LOWER UMKHOMAZI BULK WATER SUPPLY SCHEME AND ASSOCIATED INFRASTRUCTURE:

GOODENOUGH SYSTEM - WATER TREATMENT PLANT IN CRAIGIEBURN, ETHEKWINI MUNICIPALITY, KWAZULU-NATAL

AMENDED ENVIRONMENTAL MANAGEMENT PROGRAMME

DFFE REFERENCE NO.: 14/12/16/3/3/2/1030/MP1

FINAL

DECEMBER 2024

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Title and Approval Page

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Amendments Page

Date	Nature of Amendment	Amendment No.
October 2024	Draft Amended EMPr for Review by Authorities and the Public	0
December 2024	Final Amended EMPr for Submission to DFFE	1

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List of Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
CBA	Critical Biodiversity Area
CLO	Community Liaison Officer
CV	Curriculum Vitae
DARD	Department of Agriculture and Rural Development
DEDTEA	Department of Economic Development, Tourism & Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
D'MOSS	Durban Metropolitan Open Space System
DoT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EKZNW	Ezemvelo KZN Wildlife
EMPr	Environmental Management Programme
EO	Environmental Officer
GN	Government Notice
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
IAPS	Invasive Alien Plants
KZN	KwaZulu-Natal
LM	Local Municipality
LUBWSS	Lower uMkhomazi Bulk Water Supply Scheme
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NWA	National Water Act (Act No. 36 of 1998)
OCS	Off-Channel Storage
PM	Project Manager
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
WC/WDM	Water Conservation and Water Demand Management
WTP	Water Treatment Plant

1 PURPOSE OF THIS DOCUMENT

In 2018, the former Umgeni Water (now known as uMngeni-uThukela Water) received the following separate Environmental Authorisations in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) for the components of the Lower uMkhomazi Bulk Water Supply Scheme (LUBWSS):

- LUBWSS - Goodenough System (reference no.: 14/12/16/3/3/2/1030) (focus of this document); and
- LUBWSS - Ngwadini System (reference no.: 14/12/16/3/3/1/1884).

The following separate environmental processes are currently underway for the LUBWSS:

1. A new application for Environmental Authorisation (EA) was submitted to the Department of Forestry, Fisheries and the Environmental (DFFE) to cover the majority of the infrastructure changes to the Ngwadini System (rising main pipeline) as well as the Goodenough System (weir, abstraction works, pump stations, balancing tank, pipelines, reservoirs, and associated infrastructure) due to the detail design of the scheme. These changes trigger listed activities and a Basic Assessment process is thus being conducted (reference no.: 14/12/16/3/3/1/3034). An Environmental Management Programme (EMPr) has been compiled as part of this process.
2. An application to amend the EA (14/12/16/3/3/2/1030/AM1) was submitted to DFFE for specifically the Water Treatment Plant (WTP) of the Goodenough System, due to the changes made to the layout of the facility during detail design. The changes to the WTP do no trigger listed activities. An EMPr was not compiled as part of the EA Amendment Report, as there were no substantial differences between the mitigation measures presented in the original and updated Specialist Reports.

This document further only focuses on the existing EA for the Goodenough System (reference no.: 14/12/16/3/3/2/1030). Condition 15 of this EA stipulates the following: "*The Environmental Management Programme (EMPr) submitted as part of EIAr is not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting, and the provisions of this environmental authorisation*." Furthermore, Condition 16 stipulates the information that needs to be included in the amended EMPr. **This document serves as the amended EMPr, which was compiled to satisfy the aforementioned conditions of the EA**. The scope of this EMPr is the WTP only.

Note that the EMPr that was developed as part of the Basic Assessment process (reference no.: 14/12/16/3/3/1/3034) covers the other components of the Goodenough System and also serves to satisfy Conditions 15 and 16 of the EA for the Goodenough System (reference no.: 14/12/16/3/3/2/1030).

An EMPr represents 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 lifecycle of a project.

The scope of the EMPr is as follows:

- Establish management objectives during the project's pre-construction, construction and operational phases in order to enhance benefits and manage (i.e. prevent, reduce, rehabilitate and/or compensate) 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 EMPr; and
- Provide the legislative framework.

The draft EMPr was lodged for review by Interested and Affected Parties from 30 October until 29 November 2024. The Public Participation Report, which contains proof of notification, copies of comments received and the Comments and Responses Report, is contained in **Appendix K**.

2 DOCUMENT ROADMAP

As a minimum, the EMPr aims to satisfy the following:

1. The requirements stipulated in Appendix 4 of the Environmental Impact Assessment (EIA) Regulations of 2014, published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the "EIA Regulations") – refer to Table 1 below; and
2. The requirements stipulated in Condition 16 of the EA (reference no.: 14/12/16/3/3/2/1030) – refer to Table 2 below.

Table 1: Document composition in terms of Appendix 4 of the EIA Regulations

Chapter	Title	Correlation with Appendix 4 of the EIA Regulations	
1	**Purpose of the Document**	-	
2	**Document Roadmap**	-	
3	**Project Overview**	-	
4	**Environmental Assessment Practitioner**	1(a)	Details of – (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including curriculum vitae.
5	**Legal Framework**	-	
6	**Roles & Responsibilities**	1(i)	An indication of the persons who will be responsible for the implementation of the impact management actions contemplated in paragraph (f).

Chapter	Title	Correlation with Appendix 4 of the EIA Regulations	
7	**Monitoring**	1(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
8	**Environmental Training & Awareness Creation**	1(m)	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.
9	**EMPr Review**	-	
10	**Environmental Activities, Aspects & Impacts**	1(b)	A detailed description of the aspects of the activity that are covered by the final environmental management plan.
11	**Sensitive Environmental Features**	1 (c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.
12	**Impact Management**	1(d)	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 – (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities.
		1(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d).
		1(f)	A description of proposed impact management sections, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		1(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.

Chapter	Title	Correlation with Appendix 4 of the EIA Regulations	
-		1(n)	Any specific information that may be required by the competent authority

Table 2: Document composition in terms of Condition 16 of the EA (reference no.: 14/12/16/3/3/2/1030)

Condition of EA	Requirements in Condition 16 of the EA	Relevant Section in EMPr
16.1	The requirements and conditions of this authorisation.	The EMPr incorporated the requirements and conditions of the EA (as relevant)
16.2	All recommendations and mitigation measures recorded in the EIAr.	The mitigation measures contained in the original EIA Report (EIAr) were initially included in the EMPr that was appended to the EIAr. This final EMPr is based on the aforementioned document.
16.3	Mitigation measures for the reduced working corridors.	Note that this conditions related to the working corridors of the pipelines that form part of the LUBWSS Goodenough System. Hence, it is not relevant to the WTP.
16.4	All mitigation measures as listed in the specialist reports must be included in the EMPr and implemented.	The mitigation measures identified by the specialists were incorporated into the relevant sections of this EMPr.
16.5	The final site layout map.	Appendix A
16.6	An alien invasive management plan to be implemented during construction and operation of the facility. The plan must include mitigation measures to reduce the invasion of alien species and ensure that the continuous monitoring and removal of alien species is undertaken.	Appendix C
16.7	A plant rescue and protection plan which allows for the maximum transplant of conservation important species from areas to be transformed. This plan must be compiled by a vegetation specialist familiar with the site in consultation with the ECO and be implemented prior to commencement of the construction phase.	Appendix G
16.8	A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.	Appendix J
16.9	A storm water management plan to be implemented during the construction and operation of the facility. The plan must ensure compliance with applicable regulations and prevent off-site migration of contaminated storm water or increased soil erosion. The plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows. Drainage measures must promote the dissipation of storm water run-off.	Appendix H
16.10	An erosion management plan for monitoring and rehabilitating erosion events associated with the	Appendix F

Condition of EA	Requirements in Condition 16 of the EA	Relevant Section in EMPr
	facility. Appropriate erosion mitigation must form part of this plan to prevent and reduce the risk of any potential erosion.	
16.11	An effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.	Appendix D
16.12	Measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants.	Construction phase: ▪ Section 12.3.14 - Management of Pollution Generation Potential ▪ Section 12.3.20 - Management of Flora ▪ Section 12.3.21 - Management of Fauna ▪ Section 12.3.25 - Management of Watercourses Operational phase: ▪ Section 12.4.4 - Management of Vegetation ▪ Section 12.4.6 – Waste Management ▪ Section 12.4.8 - Management of Spillages ▪ Section 12.4.9 – Stormwater Management ▪ Section 12.4.11 - Management of Watercourses Site-specific plans: ▪ Alien Invasive Management Plan (Appendix C); ▪ Contingency Plan (Appendix D); ▪ Emergency Preparedness Response Plan (Appendix E); ▪ Erosion Management Plan (Appendix F); ▪ Stormwater Management Plan (Appendix H); ▪ Re-Vegetation and Habitat Rehabilitation Plan (Appendix I); and ▪ Open Space Management Plan (Appendix J).
16.13	An environmental sensitivity map indicating environmental sensitive areas and features identified during the EIA process.	Section 11 - Sensitive Environmental Features
16.14	A map combining the final layout map superimposed (overlain) on the environmental sensitivity map. This map must reflect the proposed location of the turbine as stated in the EIAr and this authorisation.	

3 PROJECT OVERVIEW

3.1 Project Background and Motivation for the LUBWSS

The current water resources supplying the South Coast of KwaZulu-Natal (KZN) are insufficient to meet the projected water demands. The Upper and Middle South Coast are currently supplied by water from local rivers and dams, augmented by the Mgeni System. The Mgeni System is the main water source that supplies about six million people and industries in the eThekwini Municipality, uMgungundlovu District Municipality (DM), Msunduzi Local

Municipality (LM), and a small portion of Ugu DM. These municipal areas comprise the economic powerhouse of the KZN.

Currently, uMngeni-uThukela Water is pursuing the project further as a scheme for domestic water supply to the South Coast. Augmentation of the water resources supplying the South Coast is urgently needed to both relieve the load on the uMngeni-uThukela Water supply system, and to meet growing water demands along the South Coast of KZN.

Recently, Ugu DM and the Department of Water and Sanitation (DWS) agreed on the Cwabeni Off-channel Storage (OCS) Dam as a solution for the Lower South Coast Area. As such, a dedicated augmentation for the Upper and Middle South Coast supply area (Hibberdene to Amanzimtoti) is required.

The LUBWSS is being pursued as the preferred augmentation option to be implemented to supplement potable water supply to the existing Upper and Middle South Coast supply area. The supply area extends from Amanzimtoti in the north to Hibberdene in the south and covers both eThekwini and Ugu Municipalities (**Figure 1**).

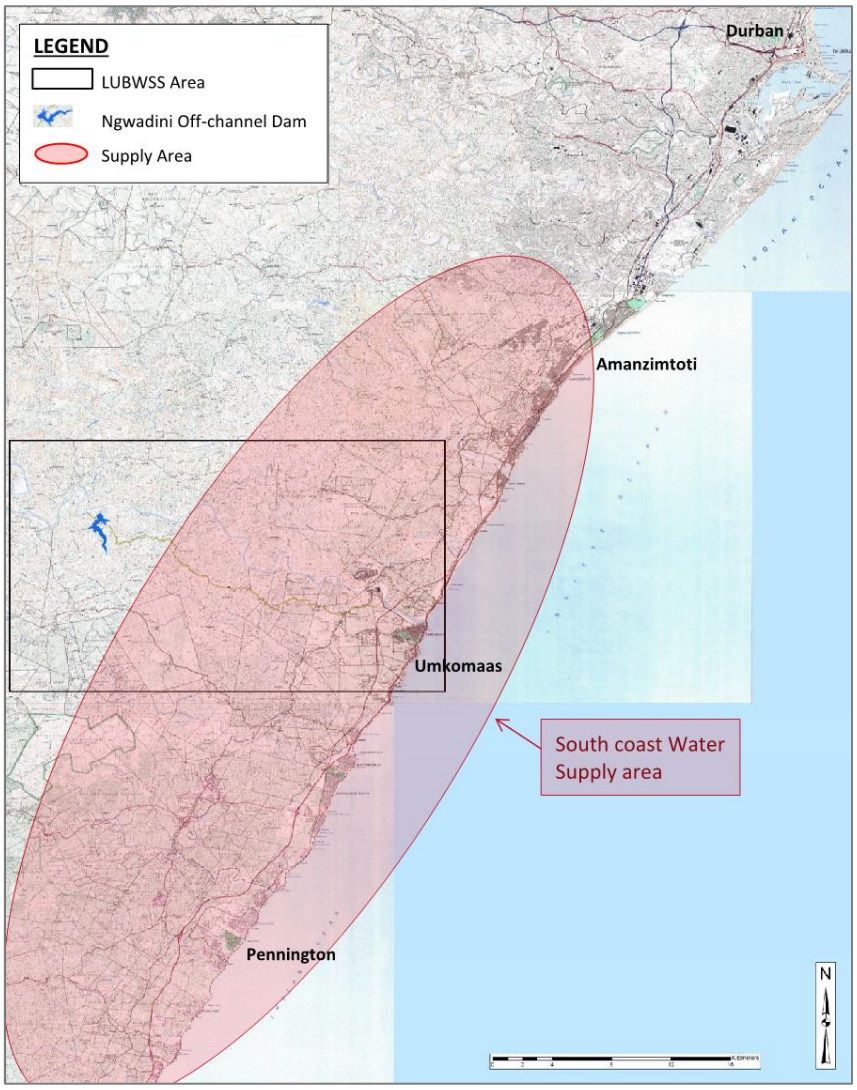

Figure 1: Map of the South Coast Water Supply area (AECOM, 2016)

Water requirements for the Upper and Middle South Coast supply area in 2014 were 85Ml/d on average, with peaks up to 110Ml/d. This supply excludes an estimated 25Ml/d suppressed demand in the supply area, due to infrastructure constraints. Water requirement projection scenarios, taking into account the growth and development plans by the municipalities as well as Water Conservation and Water Demand Management measures, determined that the 30 year water demand projection will be between 155 to 205Ml/d for the supply area. The scenarios are as follows:

- **Scenario A (Low):** Growth projection with WC/WDM;
- **Scenario B (Medium):** WC/WDM and suppressed demands; and
- **Scenario C (High):** Suppressed demands and no WC/WDM savings.

Based on the medium growth scenario as the preferred planning scenario, the LUBWSS has been sized to provide an additional average volume of 100Ml/d (with a 130 Ml/d designed peak capacity), to meet the future 30-year demand projection.

A Detailed Feasibility Study, which included preliminary design of components, was completed for the LUBWSS by AECOM SA (Pty) Ltd in 2016. Of the options investigated, “Scheme B” was selected as the preferred option for the LUBWWS. This would entail the return of stored water to the river from Ngwadini Dam in the low flow periods and abstraction at the existing Goodenough weir and delivery to the WTP through a shorter 7km pipeline.

As the cost of the two schemes were considered similar, other factors including risk were focused on. While some risks can be mitigated or absorbed as a small cost increase, key risks are associated with impacts on water delivery timeframes due to the urgency of the project.

3.2 Overview of the LUWSS Components

The overall LUBWSS (see **Figure 2**) consists of the following:

- Ngwadini System components (*excluded from the scope of this EMPr*) –
  - The Ngwadini Weir and abstraction works to fill the Ngwadini Dam during summer periods of excess flow;
  - The Ngwadini pipeline; and
  - The Ngwadini OCS Dam, with a capacity of 10 million m^3, and outlet infrastructure to release water back into the river and augment low flow periods.
- Goodenough System components (see **Figure 3**) –
  - Components excluded from the scope of this EMPr:
    - A second abstraction downstream at the Goodenough Weir site to abstract the raw water for delivery to the WTP;
    - Hydrocyclones before the pump station and WTP to remove sediments during periods of higher turbidity river flows and reduce the WTP residual;
    - A pump station to pump water from the Goodenough abstraction to the WTP;

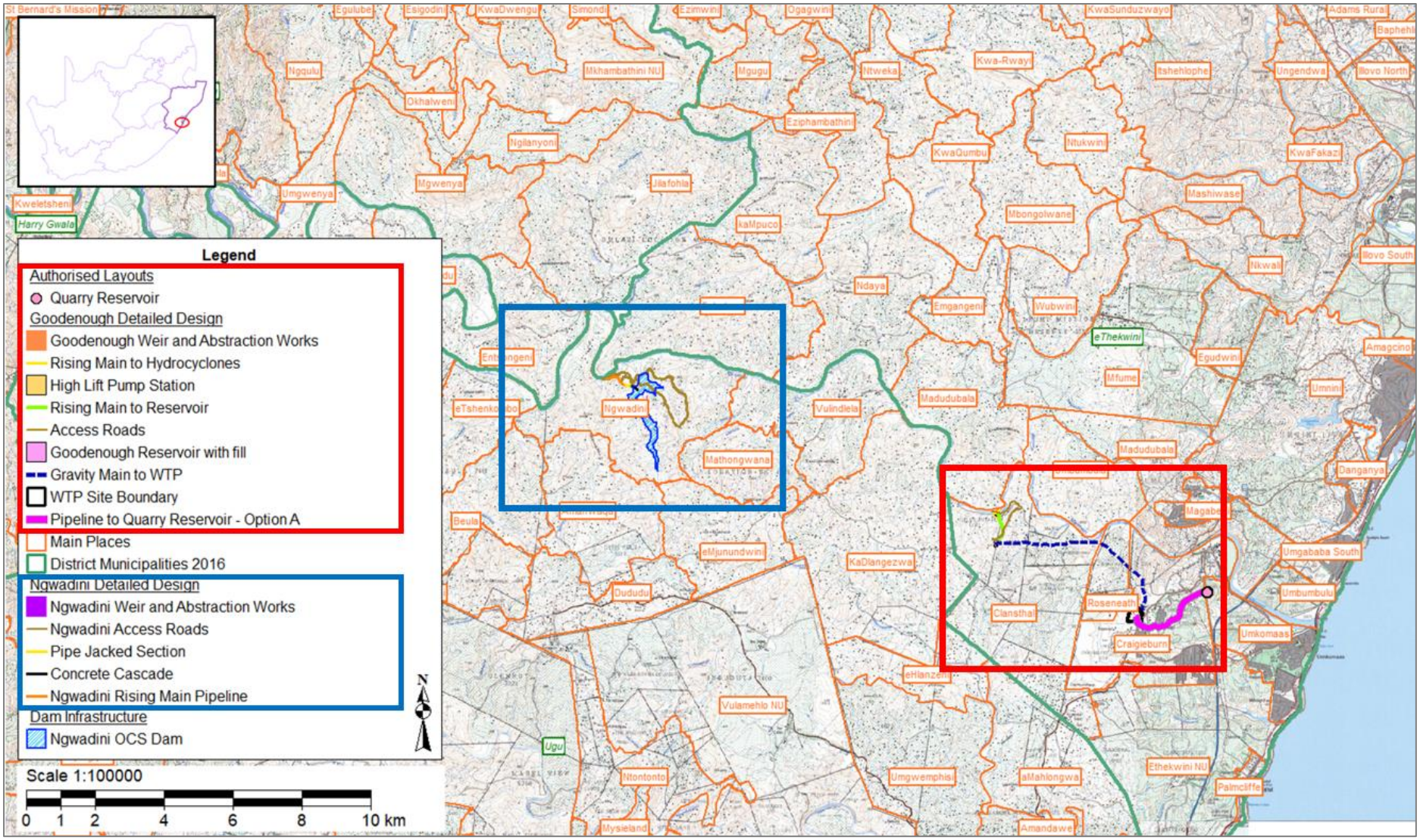

Figure 2: LUBWSS Layout (updated 2023 design). Ngwadini and Goodenough components highlighted.

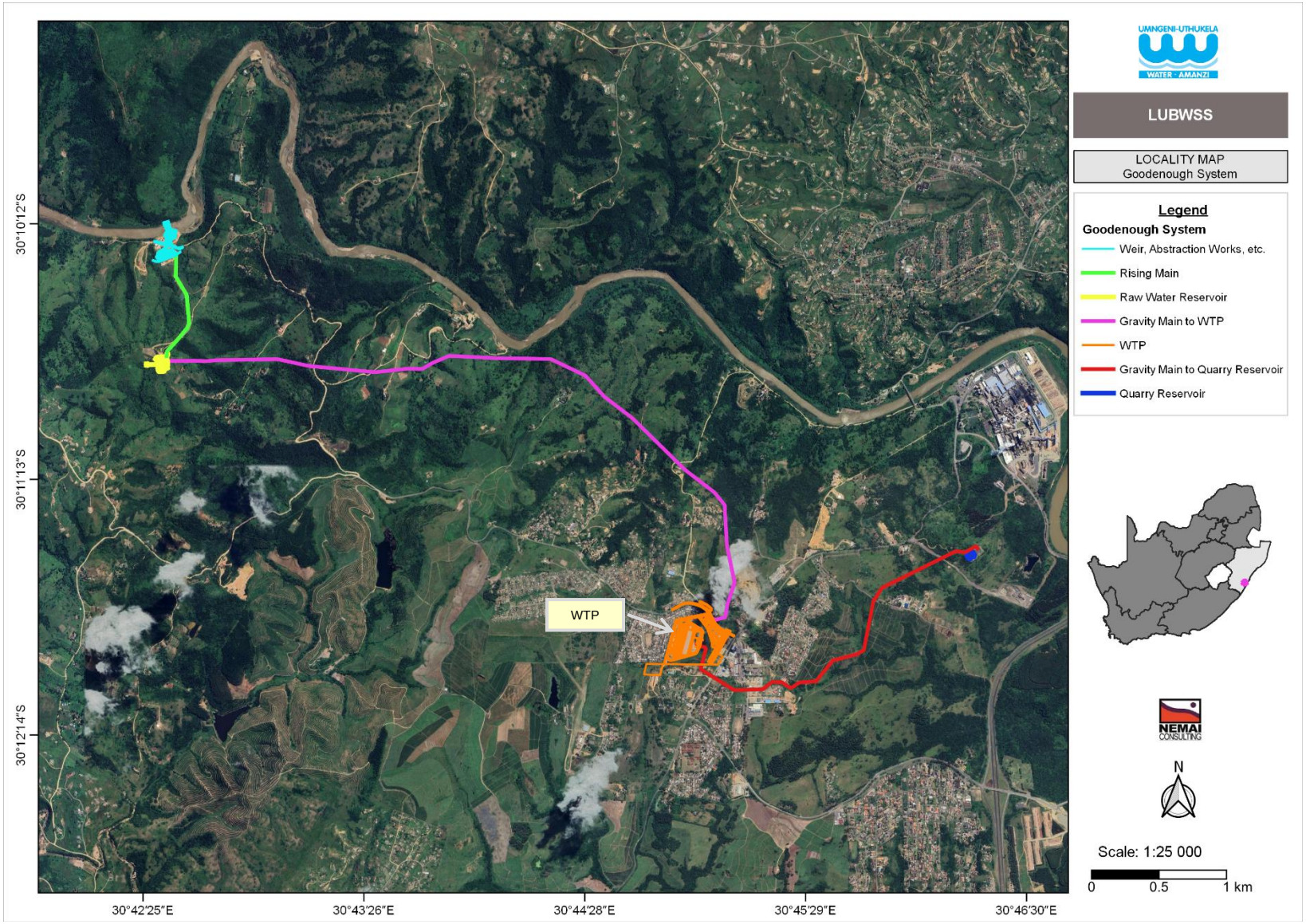

Figure 3: Aerial view of Goodenough System components (note that this EMPr only focuses on the WTP)

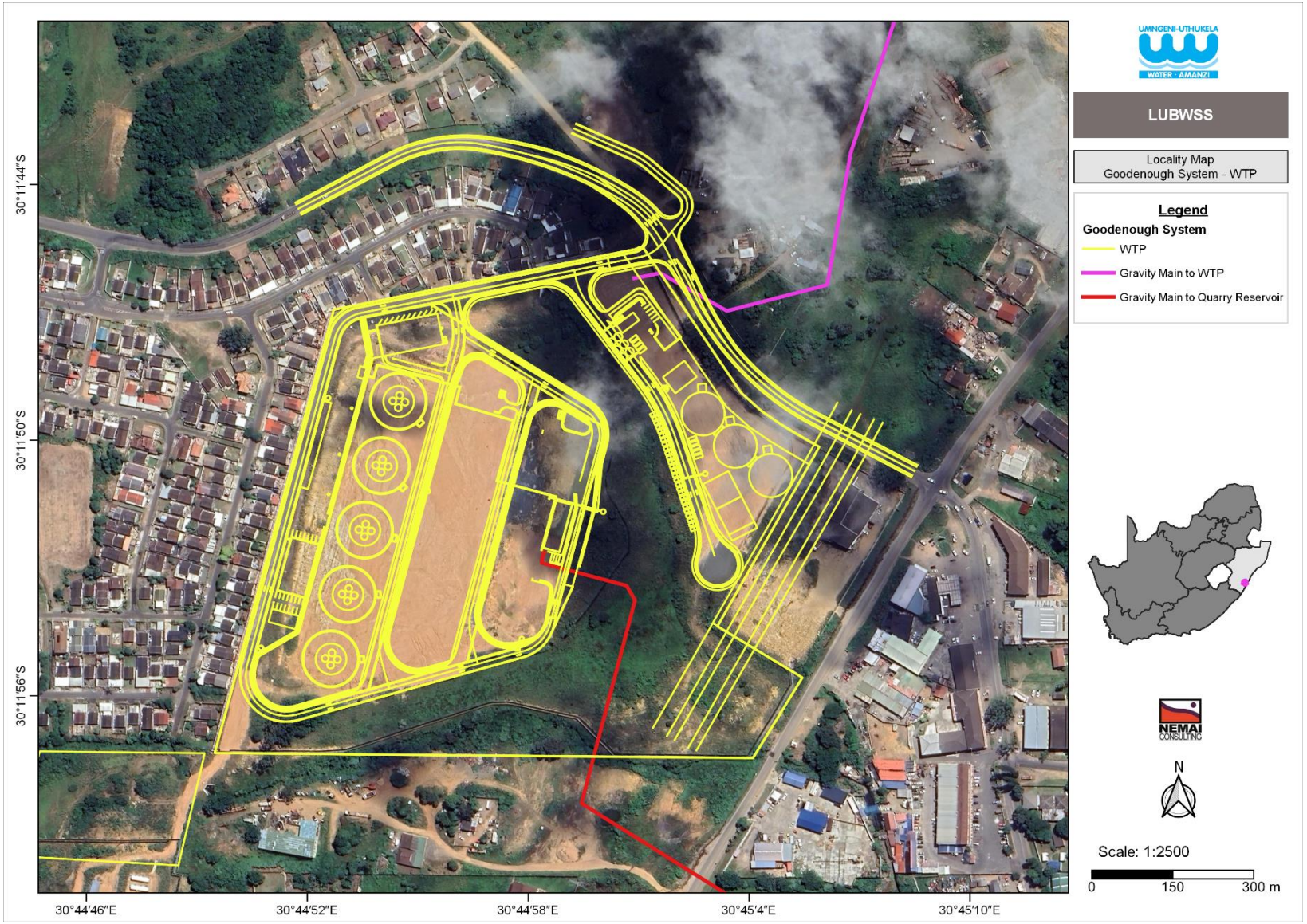

Figure 4: Aerial view of the WTP Site (note that this EMPr excludes the pipelines feeding into and out of the WTP)

- A short rising main and 7km gravity main;
- A raw water storage reservoir; and
- A potable gravity water pipeline from the WTP to Quarry Reservoir.

- Component included in the scope of this EMPr:
  - A 100 Mℓ/d WTP in Craigieburn (see **Figure 4** above). The site layout map is contained in **Appendix A**.

3.3 Project Location

The Goodenough System is located in Ward 99 of the eThekwini Municipality, in KZN. The WTP site is located within the town of Craigieburn.

The properties affected by the WTP are listed in **Table 3**.

Table 3: Property Details

Province	KZN	
Municipality	eThekwini Municipality	
Ward Number	Ward 99	
Farm Name and No.	Cragieburn, 0070 Umkomanzi Drift, 1357	
Erf and Portion No.	Erf 3181, Portions 0, 1, 2, 3 of Cragieburn Portion 170 of Umkomanzi Drift Portion 9 of Umkomanzi Drift	Erf 1608, Portion 1 of Craigieburn Portion 554 of Umkomanzi Drift Portion 555 of Umkomanzi Drift
SG Code	N0ET00700000318100000 N0ET00700000318100001 N0ET00000000135700170 N0ET00000000135700009 N0ET00700000318100003	N0ET00700000318100002 N0ET00700000160800001 N0ET00000000135700554 N0ET00000000135700555

3.4 Process Designs

The process design for the WTP is shown in **Figure 5** below.

The raw water will be gravity fed (pipeline) from the Goodenough Reservoir to the WTP, controlled inline by a needle type control valve, and discharged into the Head of Works channel where chlorine will be dosed.

The flow will then be split hydraulically in the channel into two equal streams before being dosed with Lime, Bentonite Powder, Powdered Activated Carbon, Potassium Permanganate and Coagulant..

The water is then equally distributed into five (N+1) Clariflocculators where flocculation and primary clarification will take place. The clarified water from the Clariflocculators will then be collected and distributed into ten (N+1) Pulsators for the secondary clarification stage.

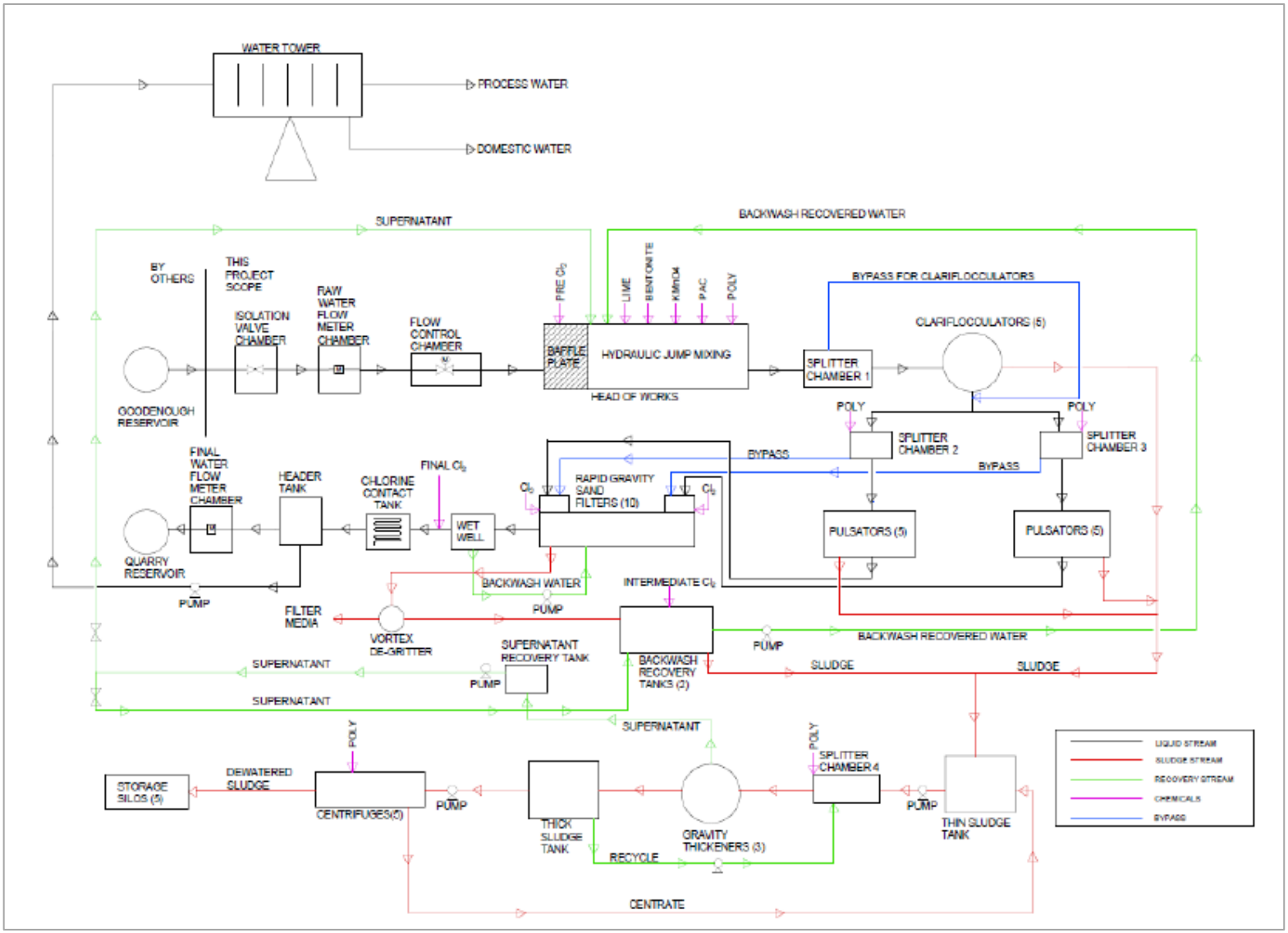

Figure 5: Detailed Design Process for the WTP

The clarified water will then be fed into an open channel that will distribute the flow over individual weirs into ten (N+1) Rapid Gravity Sand Filters. This is where filtration will occur.

The filtered water from the Rapid Gravity Sand Filters will be collected and fed into the Chlorine Contact Tank where chlorine will be dosed for disinfection. The chlorinated water will be collected in the Header Tank before its piped into the Quarry Storage Reservoir.

The Water Treatment Residuals from the Clariflocculators, Pulsators, Centrate from the Centrifuges and backwash waste from the Backwash Recovery Tank, will be gravity fed into the sludge treatment plant for processing. The residuals will be collected and fed into three (N+1) Gravity Thickeners that will concentrate the incoming residual to a Thick Sludge concentration of 4%. The Thick Sludge will then be collected at 4 % concentration and will be fed into five (N+2) Centrifuges that will dewater the thick sludge to a 25 % (min) DS concentration. The dewatered sludge will be temporarily stored in concrete Silos before it is discharged into suitable tankers and carted away to the permitted disposal site. The recovered water from the Sludge Treatment Plant will be recycled back to the Head of Works or to the Backwash Recovery Tank for further processing.

4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by the Applicant as the independent Environmental Assessment Practitioner (EAP) to compile the amended EMPr. The CV of the EAP is contained in **Appendix B**.

5 LEGAL FRAMEWORK

5.1 Overview of Legislation

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

All Project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Some of the pertinent environmental legislation that has bearing on the proposed development is captured in **Table 4** below.

Table 4: Environmental statutory framework

Legislation	Relevance
Constitution of the Republic of South Africa (Act No. 108 of 1996)	▪ Chapter 2 – Bill of Rights. ▪ Section 24 – Environmental Rights.
National Environmental Management Act (Act No. 107 of 1998)	▪ Key sections (amongst others): o Section 2 – Principles. o Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). o Section 28 – Duty of care and remediation of environmental damage. ▪ Authorisation type – Environmental Authorisation (*obtained for the development of the LUBWSS WTP*). ▪ Authorities – DFFE (national) (competent authority to review and decide on the amended EMPr) and the KZN Department of Economic Development, Tourism & Environmental Affairs (DEDTEA) (provincial).
GN No. 326 of 7 April 2017 (EIA Regulations)	▪ Purpose – regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.
National Water Act (Act No. 36 of 1998)	▪ Key sections (amongst others): o Chapter 3 – Protection of water resources. o Section 19 – Prevention and remedying effects of pollution. o Section 20 – Control of emergency incidents. o Chapter 4 – Water use. ▪ Authorisation type – General Authorisation / Water Use Licence (*required for the LUBWSS*). ▪ Authority – DWS.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	▪ Protection and conservation of ecologically viable areas representative of SA's biological diversity and natural landscapes. ▪ *Not relevant to the WTP site.*
National Environmental Management Air Quality Act (Act No. 39 of 2004)	▪ Key sections (amongst others): o Chapter 2 – National Framework and National, Provincial and Local Standards. o Chapter 4 – Air Quality Management Measures. o Chapter 5 – Licensing of Listed Activities. ▪ Authorisation type – Atmospheric Emission Licence (*not required for the LUBWSS WTP).* ▪ Authority – DFFE (national), DEDTEA (provincial) and eThekwini Municipality (local).
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	▪ Key sections (amongst others): o Section 7 – National environmental management principles. o Section 40 – Bioregions and bioregional plans. o Chapter 4 – Threatened or Protected Ecosystems and Species. o Chapter 5 – Species and Organisms Posing Potential Threats to Biodiversity. o Chapter 7 – Permits. ▪ Authorisation type – Permit (*will be required for the removal of protected species if they cannot be avoided, if they are encountered on site*). ▪ Authority – Ezemvelo KZN Wildlife (EKZNW).
National Environmental Management: Waste Act (Act No. 59 of 2008)	▪ Key sections (amongst others): o Part 2 – General duty on the holder of waste in respect of waste management. o Part 3 – Reduction, re-use, recycling and recovery of waste. o Part 4 – Regulation of waste management activities. o Part 5 – Storage, collection and transportation of waste. o Part 6 – Treatment, processing and disposal of waste. o Part 8 – Legal mechanism for managing contaminated land.

Legislation	Relevance
	▪ Authorisation type – Waste Management Licence (*not required for the LUBWSS WTP at this stage*). ▪ Authority – DFFE (national) and DEDTEA (provincial).
National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)	▪ Key sections (amongst others): o Section 58 – Duty to avoid causing adverse effects on coastal environment. o Section 63 – Environmental authorisations for coastal activities. o Section 69 – Discharge of effluent into coastal waters. o Section 71 – Dumping permits. ▪ Authorisation types (*none of these are required for the LUBWSS WTP*) – o Approval for reclamation of land. o Coastal Waters Discharge Permit. o Dumping Permit. ▪ Authority – DFFE Oceans & Coasts.
National Heritage Resources Act (Act No. 25 of 1999)	▪ Key sections: o Section 34 – protection of structure older than 60 years. o Section 35 – protection of heritage resources. o Section 36 – protection of graves and burial grounds. o Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent, etc. ▪ Authorisation type – Permit (*not required for the LUBWSS WTP*). ▪ Authority – South African Heritage Resources Agency (SAHRA) and Amafa and Research Institute.
National Forests Act (Act No. 84 of 1998)	▪ Key sections (amongst others): o Chapter 3 – Special Measures to Protect Forests and Trees. ▪ Authorisation type – Licence (*not required for the LUBWSS WTP*). ▪ Authority – DFFE.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	▪ Key sections (amongst others): o Section 22 – Application for mining right. o Section 27 – Application for, issuing and duration of mining permit. o Section 53 – Use of land surface rights contrary to objects of Act. ▪ Authorisation type – Mining Permit / Mining Right (*not required for the LUBWSS WTP*). ▪ Authority – Department of Mineral Resources and Energy (DMRE).
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	▪ Control measures for erosion. ▪ Control measures for alien and invasive plant species. ▪ Authority – KZN Department of Agriculture and Rural Development (DARD).
National Road Traffic Act (Act No. 93 of 1996)	Authority – KZN Department of Transport (DoT).
KZN Nature Conservation Management Act (Act No. 9 of 1997)	▪ Institutional bodies for nature conservation in KZN. ▪ Establish control and monitoring bodies and mechanisms. ▪ Authority – Ezemvelo KZN Wildlife.
KZN Heritage Act (Act No. 4 of 2008)	▪ Conservation, protection and administration of both the physical and the living or tangible heritage resources of KZN. ▪ Authority – Amafa and Research Institute.
Spatial Planning and Land Use Management Act (Act No. 16 of 2013)	▪ Framework for spatial planning and land use management in SA. ▪ Land development and land use applications. ▪ Authority – eThekwini Municipality.
Occupational Health & Safety Act (Act No. 85 of 1993)	▪ Provisions for Occupational Health & Safety. ▪ Authority – Department of Employment and Labour. ▪ Relevant regulations, such as Electrical Installation Regulations, Construction Regulations, etc.

5.2 National Environmental Management Act, 1998

NEMA is the framework legislation regulating the environment in South Africa. According to Section 2(3) of NEMA, development must be socially, environmentally and economically sustainable, which means the integration of these three factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Some key definitions from NEMA include:

- "Environment" - the surroundings within which humans exist and that are made up of-

  (i) The land, water and atmosphere of the earth;
  (ii) Micro-organisms, plant and animal life;
  (iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and
  (iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

- "Pollution" - any change in the environment caused by-

  (i) substances;
  (ii) radioactive or other waves; or
  (iii) noise, odours, dust or heat;

  emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

The existing EA for the Goodenough System (including the WTP) (reference no.: 14/12/16/3/3/2/1030) was granted in terms of NEMA following the previous execution of a Scoping and Environmental Impact Reporting Process in terms of the EIA Regulations. The amendment of the EMPr for the WTP, to satisfy Conditions 15 and 16 of this EA, is being undertaken in accordance with Regulation 37 of the EIA Regulations.

5.3 Method Statements

The Contractor shall provide detailed method statements on how the performance criteria in the EMPr will be met. These method statements 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 for the WTP includes at least the following (where applicable):

- ❑ Method Statement for site clearing;
- ❑ Method Statement for establishing the construction camp and laydown area;
- ❑ Method Statement for managing waste and wastewater;
- ❑ Method Statement to dealing with possible emergencies that can occur;
- ❑ 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 managing spoil material;
- ❑ Method Statement for controlling alien invasive species and noxious weeds;
- ❑ Method Statement for the decommissioning of the construction works area;
- ❑ Method Statement for rehabilitation of construction footprint; and
- ❑ Method Statement for the management of stormwater and erosion.

6 ROLES AND RESPONSIBILITIES

6.1 Department of Forestry, Fisheries and the Environment

DFFE is the Competent Authority in terms of NEMA to review and decide on the amended EMPr.

DFFE also fulfils a compliance and enforcement role with regards to the EA. DFFE may perform random inspections to check compliance. DFFE will also review the monitoring and auditing reports compiled by the independent Environmental Control Officer (ECO).

6.2 Project Applicant

uMngeni-uThukela Water is the project proponent / Applicant and is ultimately responsible for the development and implementation of the EMPr and ensuring that the conditions in the EA are adhered to. The liability associated with environmental non-compliance rests with the Applicant.

6.3 Project Manager

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

The PM 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 and the other project role players.

6.4 Environmental Control Officer

The ECO is a competent (minimum of 3 years' experience) and independent representative appointed by the Applicant. The ECO will undertake weekly inspections of the site and at least 6-monthly full compliance auditing against the EMPr and EA. The audit reports will be submitted to the PM, as well as to DFFE for their records, and also be made available to the relevant authorities, on their request.

The ECO will check the following:

- Compliance with the EMPr and the EA;
- 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.

6.5 Contractor's Environmental Officer

The primary role of the competent Environmental Officer (EO) is to coordinate the environmental management activities of the Contractor on site.

Specific responsibilities of the EO, 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 relevant persons on site;
- Exercising an internal compliance management system on behalf of the Contractor;
- Inspecting the site as required to ensure adherence to the management actions of the EMPr and the Method Statements, as well as the requirements of the EA;

- Providing inputs to the regular environment report to be prepared by the ECO (as required);
- Liaising with the construction team on issues related to implementation of, and compliance with the EMPr and EA;
- Maintaining a record of environmental incidents (such as spills, impacts, legal transgressions) as well as corrective and preventive actions taken; and
- Maintaining a public complaints' register in which all complaints are recorded, as well as action taken.

7 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.

7.1 Baseline Monitoring

7.1.1 General

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.

7.1.2 Pre-Construction Survey

A pre-construction survey needs to be conducted for all areas that are to be affected by construction activities. The survey needs to include the following:

- Site investigations by appropriate members of the project team and specialists (as relevant);
- Generate records from survey which include site details, photographs, explanatory notes, etc. (as required);
- Record the condition of existing structures and infrastructure on the site; and
- Identify site-specific mitigation measures.

The records from the pre-construction survey must be used to establish and inform the reinstatement and rehabilitation requirements for the affected areas.

7.2 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 monitoring programme:

- Monitoring during normal operations, abnormal situations and emergency situations;
- Measuring equipment must be accurately calibrated;
- Adequate quality control of the sampling must be ensured;
- Certified methods of testing must be employed;
- Where legal specifications exist for testing and sampling methods, these must be considered; and
- Establish a process for identifying and implementing corrective measures.

7.3 Compliance Monitoring and Auditing

Compliance monitoring will commence in the pre-construction phase, where those conditions in the EA 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 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.

It is recommended that the ECO undertake weekly monitoring and compliance auditing, including an audit at the end of construction and one at the end of the defects notification period. Audit reports will be submitted to DFFE.

Auditing of compliance with the EA and EMPr must be conducted in accordance with Regulation 34 of the EIA Regulations in terms of the following:

1. The holder of the EA must, for the period during which the EA and EMPr remain valid -
   a. Ensure that the compliance with the conditions of the EA and EMPr is audited; and
   b. Submit an environmental audit report to DFFE.
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 EA 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 the EIA Regulations (as amended); and
   d. Be conducted and submitted to DFFE at intervals as indicated in the EA.
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 the EA 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 may 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;
- Public complaints register; and
- Grievance Mechanism/Process for public and contractor employees.

8 ENVIRONMENTAL TRAINING AND 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 construction phase 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;
- 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 shall compile a project-specific Environmental Training and Awareness Programme, taking into consideration the abovementioned factors, to be approved by the PM/ECO.

9 EMPr REVIEW

Due to its dynamic nature, this EMPr 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:

- Does not make adequate provision for protecting the environment against the pre-construction, construction and/or operational 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
- Based on provisions in Regulation 34 of the EIA Regulations, as amended.

The amendment of the EMPr will be undertaken in terms of Regulation 34 – 37 of the EIA Regulations, as applicable.

10 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

10.1 Introduction

In order to establish best management practices and prescribe mitigation measures, the following project-related information needs to be adequately understood:

- **Activities** associated with the proposed project;
- **Environmental aspects** associated with the project activities;
- **Environmental impacts** resulting from the environmental aspects; and
- The nature of the surrounding **receiving environment**.

10.2 Project Activities

In order to understand the impacts related to the project it is necessary to unpack the activities associated with the project life-cycle, as listed in the tables to follow.

Table 5: Activities associated with the Pre-construction Phase

ACTIVITIES: PRE-CONSTRUCTION PHASE	
Project Activities	
1.	Negotiations and agreements with the affected landowners and stakeholders
2.	Detailed engineering design
3.	Detailed geotechnical design
4.	Site survey
5.	Procurement of contractors
6.	Mark construction servitude
7.	Pre-construction photographic records
8.	Development and approval of method statements
9.	Development and approval of construction plans
10.	Development of employment strategy
11.	Construction site planning, access and layout
Environmental Activities	
1.	Applicant to appoint ECO
2.	Undertake a walkdown survey of the project footprint by the relevant environmental specialists
3.	Implement site-specific plans under the EMPr
4.	Demarcation of buffers around sensitive areas (including wetlands bordering the WTP site)
5.	Apply for environmental approvals, permits and licences (if necessary)
6.	Diligent compliance monitoring of the EA, EMPr and other relevant environmental legislation
7.	Ongoing consultation with landowners and affected parties
8.	Establish environmental baseline

Table 6: Activities associated with the Construction Phase

ACTIVITIES: CONSTRUCTION PHASE	
Project Activities	
1.	Site establishment (including site camp and laydown area)
2.	Fencing of the construction area (as relevant)
3.	Registration of servitudes
4.	Pegging of overall footprint
5.	Site clearing
6.	Delivery of construction material
7.	Transportation of equipment, materials and personnel
8.	Storage and handling of material
9.	Cut and cover activities
10.	Stockpiling (sand, crushed stone, aggregate, etc.)
11.	Stormwater control mechanisms
12.	Management of topsoil and spoil
13.	Waste and wastewater management
14.	Traffic control measures
15.	Bulk earthworks
16.	Site security

ACTIVITIES: CONSTRUCTION PHASE
17. Electrical supply
18. Construction of proposed infrastructure
19. Road surface finishes
20. Concrete works
21. Landscaping
Environmental Activities
1. Reinstatement and rehabilitation of construction domain
2. Control of invasive alien plant species
3. Diligent compliance monitoring of the EA, EMPr and other relevant environmental legislation
4. Conduct environmental awareness training
5. Implement EMPr and site-specific plants that form part of the EMPr
6. Ongoing consultation with landowners and affected parties
7. Maintaining no-go areas (including wetlands bordering the WTP site)
8. Ongoing search, rescue and relocation of red data, protected and endangered species, medicinal plants, heritage resources and graves (based on area of influence of the construction activities) – permits to be in place
9. Ongoing monitoring for red data, protected and endangered species, medicinal plants, heritage resources and graves (based on area of influence of the construction activities)
10. Emergency preparedness for environmental incidents
11. Implement environmental monitoring programme

Table 7: Activities associated with Operational Phase

ACTIVITIES: OPERATIONAL PHASE
Project Activities
1. Routine maintenance inspections
2. Repair and maintenance works
3. Operation of WTP to ensure continuous and efficient treatment of water, meeting regulatory standards
4. Management of residue (sludge)
5. Monitoring and testing
Environmental Activities
1. Ongoing consultation with stakeholders
2. Diligent compliance monitoring of the EA, EMPr and other relevant environmental legislation
3. Monitoring sludge treatment, handling, transportation and disposal
4. Management of sensitive areas or buffered areas (including wetlands bordering the WTP site)
5. Safe chemical storage and handling
6. Stormwater management
7. Waste management
8. Pollution control measures
9. Control of invasive alien plant species
10. Emergency preparedness for environmental incidents
11. Implement environmental monitoring programme

10.3 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 impact.

Table 8 provides the environmental aspects that have been identified for the proposed project, are linked to the project activities (note that only high-level aspects are provided).

Table 8: Environmental aspects associated with Pre-Construction, Construction and Operational Phases

ENVIRONMENTAL ASPECTS	
Pre-construction Phase	
1.	Insufficient construction site planning and layout
2.	Poor consultation with landowners, affected parties, stakeholders and authorities
3.	Site-specific environmental issues not fully understood
4.	Inadequate environmental and compliance monitoring
5.	Absence of relevant permits and licences (as relevant)
6.	Lack of barricading of sensitive environmental features
7.	Poor waste management
8.	Absence of ablution facilities
Construction Phase	
1.	Poor consultation with landowners and affected parties
2.	Inaccurate walk-down survey
3.	Inadequate environmental and compliance monitoring
4.	Lack of environmental awareness creation
5.	Construction starting without or inadequate search and rescue
6.	Indiscriminate site clearing
7.	Poor site establishment
8.	Poor management of access and use of access roads
9.	Poor transportation practices
10.	Poor traffic management
11.	Disturbance of topsoil
12.	Disruptions to existing services
13.	Inadequate storage and handling of material
14.	Inadequate storage and handling of hazardous material
15.	Erosion
16.	Poor maintenance of equipment and plant
17.	Poor management of labour force
18.	Pollution from ablution facilities
19.	Inadequate management of construction camp and laydown area
20.	Poor waste management practices – hazardous and general (solid and liquid waste types)
21.	Poor management of pollution generation potential
22.	Poor management of water
23.	Damage to fauna and flora Species of Conservation Concern
24.	Environmental damage of sensitive areas (including wetlands bordering the WTP site)
25.	Disruption of archaeological and culturally significant features (if encountered)
26.	Dust and emissions
27.	Noise and vibration nuisance due to construction activities
28.	Influence to resource quality (I.e., water quality, aquatic biota, flow and habitat) of watercourses
29.	Poor reinstatement and rehabilitation
Operational Phase	
1.	Poor consultation with landowners, affected parties, stakeholders and authorities
2.	Poor management of WTP residue (sludge)
3.	Inadequate management of chemical storage and handling
4.	Inadequate management of stormwater

5.	Inadequate management of waste
6.	Inadequate management of access, routine maintenance and maintenance works
7.	Inadequate management of invasive alien plant species
8.	Inadequate environmental and compliance monitoring

10.4 Potential Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to **Table 9** and **Table 10** for the potential significant impacts associated with the preceding activities and environmental aspects for the construction and operational phase, respectively.

Table 9: Potential significant environmental impacts during Construction Phase

Feature	Impact
Geology and Soil	• Unsuitable geological conditions • Impacts associated with the sourcing of construction material and loss of topsoil • Soil erosion (land clearance and construction activities) • Compaction and erosion of removed and stockpiled soils • Soil contamination from incorrect storage/handling/disposal of hazardous waste and chemicals • Soil contamination through spillages and leakages • Erosion and contamination from poor stormwater management
Topography	• Visual impacts during construction • Erosion of affected areas • Impacts from changing site drainage
Geohydrology	• Groundwater pollution due to spillages and poor construction practices
Surface Water	• Loss of wetland habitat and reduction in water quality from poor construction practices • Contamination of surface water bodies • Increased stormwater runoff and poor stormwater management • Water quality impacts due to spillages and poor construction practices • Water quality impacts due to siltation
Flora	• Loss of sensitive vegetation and habitat (including wetlands bordering the WTP site) • Damage and loss of vegetation of conservation significance (if encountered on site) • Proliferation of invasive alien plants in disturbed areas • Damage to vegetation in surrounding areas outside authorised footprint • Disturbance of sensitive plant species if relocated • Soil compaction and impacts to plant regrowth • Loss of Critical Biodiversity Areas (CBAs) and Durban Metropolitan Open Space System (D'MOSS)
Fauna	• Loss of habitat through site clearing and construction • Disruption/alteration of species activities (breeding, feeding, etc.) due to noise and vibration and human presence • Illegal killing or hunting of mammals • Killing of snakes during construction phase due to poor environmental education procedures • Pollution of the biophysical environment, with adverse effects to fauna • Loss of fauna/floral species of conservation concern (if encountered on site) • Obstruction to animal movement • Introduction of alien species • Displacement of animal species (if encountered on site)
Air Quality	• Excessive dust levels • Greenhouse gas emissions

Feature	Impact
Transportation	• Construction-related traffic • Increase in traffic on the local road network • Damage to roads by heavy construction vehicles • Risks to road users
Noise & Vibration	• Noise and vibration nuisance from construction activities
Aesthetics	• Visual impacts caused by construction activities and poor housekeeping
Safety and Security	• Safety risk to surrounding communities • Injury to construction workers from various hazards associated with construction work
Waste Management	• Land, air and water pollution through poor waste management practices • Impacts from improper disposal of excess spoil material (soil and rock) generated as part of the bulk earthworks
Socio–Economic Environment	• Impacts to health of local communities • Nuisance caused by noise, vibration and dust pollution • Generation of employment opportunities for local community (positive) • Contribution to local economy (positive) • Conflicted land uses • Social impacts caused by construction workers and security personnel • Increased prevalence of HIV
Heritage Resources	• Damage to heritage resources and loss of resources of heritage and cultural significance (if encountered on site)

Table 10: Potential significant environmental impacts for Operational Phase

Feature	Impact
Topography	• Visual impacts during construction • Erosion of affected areas • Impacts from changing site drainage
Soil	• Soil erosion from poor stormwater management • Soil pollution due to improper disposal of sludge • Soil pollution due to due to spillages and poor operational practices
Water	• Loss of wetland habitat and reduction in water quality from poor operational practices • Contamination of surface water bodies • Increased stormwater runoff and poor stormwater management • Water quality impacts due to spillages and poor operational practices • Water wastage within the facility • Water quality impacts due to improper disposal of sludge
Flora	• Proliferation of invasive alien plants through inadequate rehabilitation and eradication
Noise	• Noise from operational plant can disturb nearby communities
Odour	• Malodours from sludge treatment, raw water, or chemical use at the WTP
Aesthetics	• Inadequate reinstatement and rehabilitation of construction footprint • Visual impacts from poor housekeeping at WTP
Socio–Economic Environment	• Visual impacts to surrounding communities • Disruptions to local communities from poor operational practices (e.g., noise, odour) • Human health risks from spillages and poor operational practices

11 SENSITIVE ENVIRONMENTAL FEATURES

The following is noted in terms of the sensitivity of the WTP site (refer to the combined sensitivity map in **Figure 6** below):

- The WTP site falls within areas classified as CBA Irreplaceable and D'MOSS.
- According to the Terrestrial Ecological Survey for the Goodenough System (Khuselimvelo, 2020), the WTP site is located adjacent to a small mixed use industrial area, with wetlands occurring in the area. The implications of this are that the riparian zone of the watercourse is in a very compromised condition, but it may provide an ecological corridor if well maintained. The dominant hydrophilic plants include *Cyperus papyrus* and *Typha capensis*. The area contains a high density of a mix of various alien species with isolated pockets of grassland. The grassland is dominated by species indicative of disturbance. The site is generally of low ecological value, however, the presence of a watercourse increases the ecological significance of the site (Khuselimvelo, 2020).
- Wetlands in relation to the WTP were delineated as part of the Aquatic and Wetland Baseline and Impact Assessment (The Biodiversity Company, 2020). It is noted that the WTP layout was optimised during the detail design stage. Apart from the overall optimisation of the layout, the proposed change in the routing of internal roads for the revised layout serves to optimise space and the flow of traffic to create an efficient operation of the plant, as well as to minimise the impacts to the wetland on site by reducing the wetland crossings. Due to the operational reservoir located near the abstraction and the gravity main to the WTP, no raw water storage was required on site. Similarly, since the potable supply can be gravity fed to the distribution point, Quarry Reservoir, no potable water storage will be required on site. These changes to the layout during detail design had positive impacts on the overall WTP footprint.
- No heritage resources were identified at the WTP site as part of the Heritage Impact Assessment (eThembeni Cultural Heritage, 2023).

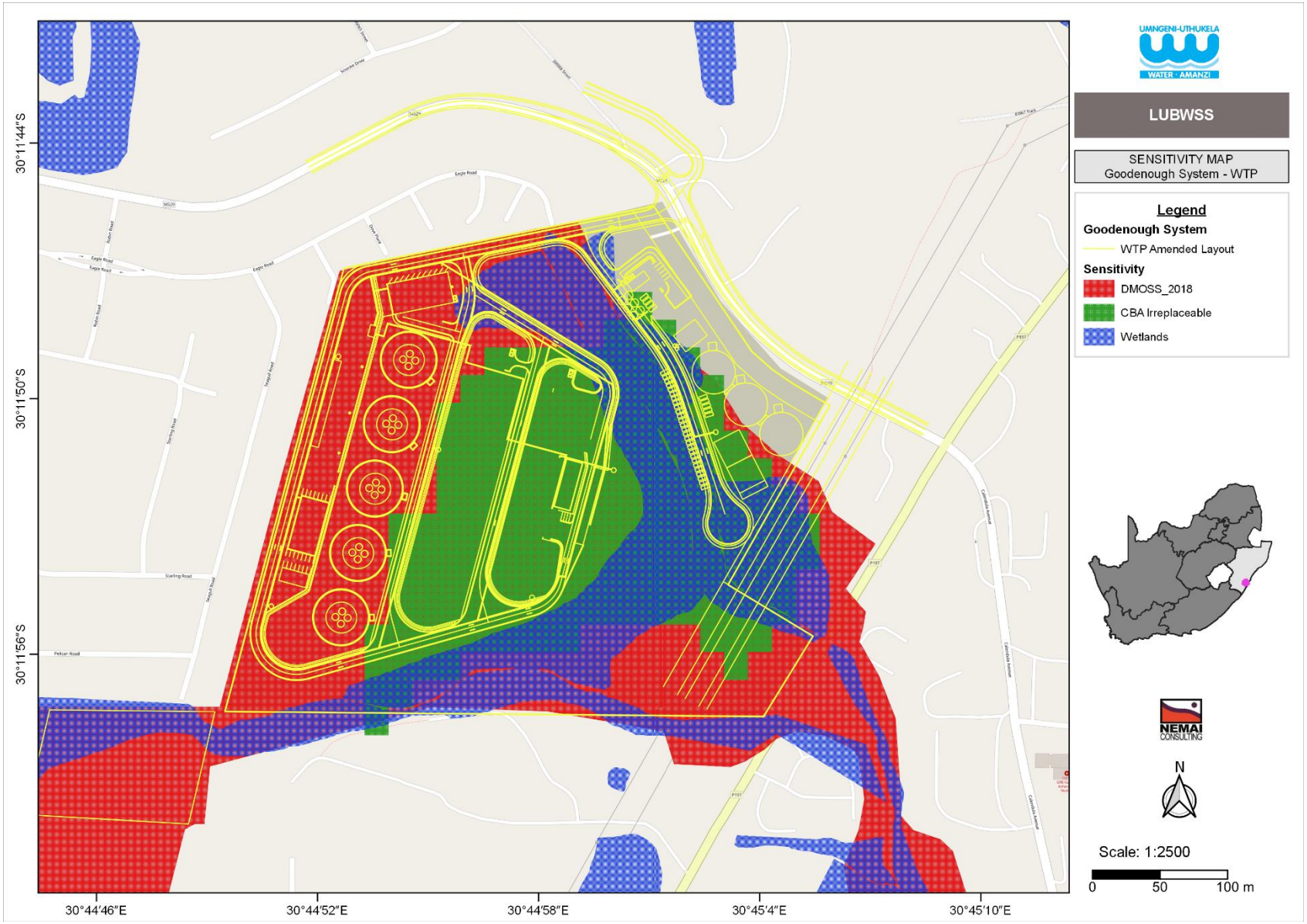

Figure 6: Combined sensitivity map

12 IMPACT MANAGEMENT

12.1 Introduction

The framework for the management measures contained in the sections to follow 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**.

12.2 Pre-Construction Phase

12.2.1 Specialist Environmental Investigations

Management Objective:

- Identify and manage impacts to sensitive and protected environmental features.

Target:

- All sensitive and protected environmental features to be identified in the construction domain of the WTP.
- 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 (if encountered).

Management Actions:

- Baseline studies shall be undertaken prior to construction to provide a benchmark against which impacts resulting from the construction and operational phases can be measured. Aspects to be included are terrestrial ecology, surface water quality, air quality and noise.
- The following plans, which are appended to the EMPr, shall be implemented:
  - Alien Invasive Management Plan (**Appendix C**);
  - Contingency Plan (effective monitoring system to detect any leakage or spillage of a hazardous substance during their transportation, handling, use and storage) (**Appendix D**);
  - Emergency Preparedness Response Plan (**Appendix E**);
  - Erosion Management Plan (**Appendix F**);
  - Plant Rescue and Protection Plan (**Appendix G**);

- Stormwater Management Plan (**Appendix H**); and
- Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**).

Responsibilities:

- Applicant to appoint suitably qualified specialists.
- Specialists to undertake site investigations.
- Contractor to execute the management actions.

Monitoring Requirements:

Responsible party	Timing	Evidence of compliance
• Specialists to execute studies. • Contactor / EO to implement management actions and site-specific management plans. • ECO to monitor compliance.	Prior to construction	• All necessary environmental consents to be in place (if required), with due consideration to the Project programme. • Search and Rescue Report. • Environmental Baseline Report.

12.2.2 Construction Site Planning and Layout

Management Objective:

- Appropriate planning and layout of construction site to ensure environmental protection.

Target:

- No impacts to sensitive environmental features as a result of construction site planning and layout.

Management Actions:

- Conduct a pre-construction survey of the area to be affected by the development. This shall include site investigations with photographic records.
- A buffer zone of 23m for the wetlands bordering the WTP site shall be strictly adhered to during construction.
- Barricade sensitive features and display signage (no-go areas).
- Prior to construction commencing the construction areas must be clearly demarcated for the duration of the construction period.
- Storage areas must be located more than 50m from the wetlands bordering the WTP site.
- Sensitive plant species that must be protected within the working area footprint must be clearly demarcated during construction period.
- Where necessary and required, the construction site must be screened from surrounding sensitive social facilities and residences, with fencing and shade cloth.
- The removal, cutting, pruning or relocation of protected indigenous species or vegetation must be approved by the relevant competent authority if required, or by the ECO if no permit is required.
- During site preparation, special care must be taken during the clearing of the works area where organic material will be stored separately from the topsoil and spoil material to

ensure for the protection thereof. This topsoil must be re-used during the rehabilitation phase.

- No access to no-go areas without the permission of the PM.
- The Contractor to develop method statements to be approved by the PM prior to construction taking place.
- Define and communicate roles and responsibilities for the implementation of the EMPr.
- Develop and implement an environmental awareness plan.
- Records of compliance/non-compliance must be kept on site at all times for DFFE on request.
- Records of all environmental incidents must be maintained and a copy of these records be made available to DFFE on request throughout the project execution.
- Prior to establishment of the site camp, the Contractor shall produce a plan showing the positions of all buildings, lay down yards, batch plants, vehicle wash areas, vehicle repair area, batching areas and infrastructure for approval by the PM.
- At all times, the Contractor shall be responsible for the safe and adequate storage of all materials and equipment on site, whether they are supplied by himself or others. The safe handling, unloading and loading of material receipts and dispatches at site or storage areas shall be the Contractors' responsibility.
- eThekwini Electricity's main records (held in the drawing office at eThekwini Electricity Headquarters) must be consulted for the presence of underground electrical services. In addition should any overhead line and/or servitude be affected, the specific permission of the Head: Electricity must be sought regarding the proposed development.
- The relocation of MV/LV electrical services, if required in order to accommodate the proposed development, will be carried out at the expense of the applicant.
- eThekwini Water and Sanitation must be contacted for records of existing sewer services in the area. The relocation of any of these services, should it be necessitated by the proposed project, will be to the expense of the applicant. Should there be a requirement to tie into the Municipalities wastewater network, then Bulk Sewer Clearance must be applied for and the applicant must contact eThekwini Water and Sanitation in this regard.

Responsibilities:

- Applicant – acquire permits.
- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Timing	Evidence of compliance
Contactor/EO & ECO	At the start of construction (prior to site establishment)	• Approved method statements. • Evidence of site establishment in accordance with method statements (photographic records). • Pre-construction survey report. • Approved site plan. • Inspection of barricading (photographic records). • Visible signage (photographic records).

		• Incident Reports.

12.2.3 Environmental Awareness Creation

Management Objective:

- Ensure that the Contractor, construction workers and site personnel are aware of the conditions in the Environmental Authorisation as well as the relevant provisions of the EMPr.

Target:

- All construction workers and employees to have completed appropriate environmental training.
- A record of environmental training undertaken to be kept on site.

Management Actions:

- All relevant parties, including the Applicant, all project managers, Contractors and Sub-Contractors shall be made aware of their responsibility for compliance with the provisions for Duty of Care and remediation of environmental damage contained in Section 28 of NEMA.
- The Contractor must arrange that all of his employees and those of his sub-contractor(s) 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 contractor's site staff including foremen and site management staff shall attend an environmental awareness training course provided by the ECO and a signed attendance register shall be kept available for confirmation.
- 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:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Timing / Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly (starting from beginning of construction).	• Records of training and awareness creation (e.g. training material, training programme, completed attendance registers, etc.)

12.2.4 Ongoing Consultation with 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 adjacent landowners and community members regarding communication.

Target:

- 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.
- No deviations from agreements made with adjacent landowners and community members.

Management Actions:

- Develop Grievance Redress Mechanism (GRM) to effectively verify and address complaints and claims received.
- Establish a communication protocol and lines of communications with affected parties, adjacent landowners, and community members.
- Complaints or liaison with affected parties, adjacent 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 of the contractor, the ECO and/or other relevant project team members to affected parties, adjacent landowners, and community members for queries/raising of issues or complaints.
- Continued liaison with authorities with regards to compliance with the EA and EMPr.
- The Contractor will control direct communication of unauthorised project workers with third parties.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Timing / Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly (starting from beginning of construction).	• Documented communication protocol. • Documented and functional GRM. • Proof of communication. • Related entries into Public Complaints Register.

12.3 Construction Phase

12.3.1 Site Clearing

Management Objective:

- Manage environmental impacts associated with site clearing.
- 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 features identified during pre-construction survey.

Management Actions:

- Method Statement to be developed by the Contractor for approval by the PM, 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.
- Vegetation clearing must be kept to an absolute minimum, and must be within footprints of the servitude, laydown area, construction camp or roads to be used. Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.
- Clearing of vegetation to be conducted in a phased manner (where possible), with due consideration of the search and rescue activities.
- Maintain barricading around sensitive environmental features (including 23m buffer zone from wetlands bordering the WTP site).
- Avoid any disturbance to demarcated sensitive environmental features.
- Suitably experienced personnel (relevant to the potentially affected environmental features) to monitor the clearing activities, with particular focus on heritage resources, as well as protected fauna and flora species.
- During site preparation, 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. It should be protected from wind and rain, as well as from contamination.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Timing / Frequency	Evidence of compliance
Contactor/EO & ECO	Prior to site clearing. Check monthly thereafter.	• Approved method statement. • Related entries into Public Complaints Register. • Visual inspections (photographic records) of cleared areas, barricading and signage.

12.3.2 Site Establishment

Management Objective:

- Minimise environmental impacts associated with site establishment.

Target:

- No damage to the environment outside construction area during site establishment.
- No damage is caused to sensitive environmental features outside of the demarcated construction areas, including marked and barricaded features identified during pre-construction survey.
- No justifiable complaints regarding general disturbance and nuisance received from the affected parties and community members.

Management Actions:

- The Contractor is to produce a site plan for the approval by the PM 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 camp in area where sensitive environmental features will not be impacted on.
- Facilities and structures shall be located with due cognisance of the terrain and geographical features of the project site.
- Positioning of the storage and laydown area should aim to minimise visual impacts.
- Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes.
- Maintain barricading around sensitive environmental features until the cessation of construction works.
- Appoint security personnel.
- Ensure noise levels are within their lawfully acceptable limits as per SANS 10103.
- Minimise disturbance from lighting of the construction camp and site.
- The extent of the site shall be limited to the approved layout, to avoid any additional clearance of vegetation.

- The Contractor shall ensure that the camp and working areas are kept clean and tidy at all times. The PM or/and the ECO shall inspect these areas on a regular basis.
- The Contractor shall comply with all safety requirements enforced; these include emergency evacuation procedures, fire preventative measures, etc.
- The Contractor shall supply firefighting equipment in proportion to the fire risk presented by the type of construction and other on-site activities and materials used on site. This equipment shall be kept in good operating order. This particularly applies to welding activities, etc.
- The Contractor is to provide designated safe smoking areas.
- Every precaution should be taken to prevent pollution of air, soil, groundwater and surface water as a result of construction activities.
- Fuel, lubricants, transmission and hydraulic fluids shall only be stored in the designated areas that comply with the Occupational Health & Safety Act (Act No. 85 of 1993).
- A copy of the EA must be kept at the property where the activity will be undertaken. The EA must be produced to any authorised official from mandated authorities who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who works or undertakes work at the property.
- All stone, sand and other building materials must be sourced from sites that have a lawful Environmental Authorisation and/or mining permit/right as the need may be. Copy of proof of source of materials must be kept and made available on request.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Related entries into Public Complaints Register. • Visual inspections (photographic records). • Copy of EA on site. • Visual inspections (photographic records) of cleared areas, barricading and signage.

12.3.3 Management of Construction Camp

Management Objective:

- Minimise environmental impacts associated with the construction camp and eating areas.

Target:

- No environmental contamination associated with the construction camp.
- Minimise visual impact associated with the construction camp.
- No complaints regarding the construction camp.

Management Actions:

- Construction camp to be screened to minimise the visual impact, where practicable.
- The Contractor shall provide eating areas for all staff. Eating areas be cleaned on a daily basis and shall provide adequate temporary shade.
- Open uncontrolled fires will be forbidden at the site camp. Rather, 'contained' cooking mechanisms will be used (e.g. gas stoves or an enclosed braai facility).
- Eating areas will be designated and demarcated.
- Refuse bins must be placed at all eating areas.
- The feeding, or leaving of food for animals, is strictly prohibited.
- Sufficient vermin/weatherproof bins will be present in this area for all waste material.
- Dishwashing facilities will be provided to ensure that wastewater is disposed of appropriately.
- Failure to comply with the Code of Conduct, or the rules and procedures implemented at the construction camp will result in disciplinary actions.
- Provide safe potable water for food preparation, drinking and bathing.
- Prohibit the felling of trees for firewood.
- Provide medical and first aid facilities at the camp area.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Fencing register. • Waste disposal records. • Documented Code of Conduct. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.4 Management of Ablution Facilities

Management Objective:

- Minimise environmental impacts associated with ablution facilities.

Target:

- No environmental contamination associated with ablution facilities.
- Minimise visual impact associated with ablution facilities.

Management Actions:

- Ablution facilities shall be provided for the workers on site. The use of these facilities must not cause any pollution to any soil or water resources as well as pose a health hazard. In addition, these toilets must be situated outside of the 23m buffer zone of the wetlands bordering the site.
- 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 PM.
- 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 100m 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 staff to use the provided toilets at all times.
- Chemical toilets must be serviced by registered service provider on at least a weekly basis.
- Temporary ablutions and toilets must be established at least 50m from any watercourse or water source.
- All temporary/portable/mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Some form of screened off changing facility must be provided separately for each sex.
- All sanitary fees that may be payable to any local authority shall be paid by the Contractor.
- Ablutions are to be cleaned/emptied on a regular basis, before they are full and contaminate the environment.
- The entrances to the toilets will be adequately screened from public view.
- Sanitary hygiene bins will be provided for female staff.
- Toilet paper shall be provided.
- The Contractor will 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 staying on site, the following controls must be imposed:
    - Positioning of the shower, and specifically its discharge point, will 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:

- PM and ECO – to check.

- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Maintenance register for ablution facilities. • Waste disposal records. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.5 Management of Workshop and Equipment

Management Objective:

- Minimise environmental impacts associated with workshops and equipment use*.*

Target:

- No environmental contamination associated with workshops and equipment use*.*

Management Actions:

- Daily checklists must be completed by drivers and operators before the vehicles and equipment are used.
- Vehicles and equipment must be turned off when not in use.
- Maintenance of equipment and vehicles will be performed in such a manner so as to avoid any environmental contamination (e.g. use of drip trays).
- All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.
- Suitable storage and disposal of hydraulic fluids and other vehicle oils.
- All diesel-powered equipment and vehicles used in construction activities must be suitably serviced, maintained and repaired in order to minimise the emission of diesel particulate matter and reduce subsequent worker exposure to this carcinogenic substance.
- All vehicles and equipment will be kept in good working order.
- Vehicles must be maintained and serviced according to the manufacturers' standards
- Leaking equipment will be repaired immediately or removed from the site.
- Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use.
- Plant to be washed in dedicated areas, where environmental contamination is prevented.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Updated maintenance schedule. • Visual inspection of workshop, storage areas, signage, spill kits, plant, etc. (photographic records). • Disposal records. • Proof of training.

12.3.6 Fencing and Barricades

Management Objective:

- To ensure and assist with controlled fencing and barricades in the working environment.
- Minimise disturbance to animals.

Target:

- Provide a clearly demarcated and safe working area.
- No direct harm to fauna due to inadequate fencing arrangements.

Management Actions:

- No unauthorised access shall be allowed to areas fenced off for construction purposes.
- In places where temporary fencing is required, the Contractor shall erect such fencing when and where required and re-erect and maintain temporary fencing as necessary. Temporary fencing shall remain in position either until it is replaced by permanent fencing or until completion of the works.
- Any fences damaged by the Contractor shall be repaired as soon as possible at his/her cost and shall be of the standard of the original fence.
- 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 to be repaired immediately.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Fencing register. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.7 Management of Labour Force

Management Objective:

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

Target:

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

Management Actions:

- Develop a Code of Conduct in terms of behaviour of construction staff.
- Prevent trespassing of construction workers onto private property.
- Construction workers must be provided with identity cards and must wear identifiable clothing and remain within the approved construction area for the project.
- Make suitable provision for transport and/or accommodation of workforce.
- 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 and demarcated smoking areas should be provided, with special bins for discarding of cigarette butts.
- Create opportunities for the employment of women.
- 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.
- Provide training for labour to benefit individuals beyond completion of the project.
- No unauthorised entry into private properties other than the designated construction footprint areas without prior engagement with the landowner and PM.

Responsibilities:

- Applicant – employment targets.
- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	▪ Documented GRM. ▪ Documented Code of Conduct. ▪ Proof of communication. ▪ Related entries into Public Complaints Register. ▪ Proof of training.

12.3.8 Management of Health and Safety

Management Objective:

- Provide a safe and healthy working environment to construction workers and the public.

Target:

- Approved Health and Safety Plan from Contractor.
- No incidents to project workers or members of the public.
- Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and other relevant regulations.

Management Actions:

- The Contractor shall submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. These requirements are aligned with the Construction Regulations (2014).
- **Health** –
    - The Construction Regulations (2014) require that all contractors conduct an initial health risk assessment of their workers activities prior to initiating any work on site.
    - All construction workers should be subject to baseline (pre-employment) medical examinations.
    - Ensure all workers are medically fit to conduct their activities, with priority being given to those workers required to engage in manual physical labour activities – pre-employment medical examinations are recommended.
    - The Contractor shall prepare a project-specific Emergency Response Plan.
    - The Contractor shall ensure the safety of the public.
- **Safety** –
    - First aid officers shall be trained on site (levels 1 to 3) to deal with construction related injuries.
    - The Contractor shall provide project workers with appropriate Personal Protective Equipment (PPE) in conjunction with training, use, and maintenance of the PPE.
    - Suitable barricading shall be erected around open excavations / trenches, as per the Construction Regulations (2014) or the prevailing legislation.
    - Provide signage as a warning of open excavations.
    - Divert runoff away from excavations, where necessary.
    - No stacking and storing of material will be allowed underneath any operational power lines.
    - The Contractor must establish site access rules and implement and maintain these throughout the construction period.
    - Maintain access control to prevent access of the public to the construction areas.

- The requirements of the Occupational Health and Safety Act (Act No. 85 of 1993) and related regulations shall be adhered to.
- Speed limits shall be enforced in all areas, including public roads and on site. All drivers shall be sensitised to this effect and courteous behaviour is expected from everybody in this regard.
- Applicable notice boards and hazard warning notices will be put in place and secured. Night hazards will be indicated suitably (e.g. reflectors, lighting, and traffic signage).
- Emergency contact details will be prominently displayed.
- All construction personnel must be clearly identifiable. All employees must also be issued with employee cards for identification purposes.
- Use approved communication channels to inform the community of OHS measures to prevent incidents involving community members.
- All complaints and/or problems related to impacts on man-made facilities and activities must be promptly addressed by the Contractor and documented.

Responsibilities:

- PM and ECO – to check.
- Dedicated Occupational Health and Safety system to be implemented by Contractor's Safety Officer, which shall be monitored and audited by the Client's Safety Agent, in terms of the Construction Regulations (2014).
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	• General compliance – monthly • Excavations - daily	• Visual inspections (photographic records). • OHS audit records. • Signage. • OHS Registers. • Records of incidents and corrective measures taken. • Proof of training.

12.3.9 Management of Emergency Procedures

Management Objective:

- Ensure adequate measures are in place to attend to environmental impacts associated with emergencies.

Target:

- All emergencies to be timeously responded to by trained project workers.
- No loss of sensitive environmental features as a result of environmental incidents.
- Safeguard potential receptors against emergency incidents.

Management Actions:

- Implement the Emergency Preparedness Response Plan (**Appendix E**) and Contingency Plan (**Appendix D**).

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Compliance with the Emergency Preparedness Response Plan (Appendix E) and Contingency Plan (Appendix D). • Emergency contact list displayed. • Updated maintenance schedule for fire-fighting equipment. • Visual inspections (photographic records). • Records of incidents and corrective measures taken. • Proof of training.

12.3.10 Management of Access and Traffic

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to the construction site.
- Ensure proper access control.
- Prevent unlawful access to construction domain.
- Adhere to agreements made with individual landowners regarding access (if relevant).
- Ensure the safety of all road users by implementing proper signage and traffic control measures.
- Limit construction-related nuisance to service nodes.

Target:

- No reports of construction vehicles using other unauthorised routes.
- No transporting of unsafe loads. Permits are to be obtained for abnormal loads.
- No speeding.
- No accidents.

Management Actions:

- Implement traffic safety measures (e.g. traffic warning signs, flagmen).
- A condition survey of the local roads to be used during the construction phase shall be made prior to construction.
- Undertake negotiations and confirm arrangements with the adjacent landowners regarding the use of traffic arrangements.

- Make provision for landowners to access their properties.
- Site access shall be controlled and no unauthorised persons shall be allowed onto the site.
- Any clearing for access or haul roads outside the demarcated works area shall only be undertaken after approval from the PM.
- Comply with all traffic-related requirements in the Occupational Health and Safety Act (Act No. 85 of 1993).
- The Contractor must comply with all driving, vehicle, licensing and driver ability requirements.
- Permission required from the PM for the movement of any vehicles and/or personnel outside of designated working areas.
- Existing roads shall be used as far as possible for construction purposes.
- Heavy vehicles shall not be allowed within 32m of watercourses. Where this is not possible, measures must be put in place to limit soil compaction and the extent of the working areas.
- Measures shall be put in place to prevent construction vehicles from entraining dirt onto public roads.
- Haul and delivery routes shall be defined and adhered to during the construction phase.
- Wet suppression of unpaved areas should be applied during dry windy periods to manage dust.
- Road authorities to be notified of any damage caused by construction activities to public roads.
- Provide hard-standing areas for vehicles and regularly inspect and clean these areas.
- The Contractor shall organise the site in such a manner that pedestrians and vehicles can move safely and without risks to health, including sufficient and suitable traffic routes and safe walkways with relevant signage.
- Access roads to be maintained in a suitable condition.
- Suitable erosion protective measures to be implemented for access roads during the construction phase.
- Consult with adjacent landowners, local authorities and communities to ensure that all affected parties are informed of the timing and extent of any disruptions.
- Clearly demarcate all access roads.
- Clearly mark pedestrian-safe access routes.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.11 Management of Waste

Management Objective:

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

Target:

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

Management Actions:

- Waste management activities shall comply with the National Environmental Management: Waste Act (Act No. 59 of 2008).
- An integrated waste management approach shall be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate.
- No waste material may be left on site after construction.
- All waste generated during the construction phase shall be disposed of at a licenced waste disposal site, based on the waste type (general versus hazardous).
- Vermin/weatherproof bins shall be provided in sufficient numbers and capacity to store domestic waste. These bins shall be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste shall be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Provide waste skips at the construction areas. These skips shall be sufficient in number, the skip storage area shall be kept clean, and skips shall be emptied and replaced before overflowing or spillage occurs.
- Ensure daily site clean-ups to prevent the build-up of litter.

- Ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs.
- Ensure that waste is transported so as to avoid waste spills en-route.
- No form of secondary pollution shall arise from the disposal of sewage and refuse.
- Excess concrete, building rubble or other material shall be disposed of in areas designated specifically for this purpose and not indiscriminately over the construction site.
- The entire works area shall be swept of all pieces of wire, metal, wood or other material foreign to the natural environment.
- Contaminated soil shall be treated and disposed of at a permitted waste disposal site, or be removed and the area rehabilitated immediately.
- Safe disposal certificates shall be maintained and made available on request.
- Contaminated materials shall be disposed of at a permitted hazardous waste disposal site.
- The recycling of suitable material (i.e. glass, paper, plastic, etc.) is encouraged.
- Liquid Waste:
    - The Contractor shall provide and maintain suitable ablution facilities at the site.
    - The Contractor shall provide adequate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons. Such facilities shall be designed and sited with the intention of preventing pollution of the surrounding area and environment.
    - All vehicles shall be serviced regularly in designated area within the Contractors camp such that they do not drip oil. Where required, vehicles shall be serviced in bunded areas and drip trays shall be provided.
    - All chemical spills shall be contained and cleaned up by the supplier or professional pollution control personnel.
    - Oil interceptors and drip trays shall be used in vehicle parking areas and during refuelling, and shall be inspected and cleaned regularly.
- Hazardous Waste:
    - Hazardous waste streams shall be established separate from general waste streams, and hazardous waste shall be disposed of at an appropriate and lawful hazardous waste disposal facility.
    - Hazardous waste shall be stored in containers with tight lids that shall be sealed and be disposed at an appropriately permitted hazardous waste disposal site. Such containers shall not be used for purposes other than those originally designed for.
    - The Contractor shall maintain a hazardous material register.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Approved method statement. • Waste management and disposal records. • Visual inspections of waste management facilities (photographic records). • Related entries into Public Complaints Register. • Proof of training.

12.3.12 Management of Storage and Handling of Non-Hazardous Material

Management Objective:

- Effective and safe management of materials on site, in order to minimise the impact of non-hazardous materials on the environment.

Target:

- No pollution due to handling, use and storage of non-hazardous material.

Management Actions:

- Materials to be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Material Safety Data Sheets (MSDS).
- Where required, stored material to be protected from rain and run-off to avoid environmental contamination.
- Materials to be appropriately transported to avoid environmental contamination. Loose loads (e.g. sand, stone chip, refuse, paper and cement) to be covered.
- Suitable remedial measures, depending on the nature of the contaminant and the receiving environment, to be instituted for spillages.
- Materials to be suitably used to prevent environmental contamination.
- Storage of material, chemicals, fuels, etc. shall not pose a risk to the surrounding environment and this includes surface and groundwater. Such storage areas shall be located outside the 1:100 year floodline of any watercourse and shall be fenced to prevent unauthorised access into the area. Temporary bunds shall also be constructed around chemical or fuel storage areas to contain possible spillages.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO	Monthly	• Records (e.g. copies of MSDSs). • Visual inspections (photographic records).

& ECO		• Proof of training.

12.3.13 Management of Storage and Handling of Hazardous Material

Management Objective:

- Ensure the protection of the natural environment and the safety of personnel on site, by the correct management and handling of hazardous substances.

Target:

- No pollution due to handling, use and storage of hazardous material.
- In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills shall be cleaned within 24 hours.

Management Actions:

- Hazardous substances shall 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 (Act No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards.
- Storage and use of hazardous materials shall be strictly controlled to prevent environmental contamination and shall adhere to the requirements stipulated on the MSDS.
- Where flammable liquids are being used, applied or stored the workplace shall be effectively ventilated.
- No person shall smoke in any place in which flammable liquid is used or stored.
- Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.
- Where flammable liquids are decanted, the metal containers shall be bonded or earthed.
- No flammable material (e.g. paper, cleaning rags or similar material) shall be stored together with flammable liquids.
- Staff that will be handling hazardous materials shall be trained to do so.
- Any hazardous materials (apart from fuel) shall be stored within a lockable store with a sealed floor. Suitable ventilation to be provided.
- All storage tanks containing hazardous materials shall be placed in bunded containment areas with impermeable surfaces. The bunded area shall be able to contain 110% of the total volume of the stored hazardous material.
- MSDSs, which contain the necessary information pertaining to a specific hazardous substance, shall be present for all hazardous materials stored on the site.
- Spill kits shall be available for the clean-up of hazardous material spillages.
- Provide secondary containment where a risk of spillage exists.
- Drip trays to be placed under parked heavy vehicles, equipment and other receptacles of hazardous material to prevent spillages.
- Regularly inspect all vehicles for leaks.

- Re-fuelling of vehicles shall take place off-site; if this is not possible then re-fuelling shall take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil.
- In the event of spillages of hazardous substances, the appropriate clean up and disposal measures shall be implemented.
- Spill reporting procedures shall be displayed at all locations where hazardous substances are being stored.
- Hazardous materials shall be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal/recycling.
- Ensure proper and timeous notification of any pollution incidents associated with hazardous materials.
- Hazardous chemical substances containers shall be clearly marked with the contents and main hazardous category e.g. “Flammable” or “Corrosive”.
- Storage of material, chemicals, fuels, etc. shall not pose a risk to the surrounding environment. Such storage areas shall be located outside of the 23m buffer zones of wetlands. Temporary bunds shall also be constructed around chemical or fuel storage areas to contain possible spillages.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Records (e.g. copies of MSDSs). • Visual inspections (photographic records). • Proof of training.

12.3.14 Management of Pollution Generation Potential

Management Objective:

- Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.

Target:

- No complaints regarding pollution.
- No measurable signs of pollution.
- Noise – Comply with SANS 10103:2008.

Management Actions:

General –

- Accidental pollution incidents shall be reported to the ECO immediately when they occur and shall be cleaned-up (to the satisfaction of the PM or ECO) by the Contractor or a nominated clean-up organization at the expense of the Contractor.

Soil –

- Soil shall be exposed for the minimum time possible once cleared of invasive vegetation, that is the timing of clearing and grubbing shall be co-ordinated as much as possible to avoid prolonged exposure of soils to wind and water erosion. Stockpiled topsoil shall be either vegetated with indigenous grasses or covered with a suitable fabric to prevent erosion and invasion by weeds.
- All cut and fill surfaces shall be stabilised with appropriate material or measures when major civil works are complete.
- All equipment shall be inspected regularly for oil or fuel leaks before it is operated. Leakages shall be repaired on mobile equipment or containment trays placed underneath immobile equipment until such leakage has been repaired.
- Soil contaminated with oil shall be appropriately treated and disposed of at a permitted landfill site or the soil can be regenerated using bio-remediation methods.
- Appropriate measures shall be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person.

Noise –

- Noisy fixed facilities shall be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites shall be evaluated in detail and specific measures designed in to the system.
- The provisions of SANS 10103:2008 shall apply to all areas at the perimeter of the site, within audible distance of residents.
- No unnecessary noise disruption or disturbance during school hours shall be allowed.
- No amplified music shall be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless at a level that does not serve as an intrusion to adjacent landowners.
- Construction activities generating output levels of 85dB or more shall be confined to the hours during normal working hours.
- The Contractor shall take preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools.
- With regards to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Contractor shall liaise with local residents on how best to minimise impact, and the local population should be kept informed of the nature and duration of intended activities.
- Construction working hours shall be set, usually from 07H00-17H00, in agreement with the PM to minimise disturbance to adjacent landowners and community members. If the

set hours need to change or be extended, this will be communicated with the relevant landowners.
- All the precautionary measures to minimise noise to the acceptable standard are to be implemented in terms of Noise Control Regulations.

Dust –

- Appropriate dust suppression measures or temporary stabilising mechanisms shall be implemented when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping), particularly during prolonged periods of dry weather. Dust suppression to be undertaken for all bare areas, including construction area, access roads, site yard, etc.
- Fine materials must be covered during transportation.
- Set speed limits for site traffic in agreement with the PM.
- Speed limits to be strictly adhered to by all personnel.
- The Contractor shall take preventative measures to minimise complaints regarding dust nuisances (e.g. screening, dust control, timing, and pre-notification of affected parties).

Lights –

- All lighting installed on site shall not lead to unacceptable light pollution to the surrounding community and natural environment (e.g. use of down-lighters).
- Light is to be directed away from the residences, in order to minimise light pollution to private properties.

Erosion –

- Implement the Erosion Management Plan (**Appendix F**).

Cement and Concrete Batching –

- Cement mixing to take place on an impervious surface (e.g. cement mixing pit).
- Batching operations to take place in a designated area, which shall be kept clean at all times.
- Location of batching plant to be approved by the PM, with due consideration of the relevant management measures.
- Ensure separation of clean and dirty water from batching plant.
- Wastewater from batching operations to be suitably disposed of.
- Waste concrete and cement sludge to be removed on a regular basis (to prevent overflowing) and to be disposed of at a suitable facility.
- Unused cement bags shall be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage of cement.
- Used cement bags shall be stored so as to prevent windblown dust and potential water contamination. Used bags shall be disposed of adequately at a licenced waste disposal facility.
- Limit concrete batching to single sites, where possible.

- Concrete transportation shall not result in spillage.
- Cleaning of equipment and flushing of mixers shall not result in pollution, with all contaminated wash water entering the waste water collection system.
- To prevent spillage onto roads, ready mix trucks shall rinse off the delivery shoot into a suitable sump prior to leaving the site.
- Suitable screening and containment shall be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations.
- All contaminated water and fines from exposed aggregate finishes shall be collected and stored in sumps and will be adequately disposed of.
- All visible remains of excess concrete shall be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.
- Any spilled concrete to be cleaned up immediately.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.
- Contractor to conduct environmental monitoring for air quality (dust), noise and water quality.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Results from environmental monitoring programme. • Updated dust suppression schedule. • Approved method statement. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Disposal records. • Proof of training.

12.3.15 Management of Topsoil

Management Objective:

- Ensure suitable removal, storage, transportation of topsoil for reuse during rehabilitation.

Target:

- An adequate amount of recovered topsoil from disturbed areas to be stored for future use.
- No visual evidence of erosion from topsoil stockpiles.
- No visual evidence of erosion from areas where topsoil has been reinstated.

Management Actions:

- Remove topsoil from areas to be affected by construction activities.

- Topsoil from the areas to be cleared shall be stored for post-construction rehabilitation work and should not be disturbed more than is absolutely necessary.
- Topsoil shall be stored in such a way that does not compromise its plant-support capacity.
- Determine the average depth of the topsoil prior to excavations.
- Identify suitable areas to store topsoil.
- Stockpiled topsoil shall not be compacted and shall be placed as the final soil layer. No vehicles are allowed access onto the stockpiles after they have been placed.
- Topsoil obtained from areas with different soil types shall not be mixed.
- Topsoil to be adequately protected from contamination from construction activities and by aggregate, cement, concrete, fuels, litter, oils, domestic and industrial waste.
- Wind and water erosion-control measures to be implemented to prevent loss of topsoil.
- Do not store topsoil in drainage lines or areas exposed to strong winds or heavy rain.
- Following the construction phase, the topsoil shall be used in rehabilitation of affected areas and landscaping around the WTP.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Approved method statement. • Visual inspections (photographic records). • Proof of training.

12.3.16 Management of Excavations

Management Objective:

- Minimise environmental impacts associated with excavations.
- Prevent hazards associated with excavations.

Target:

- No damage to sensitive environmental features outside construction area during excavations.
- Zero safety incidents related to excavations.

Management Actions:

- Construction activities to remain within the designated construction areas.
- Subsoil and overburden shall be stockpiled separately to be returned for backfilling in the correct soil horizon order.

- Suitable barricading to be erected around open excavations, as per the Construction Regulations (2014). Provide signage as a warning of open excavations.
- Divert runoff away from excavations, where necessary.
- Excavation walls are to be stabilised, as necessary.
- Inspect open excavation at least daily basis to ensure that animals have not become trapped. Such animals shall be safely removed and released, where possible. Special equipment for handling of venomous snakes shall be available on site to ensure safe removal.
- Filing of excavations to make provision for subsidence.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Approved method statement. • Updated Excavation Register. • Visual inspections (photographic records). • Visible signage. • Proof of training.

12.3.17 Management of Blasting

Management Objective:

- Minimise environmental impacts associated with blasting.

Target:

- Full compliance with blasting-related legislation and standards.
- Zero blasting-related impacts to private property, livestock or human health.

Management Actions:

- Prior to commencing with blasting activities, the blasting Contractor shall submit a Method Statement which shall comply with the Explosives Regulations (2003) and all relevant SANS standards and health and safety standards for mitigating blasting.
- The Contractor shall employ industry standard methods to control the impact of blasting and limit the risk of damage to buildings and structures by reducing blast vibrations induced in the rock mass, eliminating fly rock and limiting air-blast and noise to acceptable levels.
- Blast mats shall be used wherever fly-rock may result in damage to any infrastructure or where it could result in death or injury of animals, or where damage could be caused to sensitive environmental features.
- Blasting operations shall be controlled to ensure sound pressure levels are kept below the generally accepted ‘no damage’ level of 140 decibels.

- All explosives shall be transported, stored and handled in accordance with applicable laws and good design engineering and constructions practices.
- Blasting operations are to be strictly controlled with regard to the size of explosive charge in order to minimise noise and air blast, and timings of explosions.
- The number of blasts per day shall be limited. Blasting shall be undertaken at the same times each day.
- No blasting shall be allowed at night.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Noise and vibration levels. • Approved method statement. • Proof of notification of landowners. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.18 Management of Socio-Economic Impacts

Management Objective:

- Ensure no adverse impacts to private properties and surrounding land use as a result of construction activities.
- Maintain a good relationship and communications with stakeholders and private landowners.

Management Target:

- Zero damage to private property or infrastructure during construction.
- Zero interruption of surrounding land use activities during construction.

Management Actions:

- Implement the GRM during the construction period.
- Prior notice shall be given to residents, sensitive social receptors, such as schools or clinics, and businesses adjacent to the WTP site of any noisy or dusty activities that may be undertaken.
- Prioritise the hiring of local labour wherever possible for the project. Follow appropriate channels via the Councillor when appointing local people for the project.
- Source goods and services locally to support the local economy, as far as possible.
- Provide vocational training for local workers to improve their skills and enhance their employability beyond the project's duration.

- Any compensation required for the project shall adhere to all legal requirements.
- Provide adequate compensation for any impacts to local livelihoods.
- Local SMMEs shall be given an opportunity to participate in the construction of the project through the supply of services, material or equipment, as far as possible.
- Spaza shops may open next to the site as a consequence of construction. These shall be controlled by the Contractor to limit their footprint and to ensure that the eThekwini Metro Municipality – Informal Trading By-Law, 2014 is complied with.
- Ensure that the necessary signage and traffic measures are implemented for safe and convenient access to the site.
- No staff accommodation shall be allowed on the site, apart from security personnel.
- The provisions of the Occupational Health and Safety Act (Act No. 85 of 1993) and the Construction Regulations of 2014 shall be implemented on site.
- Ensure that women who do work on the project feel safe and are protected at all times.
- Provide suitable health services for project workers.
- Ensure suitable management of the labour force to prevent security-related issues or disturbance to community members.
- Prohibit unauthorised access of project workers into areas outside of the construction footprint.
- The Contractor and project workers shall abide by the Code of Conduct, which shall form part of the induction training.
- The Contractor shall control direct communication of unauthorised project workers with third parties.
- No encouragement of any kind of child labour and avoid the purchase of products sold by children and teenagers of less than the minimum age.
- Creating nuisances and disturbances in or near communities as a result of construction activities shall be prohibited.
- Implement a Sexually Transmitted Diseases (STD) and HIV/AIDS awareness and prevention programme amongst project workers. The Contractor shall provide an adequate supply of free condoms to all project workers. Condoms will be located at suitable points.
- Develop a clear HIV/AIDS policy and programme, which shall be functional prior to construction.
- Implement measures to prevent Gender-Based Violence (GBV), including training for workers on gender sensitivity, establishing reporting mechanisms, and ensuring security for women and children in and around the project area.
- The construction site shall be fenced for the duration of construction.
- If a risk exists of damage taking place to a property as a result of construction, a condition survey shall be undertaken prior to construction.
- The Contractor shall make good any damage that occurs on any property outside of the WTP site caused by construction activities.

- Provide regular updates and communicate with the local community regarding the project to manage negative perceptions and to keep the community informed.

Responsibilities:

- Applicant.
- PM and ECO – to check.
- Contractor and the Community Liaison Officer (CLO) to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO/CLO & ECO	Monthly	• Documented and functional GRM. • Proof of communication. • Related entries into Public Complaints Register. • Proof of training.

12.3.19 Management of Visual Aspects

Management Objective:

- Minimise visual impacts caused by the project.
- Ensure that the visual appearance of the construction site is not an eyesore the adjacent areas.

Target:

- No complaints regarding impacts to visual quality.

Management Actions:

- Advertising and lighting will be in accordance with relevant standards.
- Lighting shall be sufficient to ensure security but will not constitute ‘light pollution’ to the surrounding areas.
- The site shall be shielded /screened to minimise the visual impact, where practicable.
- Where practicable, development designs to compliment the natural surroundings in order to preserve a sense of place.
- Store materials and waste out of sight, especially in public-facing areas.
- On-going housekeeping to maintain a tidy construction area.
- Implement dust control measures on the construction site to avoid unsightly dust clouds.
- The extent of unnecessary damage to natural surrounds shall be kept to a minimum.
- Ensure vehicles leaving the site with debris or materials are covered to prevent spillage onto surrounding roads.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Approved method statement. • Related entries into Public Complaints Register. • Visual inspections (photographic records). • Proof of training.

12.3.20 Management of Flora

Management Objective:

- Preserve flora species of conservation concern outside of construction areas.
- Control alien plants and noxious weeds.

Target:

- Full compliance with environmental legislation safeguarding flora.
- No unpermitted disturbance to protected flora species.
- No disturbance to vegetation outside the development footprint.
- Ongoing eradication of alien plants and noxious weeds.

Management Actions:

- Comply with the requirements of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004), National Forests Act (Act No. 84 of 1998), National Veld and Forest Fire Act (Act No. 101 of 1998) and KZN Nature Conservation Management Act (Act No. 9 of 1997). All approvals to be in place for protected plants and trees to be affected by construction activities, in accordance with the relevant legal provisions.
- Implement the following site-specific plans that form part of the EMPr to manage impacts to flora:
    - Alien Invasive Management Plan (**Appendix C**);
    - Erosion Management Plan (**Appendix F**);
    - Plant Rescue and Protection Plan (**Appendix G**);
    - Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
    - Open Space Management Plan (**Appendix J**).
- Conduct a pre-construction survey of the area to be affected by the development to identify species of conservation concern. This shall include site investigations with photographic records.
- Sensitive plant species that must be protected within the working area footprint shall be clearly demarcated during construction period.
- A buffer zone of 23m for the wetlands bordering the WTP site shall be strictly adhered to during construction.
- Restrict the construction activities to the smallest practical/functional footprint.

- Care should be taken to keep soils stabilised when removing vegetation during construction and as part of alien plant eradication.
- Care should be taken to prevent the contamination of soil (and ultimately ground water) from accidental fuel and oil spills.
- Indigenous trees removed during construction shall be replaced at a ratio of 1:3 (i.e., 3 trees must be planted for every 1 tree removed) and protected trees at a ratio of 1:10 (i.e., 10 trees must be planted for every 1 tree removed).
- Penalties to be imposed for non-compliance by construction workers.
- Vegetation clearing must be kept to an absolute minimum.
- Mitigation measures shall be implemented to reduce the risk of erosion and the invasion of alien species.
- No exotic plants may be used for rehabilitation purposes. Only indigenous plants occurring within a ten (10) kilometre radius of the development site must be utilised.

Responsibilities:

- Applicant – acquire permits.
- Applicant/Contractor to appoint suitably qualified Ecologist.
- Contractor and Ecologist to execute the management actions, as relevant.
- PM and ECO – to check.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO, Specialist & ECO	Monthly	• Pre-construction survey report. • Permits on record. • Records of herbicide usage. • Visual inspections (photographic records), including relocated species and presence of alien invasive species. • Approved method statement. • Proof of training.

12.3.21 Management of Fauna

Management Objective:

- Ensure the protection of animals.

Target:

- Full compliance with environmental legislation safeguarding fauna.
- No direct/indirect harm to animals from construction activities.

Management Actions:

- Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), KZN Nature Conservation Management Act (Act No. 9 of 1997) and

Animal Protection Act (No. 71 of 1962). All approvals to be in place for protected fauna to be affected by construction activities, in accordance with the relevant legal provisions.

- Conduct a pre-construction survey of the area to be affected by the development to identify species of conservation concern. This shall include site investigations with photographic records.
- A buffer zone of 23m for the wetlands bordering the WTP site shall be strictly adhered to during construction.
- To avoid and minimise direct mortality of faunal species during the construction phase, every effort shall be made to save and relocate any animal encountered during site preparation that cannot flee of its own accord. These animals shall be relocated to a suitable area immediately outside the proposed construction footprint.
- No faunal species shall be disturbed, trapped, hunted or killed during the construction phase.
- Penalties to be imposed for non-compliance by construction workers.
- Inspect open excavation at least daily basis to ensure that animals have not become trapped. Such animals shall be safely removed and released, where possible. Special equipment for handling of venomous snakes shall be available on site to ensure safe removal.
- Rehabilitation of areas where vegetation was disturbed outside of the permanent development footprint shall be undertaken to ensure that habitats for animals are restored.
- Restrict the construction activities to the smallest practical/functional footprint.

Responsibilities:

- Applicant – acquire permits.
- Applicant/Contractor to appoint suitably qualified Ecologist.
- Contractor and Ecologist to execute the management actions, as relevant.
- PM and ECO – to check.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO, Specialist & ECO	Monthly	• Pre-construction survey report. • Permits on record. • Visual inspections (photographic records), including relocated species. • Approved method statement. • Proof of training.

12.3.22 Management of Archaeological and Cultural Features

Management Objective:

- Ensure that all cultural heritage elements are protected against damage from the project activities.

- Ensure the preservation and appropriate management of new findings, should these be discovered during construction.

Management Target:

- Zero damage to archaeological and cultural resources or graves as a result of construction activities.
- Full compliance with environmental legislation safeguarding cultural heritage resources and graves.

Management Actions:

- Comply with the requirements of the National Heritage Resources Act (Act No. 25 of 1999) and KZN Heritage Act (Act No. 4 of 2008). All approvals to be in place for protected cultural heritage resources and graves to be affected by construction activities, in accordance with the relevant legal provisions.
- Under no circumstances shall cultural heritage resources and graves be removed, destroyed or interfered with during construction without the relevant permits in place.
- Conduct a pre-construction survey of the area to be affected by the development to identify cultural heritage elements. This shall include site investigations with photographic records.
- All staff involved in the construction phase shall be advised of the nature of cultural heritage resource material that may be found and informed of their obligation to report any items encountered.
- Restrict the construction activities to the smallest practical/functional footprint.
- It is possible that sub-surface heritage resources could be encountered during the construction phase. The ECO and all other persons responsible for site management and excavation shall be aware that indicators of sub-surface heritage resources could include:
    - Ash deposits (unnaturally grey appearance of soil compared to the surrounding substrate);
    - Bone concentrations, either animal or human;
    - Ceramic fragments, including potsherds;
    - Stone concentrations that appear to be formally arranged (may indicate the presence of an underlying burial, or represent building/structural remains); and
    - Fossilised remains of fauna and flora, including trees.
- In the event that such indicator(s) of heritage resources are identified, the following actions should be taken immediately:
    - All construction within a radius of at least 20m of the indicator should cease. This distance should be increased at the discretion of supervisory staff if heavy machinery or explosives could cause further disturbance to the suspected heritage resource.
    - This area shall be marked using clearly visible means, such as barrier tape, and all personnel shall be informed that it is a no-go area.

- A guard shall be appointed to enforce this no-go area if there is any possibility that it could be violated, whether intentionally or inadvertently, by construction staff or members of the public.
- No measures shall be taken to cover up the suspected heritage resource with soil, or to collect any remains such as bone or stone.
- If a Heritage Practitioner has been appointed to monitor the project, s/he shall be contacted, and a site inspection arranged as soon as possible.
- If no Heritage Practitioner has been appointed to monitor the project, the head of Compliance at Amafa's Pietermaritzburg Office shall be contacted (Telephone: 033 3946 543).
- The South African Police Services (SAPS) shall be notified by an Amafa staff member or an independent Heritage Practitioner if human remains are identified. No SAPS official may disturb or exhume such remains, whether of recent origin or not.
- All parties concerned shall respect the potentially sensitive and confidential nature of the heritage resources, particularly human remains, and refrain from making public statements until a mutually agreed time.
- Any extension of the project beyond its current footprint involving vegetation and/or earth clearance shall be subject to prior assessment by a qualified Heritage Practitioner, considering all information gathered during the initial assessment.

Responsibilities:

- Applicant – acquire permits.
- Applicant/Contractor to appoint suitably qualified Heritage Practitioner.
- Contractor and Heritage Practitioner to execute the management actions, as relevant.
- PM and ECO – to check.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO, Heritage Practitioner & ECO	Monthly	• Pre-construction survey report. • Permits on record. • Inspection of barricading and visible signage (photographic records). • Visual inspections (photographic records). • Implement Chance Finds procedure. • Records of chance finds. • Proof of training.

12.3.23 Management of Existing Services and Infrastructure

Management Objective:

- Prevent impacts to existing services and infrastructure.
- Adhere to agreements made with owners / custodians of the services and infrastructure.

Management Target:

- No unwarranted complaints regarding adverse impacts to existing services and infrastructure.
- Zero damage to existing services and infrastructure.
- 100% of all relevant approvals to be obtained prior to working within existing servitudes, as relevant.

Management Actions:

- Identify and record all existing services and infrastructure in the construction domain.
- Negotiations and agreements with owners / custodians of existing services and infrastructure to be undertaken prior to construction and to be adhered to.
- Ensure access to infrastructure is available to owners / custodians at all times.
- Immediately notify owners / custodians of disturbance to services. Rectify disturbance to services, in consultation with the owners / custodians. Maintain a record of all disturbances and remedial actions on site.
- Notify landowners of any disruptions to essential services and infrastructure.
- Ensure the reinstatement and rehabilitation of the areas affected by construction activities.
- The applicant must consult eThekwini Electricity's mains records (held in the drawing office at eThekwini Electricity Headquarters), for the presence of underground electrical services. In addition, should any overhead line and/or servitude be affected, the specific permission of the Head: Electricity must be sought regarding the proposed development. The relocation of MV/LV electrical services, if required in order to accommodate the proposed development, will be carried out at the expense of the Applicant.

Responsibilities:

- Applicant – acquire permits.
- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Approved method statement. • Wayleaves on record. • Related entries into Public Complaints Register. • Visual inspections (photographic records).

12.3.24 Management of Water Use on Site

Management Objective:

- Minimise environmental impacts associated with storm water as well as water services for construction workers.
- Minimise stormwater runoff from the site onto neighbouring roads.

- Minimise water use through recycling and water efficient practices.

Target:

- No visual evidence of erosion caused by wastewater or stormwater practices.
- No environmental contamination associated with wastewater or stormwater practices.

Management Actions:

- All construction activities to comply with the National Water Act (Act No. 36 of 1998) (NWA) and eThekwini Municipality: Stormwater Management By-Law, 2020.
- Implement the following site-specific plans that form part of the EMPr:
  - Erosion Management Plan (**Appendix F**); and
  - Stormwater Management Plan (**Appendix H**).
- Water required for construction purposes shall be obtained from permitted sources.
- Implement measures to prevent water wastage on the construction site.
- Perform routine checks on plumbing systems, taps and hoses to ensure no leaks or drips occur, addressing any issues immediately.
- Train the workforce on the importance of water conservation and the best practices for using water efficiently.
- Manage stormwater from construction site to avoid environmental contamination and erosion.
- All wastewater discharges to comply with legal requirements associated with the NWA.

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO & ECO	Monthly	• Proof of water use authorisation (consumptive) / agreement with water provider. • Monitoring records of water use. • Visual inspections (photographic records). • Approved method statement. • Proof of training.

12.3.25 Management of Watercourses

Management Objective:

- Ensure that watercourses (including wetlands bordering the WTP site) are protected and incur minimal negative impact to resource quality (i.e. flow, water quality, riparian habitat, morphology, and aquatic biota).

Target:

- Full compliance with environmental legislation safeguarding watercourses.
- Minimise the habitat unit destruction and potential loss of wetland/aquatic-dependent biodiversity.
- Unaltered downstream flow regime.
- Downstream water quality to remain within acceptable ranges, as determined through baseline monitoring.
- Ecological category not to be influenced by construction activities.

Management Actions:

- Implement the following site-specific plans that form part of the EMPr to manage impacts to watercourses:
    - Alien Invasive Management Plan (**Appendix C**);
    - Contingency Plan (**Appendix D**);
    - Emergency Preparedness Response Plan (**Appendix E**);
    - Erosion Management Plan (**Appendix F**);
    - Stormwater Management Plan (**Appendix H**);
    - Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
    - Open Space Management Plan (**Appendix J**).
- Water Use Licence to be in place prior to commencing with water uses relevant to the project in terms of Section 21 of the NWA.
- A buffer zone of 23m for the wetlands bordering the WTP site shall be strictly adhered to during construction.
- Maintain barricading around sensitive environmental features (including 23m buffer zone from wetlands bordering the WTP site).
- Storage areas must be located more than 50m from the wetlands bordering the WTP site.
- Implement an adequate water, sediment and biological monitoring programme together in the form of a management action plan.
- Construction work within watercourses, as authorised in terms of NEMA and NWA, shall be undertaken outside of the peak rainfall period of the year, as far as possible.
- Where disturbance to a watercourse is unavoidable (only linked to activities authorised in terms of NEMA and NWA), modification shall be kept to a minimum in terms of the removal of riparian or wetland vegetation or the excavation of the steam channel, bed or banks.
- Stream bank or wetland vegetation may only be removed where absolutely necessary and the affected areas shall be stabilised and re-vegetated immediately following construction.
- During the excavation of watercourses (only linked to activities authorised in terms of NEMA and NWA), flows shall be diverted around active work areas where required. Water diversion shall be temporary and re-directed flow shall not be diverted towards any stream banks that could cause erosion.

- Storm water channels and preferential flow paths shall be filled with aggregate and/or logs (branches included) to dissipate and slow flows limiting erosion;
- Prevent uncontrolled access of vehicles through the wetlands that can cause a significant adverse impact on the hydrology and alluvial soil structure of these areas.
- The laydown yard, camp and storage areas shall be located outside of the 23m buffer zone of wetlands bordering the WTP site.
- All removed soil and material shall not be stockpiled within the 23m buffer zone of wetlands bordering the WTP site.
- All stockpiles shall be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.
- Any exposed earth shall be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil.
- Temporary and permanent erosion control methods may include silt fences, flotation silt curtains, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed embankments, erosion mats, and mulching.
- No construction vehicles shall be washed within a watercourse or in a manner that may result in contamination of a water resource.
- During construction the Contractor shall have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.
- Implement a water quality and biomonitoring programme for the watercourses bordering the WTP site that may be affected by the construction activities.

Responsibilities:

- Applicant – acquire Water Use Licence.
- Applicant/Contractor to appoint suitably qualified Aquatic Ecologist.
- Contractor and Specialist to execute the management actions, as relevant.
- PM and ECO – to check.

Monitoring Requirements:

Responsible party	Frequency	Evidence of compliance
Contactor/EO, Specialist & ECO	Monthly	• Water Use Licence on record. • Public complaints register. • Water quality and biomonitoring programme. • Contractor's method statement. • Inspection of barricading and visible signage (photographic records). • Visual inspections (photographic records). • Proof of training.

12.3.26 Management of Rehabilitation and Operation

Management Objective:

- Adequate reinstatement and rehabilitation of areas affected by construction.

- Conduct concurrent or progressive rehabilitation of areas affected by construction activities that are situated outside of the construction footprint.

Target:

- Complete site clean-up.
- Reinstatement and rehabilitation of areas physically disturbed by construction activities.
- 80% indigenous vegetation cover within 1 year of the completion of by construction activities.

Management Actions:

- Implement the following site-specific plans that form part of the EMPr to manage reinstatement and rehabilitation of the construction site:
    - Alien Invasive Management Plan (**Appendix C**);
    - Erosion Management Plan (**Appendix F**);
    - Stormwater Management Plan (**Appendix H**);
    - Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
    - Open Space Management Plan (**Appendix J**).

Responsibilities:

- PM and ECO – to check.
- Contractor to implement management actions.

Monitoring Requirements:

- As per the Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**).

12.4 Operational Phase

12.4.1 Introduction

Where relevant, all management actions are to be carried forward from the construction phase to the operational phase. Specific management measures for the operational phase follow.

12.4.2 Site-Specific Plans

Implement the following site-specific plans that form part of the EMPr, as relevant to the operational phase:

- Alien Invasive Management Plan (**Appendix C**);
- Contingency Plan (**Appendix D**);
- Emergency Preparedness Response Plan (**Appendix E**);
- Erosion Management Plan (**Appendix F**);
- Plant Rescue and Protection Plan (**Appendix G**);
- Stormwater Management Plan (**Appendix H**);

- Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
- Open Space Management Plan (**Appendix J**).

12.4.3 Management of Access, Routine Maintenance Inspections & Maintenance Works

Management Actions:

- Restrict operation and maintenance activities to the development footprint.
- During maintenance related activities, damage to existing structures and infrastructure will be restored to its original condition in consultation with the owners / custodians of the infrastructure.
- Maintain access control to the WTP site.
- Strict adherence to speed limits by operation and maintenance vehicles.
- All roads used for maintenance inspections and maintenance works shall be maintained and repaired where necessary.
- Monitoring to be conducted to detect erosion and implement remedial measures, where necessary. Implement the Erosion Management Plan (**Appendix F**) for the WTP.
- Maintenance work shall be undertaken as per the provisions of the EMPr for the pre-construction and construction phases, as relevant.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.

12.4.4 Management of Vegetation

Management Actions:

- All areas to be affected by the proposed project will be rehabilitated after construction activities.
- As much vegetation growth as possible should be promoted within the proposed development site in order to protect soils and to reduce the percentage of the surface area which is left as bare ground. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping. The plant material to be used for rehabilitation should be similar to what is found in the surrounding area.
- Monitor the re-growth of invasive vegetative material.
- Cordon off areas that are under rehabilitation as no-go areas.
- Control invasive plant species and noxious weeds by means of extraction, cutting or other approved methods.
- For planted areas that have failed to establish, replace plants with the same species as originally specified.
- Establish further specifications for maintenance.
- Implement the following management plans:

- Alien Invasive Management Plan (**Appendix C**);
- Erosion Management Plan (**Appendix F**);
- Plant Rescue and Protection Plan (**Appendix G**);
- Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
- Open Space Management Plan(**Appendix J**).

Responsibilities:

- uMngeni-uThukela Water and specialists (as required) to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.
- Refer to roles and responsibilities in relevant site-specific plans.

Monitoring Requirements:

- Refer to monitoring requirements in relevant site-specific plans.

12.4.5 Management of Fauna

Management Actions:

- The disturbance of fauna shall be minimised.
- Animals residing within the operational WTP site shall not be unnecessarily disturbed.
- Trained personnel / specialists to be used to safely capture and remove fauna (including snakes) encountered at the WTP.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.

12.4.6 Waste Management

Management Actions:

- **General:**
  - Develop and implement a waste management system, based on the waste management hierarchy of reduce, re-use, recycle, treatment and disposal.
  - Establish clear separation for different types of waste generated during the operational phase of the WTP, ensuring that hazardous waste, general waste, recyclable, and non-recyclable materials are stored and handled separately.
  - Ensure that all waste is properly labelled and stored in appropriate containers to prevent cross-contamination or accidental release of hazardous substances.
  - Ensure proper containment, transportation, and disposal of hazardous waste.
  - Educate operational staff on proper waste handling, segregation, and disposal procedures. Ensure they are aware of the potential environmental and safety risks associated with waste mismanagement.

- Prepare for accidental spills or releases by training staff on emergency response procedures and having necessary equipment (e.g., spill kits) readily available.

- **Residuals:**

  The drinking water treatment processes at the WTP typically generate residuals ("sludge"). These residuals contain organic and inorganic turbidity-causing solids, including algae, bacteria, viruses, silt and clay, and precipitated chemicals that are produced during treatment. At the WTP, the treatment process that will produce residuals include Coagulation, Flocculation, Sedimentation (Clariflocculator and Pulsator Clarifier), and Media Filtration (Gravity Sand Filters). These residuals are generated by addition of chemicals for coagulation/flocculation, pH adjustment, iron and manganese removal, odour and taste removal. Typically, 60 to 90% of these residuals will be captured in the sedimentation basins (Clariflocculators and/or Pulsator Clarifiers) and the remainder in the filters. A residual handling facility including four gravity thickeners followed by mechanical dewatering via five centrifuges has been designed with on-site residual storage silos at the WTP.

  Management actions for residuals are as follows:

  - Implement the Emergency Preparedness Response Plan (**Appendix E**) and Contingency Plan (**Appendix D**) related to residuals at the WTP.
  - Implement measures to prevent environmental contamination from residuals at the WTP.
  - Ensure that storage facilities for residuals are protected from rainfall and runoff.
  - Capture and treat stormwater that may come into contact with residuals, preventing pollution of nearby waterbodies.
  - Provide staff with appropriate training to safely handle residuals and manage spills, leaks, or equipment malfunctions.
  - Residuals generated at the WTP shall be disposed of at a licensed waste disposal facility. The landfill selected will need to be in possession of the requisite environmental approvals to accept the residue.
  - Obtain a formal commitment from the custodian of the licensed waste disposal facility to accept the residue, and to confirm that sufficient capacity exists at the facility.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.
- Refer to roles and responsibilities in relevant site-specific plans.

Monitoring Requirements:

- Implement a system to track waste types, quantities, handling methods, and disposal locations.

- Conduct regular inspections of waste storage areas, handling procedures, and disposal processes to ensure they meet regulatory standards.
- Regularly test quality of sludge for heavy metals, toxins, pathogens, and pollutants to ensure it meets relevant standards.

12.4.7 Water Conservation

Management Actions:

- Implement measures to prevent water wastage during the operation of the WTP.
- Perform routine checks on plumbing systems, taps and hoses to ensure no leaks or drips occur, addressing any issues immediately.
- Train the operational personnel on the importance of water conservation and the best practices for using water efficiently.
- Irrigation systems to function optimally to avoid water wastage.
- Repair leaks timeously.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.

- **Monitoring Requirements:**

- Monitoring records of water use.
- Visual inspections (photographic records).
- Proof of training.

12.4.8 Management of Spillages

Management Actions:

- Implement the Emergency Preparedness Response Plan (**Appendix E**) and Contingency Plan (**Appendix D**) for the WTP.
- Provide notification of environmental incidents to authorities in accordance with NEMA and NWA.
- Spillages of hazardous material (e.g. chemicals, hydrocarbons) to be appropriately cleaned.
- Large spillages of hazardous material (>15litres depending on the nature of the material and the receiving environment), to be cleaned and remediated by a competent service provider.
- Hazardous waste generated during clean-up to be appropriately stored, handled, transported and disposed of.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.
- Refer to roles and responsibilities in relevant site-specific plans.

Monitoring Requirements:

- Refer to monitoring requirements in relevant site-specific plans.

12.4.9 Stormwater Management

Management Actions:

- Implement the Stormwater Management Plan (**Appendix H**) for the WTP.
- Prevent water quality deterioration of the receiving watercourses from stormwater discharges.
- Prevent erosion associated with stormwater runoff.
- No illegal discharges into the stormwater system to be allowed.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.
- Refer to roles and responsibilities in the Stormwater Management Plan (**Appendix H**).

Monitoring Requirements:

- Refer to monitoring requirements in relevant site-specific plans.

12.4.10 Management of Watercourses

Management Actions:

- Implement the following site-specific plans that form part of the EMPr to manage impacts to watercourses during the operational phase:
    - Alien Invasive Management Plan (**Appendix C**);
    - Contingency Plan (**Appendix D**);
    - Emergency Preparedness Response Plan (**Appendix E**);
    - Erosion Management Plan (**Appendix F**);
    - Stormwater Management Plan (**Appendix H**);
    - Re-Vegetation and Habitat Rehabilitation Plan (**Appendix I**); and
    - Open Space Management Plan (**Appendix J**).
- Water Use Licence to be in place prior to commencing with water uses relevant to the project in terms of Section 21 of the NWA.

- A buffer zone of 15m for the wetlands bordering the WTP site shall be strictly adhered to during the operational phase.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.
- Refer to roles and responsibilities in relevant site-specific plans.

Monitoring Requirements:

- Refer to monitoring requirements in relevant site-specific plans.

12.4.11 Management of Noise

Management Actions:

- The provisions of SANS 10103:2008 shall apply to all areas at the perimeter of the site, within audible distance of residents.
- Prevent unnecessary noise disruption or disturbance to surrounding communities during the operation of the WTP.
- Implement measures to prevent noise pollution, such as soundproofing equipment and green noise barriers (trees), as required.
- Regularly service and maintain machinery to ensure it operates efficiently and without excessive noise due to wear and tear.
- Provide workers with hearing protection devices such as earplugs or earmuffs, especially when working near high-noise machinery.
- Notify nearby residents in advance about any scheduled activities that may produce higher-than-normal noise levels, such as maintenance work, equipment upgrades, or construction.

Responsibilities:

- uMngeni-uThukela Water to implement management actions.
- WTP Environmental Manager to check compliance, report incidents and provide training.

Monitoring Requirements:

- Noise monitoring in accordance with SANS 10103:2008.

13 REFERENCES

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