	National Water Act (Act No. 36 of 1998)
OHS	Occupational Health and Safety
SANS	South African National Standard
uMWP-1	uMkhomazi Water Project Phase 1
WTW	Water Treatment Works

DEFINITION OF KEY TERMS

Auditing	*A systematic and objective assessment of an organisation's activities and services conducted and documented on a periodic basis.*
Competent	*Combination of knowledge, qualifications and experience specific to the work or task being performed.*
Construction Area	*Immediate site influenced by specific construction activities, as approved by the Project Manager.*
Construction Domain	*Entire footprint required for the construction of the overall project components.*
Environment	*The surroundings in which humans exist and which comprise:* • *The land, water and atmosphere of the earth.* • *Micro-organisms, plant and animal life.* • *Any part or combination of a) and b) and the interrelationships among and between them.* • *The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.*
Environmental Aspect	*Those components of the company's activities, products and services that are likely to interact with the environment.*
Environmental Feature	*Elements and attributes of the biophysical, economic and social environment.*
Environmental Impact	*The change to the environment resulting from an environmental aspect, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.*
Environmental Management Programme (EMPr)	*A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.*
Environmental Objective	*Overall environmental goal pertaining to the management of environmental features.*
Environmental Target	*Performance requirement that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.*
Impervious	*Not permeable; not allowing liquid to pass through. Resistant to movement of water.*
Monitoring	*A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.*
Potable Water	*Water that is fit or suitable for drinking.*
Project Area	*The greater area within which the project is executed. Extends beyond the construction domain.*
Raw Water	*Natural (untreated) water found in the environment, such as water from bodies like dams and rivers.*
Sensitive environmental	*Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA as sensitive through specialists' findings and input*

features	*received from Interested and Affected Parties.*
Watercourse	*A geomorphological feature characterized by the presence of a streamflow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water. According to the National Water Act (Act 36 of 1998), a watercourse constitutes a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, 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, and a reference to a watercourse includes, where relevant, its bed and banks.*
Weeds and Invader Plants	*Weeds and invader plants are defined as undesirable plant growth that shall include, but not be limited to all declared category 1, 2 and 3 listed invader species as set out in the Conservation of Agricultural Resources Act (No 43 of 1983) regulations. Other vegetation deemed to be invasive should be those plant species that show the potential to occupy in number, any area within the defined construction area*

1 PURPOSE OF THIS DOCUMENT

The uMkhomazi Water Project Phase 1 (uMWP-1), which entails the transfer of water from the undeveloped uMkhomazi River (also known as the Umkomaas or Mkomazi) to the existing Mgeni system, is currently being investigated through a Feasibility Study. This transfer scheme is deemed to be the most viable option to provide a large volume of water to fulfil the long-term water requirements of the Mgeni system. The uMWP-1 consists of both Raw Water and Potable Water components which are being undertaken by the Department of Water and Sanitation (DWS) (previously known as the Department of Water Affairs (DWA)) and Umgeni Water, respectively.

The proposed uMWP-1 Potable Water component consists of the following:

- A Water Treatment Works (WTW) and potable water storage reservoir in the uMlaza River valley; and
- Potable water pipeline from the WTW to Umlaas Road where it connects into the existing ’57 Pipeline owned by Umgeni Water.

This document serves as the **Environmental Management Programme** (EMPr), as contemplated in Regulation 33 of Government Notice (GN) No. R. 543 (18 June 2010), for the pre-construction phase of the project. It was developed in support of the Environmental Impact Assessment (EIA) that was undertaken for the project.

2 DOCUMENT ROADMAP

As a minimum, the EMPr aims to satisfy the requirements stipulated in Regulation 33 of GN No. R. 543 (18 June 2010), as promulgated in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998). **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: EMPr Roadmap in relation to GN No. R. 543

Chapter	Title	Correlation with G.N. No. R543	
1	Purpose of this Document	–	
2	Document Roadmap	–	
3	Project Background and Motivation	–	
4	Project Location		
5	Overview of Project	–	
6	EMPr Framework	–	
7	Environmental Assessment Practitioner	R33(a)	Details of – (i) the person who prepared the EMPr; and (ii) the expertise of that person to prepare an EMPr.
8	Environmental Governance Framework	–	
9	Roles & Responsibilities	R33(d)	An identification of the persons who will be responsible for the implementation of the measures contemplated in paragraph (b).
10	Monitoring	R33(e)	Proposed mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon
11	Environmental Training & Awareness Creation	R33(j)	An environmental awareness plan describing the manner in which - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.
12	EMPr Review	–	
13	Environmental Activities, Aspects and Impacts	R33(c)	A detailed description of the aspects of the activity that are covered by the draft environmental management programme.
14	Sensitive Environmental Features	–	
15	Implementation Programme	R33(b)	Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by the EIA Regulations, including environmental impacts or objectives in respect of –

Chapter	Title	Correlation with G.N. No. R543	
			(i) planning and design; (ii) pre-construction and construction activities; (iii) operation or undertaking of the activity; (iv) rehabilitation of the environment; and (iv) closure, where relevant.
		R33(f)	As far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development, including, where appropriate, concurrent or progressive rehabilitation measures.
		R33(g)	A description of the manner in which it intends to - (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; (iii) comply with any prescribed environmental management standards or practices; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		R33(h)	Time periods within which the measures contemplated in the environmental management plan must be implemented.
		R33(i)	The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

3 PROJECT BACKGROUND AND MOTIVATION

The current water resources of the Integrated Mgeni Water Supply System (WSS) are insufficient to meet the long-term water requirements of the system. The Integrated Mgeni WSS is the main water source that supplies about five million people and industries in the eThekwini Municipality, uMgungundlovu District Municipality (DM) and Msunduzi Local Municipality (LM), all of which comprise the economic powerhouse of the KwaZulu-Natal (KZN) Province.

The Integrated Mgeni WSS comprises the Midmar, Albert Falls, Nagle and Inanda Dams in KZN, a water transfer scheme from the Mooi River and the newly constructed Spring Grove Dam. The current system (Midmar, Albert Falls, Nagle and Inanda Dams and Phase 1 of the Mooi Mgeni Transfer Scheme) has a stochastic yield of 334 million m³/a (measured at Inanda Dam) at a 99% assurance of supply. The short-term augmentation measure, Phase 2 of the Mooi Mgeni Transfer Scheme, currently being implemented with the construction of Spring Grove Dam, will increase water supply from the Integrated Mgeni WSS by 60 million m³/a. However, this will not be sufficient to meet the long-term requirements of the system.

Pre-feasibility investigations indicated that the development of the undeveloped uMkhomazi River, to transfer water to the existing Mgeni system, most likely will fulfil this requirement. The uMkhomazi River is the third-largest river in KZN in terms of mean annual runoff.

The uMWP-1 consists of both Raw Water and Potable Water components which are being undertaken by DWS and Umgeni Water, respectively. A simplified diagrammatic representation of the overall transfer scheme is provided in **Figure 1**. This report only focuses on the uMWP-1 Potable Water component.

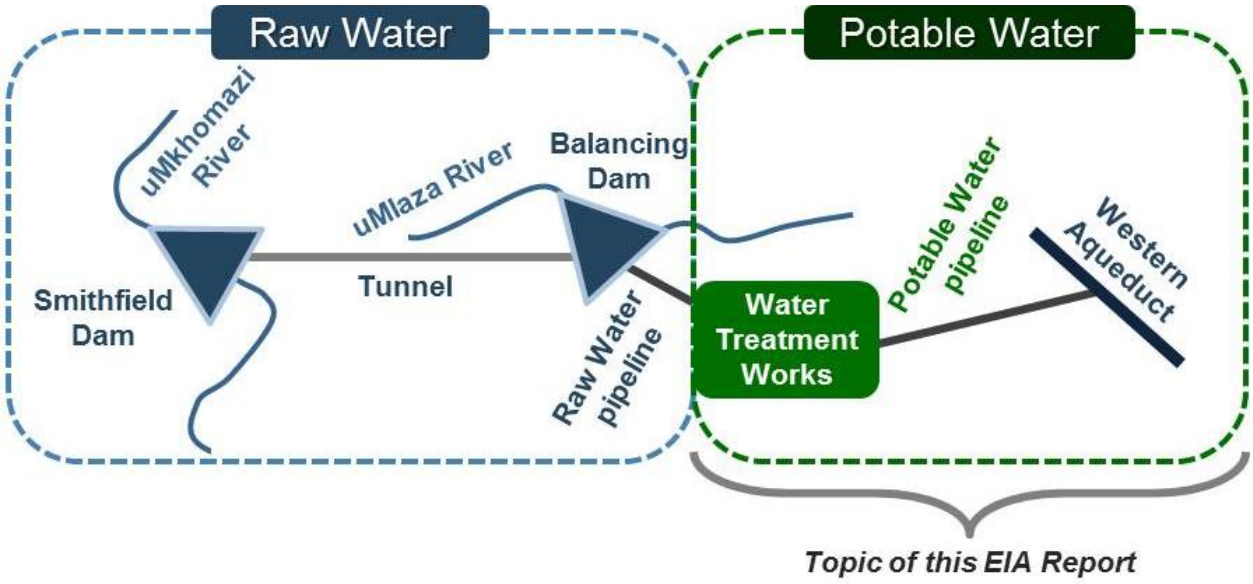


Figure 1: Simplified diagram of uMWP-1 components

4 PROJECT LOCATION

The preferred layout for the uMWP-1 Potable Water components, as established through the EIA, is shown in **Figure 2**.

The uMWP-1 Potable Water project area is situated in the southern part of KZN, in the uMgungundlovu DM. The western part falls within the Richmond LM and the eastern part in the Mkhambathini LM.

The majority of the project area is located on privately owned land which is predominantly used for commercial farming and forestry. In the north-eastern part the pipeline crosses the light industrial area of Umlaas Road.

The nearest town to the western part of the project area is Richmond, which is located more than 10km to the south-west of the WTW at Baynesfield Estate. The potable water pipeline route travels past the north of Hopewell. Apart from Umlaas Road and Hopewell, the project infrastructure is located within rural areas.

The location of the project infrastructure was influenced by various factors, such as topography and associated elevation, impacts to the receiving environment, existing servitudes, existing structures and infrastructure, access, site constraints and geotechnical conditions (amongst others). From a technical perspective, a primary determinant in siting the infrastructure was ensuring the correct elevation to maintain a gravity fed system.

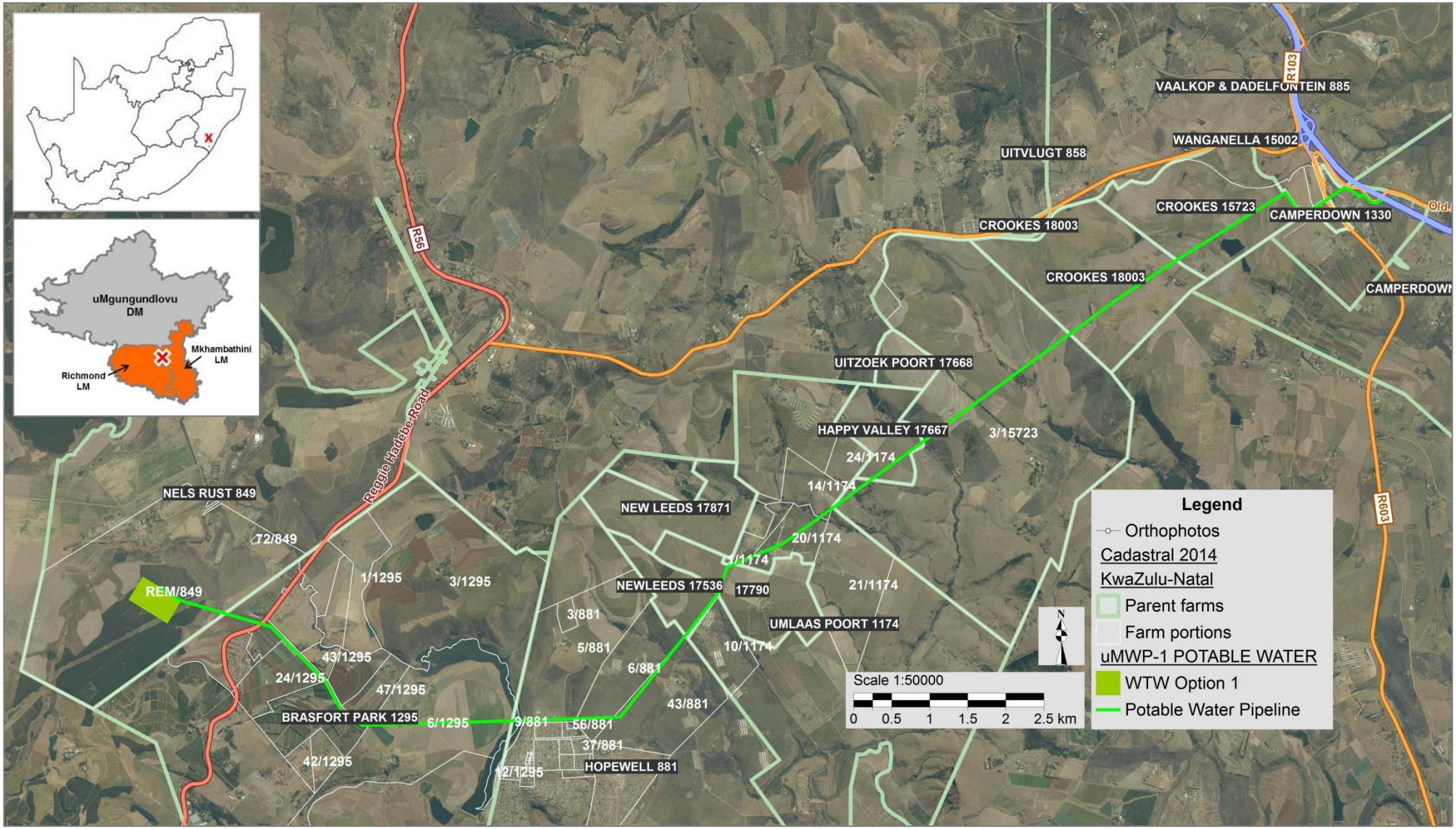


Figure 2: **Locality Map – uMWP-1 Potable Water (preferred layout)**

5 OVERVIEW OF PROJECT

The components of uMWP-1 Potable Water are listed in **Table 2**.

Table 2: uMWP-1 Potable Water Project Components

Potable Water Component	Associated Infrastructure
WTW & Potable Water Reservoir	❖ Access roads ❖ 600 m by 350 m (21 Ha) WTW, which includes (amongst others): • Control room • Inlet works • Chemical storage area • Pre-chlorination facility • Clarifiers • Filters • Post-chlorination facility • Sludge holding tanks • Thickeners • Sludge storage area • Sludge dewatering area ❖ Reservoir for storage of treated water ❖ Operator's offices ❖ Parking facilities ❖ Fencing
Potable Water Pipeline	❖ Access roads ❖ Two x 2500mm gravity pipelines running in parallel ❖ Chambers and valves

6 EMPr FRAMEWORK

Due to the extent of the overall project, the following EMPrs were developed to deal with the various key components of the project:

1. **Pre-Construction EMPr** (theme of this document);
2. Construction EMPr; and
3. Operational EMPr.

It is recommended that a Rehabilitation Management Plan be developed, which should include additional measures identified during construction to supplement the reinstatement and rehabilitation provisions included in the EMPr for the construction phase (if necessary)

The Pre-construction EMPr provides performance criteria required to address potential environmental impacts during the pre-construction phase of the uMWP-1 Potable Water project. This Report must be read in conjunction with the EIA Report.

The scope of the Pre-construction EMPr is as follows:

- Establish management objectives during the pre-construction phase in order to enhance benefits and minimise adverse environmental impacts;
- Provide targets for management objectives, in terms of desired performance;
- Describe actions required to achieve management objectives;
- Outline institutional structures and roles required to implement the Pre-construction EMPr; and
- Provide legislative framework.

7 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by Umgeni Water as the independent Environmental Assessment Practitioner (EAP) to undertake the EIA for the proposed uMWP-1 Potable Water component.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng), Durban (KZN) and Rustenburg (North West Province).

The core members of Nemai Consulting that were involved with compiling the EMPr for the project are captured in **Table 3** below, and their respective Curricula Vitae are contained in in the body of the EIA Report.

Table 3: EMPr Core Team Members

Name	Qualifications	Experience
Mr D. Henning	MSc (Aquatic Science)	15 years' experience. Prepared EMPs and acted as the Environmental Control Officer (ECO) on various projects, including: • 80km bulk water pipeline from Randfontein to Rustenburg, North-West; • Construction of the Spring Grove Dam, as part of the Mooi-Mgeni Transfer Scheme Phase 2, KZN; • Ncwabeni Off-Channel Storage and associated infrastructure, KZN; • Mokolo Crocodile West Water Augmentation Project (water transfer scheme), Limpopo; and • Foxwood Dam and associated infrastructure, Eastern Cape.
Mr C. Chidley	• B.Sc Eng (Civil); • BA (Economics, Philosophy) • MBA	22 years' experience. Prepared EMPs and acted as the ECO on various projects, including: • Raising of Hazelmere Dam, KZN; • Upgrade of the Sunderland Ridge Waste Water Treatment Works and bulk sewer line situated on the Hennops River, Gauteng; and • Empangeni Bulk Outfall Sewer, 40km pipeline, KZN.

8 ENVIRONMENTAL GOVERNANCE FRAMEWORK

8.1 Legal Framework

Pre-construction will be undertaken according to recognised best industry practices and will include measures prescribed within this EMPr. This EMPr shall form part of the contract documents, and informs the Contractor about his duties in the fulfilment of the project objectives, with particular reference to the mitigation of environmental impacts that may potentially be caused by pre-construction activities associated with the project. The Contractor will note that obligations imposed by the EMPr are legally binding in terms of environmental legislation.

All project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Specific legislation that must be complied with includes, but is not necessarily limited to:

- Constitution of the Republic of South Africa, (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- National Water Act (No. 36 of 1998);
- Mineral and Petroleum Resources Development Act (No. 28 of 2002);
- National Environmental Management: Biodiversity Act (No. 10 of 2004);
- National Environmental Management: Waste Act (No. 59 of 2008);
- National Heritage Resources Act (No. 25 of 1999);
- National Veld and Forest Fire Act (No. 101 of 1998);
- National Environmental Management Protected Areas Act (No. 57 of 2003);
- Environmental Conservation Act (No. 73 of 1989);
- National Environmental Management Air Quality Act (Act No. 39 of 2004);
- Integrated Coastal Management Act (Act No. 24 of 2008);
- Animal Protection Act (No. 71 of 1962);
- Conservation of Agricultural Resources Act (No. 43 of 1983);
- Hazardous Substances Act (Act No. 15 of 1973);
- Occupational Health and Safety Act (No. 85 of 1993);
- Construction Regulations (2014); and
- Explosives Act (No. 15 of 2003).

The various forms of authorisation that will be required for the project are listed in **Table 4**.

Table 4: Authorisations required for the implementation of the project

Description	Legal Reference	Regulatory Authority
Approval required for listed activities in terms of the EIA Regulations (18 June 2010) associated with the project. Scoping and EIA process conducted.	• National Environmental Management Act (No. 107 of 1998) • EIA Regulations (GN No. R. 543, R. 544, R. 545 and R. 546 of 18 June 2010)	DEA

Description	Legal Reference	Regulatory Authority
The project entails the following activities that constitute water uses in terms of Section 21 of the National Water Act (NWA) (No. 36 of 1998): • Section 21(c) - Impeding or diverting the flow of water in a watercourse (instream works for crossing of watercourses by the pipeline); and • Section 21(i) - Altering the bed, banks, course or characteristics of a watercourse (instream works for crossing of watercourses by the pipeline).	• National Water Act (No. 36 of 1998)	DWS
Permits to be obtained if protected trees are to be cut, disturbed, damaged, destroyed or removed.	• National Forests Act (No. 84 of 1998)	Department of Agriculture, Forestry and Fisheries (DAFF)
Permits to be obtained if heritage resources are to be impacted on and for the removal of graves.	• National Heritage Resources Act (No. 25 of 1999) • KZN Heritage Act (No. 04 of 2008)	Amafa aKwaZulu-Natali
Permits to be obtained for the removal and transportation of endangered fauna and flora.	• National Environmental Management: Biodiversity Act (Act No. 10 of 2004) • Natal Nature Conservation Ordinance (15 of 1974)	Ezemvelo KZN Wildlife (EKZNW)
Permits required for blasting.	• Explosives Regulations (GN R109 of 17 January 2003)	SAPS Explosives

Additional legal requirements include the following:

- ❖ All waste (general and hazardous) generated during the pre-construction phase may only be disposed of at appropriately licensed sites in terms of National Environmental Management: Waste Act (No. 59 of 2008);
- ❖ Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards;
- ❖ The storage of general or hazardous waste in a waste storage facility must comply with the norms and standards in GN No. R. 926 of 29 November 2013;
- ❖ Construction Regulations (2003) published under the Occupational Health and Safety Act (No. 85 of 1993) apply to construction activities including “the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work”. A “health and safety plan” which addresses hazards identified, and includes safe work procedures to mitigate, reduce or control the hazards identified, is required under this Act; and
- ❖ Umgeni Water will need to conform to all its legal obligations as part of the acquisition of land for the construction and operation of the project.

8.2 Project Specifications

The EMPr focuses more on performance criteria for environmental compliance, whereas the detail on how the project is to meet these performance criteria is provided in the Umgeni Water Particular Specification for Environmental Management of Construction Projects (contained in Appendix A) in the form of minimum standards and measures to be implemented by the Contractor. The EMPr and Specification are regarded as complimentary and where any contradictions exist the latter will take preference.

The Contractor shall provide detailed method statements on how the performance criteria will be met, through the application of the specification. These methods are to be reviewed and approved by the Project Manager to ensure that they are adequate.

The Method Statements must be project- and site specific and should explain in detail the following:

1. The manner in which the work is to be undertaken;
2. The estimated schedule for the works (timing);
3. The area where the works will be executed (location);
4. The materials and plant / equipment needed for the works;
5. The necessary mitigation measures that need to be implemented to adequately safeguard the environment, construction workers and the public (where applicable);
6. Training of employees;
7. Roles and responsibilities; and
8. Monitoring and reporting requirements;

The list of method statements required to assist in the implementation of this EMPr includes at least the following (where applicable):

- Method Statement for site clearing;
- Method Statement for establishing the construction camp;
- Method Statement with regard to waste and wastewater management;
- Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;
- Method Statement for dust control;
- Method Statement for the storage and handling of hazardous substances;
- Method Statement for management of concrete and batching plants;
- Method Statement for river diversions;
- Method Statement for managing spoil material;
- Method Statement for controlling alien invasive species and noxious weeds;
- Method Statement for the decommissioning of the construction works area; and
- Method Statement for rehabilitation of construction footprint.

9 ROLES & RESPONSIBILITIES

A high-level outline of the institutional arrangements for the implementation of the EMPr during the pre-construction and construction phases of the project, as well as the conditions of the Environmental Authorisation, is provided in **Figure 3**.

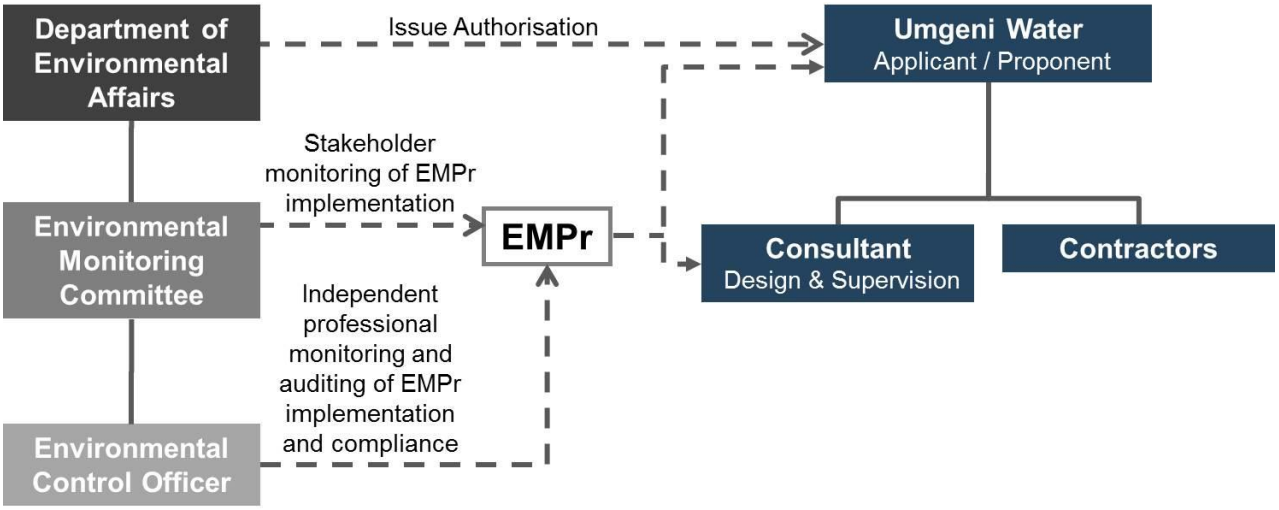


Figure 3: Institutional Arrangements: Roles & Responsibility

9.1 DEA

DEA is the mandated authority in terms of the National Environmental Management Act (No. 107 of 1998) that determines whether authorisation can be issued for the project, following a decision-making process conducted as part of the EIA. Conditions are included in the Environmental Authorisation, which need to be complied with by the project applicant.

DEA also fulfils a compliance and enforcement role with regards to the authorisation. The Department may perform random inspections to checks compliance. DEA will also serve as an active member of the Environmental Monitoring Committee (EMC) (if established) and will review the monitoring and auditing reports compiled by the ECO.

Amendments may be required to the EMPr or the Environmental Authorisation, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by DEA.

9.2 Umgeni Water

Umgeni Water is the applicant in terms of National Environmental Management Act (No. 107 of 1998). Umgeni Water is also referred to as the project proponent and is ultimately responsible for

the development and implementation of the EMPr and ensuring that the conditions in the Environmental Authorisation are satisfied. The liability for non-compliance thus rests with Umgeni Water.

9.3 Environmental Monitoring Committee

An EMC may be established before commencement of any construction activities, and will serve as an additional mechanism for monitoring the implementation of the EMPr and compliance with the Environmental Authorisation as well as for improving communication amongst key stakeholders. The committee will have an advisory, monitoring and "watch-dog" role for the duration of the construction phase of the project. This committee will report to the Director-General of DEA.

Appropriate Terms of Reference for the EMC will need to be prepared, which will include roles and responsibilities, membership and functionality (amongst others).

9.4 Project Manager

The Project Manager has over-all responsibility for managing the Contractors and for ensuring that the environmental management requirements are met. During the construction phase, the Project Manager will be the proponent's (or implementing agent's) construction manager. During the operations phase it is expected that this role will be fulfilled by the operations manager.

The Project Manager will be on site and the responsibilities of this party will include the following (amongst others):

- Overseeing of all environmental matters and compliance with all environmental requirements and authorisations; and
- Act as the interface between the ECO, EMC (if established) and the other project role players.

9.5 Environmental Control Officer

The ECO is a competent (minimum of 3 years' experience) and independent representative, who acts as the EMC (if established) monitoring representative for the conducting of independent audits and performing a secretariat function for the EMC.

The ECO will undertake weekly inspections of the site and at least 6 monthly full compliance auditing against the EMPr and Environmental Authorisation. The aforementioned reports will be submitted to the Project Manager, EMC (if established) and DEA for their records.

The ECO will also check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (air, noise and water quality).

9.6 Contractor's Environmental Officer

The primary role of the competent Environmental Officer (minimum of 3 years' experience) is to coordinate the environmental management activities of the Contractor on site.

Specific responsibilities of the Environmental Officer, who will be on site, will include the following:

- Aiding the Contractor to comply with all the project's environmental management requirements;
- Assisting the Contractor in compiling Method Statements;
- Facilitating environmental activities and environmental awareness training of all persons on site;
- Exercise an internal compliance management system on behalf of the Contractor;
- Inspect the site as required to ensure adherence to the management actions of the EMPr and the Method Statements;
- Ensuring that environmental monitoring (air, noise and water quality) is being undertaken;
- Complete Site Inspection Forms on a regular basis;
- Provide inputs to the regular environment report to be prepared by the ECO (as required);
- Liaise with the construction team on issues related to implementation of, and compliance with, the EMPr;
- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded, as well as actions taken.

10 MONITORING

Monitoring is required to ensure that the receiving environment is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

10.1 Baseline Monitoring

Baseline monitoring aims to determine the pre-construction state of the receiving environment, and serves as a reference to measure the residual impacts of the project by evaluating the deviation from the baseline conditions and the associated significance of the adverse effects.

The environmental parameters to be included in the baseline monitoring, which is to be undertaken by Umgeni Water, are shown in **Table 5**.

Table 5: Baseline Monitoring Requirements

Environmental Parameter	Monitoring Locations	Requirements
Water Quality	• All major watercourses to be affected by the project, including the uMlaza River and its tributaries (including drainage lines). Sites to be located at suitable spots up- and downstream of the construction sites and in-stream works, to be determined in consultation with the ECO. • *In situ* water quality monitoring to be conducted.	• Comply with relevant standards - SANS 5667. • Water Quality variables to be tested include: ○ Chemical oxygen demand ○ Total ammonia ○ Copper ○ Iron ○ Lead ○ Nitrite/Nitrate ○ Orthophosphate ○ Zinc ○ Faecal coliform bacteria ○ Sodium (Na) ○ Soap, oil and grease ○ Manganese ○ Fluoride
Air Quality	• Dust fallout units to be located taking into consideration significant sources of air pollution, sensitive receptors, and dominant wind direction. Dust fallout to be measured at / around the following sites (as a minimum) – ○ Batching plant; ○ Soil stockpiles; ○ Crusher area; ○ WTW construction area; ○ Sensitive features – ▪ The homesteads located on The Mynde Farm and Kyalami Farm; ▪ The Hopewell community; ▪ Dwellings situated in close proximity to the pipeline route; ▪ Chicken houses situated alongside the pipeline route; and ▪ Businesses and residential areas in the Umlaas Road area, situated in close proximity to the pipeline route • Particulate matter (PM_{10}) – strategic	• Dust fallout – comply with ASTM D1739; SANS 1929, SANS 69. • Particulate matter (PM_{10}) – comply with the National Ambient Air Quality Standards.

Environmental Parameter	Monitoring Locations	Requirements
	monitoring point(s) to be selected.	
Noise & Vibration	Noise and vibration monitoring sampling sites to be located taking into consideration significant sources of noise, sensitive receptors (see receptors listed under Air Quality), and dominant wind direction. Sites to coincide with dust fallout sites (where relevant).	• Comply with SANS 10103:2008.
	Develop and implemented a noise and vibration monitoring programme that includes sensitive avifauna (including Blue Swallow and Cranes).	• Establish requirements of environmental authorities and stakeholders, including DEA, EKZNW, BirdLife SA and WESSA.

10.2 Environmental Monitoring

Environmental monitoring entails checking, at pre-determined frequencies, whether thresholds and baseline values for certain environmental parameters are being exceeded. The parameters and sampling localities used during the baseline monitoring will form the basis of the environmental monitoring programme.

The following requirements need to be incorporated into the programme:

- Monitoring during normal operations, abnormal situations and emergency situations (e.g. unexpected spillage of hazardous substance);
- Measuring equipment must be accurately calibrated;
- Adequate quality control of the sampling must be ensured;
- Analysis is to be undertaken at a SANS 17025 certified laboratory;
- Certified methods of testing must be employed;
- Where legal specifications exist for testing and sampling methods, these must be taken into account; and
- Establish a process for identifying and implementing corrective measures.

Note that the specifications may include more detailed requirements in terms of environmental monitoring.

10.3 Compliance Monitoring and Auditing

Compliance monitoring will commence in the pre-construction phase, where those conditions in the Environmental Authorisation that need to be adhered to prior to project implementation will need to be checked and recorded, as well as to check compliance with the provisions in the Pre-Construction EMPr. Compliance monitoring will be completed at the end of the defects liability period to check the performance of rehabilitation measures and whether the related objectives have been met.

The ECO will undertake weekly inspections of the site and at least 6 monthly full compliance auditing against the EMPr and Environmental Authorisation. The aforementioned reports will be submitted to the Project Manager, EMC (if established) and DEA for their records.

Auditing of compliance with the Environmental Authorisation and EMPr must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014) in terms of the following:

1. The holder of an Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr, remain valid -
    a. Ensure that the compliance with the conditions of the Environmental Authorisation and EMPr is audited; and
    b. Submit an environmental audit report to DEA.
2. The environmental audit report must-
    a. Be prepared by an independent person with the relevant environmental auditing expertise;
    b. Provide verifiable findings, in a structured and systematic manner, on-
        i. The level of performance against and compliance of an organization or project with the provisions of the requisite Environmental Authorisation and EMPr; and
        ii. The ability of the measures contained in the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
    c. Contain the information set out in Appendix 7 of GN No. R 982 (4 December 2014); and
    d. Be conducted and submitted to DEA at intervals as indicated in the Environmental Authorisation.
3. The environmental audit report must determine-
    a. The ability of the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
    b. The level of compliance with the provisions of Environmental Authorisation and EMPr.

A document handling system must be established to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr. Supplementary EMPr documentation could include:

- Method Statements;
- Site instructions;
- Emergency preparedness and response procedures;
- Record of environmental incidents;
- Non-conformance register
- Training records;
- Site inspection reports;
- Monitoring reports;
- Auditing reports; and
- Public complaints register (single register for maintained for overall site).

11 ENVIRONMENTAL TRAINING & AWARENESS CREATION

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The various means of creating environmental awareness during the pre-construction and construction phases of the project may include:

- Induction course for all workers before commencing work on site;
- Refresher courses (as and when required);
- Daily toolbox talks, focusing on particular environmental issues (task- and area specific);
- Courses must be provided by suitably qualified persons and in a language and medium understood by the workers. It is noted that Zulu and English are the dominant languages in the area;
- Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. grave sites, protected trees); and
- Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

The Contractor must compile a project-specific Environmental Training and Awareness Programme, taking into consideration the abovementioned factors, during the pre-construction phase to be approved by the Project Manager.

12 EMPr REVIEW

Due to its dynamic nature, the EMPr for uMWP-1 Potable Water will be reviewed and revised when necessary to ensure continued environmental improvement.

Following detailed design and planning, the EMPr may need to be revised to render the management actions more explicit and accurate to the final project specifications. Changes to the EMPr shall also be required where the existing system:

- Following detailed design and planning, the EMPr may need to be revised to render the management actions more explicit and accurate to the final project specifications;
- Does not make adequate provision for protecting the environment against the pre-construction activities;
- Needs to be modified to meet conditions of statutory approval;
- It is not achieving acceptable environmental performance;
- Requires changes due to the outcome of a monitoring or auditing event or management review;
- Provides redundant, impracticable or ineffective management measures; and
- In terms of Regulation 34 of GN No. R 982 (4 December 2014).

The amendment of the EMPr will be undertaken in terms of Regulation 34 – 37 of GN No. R 982 (4 December 2014), as applicable.

13 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

13.1 Environmental Activities

The main project activities as well as high-level environmental activities undertaken in the pre-construction phase are listed in **Table 6**.

Table 6: Activities associated with Pre-Construction Phase

Project Phase: Pre-construction
Project Activities
• Negotiations and agreements with the affected landowners (including Baynesfield Trust and private landowners), tenants, occupiers of land, stakeholders and authorities
• Initiate legal process required for land acquisition
• Detailed engineering design
• Detailed geotechnical investigations, including geophysical investigations
• Survey and mark construction servitude
• Survey and map topography for determination of post-construction landscape, rehabilitation and shaping (where necessary)
• Possible removal of trees within construction servitude
• Pipe procurement
• Procurement process for Contractors
• Review Contractor's method statements (as relevant)
• Selective improvements of access roads to facilitate the delivery of construction plant and materials
• Arrangements for accommodation of construction workers
• The building of a site office and ablution facilities
• Confirmation of arrangements with individual landowners / tenants / occupiers of land for managing and mitigating issues such as fencing and gate dimensions for traversing servitude, traversing patterns of livestock over servitude, access to livestock drinking points, security, opening and closing of gates and access to private property
• Confirmation of the location and condition of all buildings, assets and structures within the servitude
• Determining and documenting the road conditions for all identified haul roads
• Fencing of corridor
• Conduct detailed hydraulic analysis to determine the optimum positioning of the scour valves
High Level Environmental Activities
• Diligent compliance monitoring of the EMPr, environmental authorisation and other relevant environmental legislation
• Undertake a walk through survey of the project footprint by the relevant environmental specialists to identify sensitive environmental features
• Search, rescue and relocation of red data, protected and endangered species as well as medicinal plants (based on area of influence of the construction activities)
• Search, rescue and relocation of heritage resources and graves (based on area of influence of the construction activities)
• Develop environmental monitoring programme (air quality, water quality, noise, traffic, social)

Project Phase: Pre-construction
• Conduct further baseline environmental studies for environmental monitoring programme
• Barricading of sensitive environmental features (e.g. graves)
• Permits if protected trees are to be cut, disturbed, damaged, destroyed or removed
• Permits if heritage resources are to be impacted on and for the relocation of graves
• Establish Environmental Monitoring Committee (EMC) if necessary
• On-going consultation with I&APs
• Other activities as per Pre-Construction EMPr

13.2 Environmental Aspects

Environmental aspects are regarded as *those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impac*t. The environmental aspects listed in **Table 7** have been identified for the proposed project during the pre-construction phase, which are linked to the project activities (note that only high level aspects are provided):

Table 7: Environmental Aspects associated with Pre-Construction Phase

Project Phase: Pre-construction
Environmental Aspects
• Inadequate consultation with landowners/ tenants / occupiers of land
• Inadequate environmental and compliance monitoring
• Poor construction site planning and layout
• Land occupancy by temporary buildings, provisional on-site facilities and storage areas
• Inaccurate pre-construction environmental walk through survey (including search and rescue)
• Absence of relevant permits (e.g. for protected trees, heritage resources)
• Lack of barricading of sensitive environmental features
• Poor waste management
• Absence of ablution facilities

13.3 Potential Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to **Table 8** for the potential significant impacts associated with the preceding activities and environmental aspects for the pre-construction phase.

Table 8: Potential Significant Environmental Impacts - Pre-Construction Phase

Environmental Factor	Potential Issues / Impacts
Land Use	• Servitude restrictions • Loss of cultivated land and timber land within construction domain • Change of land use at WTW
Climate	• Greenhouse gas emissions
Topography	• Visual impact in river valleys • Erosion of affected areas on steep slopes
Soil	• Soil erosion • Soil compaction • Soil contamination • Loss of topsoil and fertile soil • Disturbance of contaminated soils during construction
Water Quality	• Sedimentation from runoff from cleared areas
Aquatic Ecology	• Disruptions to aquatic biota community due to water contamination.
Riparian & Instream Habitat	• Loss of riparian and instream vegetation within construction domain.
Water use	• Water quality deterioration and disturbance to flow caused by construction activities may adversely affect downstream water users • Elevated sediment levels may damage downstream pumpstations and reticulation, where users abstract water from the watercourse • Water abstracted from watercourses for construction purposes • Impacts to water users associated with Mapstone Dam, depending on the nature of the crossing
Wetlands	• Impacts to wetland characteristics
Terrestrial Ecology	• Potential loss of significant flora and fauna species • Damage / clearance of habitat of conservation importance • Proliferation of exotic vegetation
Socio-economic Environment	• Loss of land within construction domain • Risk to livestock • Nuisance from dust and noise • Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS) • Land claims • Safety and security • Use of private access roads and local road network • Impact to visual quality and sense of place • Light pollution
Agriculture	• Disruptions to farming operations as a result of construction-related use of existing access roads • Loss of cultivated land and timber land within construction domain • Loss of fertile soil through land clearance • Loss of grazing land within construction domain • Risks to livestock
Air Quality	• Excessive dust levels • Greenhouse gas emissions
Noise	• Localised increases in noise during construction
Historical &	• Damage to heritage resources through construction activities

Environmental Factor	Potential Issues / Impacts
Cultural Features	• Disruptions to tourism activities at the Heritage Centre, Baynesfield Estate
Existing Structures & Infrastructure	• Crossing of existing infrastructure (e.g. power lines, telephone lines, pipelines, railway lines) • Pipeline passes in close proximity to existing structures (such as dwellings, chicken houses)
Transportation	• Increase in traffic on the local road networks • Creation of temporary and permanent access roads
Solid Waste	• Waste generated from site preparations (e.g. plant material) • Domestic waste
Aesthetics	• Visual quality and sense of place to be adversely affected by construction activities
Tourism	• Influence to tourism activities at Baynesfield

14 SENSITIVE ENVIRONMENTAL FEATURES

Within the context of the project area, cognisance must be taken of the following sensitive environmental features (some shown in in **Figure 4**) for which mitigation measures are included in the EIA Report and EMPrs:

- All watercourses in the project area, which includes the uMlaza River and its tributaries (including drainage lines), are regarded as sensitive and require suitable protection from the construction and operational activities. All activities of the project life-cycle to comply with the National Water Act (Act No. 36 of 1998).
- Known heritage resources situated in relative close proximity to the project infrastructure, which need to be suitably safeguarded, include the following:
  - Stead family cemetery (29°46'10.71"S; 30°25'10.77"E);
  - Stead family church (29°46'09.40"S; 30°25'09.30"E); and
  - Baynesfield Methodist church & cemetery (29°46'22.06"S; 30°21'35.10"E).
- Although the majority of the project area is disturbed, protected fauna and flora species may occur in certain areas (wetland crossings), which need to be protected against the project's potential adverse impacts. All project activities to comply with the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), National Forests Act (Act No. 84 of 1998) and Natal Nature Conservation Ordinance (15 of 1974) in this regard. Sensitive species to be identified as part of the pre-construction survey. If relocation is not required, then these species and their habitat need to be adequately protected from construction activities.
- This project is situated in an area of generally high avifaunal sensitivity (based on the bird species recorded in the broader area), particularly in the western parts. However, much of the site is already transformed for agriculture and forestry, leaving little natural habitat for red listed bird species.
- Commercial agriculture is the primary land use in the western and central parts of the project area, and the majority of the infrastructure is situated on cultivated land. Construction and operational activities need to be planned and coordinated in consultation with the affected farmers.
- Through the options selected it was attempted to minimise the impacts to the future desired land use in the Umlaas Road Light Industrial Development Node. Firm guidance was also received from multiple I&APs in this regard, which lead to the refinement of the pipeline route options in this area.
- A particularly steep area is encountered along pipeline route Option 1 to the east of Mapstone Dam. Measures need to be implemented to prevent erosion at all steep areas (including along access roads).

- All traffic and pedestrians on the public roads are regarded as sensitive and measures need to be implemented to safeguard these road users. To minimise impacts to the transportation network, all major roads and railway lines will be crossed via pipe jacking.
- Baynesfield Estate is strategically located in terms of the project footprint and key infrastructure components (including the uMWP-1 tunnel outlet, balancing dam, raw water pipeline and WTW). Impacts to agricultural activities on the property need to be controlled to ensure minimal loss of high potential agricultural land. Ongoing communication and engagement with the Baynesfield Trust needs to be maintained during the project life-cycle. The construction activities associated with the uMWP-1 Raw Water and Potable Water need to be synchronised in such a way as to reduce the overall disturbances to the farming operations and tourism activities at the estate.
- Dust-intolerant crops such as avocado orchards are located on the Baynesfield Estate, and suitable mitigation measures need to be implemented to suppress dust caused by construction activities in this area.
- All existing infrastructure and structures are regarded as sensitive and need to be safeguarded from construction activities until they have been relocated, where avoidance is not possible.
- Sensitive receptors to dust and other air quality impacts in the study area (**Section 10.1**).
- Prevent construction-related nuisance to sensitive socio-economic receptors (**Section 10.1**).
- Properties may not be accessed unless consent has been granted by the landowner, or until the land acquisition process has been concluded, or a construction servitude has been registered.

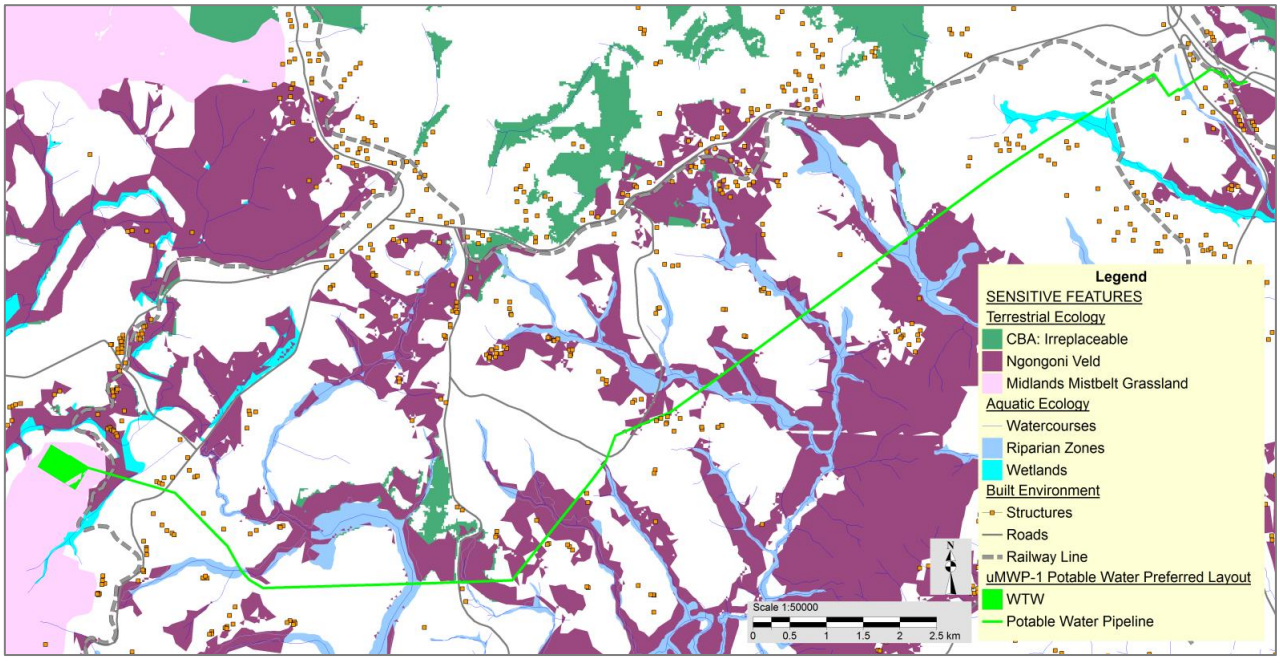


Figure 4: Sensitivity Map

The sensitivity map shown in **Figure 4** needs to be made available to the implementation team (including the Project Manager, Environmental Control Officer and Contractor) in GIS format to allow for further consideration and adequate interpretation at an appropriate scale. The map must be supplemented with the findings of the environmental sensitivity walk down survey and any other findings during the project life-cycle.

15 IMPLEMENTATION PROGRAMME

The framework for the subsequent management measures consists of the following:

- **Management objectives** – i.e. desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources);
- **Targets** – i.e. level of performance to accomplish management objectives;
- **Management actions** – i.e. practical actions aimed at achieving management objectives and targets;
- **Responsibilities**; and
- **Monitoring requirements**.

15.1 General Requirements

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements and sensitive environmental features;
- Define and communicate roles and responsibilities for the implementation of the EMPrs;
- Undertake negotiations and confirm arrangements with landowners and/or land users regarding:
  - Use of the R56, D360, R624, P547, R603, D125 (and all other public roads, as relevant) and all private roads, with associated traffic arrangements;
  - Land occupancy (construction facilities);
  - Domestic animals (avoiding impacts to livestock);
  - Protocol for lodging complaints;
  - Possible loss of access;
  - Existing structures and infrastructure (including temporary and permanent water management structures and infrastructure);
  - Fencing and gate dimensions for traversing servitude;
  - Traversing patterns of game and/livestock;
  - Access to game and/livestock drinking points;
  - Security; and
  - Opening and closing of gates and access to private property.
- Ensure that all existing structures within the construction area are identified and recorded;
- Acquire additional timber land around WTW Option 1 to utilise screening offered by existing pine trees. For the WTW the construction domain needs to be contained within the site boundary to avoid disturbance outside of the eventual plant's footprint. All external areas that

are not associated with permanent infrastructure and the operation of the scheme need to be adequately rehabilitated.

- ❖ Ensure that a suitable water source is in place to supply water to the irrigators downstream of Mapstone Dam, in consultation with the Upper Umlaas Irrigation Board, for the period during which their normal supply will be influenced by the construction of the pipeline within the basin.
- ❖ Ensure that acceptable flow is maintained in uMlaza River downstream of Mapstone Dam during the construction of the pipeline within the basin.
- ❖ Reconfigure the layout of the WTW site to avoid the power line servitude, as far as possible, in further consultation with Eskom.
- ❖ Construction and operational activities need to be planned and coordinated in consultation with the affected farmers in order to minimise impacts on crop production.
- ❖ Establish an Environmental Monitoring Committee (EMC) if deemed to be necessary in the pre-construction phase, with suitable representation of authorities, stakeholders and I&APs.

15.2 Specialist Environmental Investigations

Management Objective:

Identify sensitive and protected environmental features in addition to those that have been identified as part of the EIA process.

Target:

1. All sensitive and protected environmental features to be identified in the construction domain (all the components of the project).
2. All relevant approvals to be obtained prior to relocation of red data, protected and endangered flora and fauna species, medicinal plants, heritage resources and graves.

Management Actions:

- Conduct environmental sensitivity walk down survey of entire project footprint prior to construction. Specialists to advise on necessity for surveying multiple seasons. Mitigation measures to be included in final EMPr. Survey team to include the following specialists:
    - Avifaunal specialist;
    - Terrestrial ecologist;
    - Aquatic ecologist; and
    - Heritage specialist.
- Search, rescue and relocation of red data, protected and endangered species and medicinal plants. This is to be implemented taking into consideration the project programme to ensure that these sensitive environmental features are rescued prior to potential impact occurrence.

DEA, KZN Department of Economic Development, Tourism and Environmental Affairs (DEDTEA), EKZNW and DAFF are to be consulted to ensure that requirements are satisfied. For fauna and flora species, the following factors need to be considered (amongst others):

1. Detailed plan of action (including timeframes, methodology and costs);
2. Site investigations to identify and record sensitive species;
3. Consultation with authorities and stakeholders;
4. Marking of species to be relocated;
5. Seeking of permits;
6. Identification of suitable areas for relocation;
7. Aftercare; and
8. Monitoring (including targets and indicators to measure success).

- Search, rescue and relocation for heritage resources and graves. This is to be implemented taking into consideration the project programme to ensure that these sensitive environmental features are rescued prior to potential impact occurrence. Amafa aKwaZulu-Natali is to be consulted to ensure that their requirements are satisfied.

Responsibilities:

- Umgeni Water to appoint suitably qualified specialists.
- Specialists to execute the management actions.

Monitoring Requirements:

Approvals, permits and licences are to be in place with due consideration to the project programme.

Implementation Timeframe:

Prior to any construction activities.

15.3 Approvals, Permits and Licensing Requirements

Management Objective:

Compliance with applicable legislation to prevent unauthorised activities and negative impacts to protected environmental features.

Target:

Obtain requisite approvals for the relevant protected environmental features.

Management Actions:

- Seek permit from DAFF in terms of the National Forests Act (No. 84 of 1998) for protected trees that are to be cut, disturbed, damaged, destroyed or removed.
- Seek permit from EKZNW in terms of the Natal Nature Conservation Ordinance (15 of 1974) for the removal and transportation of endangered fauna and flora (if relevant).
- Seek permit from Amafa aKwaZulu-Natali in terms of the KZN Heritage Act (No. 04 of 2008) if heritage resources are to be impacted on (relocated or destroyed), and for the removal of graves.
- Seek all other approvals, permits and licenses required for the project, in accordance with the protocols prescribed by the governing bodies.
- Approvals are to be in place prior to the potential impacts to the protected environmental features.

Responsibilities:

- Umgeni Water to appoint suitably qualified specialists.
- Specialists to seek and obtain relevant approvals.

Monitoring Requirements:

Approvals, permits and licences are to be in place with due consideration to the project programme.

Implementation Timeframe:

Prior to any potential adverse impacts to protected environmental features, based on legal provisions and requirements of mandated authorities.

15.4 Administrative Requirements

Management Objective:

- Ensure that all administrative measures and arrangements associated with the compliance with the Environmental Authorisation and EMPr are in place.

Target:

- Administrative measures and arrangements are confirmed, checked and maintained.
- Document control procedure is in place, in accordance with the Environmental Management System to be employed on site.

Management Actions:

- Financial provision is made for the implementation of the conditions of the Environmental Authorisation and the mitigation measures contained in the EMPr. Differentiate between those requirements that relate to the Proponent, Contractor, environmental team and other responsible parties.
- Document control procedure is to be provided and adhered to.
- Filing system is to be provided and maintained.

Responsibilities:

- Proponent – administrative provisions for compliance.
- Project Manager/Engineer and ECO - checking.
- Contractor – administrative provisions for compliance.

Monitoring Requirements:

- Document control procedure.
- Filing systems.
- Financial provisions (e.g. bill of quantities, budgets, etc.).

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.5 Construction Site Planning and Layout

Management Objective:

Proper planning and layout of the construction domain to ensure protection of sensitive environmental features. Refer to features highlighted in **Section 14**, Sensitivity Map (**Figure 4**), findings from pre-construction survey, further environmental studies, etc.

Target:

1. No negative impacts to sensitive environmental features as a result of poor construction site planning and layout.
2. A 100% of the construction footprint is to be included in the pre-construction survey.

Management Actions:

- Conduct a pre-construction survey of the area to be affected. This must include site investigations with photographic records.

- Suitable specialist(s) are to identify sensitive environmental features (including fauna, flora and heritage sites) where special care needs to be taken, and implement the required suitable mitigation measures to safeguard these features (e.g. barricading, signage and awareness creation). Refer to the findings of the EIA specialist studies.
- A suitable specialist is to identify protected plants and trees. Any protected plants or trees in proximity to the construction domain that will remain, should be marked clearly (danger tape, fencing, etc.) and must not be disturbed, defaced, destroyed or removed, unless otherwise specified by the Project Manager. Acquire the necessary permits under the National Forests Act (No. 84 of 1998) if avoidance of protected trees is not possible.
- The Contractor is to produce a site plan for the approval of the Project Manager/Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features. The plan must show the following (as relevant):
    - Buildings and structures;
    - Contractors' camp and lay down areas;
    - Site offices;
    - Site laboratories;
    - Batching plants;
    - Crusher plants;
    - Roads and access routes;
    - Gates and fences;
    - Essential services (permanent and temporary water, electricity and sewage);
    - Solid waste storage and disposal sites;
    - Site toilets and ablutions;
    - Hazardous waste storage and disposal sites;
    - Firebreaks;
    - Excavations and trenches;
    - Cut and fill areas;
    - Topsoil stockpiles;
    - Spoil areas;
    - Construction material stores;
    - Vehicle and equipment stores;
    - Workshops;
    - Wash bays;
    - Fuel stores;

- Hazardous substance stores;
- Sensitive environmental features; and
- Any other activities, facilities and structures deemed relevant.

Responsibilities:

- Project Manager/engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Photographic record as part of the pre-construction survey of areas to be affected by construction activities.
- Approved site plan.
- Barricading and signage.
- Records of awareness creation.

Implementation Timeframe:

Prior to the establishment of any construction site for the overall project.

15.6 Managing Geotechnical Investigations

Management Objective:

Manage the possible negative environmental impacts associated with detailed geotechnical investigations.

Target:

1. No deviations from agreements made with the landowners.
2. No damage to sensitive environmental features (e.g. marked and barricaded heritage resources, protected trees, watercourses, structures and infrastructure).
3. Rehabilitation of test pits.

Management Actions:

- Suitable access arrangements are to be made in accordance with agreements prior to site investigations.
- Safe operation of plant and equipment required for geotechnical investigations.
- Adequate management of domestic and construction waste produced during investigations.

- Implement measures to mitigate soil erosion, loss of vegetation and pollution associated with the investigations.
- Prevent damage to sensitive environmental features.
- Landscape and rehabilitate test pits.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Geotechnical team to implement management actions.

Monitoring Requirements:

- Public complaints register.

Implementation Timeframe:

Prior to geotechnical investigations up to reinstatement and rehabilitation of affected areas.

15.7 Environmental Awareness Creation

Management Objective:

Ensure that the Contractor, construction workers and site personnel are aware of the relevant provisions of the EMPr, sensitive environmental features and agreements made with the affected landowners and community members.

Target:

1. All construction workers and employees are to have completed appropriate environmental training before being allowed on the construction site.
2. A record of environmental training undertaken is to be kept on site.

Management Actions:

- Environmental Training and Awareness Programme to be developed, which is to be approved by the Project Manager.
- The Contractor must arrange that all of his employees and those of his sub-contractors go through the project specific environmental awareness training courses before the commencement of construction and as and when new staff or sub-contractors are brought on site.

- The environmental training is compulsory for all employees and structured in accordance with their relevant rank, level and responsibility, as well as the Environmental Specification as they apply to the works and site.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Records of environmental training and awareness creation.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.8 On-going Consultation with Community and Affected Parties

Management Objective:

- 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.
- Adhere to agreements made with individual landowners and community members regarding communication.

Target:

1. All complaints and claims are to be acknowledged within 5 working days and are to be responded to within 10 working days of receipt, unless additional information and / or clarification are required.
2. No deviations from agreements made with individual landowners and community members.

Management Actions:

- Establish lines of communications with landowners and community members.
- Existing communication channels need to be duly respected and adhered to when engaging with the Hopewell Township.
- Establish processes and procedures to effectively verify and address complaints and claims received.

- Complaints or liaison with landowners and community members with regard to environmental aspects, compensation or disturbance to activities or animals, must be recorded, reported to the correct person and a record of the response is to be entered in the complaints register.
- Provide the relevant contact details to landowners and community members for queries / raising of issues or complaints.
- Provide all information, especially technical findings, in a language that is understandable to the general public. The dominant local languages include English and Zulu.
- Convene a meeting with RCL to discuss (amongst others):
  - Establish specific requirements of RCL;
  - Confirm construction methodology to be adopted on all RCL properties;
  - Confirm access roads to be utilised;
  - Confirm location of existing infrastructure and structures and identify suitable mitigation measures in consultation with RCL;
  - Temporary fencing between construction servitude and the chicken houses;
  - Requirements for sanitation facilities;
  - Seek to minimise impacts to existing farming operations on RCL properties; and
  - Ensure compliance with RCL's biosecurity protocols in relation to the construction and maintenance of the pipeline on their properties.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.9 Site Clearing

Management Objective:

- Manage environmental impacts associated with site clearing.
- External to the WTW site, pipeline construction servitude and construction-related facilities, ensure that only areas that are specifically required for the construction purposes are cleared.

Target:

No damage is caused to sensitive environmental features outside of the demarcated construction areas, including marked and barricaded heritage resources, protected trees, watercourses, cultivated areas, structures and infrastructure.

Management Actions:

- Restrict site clearing activities to the construction area / domain.
- Clearing of vegetation is to be conducted in a phased manner (where possible), with due consideration of the search and rescue activities. Vegetative cover for sensitive areas such as riparian zones is to remain for as long as possible.
- A Method Statement is to be developed, which will provide the details of how site clearing will be executed. Where possible, clearing by hand is recommended in order to create employment opportunities.
- Maintain barricading around sensitive environmental features.
- Avoid any disturbance to demarcated sensitive environmental features.
- Suitably experienced personnel (relevant to the potentially affected environmental features) are to monitor the clearing activities, with particular focus on heritage resources and graves, as well as protected fauna and flora species.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- No clearing outside of construction domain.
- Intact barricading.
- Public complaints register.
- Contractor’s method statement.

Implementation Timeframe:

Prior to and during clearing of any construction site.

15.10 Site Establishment

Management Objective:

Minimise negative environmental impacts associated with site establishment.

Target:

1. No deviations from agreements made with individual landowners and community members.
2. No damage to sensitive environmental features outside demarcated construction areas during site establishment.
3. No access or encroachment into no-go areas.
4. No justifiable complaints regarding general disturbance and nuisance received from the affected landowners and community members.

Management Actions:

- The Contractor is to produce a site plan for the approval by the Project Manager/Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features.
- Locate construction camps in areas where sensitive environmental features will not be impacted on.
- Obtain permission from directly affected landowners for site camps.
- Site Camp 2 (ERF 881 Portion 5 Hopewell) needs to be positioned in consultation with RCL.
- or occupation of the land for the duration of the construction activities should be gained from the land owners and in consultation with RCL
- Facilities and structures shall be located with due cognisance of the terrain and geographical features of the project site.
- Positioning of the storage and lay-down areas should aim to minimise visual impacts.
- Maintain barricading around sensitive environmental features until the cessation of construction works.
- Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.
- Ensure noise levels of construction activities and equipment are within their lawfully acceptable limits as per SANS 10103.
- Minimise public disturbance from lighting of the construction camp and site. For example, proper design of the placing (zones), height, type, direction (inward rather than outward) and intensity of floodlights, without compromising safety.
- Establish a local SMME recruitment preference policy.

- Land required for the construction servitude must be acquired in accordance with statutory requirements.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Intact barricading.
- Public complaints register.
- Contractor's method statement.
- Registered construction servitude.

Implementation Timeframe:

Prior to and during site establishment.

15.11 Management of Access and Traffic

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to construction sites, as shown in the layout map in **Figure 2**.
- Ensure that the community have reasonable access to the land during construction.
- Ensure proper access control.
- Prevent unlawful access to the construction domain.
- Adhere to agreements made with individual landowners and community members regarding access.
- Ensure the safety of all road users by implementing proper signage and traffic control measures.
- Limit construction-related nuisance to service nodes.

Target:

1. No reports of construction vehicles using other unauthorised routes.
2. No complaints regarding blocking of access to farms.
3. No direct harm to livestock and wild animals due to inadequate access control.
4. No transporting of unsafe loads. Permits are to be obtained for abnormal loads.

5. No speeding.
6. No accidents.

Management Actions:

- Undertake negotiations and confirm arrangements with the private landowners regarding the use of the D360, D125, other relevant public and private roads and associated traffic arrangements.
- Determine and document the road conditions of the R56, D360, R624, P547, R603, D125 (and all other public roads, as relevant), as well as all private access roads that will be affected by construction traffic, as relevant.
- Selective upgrade of the D360, the intersection of the R56 and P315 (access to WTW) and other relevant access roads (see layout map) to ensure that they are capable of accommodating the type of vehicles and/or mechanical plant using these roads.
- Obtain the necessary approval for road upgrades, pipe-jacking and wayleave for road construction from the KZN Department of Transport (DoT), as applicable.
- Any clearing for access or haul roads outside the demarcated works area shall only be undertaken after approval from the Project Manager/ Engineer.
- Temporary access roads are to be suitably rehabilitated.
- Ensure temporary accommodation of traffic where any public or private roads are to be affected by construction activities.
- Make provision for community members to access their properties safely.
- A speed limit of 40 km/h should be applied on public and other roads within the project area.
- Ensure appropriate traffic safety measures are implemented to make provision for blind rises and sharp bends on the DR360 and other relevant roads within the construction domain.
- Permission is required from the Project Manager/Engineer for the movement of any vehicles and/or personnel outside of designated working areas.
- Access roads are to be maintained in a suitable condition.
- Clearly mark pedestrian-safe access routes within the construction areas.
- Suitable erosion protective measures are to be implemented for access roads during the construction phase.
- Traffic safety measures (e.g. traffic warning signs, flagmen) are to be implemented where applicable.
- Clearly demarcate all construction access roads.
- Proper access control is to be maintained to prevent livestock from accessing construction areas.

- All fences erected for construction purposes (e.g. fences around camp sites, fencing around trenches, etc.) should be inspected on a daily basis to detect whether any damage has occurred. Damaged fences / barricading is to be repaired immediately.
- Consult with property owners, local authorities and communities to ensure that all affected parties are informed of the timing and extent of any disruptions.
- Ensure that service nodes, such as the community facilities in Hopewell Township, remain easily and safely accessible at all times. Limit the construction-related nuisance to these areas.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Signage displayed and maintained.
- Contractor's method statement.
- Maintenance of access control to construction sites.
- Maintenance of access roads.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.12 Management of Labour Force

Management Objective:

- Ensure suitable management of the labour force to prevent security-related issues or disturbance to landowners and community members.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

1. No complaints from landowners and community members regarding trespassing or misconduct by construction workers.
2. All unskilled labour to be sourced from local communities.

Management Actions:

- Prohibit trespassing of construction workers on private property.
- Workers should be provided with identity cards and should wear identifiable clothing.
- Make suitable provision for accommodation of the workforce off-site.
- Creating nuisances and disturbances in or near communities shall be prohibited.
- Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.
- Designated smoking areas should be provided, with special bins for discarding of cigarette butts.
- Establish a 'labour and employment desk' in consultation with local authorities, which is not to be situated at the site.
- Create opportunities for the employment of women.
- Where possible use labour-intensive methods of construction.
- Use local labour as far as possible, where necessary (e.g. unskilled labour).
- Develop a community labour agreement with targets for employment and for progression.
- Implement applicable training of labour to benefit individuals beyond completion of the project.
- Implement a STD and HIV/AIDS awareness and prevention programme amongst labourers. The contractor should provide an adequate supply of free condoms to all workers. Condoms should be located in the bathrooms and other communal areas on the construction site and at the construction camps. If viable, a voluntary counselling and testing programme should be introduced.

Responsibilities:

- Proponent – employment targets.
- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Labour-related targets.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.13 Management of Ablution Facilities

Management Objective:

Minimise environmental impacts associated with ablution facilities.

Target:

1. No environmental contamination associated with ablution facilities.
2. Minimise visual impact associated with ablution facilities.

Management Actions:

- Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the construction camp and along construction sites, which conform to all relevant health and safety standards and codes.
- No pit latrines, french drain systems or soak away systems shall be allowed. Install and maintain conservancy tanks for any site offices. The location of conservancy tanks is to be approved by the Project Manager/Engineer.
- Toilets may not be situated within 100 meters of any water body or within the 1:100 year flood line.
- A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100 m from any working area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.
- All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Ensure the proper utilisation, maintenance and management of toilet, wash and waste facilities.
- The entrances to the toilets shalll be adequately screened from public view.
- These facilities will be maintained in a hygienic state and serviced regularly.
- Toilet paper shall be provided.
- The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed waste disposal facility.
- Should shower facilities be provided for use by staff on site, the following controls must be imposed:
    - Proper positioning of the shower, and specifically its discharge point, shall be carried out to ensure that erosion and build-up of detergents does not occur.

- All discharge from the shower and other washing facilities must be managed to prevent environmental contamination.
- Use of the shower facilities must be limited to staff or authorised persons only.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Maintenance register for ablution facilities.
- Waste disposal certificates.
- Contractor's method statement.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

15.14 Management of Topsoil

Management Objective:

Ensure suitable removal, storage, and transportation of topsoil for re-use during rehabilitation.

Target:

1. At least 95% of recovered topsoil from disturbed areas is to be stored for future use.
2. No visual evidence of erosion from topsoil stockpiles.
3. No visual evidence of erosion from areas where topsoil has been reinstated.

Management Actions:

- Determine the average depth of the topsoil prior to excavations.
- Identify suitable areas to store topsoil.
- Remove topsoil from areas to be affected by construction activities.
- Prevent mixing of topsoil with subsoil.
- Topsoil is to be adequately protected from contamination from construction activities and material.
- Protect stored topsoil from compaction.

- Wind and water erosion-control measures are to be implemented to prevent loss of topsoil.
- Following the construction phase, the topsoil should be placed as the final soil layer prior to seeding, on areas to be rehabilitated.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Condition of topsoil stockpiles.
- Dust monitoring.
- Rehabilitated areas.
- Contractor's method statement.

Implementation Timeframe:

Prior to site clearing up to when topsoil is used for rehabilitation.

15.15 Management of Waste

Management Objective:

- Minimise negative environmental impacts associated with waste.
- Apply waste management principles to prevent, minimise, recycle or re-use material, with disposal as a last option.

Target:

- No littering on construction site.
- Maintain a clean and tidy construction site.
- A 100% record of all waste generated and disposed of at waste disposal facilities.
- Valid disposal certificates for all waste disposed.
- Provision of adequate waste containers that are easily accessible and maintained.
- Waste bins are to be removed and cleaned weekly.

Management Actions:

- Waste management activities must comply with the National Environmental Management: Waste Act (No. 59 of 2008).

- The storage of general or hazardous waste in a waste storage facility must comply with the norms and standards in GN No. R. 926 of 29 November 2013.
- Vermin / weatherproof bins shall be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Establish and monitor recycling targets.
- Provide waste skips at the construction areas. These skips should be sufficient in number, the skip storage area should be kept clean, and skips should be emptied and replaced before overflowing or spillage occurs.
- Ensure suitable housekeeping. .
- The Contractor shall ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that solid waste is transported so as to avoid waste spills en-route.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Waste register.
- Recycling targets.
- Disposal certificates.
- Contractor’s method statement.

Implementation Timeframe:

Throughout the duration of the pre-construction period.

APPENDIX A

UMGENI WATER PARTICULAR SPECIFICATION FOR ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION PROJECTS