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UPDATED

ENVIRONMENTAL MANAGEMENT PROGRAMME

In terms of the **National Environmental Management Act**

(NEMA, Act 107 of 1998, as amended)

For

BULK SERVICES UPGRADE

Thembalethu, George

Prepared for the Applicant: **George Municipality**

Prepared By: **Cape *EAP*rac**

Report Reference: **GEO379d/08**

DEA&DP Reference: **16/3/1/1/D2/50/0060/12**

DEA&DP Case Officer: **Ms Shireen Pullen**

Report Date: **12 September 2024**

UPDATED

ENVIRONMENTAL MANAGEMENT PROGRAMME

BULK SERVICES UPGRADE

Thembalethu, George

Submitted for:

DEPARTMENTAL REVIEW

Report Issued by:

Cape Environmental Assessment Practitioners

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DOCUMENT TRACKING

DOCUMENT HISTORY

DOC REF	REVISION	DATE	AUTHOR
GEO379d/08	Updated – Bulk Services – V2	2024-09-12	Ms Louise-Mari van Zyl
GEO379/03	Updated - Bulk Services – V1	2021-10-18	Ms Siân Holder
GEO379/01	Updated - Area 8A, B & C Housing – V1	2015-04-16	Mr Dale Holder
GEO191/16	Area 8A, B and Bulk Services - Draft	2013-11-26	Ms Siân Holder

DISTRIBUTION

DESIGNATION	NAME	EMAIL / FAX
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Holder of EA / Applicant	George Municipality: Municipal Manager	(044) 873 3377
Consulting Engineers & Project Managers	Lukhozi Consulting Engineers (Pty) Ltd.	k.potgieter@lukhozi.co.za

ORDER OF REPORT

Updated Environmental Management Programme (EMPr) for Bulk Services Upgrade 2024-09-12

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Appendix B : Updated Site Development Plans

Typical Sewer Details 1762-SEW-010 (Lukhozi Consulting Engineers, 2024)

Stream Crossing, Stormwater Overflow and Stormwater Details 1762-STW-001 (Lukhozi Consulting Engineers, 2024)

Stream Crossing and Stromwater Details 1762-STW-002 (Lukhozi Consulting Engineers, 2024)

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- Bulk Sewer Gravity Main – Phase 1 (Area 1 to Area 5). Drawings: C20035G-L-01 to C20035G-L-03 (Lyners Consulting Engineers).
- Typical Stream Crossing Detail: C20035G-D-01 (Lyners Consulting Engineers)

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ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

Appendix 4 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Management Programme (EMPr). The checklist below serves as a summary of how these requirements were incorporated into this EMPr.

Table 1: Checklist in terms of Appendix 4 of Regulation 982 of 2014 EIA Regulations

Requirement	Description
Details and expertise of the EAP who prepared the EMPr; including curriculum vitae.	Ms Louise-Mari van Zyl of Cape Environmental Assessment Practitioners. See Cover Pages & Appendix F for CV.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 1 & 2
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 must be avoided, including buffers	Appendix A, B & C.
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – (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.	Section 4 - Responsibilities Section 5 – Pre-Construction Design **Section 6.1 – Environmental Impacts & Mitigations** **Section 6 – Construction & Rehabilitation Phase** Section 7 – Social Requirements Section 8 – Heritage Requirements Section 9 – Method Statements Section 10 – Operation Phase Section 11 – Health & Safety Section 12 – Implementation Schedule
A description and identification of impact management outcomes required for the aspects contemplated above.	Section 6 Section 12
A description of the proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated above 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 practises; (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.	Section 4 Section 5 **Section 6** Section 7 Section 8 Section 9 Section 10 Section 11 Section 12
The method of monitoring the implementation of the impact management actions contemplated above.	Section 4.3 – ECO Responsibilities Section 12 – Implementation Schedule Section 15 - Monitoring

Requirement	Description
The frequency of monitoring the implementation of the impact management actions contemplated above.	Section 4.3 – ECO Responsibilities Section 12 – Implementation Schedule Section 15 - Monitoring
An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 4 Section 12
The time periods within which the impact management actions must be implemented.	Section 6 Section 12
The mechanism for monitoring compliance with the impact management actions.	Section 4.3 – ECO Responsibilities Section 12 – Implementation Schedule Section 15 - Monitoring
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	Section 4.3 Section 15 - Monitoring
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.	Section 4.3.2 Section 5 Section 6 Section 10 Section 12
Any specific information that may be required by the competent authority: **Condition 9 of EA**: The draft Environmental Management Programme (EMPr) submitted as part of the application for environmental authorization must: - 9.1. to amended. 9.1.1. incorporate the conditions of the authorization given in the EA; 9.1.2. include the removal of alien vegetation to co-incide with the end of the construction phase; 9.1.3. the development of a long-term alien management plan after completion of the project which must include follow up removal of invasive alien vegetation and removal of rubble at least twice a year for a period of not less than 10 years after construction; 9.1.4. incorporate measures pertaining to identification and allocation of environmental management roles, responsibilities and accountability, including timeframes for the implementation of the EMPR; 9.1.5. make provision for the compilation of method statements that are to the satisfaction of the appointed Environmental Control Officer (ECO); 9.1.6. be submitted to the Directorate: Land Management (Region 3) for consideration at least three weeks prior to the commencement of construction activities; 9.2. be approved by the Department before the commencement of any construction activities; and 9.3. meet the requirements outlined in Section 24N (2) & (3) of the National Environmental Management Act, 1998 (Act no 107 of 1998, as amended)(NEMA) and regulation 34 of the Environmental Impact Assessment Regulations 2010.	This document. Throughout EMPr. Section 6.6 Section 6.6 Section 4 Section 9 *Noted.* *Noted.* Compliant

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Glossary of Terms

DEA	**Department of Environmental Affairs** – the national authority for sustainable environmental management and integrated development planning.
DEA&DP	**Department of Environmental Affairs and Development Planning** – the provincial authority for sustainable environmental management and integrated development planning.
CARA	**Conservation of Agricultural Resources Act (Act 43 of 1983)** - provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
CBA	**Critical Biodiversity Area** – An area designated over sensitive, vulnerable and endangered features or ecosystems, which remain relatively intact and are in need to protection.
ECA	**Environment Conservation Act, 1989** - To provide for the effective protection and controlled utilization of the environment and for matters incidental thereto.
ECO	**Ecological Control Officer** – independent site agent appointed by a proponent to observe, monitor and where applicable, enforce environmental policies and principles on a development site.
ECR	**Environmental Control Report** – Report (usually monthly) compiled by the ECO to report of construction activities on site and compliance with the EA & EMPr.
EMPR	**Environmental Management Programme –** an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction and operation, and decommissioning of a project are prevented and that positive benefits of the projects are enhanced.
ESA	**Ecological Support Area –** an area designated to support the ecological integrity of Critical Biodiversity Areas and/or sensitive ecosystems.
NEMA	**National Environmental Management Act (Act 107 of 1998)** – national legislation that provides principles for decision-making on matters that affect the environment.

George

Emergency and Important Numbers

Emergency Response / Disaster Management	**10177**
Eden Control Room	044 805 5055
Eden Fire Services	044 801 6376
Police	**10111**
Mossel Bay SAPS (George Road)	044 690 3334
National Disaster Management (Cell phone)	112
Disaster Management (Provincial)	021 937 0800
Life Bay View Private Hospital	044 691 3718
Provincial Hospital	044 691 2011
Ambulance	044 691 3170
ER 24 Private Ambulance Service	084 124
Mossel Bay Municipality	044 501 3000
Emergency (All hours)	**044 606 5000**
Fire & Rescue Services	044 691 3722
Traffic Department	044 606 5201
Water & Electricity	044 606 5041
Electricty Disruption (after hours)	044 805 5073
Sea Rescue (Provincial)	021 449 3500
NSRI Station 15	082 990 5954
Mossel Bay Surf & Life Saving Club	083 462 1182
Southern Cross Life Saving Club	082 740 7654
Mountain Rescue (Provincial)	021 948 9900
Andrew	082 339 1240
Rogan	082 323 4349
Western Cape Tygerberg Poison Centre	021 931 6129
Poisons Information Hotline	0861 555 777
African Snakebite Institute	082 494 2039
Child Emergency	0800 123 321
Citizens Advice Bureau	021 422 0300
SPCA	044 693 0824
CapeNature	044 802 5310
Marine & Coastal Management	044 691 2939
Heritage Western Cape	021 483 9685
Department of Water & Sanitation: Water Pollution	0800 200 200
ROSE Foundation	021 448 7492

1 INTRODUCTION

Cape Environmental Assessment Practitioners (Pty) Ltd. - *C*ape *EAP*rac was appointed, by George Municipality, as the independent Environmental Assessment Practitioner (EAP) responsible for facilitating the legally required Basic Assessment Environmental process for the proposed **formalization of the Area 8A & B Informal Settlements and Bulk Services upgrade** in

Thembalethu. This process was undertaken during the course of 2013 and culminated with the Western Cape Department of Environmental Affairs & Development Planning (DEA&DP) issuing an Environmental Authorisation (EA), in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended), on **4 March 2014**, DEA&DP Ref: ***16/3/1/1/D2/50/0060/12.*** A Correction Notice was subsequently issued on **14 March 2014** to correct the activity description in the original EA.

As the Holder of the EA, the George Municipality is authorised to undertake the following activities in terms of the abovementioned EA and Correction Notice:

Formalisation of 186 erven within Area 8A (Erf 4056) and 8B (Erf 4055) in Thembalethu approximate to the Draft Subdivisional Plan for Areas 8A&B Alternative 1 (Delplan, Jan. 2013):

- 181 residential erven;
- an erf for the existing Telkom tower;
- an erf for the existing crèche and church;
- an erf for the existing corner shop,
- two areas of public open space (one as a thoroughfare between two blocks of erven and one large area designated over the dam area).
- Internal road, water, sewerage, electrical and stormwater services/infrastructure.

Upgrade of Bulk Sewer Infrastructure: Approximate to Plan No: 108429 GE 400 Rev I, dated 13 November 2013 (Aurecon Consulting Engineers), including:

- New bulk gravity and rising mains totalling a distance of approximately 12km to service for UISP Areas 1, 2, 3, 5, 6A & B, 7 and 8A, B & C;
- Upgrade of Pacaltsdorp No. 1 Pumpstation and Thembalethu No. 6 Pumpstation;
- Decommissioning of Thembalethu Pumpstations No. 3, 4 & 5 and associated rising main sewer lines; and
- Five pipe bridges over the Schaapkop River, as well as several stream / tributary crossings.

Installation of Bulk Electrical Powerline: A 66kV overhead powerline, aligned from Kraaibosch area, south-east of Thembalethu Areas 4A and 4C to link to the authorised 66kV powerline running along the northern edge of Pacaltsdorp to the Protea Substation. This powerline is to cross over the Schaapkop River in two places.

Condition 9 of this EA requires that the draft Environmental Management Programme (EMPr), submitted as part of the abovementioned Basic Assessment Environmental Application process, be updated / amended and submitted to the DEA&DP Directorate: Land Management (Region 3) for approval at least three weeks prior to commencement of any construction activities.

Cape EAPrac updated the abovementioned draft EMPr for the **housing component only** (Area 8 A, B & C) during 2015, Ref: GEO379/01. As the detailed design for the Bulk Services (sewer & electrical lines) were not yet available at the time, this updated EMPr did not include these services.

This updated EMPr now serves as the amended document applicable to the bulk services only as approved in the abovementioned Environmental Authorisation. All details and provisions associated with the housing component have been excluded from this document.

The following section provides a brief introduction to the context of the proposed Bulk Services project:

The proposed **bulk sewerage pipelines and associated infrastructure** are to be aligned predominantly along the edge of the Thembalethu settlement, along the edge and within the Schaapkop River valley to the south, separating Thembalethu from Pacaltsdorp.

The existing sewer system is overloaded, with blockages and leaks (resulting from mis-use, acts of vandalism & theft etc.) with pollution and sewerage spillage into the Schaapkop River a common occurrence. In addition, the lack of proper sewerage reticulation in the new and proposed extensions

of Thembalethu and Pacaltsdorp aggravate the current situation now and into the future, and generate a range of additional environmental and health problems and impacts

Please refer to the approved Revised Bulk Sewer Main Proposal Plan No: 108429 GE 400 Rev I, 13/11/13, provided by Aurecon Consulting Engineers (*see Appendix H attached)*: The proposed upgrade of the Bulk Sewer Reticulation includes sections of Rising Main and Gravity pipelines which will ultimately link to the Waste Water Treatment Works. These pipelines will cross the Schaapkop River, via concrete pipe bridges, at six (6) points. All proposed sewer pipe bridges are designed above the 1:100 year floodline of the river / watercourse. In addition, the proposed pipelines will cross over a number of tributaries / streams / stormwater furrows flowing from the developed areas on the plateau towards the Schaapkop River below. These stream crossing structures have also been designed to accommodate 1:100 year flood events.

The abovementioned river and stream crossings were detailed in the Water Use Licence Authorisation (WULA) Application as submitted to the Department of Water & Sanitation (DWS) for Water Use Authorisation. Conditions of implementation related to the design, installation and rehabilitation of the river and stream crossings are included in the Water Use License Authorisation (WULA) issued on 15 December 2014 (*attached in Appendix D)* and must be adhered to along with the conditions of the EA and provisions of this EMPr.

[1]Amendment of Environmental Authorisation and Subsequent Updates To This EMPr: 2024-09-12

The approved pipeline route (Figure 1) was authorised north of the old 'All Brick' brickworks site as being the lowest point for the gravity sewer line at the time. The 'All Brick' brickworks site however was the subject of **severe land invasion/occupation during and following the COVID period** when there was an understandable **lapse in monitoring protocol in terms of anti-land invasion** by the Municipality.

The 'All Brick' brickworks site is **now completely occupied** by informal dwellings making it a near impossible challenge to implement the approved route (logistical challenges with relocation of families / safety for contractors in terms of their staff and materials, as well as safety in terms of wide open excavated trenches that need to be dug to lay the pipe that poses a threat to especially free roaming livestock and children).

In addition, should these informal areas be formalised (services) in future by the Municipality, with the original alignment of the sewer pipeline in the approved position, all of the households on the 'All Brick' brickworks site will be excluded from a formal sewage reticulation network.

Due to informal housing units erected since the issue of the Environmental Authorisation (Figure 2 and Figure 3) the alignment north of the 'All Brick' brickworks site is therefore **not deemed feasible any longer.**

[1] All information added to this Environmental Management Programme as part of the Amendment Application process have been highlighted in RED for ease of reference.

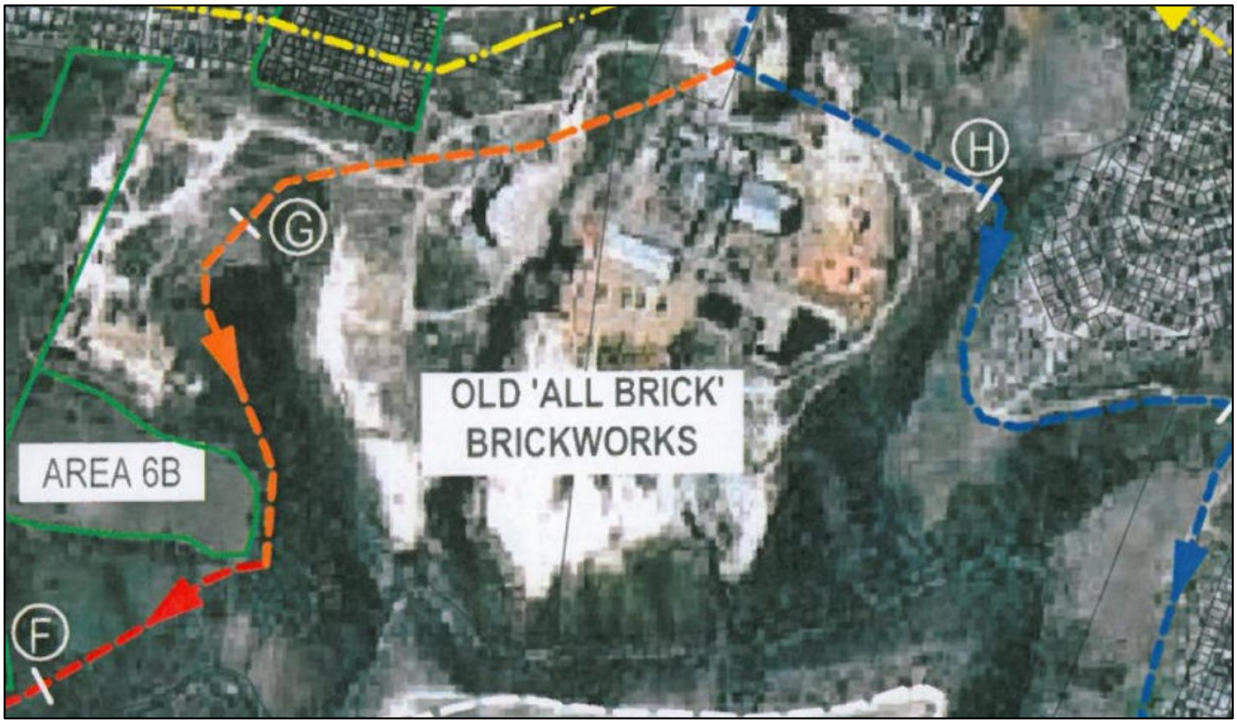


Figure 1: Approved pipeline route north of the old 'All Brickworks' brickworks site (Aurecon, 2013).

Figure 2: Aerial imagery of the old 'All Brick' brickworks site in 2014 (Google Earth, 2024).

Figure 3: Aerial imagery of the old 'All Brick' brickworks site in 2023 (Google Earth, 2024).

It is therefore proposed to **realign the pipeline route** that was originally located **between Point G and Point H in** Figure 1, to the **south** of the old 'All Brick' brickworks site/approved route, to avoid the majority of the newly erected settlements (Figure 4) and to enable future connection of these households to the sewer network if deemed necessary by the Municipality. The realignment of the sewer pipeline route to the south of the 'All Brick' brickworks site will ensure that if this area can also be formalised/serviced in future, should the households in this area be connected to the formal sewage system.

Figure 4: Proposed pipeline route (Yellow Line) around the southern border of the old 'All Brick' brickworks. Original approved pipeline route (Red Line).

1.1 PURPOSE OF THE EMPR

This Environmental Management Programme (EMPr) contains management requirements and recommendations made by *Cape EAPrac*, participating specialists and stakeholders, as well as in terms of best practice. The recommendations and Conditions as contained in the Environmental Authorisation (EA), Ref: 16/3/1/1/D2/50/0060/12, dated 04 March 2014, have been incorporated in this Updated EMPr.

This EMPr has been compiled with due consideration of Section 33 of NEMA and relevant guidelines for Environmental Management Plans. These requirements and recommendations make reference to **pre-construction, construction and operation activities, and decommissioning phases.**

- This EMPr must be included in **ALL tender and contract documentation** associated with this project.
- This document is **binding on the Municipality and all Contractor, Sub-contractors, Service-providers and visitors** to the site, as well as on **all activities** associated with the installation of the Thembalethu Bulk Sewer and Powerline, including all associated infrastructure upgrades required for this development to be undertaken.
- Copies of this EMPr must be kept on site and all Contract / Site Managers are expected to familiarise themselves with the content of this EMPr.

Section 28 of NEMA provides for the Duty of Care principle, which *"…obliges every person who causes, has caused or may cause significant environmental degradation to take reasonable measures to prevent such degradation from occurring, continuing or recurring".* This clause forms the underpinning philosophy of this EMPr.

The purpose of this EMPr is to ensure that the environmental impacts and management of the various phases (there are three) of the bulk service upgrade development on the receiving environment are managed, mitigated and kept to a minimum. The three (3) phases include: **Site preparation** (site demarcation, vegetation removal), **construction** (earthworks, installation & construction of sewer pipelines & associated infrastructure) and **rehabilitation** (alien clearing, re-vegetation etc.) and **operation** (management & maintenance of built infrastructure).

The EMPr must provide easily understood and clearly defined actions that should be implemented during each phase of the development of the proposal. The EMPr is a dynamic document that is flexible and responsive to new and changing circumstances. Changes to 'management actions' may be implemented with consent from the **Environmental Control Officer (ECO),** however changes to 'management outcomes'[2] must be considered by the competent authority and may require a formal amendment of the EMPr prior to implementation.

The draft EMPr (Ref: GEO191/16) was submitted to DEA&DP along with the Basic Assessment Report (BAR) in the November 2013. This was before the Environmental Authorisation was issued. Changes have been made in the draft EMPr in the form of two Updated EMPr documents: one focused on the Formalisation of the Housing for Area 8A, B & C (Ref: GEO379/01), and one document, focused on the installation of the Bulk Service Infrastructure (Ref: GEO379/03). Both updated EMPr documents include conditions of the Environmental Authorisation have been submitted to the DEA&DP for consideration and approval.

1.2 STATUS OF THIS EMPR

It is of utmost importance that this EMPr be read in conjunction with any legally obtained authorisations / approvals, such as an Environmental Authorisation (EA), the Water Use License

[2] Unless otherwise defined in this EMPr the 'impact management outcomes' and associated 'impact management actions' for implementation have been included within each section of the Report, as well as the Implementation Schedule table, as Section 12.

Authorisation (WULA), Forestry Licence/s (if required), municipal certification and/or heritage permits (if required). Should the Environmental Authorisation (EA) contain requirements (conditions) that contradict any points in this EMPr, the requirements (conditions) in the EA, supersede this EMPr.

- The EMPr is valid for the duration of the project with each applicable phase corresponding to the identified requirements.
- **Condition 1 of the EA** stipulates the EA is valid for a period of **five years** from the date of issue (04 March 2014). The holder must commence with all the listed activities within the said period or this EA lapses and a new application for EA must be submitted to the competent authority, unless the holder has lodged a valid application for amendment of the validity period of the EA, before the expiry of the EA. In such instances, the validity period will be automatically extended ("the period of administrative extension") from the day before this EA would otherwise have lapsed, until the amendment application for the extension of the validity period is decided. The listed activities, including the site preparation, may not commence during the period of administrative extension.

A portion of the bulk sewer pipeline and associated infrastructure installation commenced in 2015 (bulk sewer pipeline below Areas 5 & 6A & River Crossing No.6 to the Pacaltsdorp Pumpstation 1), while the formalization of Area 8 A, B & C settlements commenced in March 2017 (under updated EMPr, Ref GEO379/01). All the listed activities authorized as part of the EA have thus been commenced with within the abovementioned 5-year EA validity period**. The EA, and by default this updated EMPr, is thus still considered to be valid and in force.**

1.3 AMENDMENT OF THE EMPR

The manner and frequency for updating this EMPr is as follows (Condition 9 of the EA):

- An Application for Amendment to the EMPr must be submitted to the competent authority if any **further amendments or deviations** are to be made to the EMPr, other than those included and approved as part of this version of the Updated EMPr. These amendments / deviations may only be implemented once the amended EMPr has been authorized in writing by the competent authority, prior to the amendment/deviation taking effect.
- Should impact **'management outcomes'** be affected, a formal Amendment of the EMPr must be submitted to the Competent Authority and such amendments may only take affect with prior permission from the Competent Authority;

Impact **'management actions'** may be amended with prior consent from the ECO without formal amendment of the EMPr, on condition that such management actions be updated once the Environmental Audit is completed.

2 PROPOSED ACTIVITY

The **existing Thembalethu bulk sewer system is overloaded**, with blockages and leaks (resulting from misuse & acts of vandalism etc.) resulting in pollution and sewerage spillage into the Schaapkop River a common occurrence. In addition, the lack of proper sewerage reticulation in the new and proposed formal extensions of Thembalethu UISP (over 4939 erven) and Syferfontein /Housing Project (7700 erven) would aggravate the current, and generate a range of additional, environmental and health problems. The proposed **Thembalethu Bulk Sewer infrastructure** discussed in Section 2.1 below, has been designed to rectify several of the constraints / problems experienced by the current system, while providing the necessary capacity to handle the new and proposed housing developments proposed for the area.

2.1 BULK SEWER INFRASTRUCTURE

Please refer to the Revised Bulk Sewer Main Proposal Plan No: **108429 GE 400 Rev I, 13/11/13**, provided by Aurecon Consulting Engineers, as well as the Technical Report (*see Appendix H attached*).

The proposed bulk sewer infrastructure, involves **approximately 12km of sewer pipeline, the upgrade and decommissioning of sewer pumpstations, five (5) river crossings and several stream / tributary crossings**, within the Schaapkop River Valley.

This sewer infrastructure has been described in Section 2.1.1 below as follows: from east to west, starting in proximity to Area 4C / Area 8 and ending in proximity to the N2 highway (west of Thembalethu). Please note that the white and yellow pipelines depicted on these plans are existing or under construction.

2.1.1 Approved Alignment / Infrastructural Alternative/s

The approved bulk sewer proposal discussed below provides the most feasible long term solution to the Municipality, based on the changes to the MIG allocation, available Municipal funds, and a practical approach to servicing of the UISP housing areas within possible implementation delays. The phasing and sequencing of this bulk sewer proposal will have to be adjusted to conform to the Municipality's funding requirements, as the upgrading of Pumpstations No.1 & No.6 and associated risings mains would require the bulk of this expenditure.

- **500mm-diameter bulk gravity sewer (red line as Option 3):** starting in proximity to tributary from Area 8, to River Crossing No. 5 opposite the Thembalethu Pumpstation No.6.

This section of gravity pipeline (north of Pumpstation 6) was re-aligned to the top of the valley slope to avoid traversing the remaining Afrotemperate Forest patches located within this section of the Schaapkop River valley. Instead of linking to the Pumpstation No.6 (at River Crossing No.5), as initially proposed, this gravity line will now link to the 500-diameter gravity line, discussed as Option 1 below. The access road / thoroughfare required for this line will thus follow the valley edge and not run through the forest area.

- **Bulk gravity sewer** catering for sewerage flows area around Area 3 ranging from approximately 10l/s to 92l/s: (1200m-long 300mm-diameter & 630m-long 350mm-diameter PVC-u sewer pipelines (**blue line as Option 1**)).
- **Decommissioning of Pumpstation No.3.**
- Upgrade existing 710m-long 250mm-diameter PVC-u rising main with additional **500mm-diameter GRP rising main (blue line as Option 2)** – to run parallel to existing line within the existing bench / access road and across existing steel pipe-bridge (**River Crossing No.1**), to link to existing 800mm GRP bulk sewer north of Pacaltsdorp.

Two initially proposed (and excluded) rising mains: aligned to the north / north-east of 'All-Brick' property (proposed 250mmØ blue dotted line), and to the south / south-east of 'All-Brick' property (optional 315mmØ orange dotted line); have now been ***replaced with two gravity lines:***

- ***Orange line:*** *200mmØ line draining to the west of the 'All-Brick' property to link to the red gravity line, south of Area 6B; and*
- ***Blue line:*** *250mmØ line draining to the east of 'All-Brick' property along the same alignment of an existing sewer line to link to Option 1 (at the decommissioned Pumpstation No.3).*

These bulk gravity lines are proposed to manage flows associated with Area 2, as well as the potential future housing area proposed for the 'All-Brick' property.

- **River Crossing No. 5:** A 60m concrete pipe-bridge to accommodate the 500mm-diameter line receiving gravity flow from the abovementioned Options 1 & 3.

A concrete pipe bridge is considered prudent as the recently completed steel-pipe-bridge over the Schaapkop River has already been vandalised (only months after installation). The River valley in this area is very deep at the proposed crossing point opposite PS No.6 and 13m-high piers will be required to support the pipe-bridge. The pipe bridge will have a 1m x 1m square section with re-enforcing placing around the perimeter, with the pipeline placed in the middle of the concrete section.

- **Upgrade / expansion of Thembalethu Pumpstation No.6**: The current pumpstation flow of 60l/s will now be upgraded to handle an interim design flow of 220l/s. This will entail the following:
  - upgrade of the existing inlet works and a new 700mm-diameter inlet;
  - the replacement of the existing 350kVA emergency power generator with a 1.5MVA unit;
  - two additional sumps to be constructed adjacent to the existing two sumps,
  - a new dry-well building below the sumps for the installation of three new pumpsets,
  - a new Motor Control Circuit (MCC) panel room, and
  - a new 2-ton gantry crane to service the new pumps and valves around the dry well during installation and future servicing.
  This upgraded pumpstation will be connected to the new 500mm-diameter rising main (Option 2 above), which will work in conjunction with the existing 250mm-diameter rising to accommodate future design flows, as well as the completion of the UISP Areas 4A&C (existing gravity line), 8A&B (Option 3 above) and 3 (Option 1 above) draining to this pumpstation. The installation and connection of Option 1 to PS No.6 will allow the Municipality to **decommission the existing Pumpstation 4 (15l/s) and Pumpstation 3 (35l/s)**.
- **Bulk gravity sewers for UISP Areas 1, 5, 6A, 6B & 2**, to be constructed in two sections (catering for sewerage flows of 10l/s to 115l/s) (**blue line from Area 1 and red line around Areas 5, 6A&B**). The first section (2985m-long) drains Areas 1, 5 and a portion of 6A, to River Crossing No.6; while the second section (975m-long) drains the remainder of Area 6A, Area 6B and Area 2, to River Crossing No.6.
- **River Crossing No. 6:** A 30m post-tensioned concrete pipe-bridge for a 500mm-diameter gravity sewer catering for flow from the above gravity lines to the Pacaltsdorp Pumpstation No.1: The Schaapkop River valley is shallow at this crossing point and the 30m span is required to clear over the 1:100 year floodplain. A concrete span this long can only be achieved by providing post-tensioning cables in the concrete structure (a 1.1m x 1.1m square section) with pipeline placed at the centre. The bridge supports will be constructed on concrete piles driven into the rock formations below the river bed. The piling position will be outside the 1:100 year floodline, protected by gabions on the river bank (intended to extend protection of the pipe-bridge support positions).
- **Upgrade / expansion of Pacaltsdorp Pumpstation No.1:** The upgrade will entail the following:
  - construction of a larger sump adjacent to the existing three sumps;
  - two approx. 2.5ton 300l/s pumps (2.4m in height) tEMProrarily installed into this sump;
  - new separate MCC panel room constructed adjacent to the main pump dry well;
  - new 3-ton gantry to service the new pumps (the existing two 2-ton gantries will be retained to move the larger diameter valves around the dry well for installation and future servicing);
  - the existing three sumps division walls will be removed to create two enlarged sumps required for the higher flows
  This upgraded pumpstation will be connected to the new 700mm-diameter rising main, which will work in conjunction with the existing 400mm-diameter rising main, to accommodate flows expected from the 4939 erven UISP project.
- **1100m-long, 700mm-diameter rising main** to augment existing 400mm-diameter rising main from PS No.1 to the Outeniqua Waste Water Treatment Works (WWTW) via River Crossings 2 & 3 (**orange line**): to be constructed 4m parallel to existing line. Air- and scour-valves will be provided to allow the pipeline to operate efficiently. The rising main will stop at the entrance to

the WWTW and the flow split between the existing inlet works and the proposed new inlet works (outside the scope of this project).

- **River Crossings No. 2 & No. 3** The streams have relatively steep sides, therefore concrete pipe-bridges will be constructed over the short spans (Crossing No.2 = 32m & Crossing No.3 = 24.5m). Due to the large diameter of the abovementioned rising main, as square section of 1.2m x 1.2m will be provided, with concrete piers both ends of the bridges. These pipe-bridges have been designed to be above the 1:100 year floodline of these streams.
- **Decommission existing Pumpstation No. 5.**
- **Upgrade and re-alignment of remainder of N2 bulk sewer (red line south of N2 highway)**: Operational difficulties (blockages due to flat gradients etc.) exist downstream to the existing Pumpstation No.5. In addition, Area 1 of the UISP housing project is located adjacent and over the existing pipeline alignment. Thus the 1560m-long pipeline will be upgraded to 200mm- and 250mm-diameter lines and relocated to an improved gradient.

In **areas of steep gradient** within the river valley, **a bench** will be created into the slope, into which the pipeline will be installed. This bench will also **serve as an access track** for maintenance work, where manholes will be provided every 80m.

Stream / Tributary Crossings:

The bulk gravity sewer lines will cross a number of small tributaries / side streams which feed into the Schaapkop River (labelled A to J on the Drawing No: 108429 GE 400 Rev I, 13/11/13). As not all of the routes have been surveyed yet, additional stream crossings could be identified at a later stage and the design of crossing infrastructure may be amended. If this occurs the Department of Water & Sanitation (DWS), via the Breede Gouritz Catchment Management Agency (BGCMA) must be notified and the WULA amended, where necessary. The typical / conceptual River and Stream Crossing information is provided in Table 4 of the Technical Report (Pg 14):

Crossing Methodology:

As per instructions from the Department of Water & Sanitations these stream crossing have been designed to accommodate 1:100 year flood events. The preliminary stream crossing methods proposed include the following:

- A temporary berm is constructed in the stream, used to divert the existing flow to a temporary pipeline installed to divert the normal flow past, and below, the construction area. Two sets of silt traps are erected below the construction area to avoid pollution downstream.
- Box culverts are installed on a concrete surface bed in the stream bed. These culverts will be sized to accommodate the 1:100 year flood events.
- Two gabion walls are constructed are constructed perpendicularly over the stream over the box culverts. These walls are placed parallel to one another, with a 3m distance between the inner faces. The two walls of tied together with wire gabion mesh at each 1m height interval. The area in-between the gabion is then filled with G7 road material (gravel) to form an access track, used by the Municipality for maintenance purposes.
- The bulk sewer pipeline is laid to the correct levels in between the two gabion walls in the access track fill material. This removes the need for steel pipe-bridges to span over the streams, which are prone to vandalism and theft. It also allows protection of the pipeline below a single access track across the stream valley.
- Reno mattresses are provided ahead and below the gabion walls to prevent undermining and erosion of soil on either side of the structure. Further gabion walls are also constructed 5 to 10m downstream of the structure in the stream bed to prevent the river cutting back to the gabion structure and undermining it in the future.
- Once the structure in complete, the stream flow is re-directed through the box culverts. Once the flow has stabilised, the silt traps are removed and silt trapped silt used to rehabilitate the construction area.

Condition 7 of the EA states that any changes to, or deviations from the scope of the description set out in activity description must be accepted or approved, in writing, by the competent authority before such changes or deviations may be implemented. In assessing whether to grant such acceptance / approval or not, the competent authority may request such information as it deems necessary to evaluate the significance and impacts of such changes or deviations and it may be necessary for the holder to apply for further authorization in terms of the applicable legislation.

2.1.2 Detailed Design – Bulk Gravity Main (Area 1 to 5)

A portion of the bulk sewer pipeline and associated infrastructure commenced in 2015 (bulk sewer pipeline below Areas 5 & 6A & River Crossing No.6 to the Pacaltsdorp Pumpstation 1), while the formalization of Area 8 A, B & C settlements commenced in March 2017 (under updated EMPr, Ref GEO379/01).

Lyners Consulting Engineers have been appointed to undertake the detailed design and implementation of a next section / phase of approved the Bulk Sewer Project i.e. the bulk gravity main from Area 1 to Area 5, including stream crossings A and B. *Refer to Appendix B1 for detailed alignment of this section of the Bulk Sewer (Drawings C20035G-L-01, C20035G-L-02 & C20035G-L-03).* This section of the alignment is indicated on the approved Plan as the blue line adjacent to Area 1, as well as portion of the red line above stream crossing C, to connect to the installed Area 5 gravity line (as mentioned above). A revised alignment and detailed design for stream crossings A & B has also been provided by Lyners Consulting Engineers (*see Drawing C20035G-D-01).* These streams crossing have also been designed to accommodate the 1:100 year flood events and allow for vehicle access to maintenance during operation. These detailed designs must be submitted to the Breede Gouritz Catchment Management Agency (BGCMA) for approval prior to commencement.

2.2 BULK ELECTRICAL INFRASTRUCTURE

Refer to Electrical Drawing No: GRG 09 04 00005, provided by BDE Consulting Electrical Engineers, attached in Appendix C. A proposed 66kV overhead powerline is to be aligned from the Kraaibosch area, south-east of Thembalethu Areas 4A and 4C. This powerline is to cross over the Schaapkop River parallel to an existing line (within an existing servitude) is proximity to Thembalethu Pumpstation 6, to align south-west of Area 3, across the Schaapkop River to link to the authorised 66kV powerline running along the northern edge of Pacaltsdorp to the Protea Substation.

As this proposed overhead is to cross over the Schaapkop River in two places, the following conditions will apply:

- If possible the electrical line pylons should be erected further than 32m from the edge of the River;
- If the above is not possible (i.e. pylons required with 32m of the River), the excavation required for the installation of the pylon structures should not result in the movement of 5 cubic metres of material. In addition, the foundations of the pylons should not exceed 10m² in size.
- The spanning of the electrical cables shall be done without the disturbance / removal of vegetation from the river valley;
- No access / servitude track will be permitted within the River valley.

2.3 PROPSOED AMENDMENTS

Pipeline Length and Design:

Details of the proposed sewer pipeline realignment on Erf 5006, Portion 40/197 and Portion 50/197 being the focus of this amendment application can be viewed in Table 2.

Table 2: Estimated bulk gravity sewer design proposed (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

Estimated Length	Estimated Pipe Diameter	Estimated Number of Manholes
2430m	200mm ø	82

The bulk sewer lines will be designed to the following standards (Table 3):

Table 3: Sewer line design standards (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

Minimum Full Pipe Velocity	0.7 m/s (due to the low design flows calculated velocities are as low as 0.4-0.5 m/s).
Maximum Full Pipe Velocity	2.2 m/s.
Minimum Cover To Pipes	1.0m below finished road level and 0.8m below finished ground level.
Maximum Depth	4.0m below finished ground level.
Maximum Manhole Spacing	80m.
Minimum Pipe Size	200mm ø.
Minimum Erf Connection Size	110mm ø.
Minimum Gradient Sewer Main	1:150 (per George Municipality requirements)

Sewer mains will be uPVC Class 34 heavy-duty solid wall (complying with SANS 1601) with a pipe stiffness of 400 kPa.

Manhole Design:

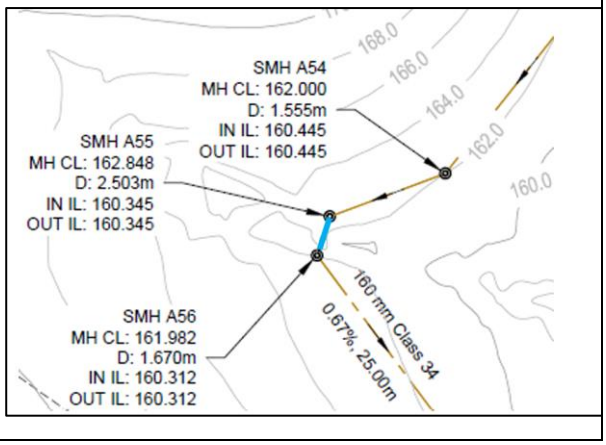
Manholes are to be constructed using 1.0m ø precast concrete rings. Manholes deeper than 1.5m will be reduced to 0.75m ø precast concrete rings. Manhole covers will be flush with ground level within roadways, 50mm above ground level in road reserves and 500mm above ground level in open spaces.

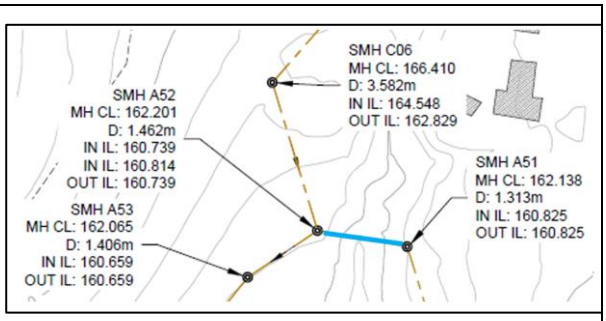
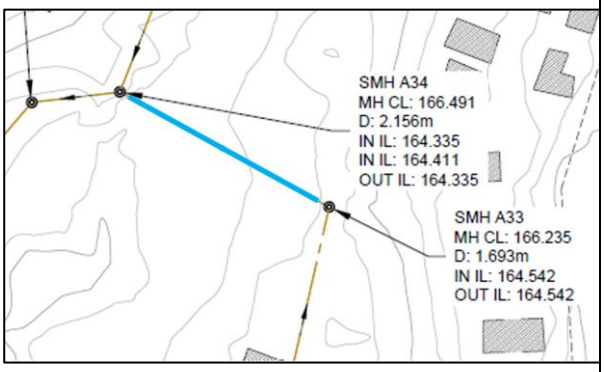
Main Tributary Crossings:

Due to the proposed sewer pipeline route following the lowest possible contour line to allow for maximum gravitation drainage of sewage, three (3) main tributaries will have to be crossed along the length of the sewer pipeline route (Figure 5 and Table 4). The main stream crossings will be by means of sewer pipe bridges constructed with reinforced concrete. Various minor tributaries will have to be crossed along the length of the proposed pipeline route. Stormwater protection measures will be implemented at the minor stream crossings (soil rip-rap, gabion baskets and reno mattresses etc.). Exposed faces of gabion baskets and reno mattresses are to be protected by means of shortcreting/gunite to prevent vandalism and theft.

Figure 5: Location of three main tributary crossings (Red Circles) along the new proposed sewer pipeline route.

Table 4: Main stream crossing details (Lukhozi Consulting Engineers (Pty) Ltd and Confluent Environmental (Pty) Ltd, 2024).

Crossing Number and Approximate Length	GPS Coordinates and Property	Proposed Method of Installation	Layout and Location of Main Crossings (Blue)
#1. ~5m across.	34° 0'34.27"S 22°28'26.97" E Erf 5006	Dig into the watercourse bed pipeline approximately 1m deep.	

#2. ~13m across.	34° 0'32.88"S 22°28'28.19" E Erf 5006	Bridge on concrete supports. Pipeline to be uPVC, laid on a bed of sand in a concrete bridge structure.	
#3. ~31m across.	34° 0'30.34"S 22°28'38.99" E Erf 5006	Bridge on concrete supports above the 1:100 floodline. Pipeline to be uPVC, laid on a bed of sand in a concrete bridge structure.	

Additional Stabilisation of Beds and Banks on Portion 58/197:

In addition to the proposed sewer pipeline realignment forming the basis of this Amendment Application, additional stabilisation of beds and banks are proposed on Portion 58 of Farm 197.

The following bulk gravity sewers have recently (June 2024) been installed as part of the original Environmental Authorisation (Ref: 16/3/1/1/D2/50/0060/12) (Table 5 and Figure 6):

Table 5: Bulk gravity sewers installed on Portion 58/197 (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

Portion	Length	Pipe Diameter
1A	316m (200mm ø) 50m (355mm ø)	200mm ø and 355mm ø as per the existing pipeline with steeper falls of minimum 1 in 150.
1B	120m (355mm ø)	355 mm ø as per the existing pipeline with steeper falls of minimum 1 in 150.

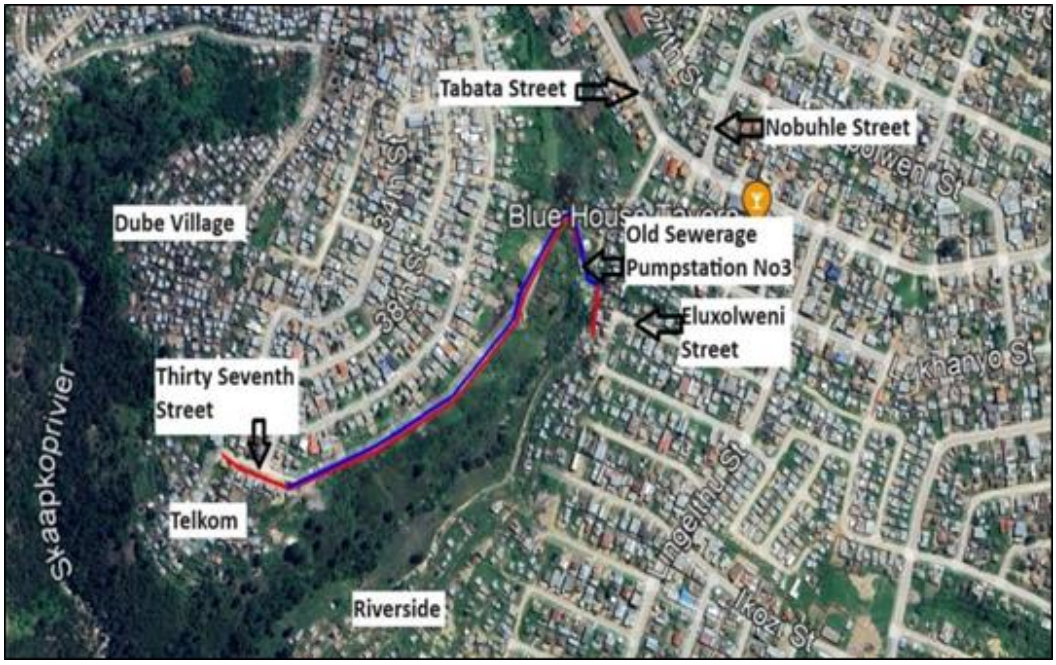


Figure 6: Existing bulk sewer line with poor gradient (Red Line) and new bulk sewer line completed during June 2024 (Blue Line) (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

Following the completion of the above works, it was identified that additional protection in the form of reno mattresses, stormwater headwalls and junction boxes are required to prevent erosion and damage to the newly constructed sewer pipeline as well as the stream bed below the newly constructed gabion wall (34° 00' 40.22" S ; 22° 29 '20.05" E) (Figure 7).

Figure 7: Newly constructed gabion wall. Reno mattresses proposed at the foot of the gabion wall to prevent erosion from plunging water in the stream bed. Reno mattress proposed above the gabion wall to prevent erosion caused by blocked stormwater pipelines causing water to flow over the face of the gabion wall.

Since completion of construction of the gabion wall, it has been noted that the inflow of the stormwater pipe continuously blocks with litter resulting in water overtopping the crossing point and washing down the face of the gabions. It is proposed to provide additional protection on the form of a 22m x 6m reno mattress on top of the crossing to prevent erosion.

Figure 8: Proposed Reno mattress above the gabion wall to prevent erosion caused by blocked stormwater pipelines causing water to flow over the face of the gabion wall (Confluent Environmental, 2024).

Three (3) x reno mattresses of 12m x 6m each are proposed below the newly constructed gabion wall at the stream crossing on Portion 58 of Farm 197. The proposed reno mattresses will prevent erosion of the stream bed caused by plunging water as well as water entering from the west and east of the gabion wall (Figure 9).

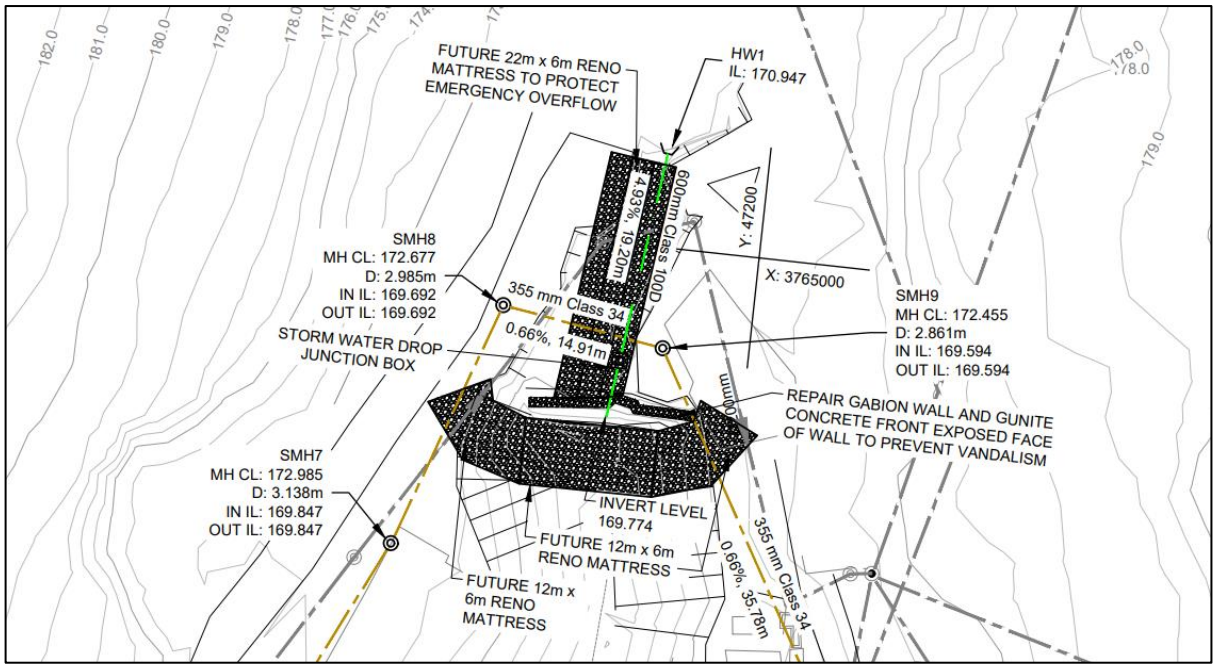


Figure 9: Proposed reno mattresses above and below the newly constructed gabion wall to prevent erosion (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

To prevent erosion/damage from stormwater entering Portion 58 of Farm 197 from the west and east, an additional reno mattress (20m x 4m) crossing the width of the stream, stormwater headwalls and a stormwater junction boxes are proposed (34° 00' 42.61" S ; 22° 29 '20.39" E). 900mm ø class 100D concrete stormwater pipes are proposed and will convey stormwater underneath the newly constructed 355mm ø sewer pipeline (Figure 10).

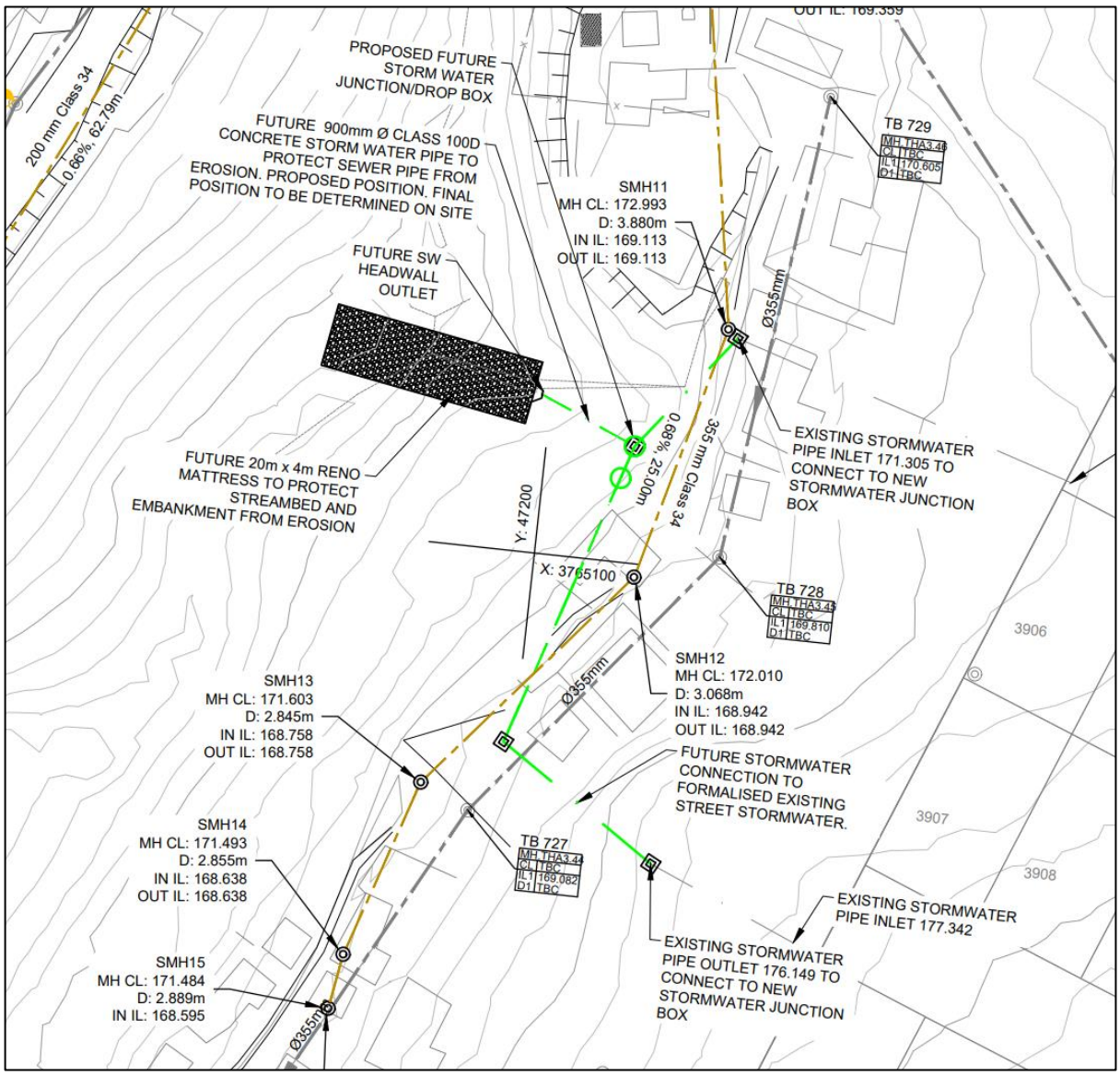


Figure 10: Proposed reno mattress (20m x 4m), stormwater headwalls, stormwater junction boxes and 900mm ø stormwater pipes (Lukhozi Consulting Engineers (Pty) Ltd, 2024).

2.4 PROJECT PHASING

2.4.1 Pre-construction / Site Preparation Phase

The pre-construction phase of the development refers to the site preparation i.e. establishment of a site camp, demarcation of areas (for structures, services, no-go, storage etc.), plant rescue, topsoil stripping and storage etc.

2.4.2 Construction Phase

The construction phase of the development refers to the earthworks and construction of structures associated with the installation of the bulk sewer and electrical upgrades. This phase also includes the immediate post-construction rehabilitation works.

2.4.3 Operation Phase

The operational phase commences when all phases of the bulk sewer have been completed and the bulk sewer has been connected to the Waste Water Treatment Works (WWTW) in Pacaltsdorp,

2.4.4 Closure and Decommission Phase

It is highly unlikely that the service infrastructure associated with residential development within a residential area (inside the urban edge) will be subject to closure and decommission, even over the long term. As such, specific management recommendations related to decommissioning are not included with this EMPr.

3 LEGISLATIVE REQUIREMENTS

Condition 16 of the EA: Notwithstanding the environmental authorization (EA), the holder must comply with any other statutory requirements that may be applicable to the undertaking of the listed activities.

The Holder of the EA, the George Municipality, is required to **comply** with all necessary **legislation**, **policies** and **guidelines**. These include, but are not limited to:

3.1 ENVIRONMENT CONSERVATION ACT, 1989 (ECA)

The **EIA** regulations contained in the Environmental Conservation Act (ECA) have been replaced by the NEMA, however the provisions included in this legislation are still applicable. In particular, the contractor must comply with the draft regulations pertaining to noise as published in the province of Western Cape Provincial Extraordinary Gazette as provision made in section 25 of the ECA), as well as **Section 24** of the ECA regarding waste management and Section 20 of the ECA dealing with waste management under Part IV, Control of Environmental Pollution. The **transitional arrangements** between the **ECA** and the **NEMA,** as well as the transitional arrangements for the various **regulations** published in terms of the NEMA are of importance and must be considered.

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA, ACT 107 OF 1998)

The National Environmental Management Act (**NEMA**, Act 107 of 1998, as amended), makes provision for the identification and assessment of **activities** that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs) based on the findings of an Environmental Assessment. It also embraces the notion of sustainable development as contained in the Constitution of South Africa (Act 106 of 1996) in that everyone has the right:

- to an environment that is not harmful to their health or wellbeing; and
- to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.

NEMA aims to provide for cooperative environmental governance by establishing principles for decision-making on all matters relating to the environment and by means of Environmental Implementation Plans (**EIP**) and Environmental Management Plans/Programmes (**EMPr**).

Principles contained in Section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should:

- In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment and avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and

- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

It is incumbent upon the Holder of the EA to show how the proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.Section 28 of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended) provides for the **Duty of Care** principles, which "…*obliges every person who causes, has caused or may cause significant environmental degradation, to take reasonable measures to prevent such degradation from occurring, continuing or recurring*".

This clause forms the underpinning philosophy of this EMPR, as it is well understood that the earthworks required to access and install these bulk services have the potential to cause significant degradation to the open space and riparian environments through which they traverse.

3.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT (NEM:BA) (ACT 10 OF 2004)

This Act controls the management and conservation of South African **biodiversity** within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

It must be highlighted that the Bulk Sewer pipelines traverse sensitive vegetation along the Schaapkop River.

A large proportion of the sewer alignment is considered low or very low sensitivity as a result of transformation and other destructive activities. There are however some areas of natural to semi-natural habitat present which are considered moderate to very high sensitivity depending on their condition and composition. Of particular concern is **valley along the tributary adjacent to the Thembalethu No. 6 Pump Station**. This area consists of dense, **mature Southern Afrotemperate Forest** with protected and listed species present including Assegaai Tree (*Curtisia dentata)* and Outeniqua Yellowwood Tree (*Podocarpus falcatus)*. Disturbance within this area should be minimised as much as possible and, in particular, access to this area should not be facilitated as it has maintained its current state largely through being inaccessible.

3.3.1 The National List of Threatened Ecosystems

The National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No. 32689, 6 November 2009) was gazetted in 2014 and 2016. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the National Spatial Biodiversity Assessments (NSBA) in 2004, 2007 & 2011.

According to the SANBI BGIS VegMap (2018) and the National Spatial Biodiversity Assessment (2016) the natural vegetation mapped for this target area of Thembalethu, George '**Garden Route Granite Fynbos'**, which has an ecosystem status of **'Critically Endangered'** and is **listed as a National Threatened Ecosystem** (2014). Ecosystem status determines the degree of protection different vegetation types and biomes require, based on transformations in the landscape. This ecosystem should thus be afforded the highest degree of protection and should thus be rehabilitated to a natural state wherever possible. *See Appendix A attached for Biodiversity Maps.*

3.3.2 Garden Route Biodiversity Sector Plan (GRBSP)

A Biodiversity Sector Plan (BSP) provides a way forward in reconciling the conflict between development and the maintenance of natural systems. It provides biodiversity information needed for land-use planning and decision-making and other multi-sectoral planning processes (between Cape Nature, DEA&DP and Department of Water Affairs, district and local municipalities etc.). Central to the Garden Route BSP is the **Critical Biodiversity Area (CBA) Map**, which together with its associated guidelines and GIS maps, have been consulted in the assessment of this development proposal.

As mentioned above, portions of the bulk services upgrade fall within a CBA associated with the Schaapkop Rivier catchment to the north of the site.

3.3.3 Alien Invasive Species Regulations & List, 2016 (GNR. 598)

Along with the abovementioned National List of Threatened Ecosystems (2014), NEM:BA provides a 'List of Alien and Invasive Plant Species (2016)', which require control or management.
Chapter 5 of NEM:BA deals specifically with these species which may pose a threat to biodiversity and aims to – '*to **prevent the unauthorized introduction and spread** of alien species and invasive species to ecosystems and habitats where they do not naturally occur; **to manage and control** alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular; **and to eradicate** alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats*'.
Control and management of Alien Invasive Plant Species, within the ambit of the NEM:BA, is guided by the definition of different categories or lists according to their current invasive state and potential to become invasive. These categories are, as per the NEM:BA Regulations:

- Category 1a Listed Invasive Species: **requiring compulsory control**. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b Listed Invasive Species: **requiring compulsory control** as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2 Listed Invasive Species: regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat. 2 plants that occur in riparian zones.

Category 3 Listed Invasive Species: regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift). No permits will be issued for Cat. 3 plants that occur in riparian zones.

Condition 9.1.2 of the EA: The removal of alien vegetation along the sewer alignment route must co-incide with the end of the construction phase.

Condition 9.1.3 of the EA: A long-term alien management plan must be developed to control alien vegetation after completion of the project, which must include follow-up removal of invasive alien vegetation and removal of rubble at least twice a year for a period of not less than 10 years after construction.

3.4 NATIONAL WASTE MANAGEMENT STRATEGY

The National Waste Management Strategy presents the South African government's strategy for **integrated waste management** for South Africa. It deals among others with: Integrated Waste

Management Planning, Waste Information Systems, Waste Minimisation, Recycling, Waste Collection and Transportation, Waste Treatment, Waste Disposal and Implementing Instruments.

3.5 DEA&DP WASTE MINIMISATION GUIDELINE DOCUMENT FOR ENVIRONMENTAL IMPACT ASSESSMENT REVIEWS (MAY 2003)

This Guideline raises awareness to **waste minimisation** issues and highlights waste and wastage minimization practices. Part B of this document is of particular importance, as it addresses issues of general waste and wastage minimization during construction activities.

3.6 SANS 10400 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

The application of the **National Building Regulations** contains **performance parameters** relating to fire safety, sanitation systems, moisture penetration, structural safety, serviceability and durability. It also takes into account how the above can be established to reflect social expectations in a manner which supports sustainable development objectives.

3.7 NATIONAL BUILDING REGULATIONS

The National Building Regulations and Building Standards Act as amended must be complied with. This act addresses, inter alia:

- Specifications for draftsmen, plans, documents and diagrams;
- Approval by local authorities;
- Appeal procedures;
- Prohibition or conditions with regard to erection of buildings in certain conditions;
- Demolition of buildings;
- Access to building control officers;
- Regulations and directives; and
- Liability.

3.8 NATURE & ENVIRONMENTAL CONSERVATION ORDINANCE (19 OF 1974)

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Western Cape, Cape Nature fulfills this mandate.

As mentioned above, several intact areas of vegetation exist along certain sections of the bulk services alignment, which must be protected from harm as far as possible

3.9 CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the floodlines of water courses and wetlands.

There is an **abundance of alien plant species along the bulk services alignment**, which will require control and/or removal. In addition, evidence of erosion was noted at the site. **Recommendations in terms of alien plant removal / control**, as well as **erosion control (and rehabilitation)** have been included in this Environmental Management Programme (EMPr).

3.10 NATIONAL WATER ACT (NWA) (NO 36 OF 1998)

Section 21c & i of the National Water Act (NWA) requires that authorisation be applied for from the Department of Water and Sanitation (DWS) for any activity in, or in proximity to any watercourse. The bulk services upgrade will require a number of river and stream crossings (mostly via pipe bridges). No activity may take place within 500m radius from the boundary of any wetland or within the **1:100 flood line** and/or within the delineated riparian habitats, whichever is the greatest of the watercourse unless authorised by this Department. The Department of Water & Sanitation issued a Water Use License Authorisation (WULA) on 15 December 2014 (*see Appendix D)*, which contains several conditions applicable to all activities within the riparian zone and associated 1:100 year flood line area of the river and stream crossings. These conditions prescribe requirements and measures for pre-construction, construction and post-construction rehabilitation and monitoring, which must be implemented and adhered to.

3.11 NATIONAL FOREST ACT (ACT 84 OF 1998)

The NFA provides for the **protection of forests**, as well as **specific tree species**, quoting directly from the Act: “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”. The Department of Agriculture, Forestry & Fisheries (DAFF) is responsible for the implementation and enforcement of the NFA, which includes **prohibition of damage to indigenous trees in any natural forest without a licence** (Section 7 of the NFA), as well as the prohibition of the cutting, disturbing, damaging destroying or removing **protected trees** without a licence (Section 15 of the NFA).

Should natural forest (more than three indigenous tree crowns touching, irrespective of species) or any protected trees species be affected by the proposed installation of bulk services in the Schaapkop River Valley, a **Forestry Licence**, in terms of this Act, must be obtained from the Department of Forestry, Fisheries and the Environment (DFFE) before any damage to these trees may take place.

3.12 NATIONAL VELD & FOREST FIRE ACT (NVFFA) (ACT 101 OF 1998)

The purpose of the National Veld and Forest Fire Act is to **prevent and combat veld, forest and mountain fires** throughout the Republic of South Africa and to provide institutions, methods and practices for achieving this purpose. Institutions include the formation bodies such as Fire Protection Associations (FPA’s) and Working on Fire. The Act provides the guidelines and constitution for the implementation of these institutions, as well as their functions and requirements.

Every owner on whose land a veldfire may start or burn or from whose land it may spread must prepare and maintain a firebreak on his or her side of the boundary between his or her land and any adjoining land. The procedure in this regard and the role of adjoining owners and the fire protection association are dealt with within this Act.

The implications of this Act relate to the management of cut biomass from the control of alien invasive vegetation along the Sewer alignment. General principles regarding management of biomass include the following:

- Cut alien plant material MUST be stockpiled **outside of all watercourses (at least 32m from edge of river bank)** and outside of the **1:50 year floodline**, whichever is the greater;
- Where possible, useful firewood must be removed from site;
- The George Municipality should take responsibility of **removing** biomass to a suitable disposal site and/or chipping the woody material for use of pedestrian pathways etc.
- Care must be taken to curb the **spread of seed** when removing and disposing of the cut material.

3.13 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). Heritage Western Cape (HWC) is the enforcing authority in the Western Cape.

In terms of Section 38 of the National Heritage Resources Act, the following activities are relevant to this project:

- *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the HWC, or the responsible resources authority. **No buildings older than 60 years and heritage significance were identified within the bulk services upgrade area.**

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). **No grave sites were found within the bulk services upgrade settlement.**

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority. See **Section 7** below regarding the specific managements of **Heritage Resources** for the bulk services upgrade, Thembalethu.

4 RESPONSIBILITIES

The following section deals with the identification and allocation of management roles, responsibilities and accountability for the implementation of the provisions of this EMPr and conditions of the EA.

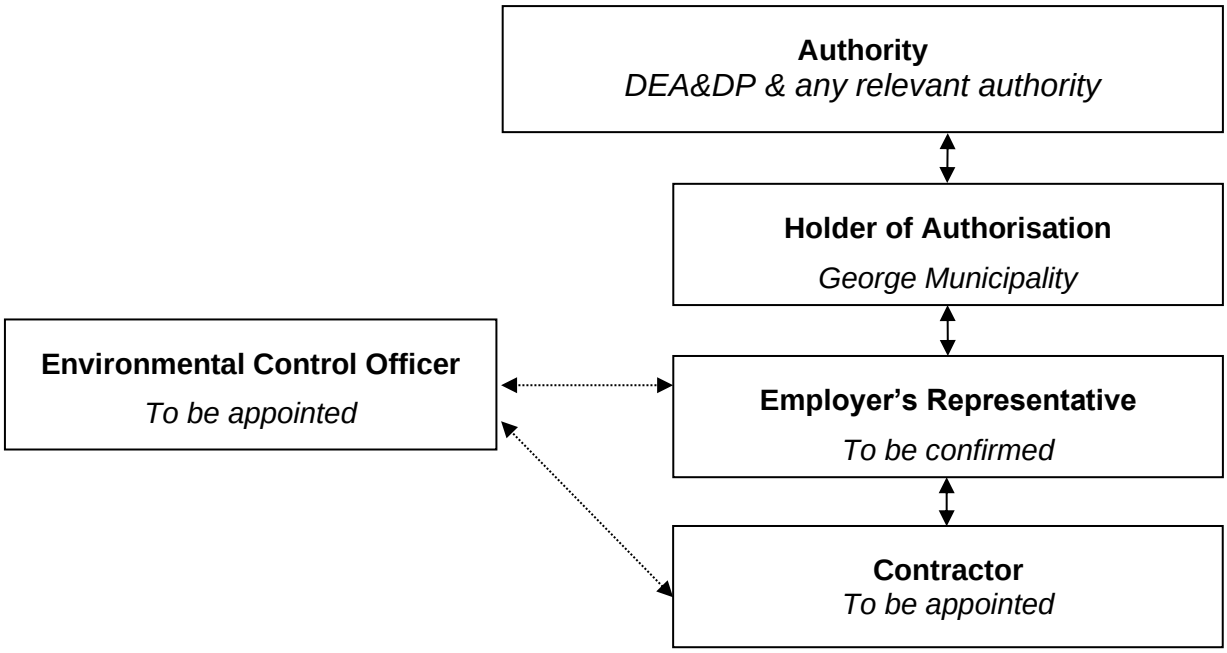


Figure 2: EMPr implementation organizational structure during construction.

4.1 HOLDER OF THE ENVIRONMENTAL AUTHORISATION

The Holder of the Environmental Authorisation is the person or entity who is responsible for carrying out pre-planning, construction, rehabilitation and operational activities to be undertaken as part of the Thembalethu Bulk Services project. This includes activities authorised in terms of any legislation.

Condition 6 of the EA: The Holder of the Authorisation is responsible for ensuring compliance with the EA conditions by any person acting on his/her behalf, including as agent, sub-contractor, employee or any person rendering a service to the holder.

The responsibilities of the Holder of the EA include but are not limited to the following:

- Be conversant with the EMPr, any relevant Environmental Authorisation, Water Use License Authorisation (WULA), Waste License, Forestry Licence, Permit or any other legally binding documentation;
- Ensure that the senior site personnel are aware of and understand the conditions and recommendations contained in the EMPr, any relevant Environmental Authorisation, WULA, Forestry Licence/s, Permits or any other legally binding documentation;
- Order the removal of any person(s) and / or equipment found in contravention of any of the above-mentioned authorisations;
- It is stipulated in the Environmental Authorisation, Condition 13, that access to the site (referred to in Section C) must be granted, and a copy of EA, the EMPr, the WULA, any other relevant approval and the ECO environmental reports mentioned above must be produced, to any authorised official representing the Competent Authority who requests to see it for the purposes of assessing and/or monitoring compliance with the conditions contained herein.

Condition 8 of the EA: The applicant (*read Holder)* must notify the competent authority in writing, within 24 hours thereof if any condition stipulated in the EA is not being complied with.

Condition 14 of the EA: The applicant must submit an application for amendment of the environmental authorization to the competent authority where any detail with respect to the EA must be amended, added, substituted, corrected, removed or updated. Further, the rights granted by the EA are personal rights (i.e. not attached to a property, but granted to a natural or juristic person). As such, only the holder may undertake the activities authorized by the competent authority. The manner in which such permission to transfer the rights and obligations must be applied for is details as Conditions 14.1 and 14.2 of the EA (*see Appendix D).*

4.2 ENGINEERS & CONTRACTORS

The Engineers and Contractors are responsible for physically carrying out the relevant activities, and onto whom the majority of the recommendations in this EMPr are intended. The responsibilities indicated here are also relevant to Sub-Contractors, under the supervision of the Main Contractor.

The responsibilities of the Engineers and Contractors include but are not limited to the following:

- Be conversant with the EMPr, any relevant Environmental Authorisation, Water Use License Authorisation (WULA), Forestry Licence/s, Permits or any other legally binding documentation;
- Have a responsibility to adhering to any conditions and recommendations laid out in above mentioned documentation;
- Prevent actions that may cause harm to the environment;
- Be responsible for any remedial activities in response to an environmental incident within their scope of influence;
- Liaise with the ECO and the Holder of the EA in the event that any industry regulated standards are in contradiction with the EMPr or any other authorisations;
- Review and amend any construction activities to align with the EMPr and Best Practice Principles;
- Ensure compliance of all site personnel and / or visitors to the EMPr and any other authorisations.

4.3 ECOLOGICAL CONTROL OFFICER (ECO)

It is stipulated in the Environmental Authorisation, **Condition 17** that a suitably experienced Environmental Control Officer (ECO) be appointed to oversee all activities for the duration of the construction phase (i.e. site clearance, construction activities, services, road works) before commencement of any land clearing or construction activities to ensure compliance with the EMPr and the conditions contained in the EA.

The ECO must have a minimum of a tertiary level qualification in the natural sciences field. The ECO must have at least **3 years' experience** as an ECO.

The responsibilities of the ECO include but are not limited to the following:

- Give **seven (7) calendar days' notice** to the Competent Authority prior to commencement of construction (Condition 4 of the EA);
- Be appointed prior to commencement of any works (i.e. removal of vegetation, movement of soil and or construction activities commencing);
- The ECO must provide guidance and supervision regarding the demarcation of the work and NO-GO areas along the sewer pipeline alignment and watercourse crossings;
- Provide environmental induction training to contractors on site prior to construction activities commencing, especially with regard to the protection of Milkwood Trees, as well as removal of reptiles/mammals found on the site during construction;
- Keep record of all activities on the site; problems identified; transgressions noted, and a task schedule of tasks undertaken by the ECO;

- Provide maintenance, update and review of the EMPr if necessary;
- Liaison between the Holder of the EA, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMPr;
- Compilation of **Environmental Control Reports (ECR)** to ensure compliance with the EA, EMPr and duty of care requirements, where necessary and present these reports to the Holder of the EA as well as the appointed main Contractor at the monthly meetings;
- A **copy** of the **jobsite security plan** should be included in the first **environmental control report** to be submitted to the DEA&DP by the ECO;
- Submit the monthly ECR to the Competent Authority every 3-months;
- Compilation of the **Environmental Audit Report** or Environmental Completion Statement**,** within six (6) months of completion of construction (or as otherwise defined in the Environmental Authorisation), inclusive of all post-construction rehabilitation and monitoring measures and submission of such report to the Competent Authority;
- Ensuring compliance with this EMPr and conditions contained in the EA;
- Ensuring compliance with the Environmental Authorisation, the WULA and Forestry Licence/s, if applicable;
- Provide guidance and interpretation of the EA and EMPr where necessary;
- Issuing site instructions to the contractor for corrective actions required;
- Attendance of monthly site / **contract meetings**;
- Maintain a record of environmental incidents (e.g. spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. This information must also be included in the ECR;
- The ECO, in conjunction with the Engineers Representative, has the authority to **stop work** on site if he / she considers that any actions of excessive non-compliance of the EMPr, authorisations or General Duty of Care are taking place.
- Maintain a public complaint register in which all complaints and action taken must be recorded. This information must also be included in the ECR;
- Submit Completion Statement Reports, within three (3) months from completion, to the Competent Authority;
- Remain employed until all development activities are concluded, and the post construction rehabilitation and monitoring requirements are finalised.

4.3.1 ECO Inspection Frequency

The ECO is required to conduct regular site visits for the duration of the construction period, in order to ensure the contractor receives the necessary induction and that all procedures are in place. Additional visits may be undertaken in the event of any unforeseen environmental accidents.

- **Weekly site inspections** during site preparation – demarcation of work & NO-GO areas, vegetation removal and stripping of topsoil.
- **Twice a month site inspections** during earthworks associated with the installation of sewer infrastructure and construction of structures / accesses.
- **Monthly site inspections** towards the end of installation / construction once all infrastructure is in and shaping / rehabilitation works commence.

The duration and frequency of these visits may be increased or decreased at the discretion of the ECO in consultation with the Engineers Representative, and should the contractor have a suitably experienced environmental site officer (ESO) the ECO can act in a supervisory role with the ESO assisting.

4.3.2 Environmental Induction and Training

The ECO in consultation with the contractor must ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMPr. The presentation must be conducted, as far as is possible, in the employees' language of choice. The contractor must provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, training must include:

- Explanation of the importance of complying with the EMPr and the employees accountability;
- Discussion of the potential environmental impacts of construction activities;
- The benefits of improved personal performance;
- Employees' roles and responsibilities, including emergency preparedness ;
- Explanation of the mitigation measures that must be implemented when carrying out their activities;
- Explanation of the specifics of this EMPr and its specification (no-go areas, etc.);
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr.

Should the staff turnover be high and with additional appointment of sub-contractors, it may be necessary to undertake additional induction training sessions. The contractor must keep records of all environmental training sessions, including names, dates and the information presented.

5 PRE-CONSTRUCTION & OPERATIONAL DESIGN CONSIDERATIONS

The recommendations made below are those that require consideration in the **detailed design** phase of the development. These design phase **considerations** need to be **included** in all relevant **engineering drawings** and **specifications** provided to the civil contractors.

5.1 PRE-CONSTRUCTION ENVIRONMENTAL COMPLIANCE WORKSHOP

It is required that a **pre-construction** environmental **compliance workshop** be undertaken before any construction commences on site. This workshop can be **combined** with a **site handover** meeting, but must take place before any activities take place on site and before any plant is moved onto site.

The following people must be present at this Environmental Compliance Workshop:

- The **ECO**;
- The **Main Civil Contractor** (including contract manager, site agent and foreman);
- The **Consulting Engineers** (electrical, civil and structural, whichever applicable);
- Representative of the **George Municipality**; and
- **Project Management**.

Provision should be made to attend a 2-hour Environmental Induction / Compliance workshop that will be **chaired** by the **ECO**.

The location and parameters associated with the establishment of the Contractor's Site Camp, as well as the demarcation of the sewer alignment route / work areas and NO-GO areas and plant rescue operation will need to be discussed and confirmed during this meeting.

The provisions of this **EMPr**, the conditions of the **Environmental Authorisation (EA)** and the **Water Use Licence Authorisation (WULA)** will be discussed in detail at this workshop.

A license under the National Forest Act to disturb forest and protected trees, must be obtained from the Department of Forestry, Fisheries and the Environment (DFFE) before any

protected trees be trimmed, transplanted or damaged. This is applicable to works in proximity to River Crossing No.6.

5.2 DESIGN REQUIREMENTS OF WULA

A Water Use Authorisation Licence (WULA), number 16/K30C/CI/2723, was issued to the George Municipality on 15 December 2014 in terms of Sections 21(c) & (i), read together with Sections 22 and 40 of the National Water Act, 1998 (Act 36 of 1998), authorizing the following water uses:

- the provision of sewerage infrastructure for **six (6) formal crossings of the Schaapkop River**, and
- the provision of sewerage infrastructure to **cross ten (10) storm water drainage furrows / tributaries/ streams** leading to the river.

This WULA contains several pre-construction requirements, applicable to administrative matters, structural design, management, rehabilitation, monitoring and reporting, which must be complied with. Should any design revisions or changes to the river or stream crossings be required, these must be submitted to and approved by the Breede Gouritz Catchment Management Agency (BGCMA) prior to commencement.

6 CONSTRUCTION ENVIRONMENTAL MANAGEMENT REQUIREMENTS

6.1 ENVIRONMENTAL IMPACTS & MITIGATIONS

6.1.1 Electrical Powerline Requirements

As the proposed 66kV overhead electrical powerline is to cross over the Schaapkop River in two places, the following mitigation measures / conditions will apply:

- If possible, the electrical line pylons should be erected **further than 32m from the edge of the River**;
- If the above is not possible (i.e. pylons required with 32m of the River), the excavation required for the installation of the pylon structures should not result in the movement of 10 cubic metres of material. In addition, the foundations of the pylons should not exceed 10m² in size.
- The spanning of the electrical cables shall be done without the disturbance / removal of indigenous vegetation from the river valley;
- No access / servitude track will be permitted within the River valley.

6.1.2 Ecological Requirements / Mitigations

The area affected by the construction of the bulk-service sewer infrastructure at Thembalethu is largely **highly ecologically degraded** and the prospects for rehabilitation of the affected areas would be very low. If the affected ecosystems were intact, then the impact of the proposed development would be considered to be very high and the development would likely be considered to be fatally flawed. However, the current state of the affected habitats is generally very poor and areas which can be considered to be reasonably intact are limited in extent. Although some of these, such as the **forest patches, are considered sensitive** and retain significant biodiversity, the long-term viability and persistence of these areas is uncertain due to the **high alien plant invasion** pressure, as well as the **anthropogenic impacts** such as hunting, livestock grazing and collection of plants for traditional medicine.

Given the landscape context of these areas and their proximity to Thembalethu, there do appear to be many viable conservation options that could improve the long-term conservation value and ecological functioning of these areas. In addition, standard mitigation measures such as alien

clearing along the access track are of limited value in the current context due to the overwhelmingly degraded and already invaded nature of the surrounding landscape. Consequently, **mitigation should focus on avoidance of sensitive areas where possible** and **reducing the development footprint as far as possible**, as well as ensuring that the construction approach results in a robust end result which **resists erosion** as the **long-term maintenance** of the access of the track by the municipality is unlikely.

The Schaapkop River itself appears to be largely sterile as a result of regular pollution from the existing sewer system which is overloaded, as well as input from the waste water treatment works. Only the upper reaches of the stream above the inlet from the waste water treatment works appears to be ecologically functional. Consequently, the **River itself is not considered highly sensitive** in its current state and the development is **not likely to create a significant impact on the in-stream biota.**

The **most sensitive area** identified during the site visit was the **forest patch near to the No.6 Pump Station**. This area is exceptionally steep and densely vegetated, traversing this area on foot is exceptionally difficult, which may be why this area remains relatively free of anthropogenic impact. The construction of the sewer access track will facilitate access to this area which currently represents a relatively safe refuge for fauna and flora in this area.

Options for avoiding this area should be investigated and alternative solutions should be found if possible, which can avoid impact this sensitive area. *The gravity pipeline (Option 3) has been re-aligned to the top of the valley slope to avoid traversing the sensitive indigenous forest in this area. Consequently, the access track associated with this pipeline will also not impact on this forest area.* Over and above this re-alignment, all efforts must be made to **avoid intact patches of forest and fynbos.**

A license under the National Forest Act to disturb forest and protected trees, must be obtained from the Department of Forestry, Fisheries and the Environment (DFFE) before any natural forest (three indigenous tree crowns touching) or protected trees be trimmed, transplanted or damaged.

All **trenches** dug for the sewer lines, should **not be left open for extended periods of time** as fauna may fall in and become trapped in them. In addition, open trenches are often used as dumpsites by the local community.

Where roots of indigenous trees are encountered along the pipeline route, care must be taken to absolutely **minimise root damage** as far as practicable. For instance, the work could be done by digging around the roots and tunnelling under them by hand, and then sliding the pipe section underneath the roots to place it.

6.2 ESTABLISHMENT OF CONTRACTORS SITE CAMP

The Contractors Site Camp must be established in **consultation** with the **ECO**. The site camp may **not** be erected on any areas considered **sensitive** (within the riparian zone or 1:100 year flood line whichever is the greatest) and no **indigenous vegetation** may be removed, damaged or disturbed without consent from the ECO or until the required plant rescue operation has been completed. The following points are applicable:

Condition 13 of the EA: A copy of the environmental authorization and the EMPr must be kept at the site where the listed activities will be undertaken. Access to the site referred to in Section C of the EA must be granted and the environmental authorization and EMPr must be produced to any authorized official representing the competent authority who requests to see it for the purposes of assessing and/or monitoring compliance with the conditions contained therein. The environmental authorization and EMPR must also be made available for inspection by any employee or agent of the applicant who works or undertakes work at the site.

- The Contractors Site Camp must be situated **within** the **development area,** but further than 40m from any drainage line or watercourse. Off-site Site Camps may only be erected once **written permission** from the **landowner** is obtained and any other necessary authorisations are in place.
- **Topsoil** from the site camp area must be **stripped** and stockpiled for re-use during rehabilitation. This must be done to ensure no contamination of the topsoil while the site camp is in use.
- The **temporary fuel storage** in the construction site camp must be **bunded** to allow for the capturing of spilt fuel before it infiltrates into the subsurface, preventing spilt fuel from entering the stormwater systems, thus avoiding the risk of contamination of both surface and groundwater systems.
- The site camp must be **fenced off** with shade netting.
- All **construction material** must be **stored** in the site camp, unless otherwise approved by the ECO.
- **No** personnel may **overnight** in the site camp, **except** in the case of a **night watchman** / security.
- **Fires** for **cooking** and/or **heating** are **only** allowed within the site **camp** after consultation with the **Health** and **Safety** Representative.
- **Fuel** may only be stored in the camp site.
- **Storage** of **waste** must take place **within** the **site camp** and must be removed on a regular basis.
- The site camp must be provided with sufficient **ablution facilities** (toilets and potable water) of which the content must be disposed of regularly and at the suitable facilities.

6.3 DEMARCATION OF WORK & NO-GO AREAS

The demarcation of no-go areas is of extreme importance to ensure that damage is restricted to the future developed area and that areas outside this demarcated area are protected and not damaged unnecessarily. This is particularly important for the bulk services alignment along the Schaapkop River.

The process for this is as follows:

- The exact **alignment** of the construction area to be surveyed and pegged. This must be done during the pre-construction phase;
- The full extent of the work area along the pipeline routes must be demarcated (the width of the allowable work area will depend on the sensitivity of each section of pipeline).

Condition 12 of the EA: A clearly demarcated working footprint must be established prior to construction activities commencing and all areas outside the demarcated area must be treated as no-go areas.

- The particular area highlighted as sensitive by the ecologist (forest patches in valley in proximity of the Pumpstation No.6 and fynbos area south-west of the 'All-Brick' property) will be subject to **working footprint of 4m**;

Condition 11 of EA: Disturbance through the sensitive forest areas must be limited and this area must be demarcated with shade cloth "walling" above and below the work area.

- The contractor in conjunction with the ECO must walk the areas determined and **mark** the full extent of the area to be **disturbed** (allowing sufficient space for the construction activity);
- This disturbance is to be clearly marked with a double strand of wire with danger tape placed between strands;
- All areas **outside** this demarcated area are considered as "**no-go**" areas for any construction; and,
- The sensitive vegetation outside of the work area along the Schaapkop River must be demarcated as a "**no-go**" area.

- Construction staff must be briefed as part of the **environmental induction** on the requirements regarding the no-go areas.

6.4 ENVIRONMENTAL AWARENESS AND TRAINING

The ECO in consultation with the contractor shall ensure that adequate and on-going **environmental awareness training** of senior site personnel takes place and that all construction workers receive an **induction** presentation on the importance and implications of the EMPr. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

As a minimum, training should include:

- Explanation of the importance of **complying** with the **EMPr**;
- Discussion of the potential **environmental impacts** of construction activities;
- The benefits of **improved personal performance**;
- Employees' **roles and responsibilities**, including emergency preparedness;
- Explanation of the **mitigation measures** that must be implemented when carrying out their activities;
- Explanation of the **specifics** of this **EMPr** and its specification (no-go areas, fire policy, waste management and others); and
- Explanation of the **management structure** of individuals responsible for matters pertaining to the EMPr.

The Contractor must keep records of all environmental training sessions, including names, dates and the information presented. Details of the Environmental Induction/s must be included in the Environmental Control Report as submitted to the DEA&DP.

6.5 PLANT RESCUE & HABITAT PROTECTION

A **pre-construction walk-through** of the sewer line route must be undertaken within the identified sensitive areas to identify and demarcate any species of conservation concern that can be translocated or avoided. Special attention should be given to large specimens of indigenous trees.

In the event that natural forest habitat and/or protected trees species cannot be avoided, a **license under the National Forest Act to disturb forest and protected trees**, must be obtained from the Department of Forestry, Fisheries and Environment (DFFE) before any forest or protected trees be trimmed, transplanted or damaged.

Condition 20 of the EA: The applicable requirements with respect to relevant legislation pertaining to cutting, damaging or destroying protected trees or trees from a natural forest must be adhered to.

Plants of conservation value, found during the pre-construction site assessment / walk-through, particularly along the sensitive areas that will be affected by the bulk service installation, should be carefully removed (with as much of the roots as possible) and **transplanted immediately** outside the construction work area / disturbance corridor. Alternatively, these rescued plants should be **bagged and stored** in a suitably **protected area** (area to be excluded from construction activities, where they can be maintained with regular watering) for use in rehabilitation and landscaping activities. These plants should be used for the **rehabilitation** of the disturbed areas along the pipeline route, as directed by the **ECO**.

6.6 ALIEN INVASIVE MANAGEMENT PLAN

The existing vegetation which occurs within the bulk services upgrade area is predominantly alien invader plants (noted: *Kukuyi* grass, Black Wattle, Bugweed, etc.).

Control of alien invasive plant species along the sewer pipeline disturbance corridor / servitude must commence as part of the site clearance operation and continue in parallel with service installation and structure construction activities for the duration of the construction period. The **complete removal of alien invasive plants from the entire sewer pipeline servitude** must **coincide with the end / completion of the construction contract**.

A long-term alien invasive plant control / management plan must be developed within 3-months of completion of the project, which includes **follow-up** removal operations and removal of any rubble or waste along the sewer pipeline servitude **every 6-months** (twice a year) for a period of not less than 10-years after construction.

The following measures must be implemented as a minimum:

- In areas of steep slopes and within / near sensitive indigenous vegetation, clearing of invasive vegetation must take place by **hand only** (chainsaws, slashers, tree-poppers, hand pulling etc.). In areas outside steep slopes / sensitive indigenous vegetation heavy machinery can be used;
- **No heavy machinery** (bull-dozers, excavators, trackers etc.) in proximity to the banks of the Schaapkop River;
- **Cut stumps are to be treated** with a suitable herbicide to prevent coppicing and regrowth. Under no circumstances may herbicide equipment (sprayers, containers, brushes, nozzles etc.) be emptied or cleaned near or within the Schaapkop River. All such equipment must be emptied and cleaned offsite, under controlled conditions;
- **Disturbance** to the **soil** must be **limited**, therefore roots and stem stumps of cut trees must be left in situ, where possible;
- To minimise **fire risk**, all cut material must be taken out of the pipeline servitude. Usable wood can be stockpiled in an area defined by the ECO, where residents of Thembalethu can have access to it for cooking and heating, under control conditions;
- Care should be taken to curb the spread of seed (and vegetative re-growth in the case of Madiera Vine) when removing and disposing of the cut material.
- **Seeding with grass** along the steep banks with species such as *Eragrostis curvula* to create a perennial plant cover which discourages alien invasion.
- **Regular alien clearing** within the sensitive areas such as the intact forest patches along the access track.
- An **Alien Management Programme** should be compiled and should include a **Management Fund** to ensure it can be implemented into the future and not only post construction phase (CapeNature recommendation).

Condition 9.1.2. of the EA stipulates that the removal of alien vegetation must take place at the same time as the construction phase concludes.

6.7 FIRE MANAGEMENT AND PROTECTION

The **type** and **state** (disturbed nature, and alien plant biomass) of the vegetation found bulk services alignment poses a **fire risk** associated with uncontrolled **wild / forest fires**.

The following points should be considered with regards to fire protection, considering the proximity of the residential settlements, as well as the densely vegetated (with high alien plant biomass loads) within River valley:

- A key component of the abovementioned alien invasive plant removal programme should be the total **removal** of all **invasive alien vegetation material** from the entire sewer servitude, in order to decrease the fire risk associated with the accumulation of biomass. Under no circumstances should plant bulk biomass or waste material be burned on-site;
- Construction staff and residents should be made aware of potential fire risks – cigarette butts and unsupervised fires. For example, cigarette butts may not be thrown in the veld, but must be **disposed** of correctly - the Contractor with input from the ECO, must designate smoking areas

during construction (in compliance with the Tobacco Products Control Amendment Act 63 of 2008) with **suitable receptacles** for disposal.
- In case of an **emergency**, the contact details of the local fire and **emergency services** must be readily available (sign-posted within the Contractor site camp) (*see cover pages of this EMPr for emergency contact details)*;
- Contractors and the Municipality must ensure that basic **firefighting equipment** is available on site as per the specifications defined by the health and safety regulations;
- **No fires** shall be allowed in proximity to the Schaapkop River; and
- The **fire risk** on site and **fire-fighting training** must be a point of discussion as part of the environmental **induction** training prior to commencement of construction and as part of general management meetings between the Municipality and Contractors.

6.8 EROSION CONTROL & STORMWATER MANAGEMENT

The design of the temporary stormwater management measures must ensure that **discharge points** must be contained within the bounds of the site / disturbance corridor and **negate erosion**. These stormwater structures should promote the dissipation and infiltration of run-off on the site. Stormwater control measures and discharge points should contain suitable **energy dissipating** structures to reduce water energy, **dispersing** the water rather than concentrating it, as well as **silt and garbage / litter traps**. In addition, these measures should serve to promote run-off infiltration and soak-away, to allow sub-surface seepage, rather than surface flow. The positioning and on-going maintenance of these stormwater management measures / structures should be determined by the engineer in consultation with the ECO.

Any areas that are identified by the ECO as being prone to erosion must be **suitably protected** with for e.g. **silt fencing and/or sand bags** during the earthworks / construction period. During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

Any **erosion channels** found to exist within the construction site, or new ones that develop during construction on steep slopes must be backfilled, compacted and **restored** to an acceptable condition.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be **actively managed**. The most suitable method of stabilisation shall be determined in consultation with the ECO. Consideration and provision shall be made for the following methods (or combination thereof):

- **retaining cut slopes** with the installation of permanent retaining wall structures,
- **brush-cut** packing,
- **mulch** or chip cover,
- **straw** stabilising,
- planting of **vegetation** (*refer to Section 6.19 below*),
- soil binders and anti-erosion compounds,
- mechanical cover or packing structures (including the use of geofabric, log/pole fencing) &
- installation of biddum or shadecloth silt screens.

Prospective contractors must make provision for these in their tenders.

Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be **repaired** and **maintained** to the satisfaction of the ECO.

In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and re-vegetation should commence as soon as possible.

Regular monitoring for erosion problems along the access track, especially in areas where runoff gets onto the bench from upslope. Erosion problems should be **rectified on a regular basis**.

Culverts and pipe bridges should be **inspected on a regular basis** for erosion problems and rectified where necessary.

The Contractor shall, as an **ongoing** exercise, implement erosion and sedimentation control measures to the satisfaction of the ECO.

6.9 TOPSOIL HANDLING

In terms of the services installation, **topsoil must be stockpiled separately** from the sub-soil and the sub-soil should be used first to fill the trench and thereafter the topsoil. This process will encourage natural regeneration of the local indigenous species.
Topsoil is of utmost importance for use in rehabilitation of disturbed areas and should therefore under no circumstances be mixed with sub-soils or any building material (clay, gravel or building sand/stone) or pollutant.

The following requirements regarding topsoil handling must be considered:

- A minimum **150mm** layer of topsoil from the entire sewer alignment corridor should be stripped and **stockpiled**;
- The topsoil placement and stockpiles must be approved by the **ECO** and may not be within the 30m of any slope of drainage line;
- The topsoil may not be stockpiled within the riparian zone or 1:100 year flood line (whichever is the greatest);
- The topsoil stockpile must be **protected from erosion** as indicated by the ECO (silt fences etc.); and
- The topsoil must be replaced onto disturbed areas (sewer alignment etc.) on completion of construction. Steep areas must be rehabilitated / revegetated immediately by sowing of indigenous grass seed and/or placement of indigenous grass sods (*refer to Section 6.19 below).*

6.10 NOISE CONTROL

It is recommended that noise generation be kept to a minimum and that construction activities be confined to **normal working hours** (08:00 - 17:00 on workdays).

Apart from confining noise to the normal hours as detailed above, the following noise abatement (reduction of intensity and amount) measures should be implemented:

- Construction vehicles **adhering to approved access routes** and maximum speed limits;
- **Strict operation times and periods** for construction works;
- Adherence to the National Building Regulations and Section 25 of ECA to minimise noise impacts;
- Provide **baffle and noise screens** to noisy machines as necessary;
- Provide **absorptive linings to the interior of engine compartments**;
- Ensure **machinery is properly maintained** (fasten loose panels, replace defective silencers);
- Switch off machinery immediately when not in use; and
- Reduce impact noise by careful handling of equipment and machinery.

The Contractor shall be responsible for compliance with the relevant legislation with respect to noise *inter alia* Section 25 of ECA.

6.11 WASTE MANAGEMENT

Condition 18 of the EA: An integrated waste management approach, which is based on waste minimization and incorporates reduction, recycling, re-use, and disposal, where appropriate, must be employed. Any solid waste must be disposed of at a landfill licensed in terms of the applicable legislation.

The section below deals specifically with the **construction waste management** requirements. The **operational** waste management requirements are detailed further on in this report.

Only **approved** waste disposal methods will be allowed. The Contractor shall ensure that fenced / enclosed waste storage site be established within or adjacent to the Site Camp (scavenger proof) and that all site **personnel** are instructed in the proper **disposal** of all waste. The Contractor shall ensure that sufficient disposal facilities (refuse bins and cigarette butt receptacles) are available.

The contractor is to familiarize themselves with the requirements of the **National Environmental Management Waste Act. NO** activities listed in terms of this act may commence without a **Waste License.**

Recycling must be encouraged on site and recycling bins must be provided at the **contractor's camp** and clearly marked. It is recommended that **local community** leaders be contacted to identify groups or individuals who may benefit from the disposal of recyclable material and scrap metal, if any.

Disposal of all waste materials must be done at **suitable facilities**. **No illegal dumping** of any waste material on or off site is permitted (this includes the use of any waste material for fill). The **disposal** of all **general and construction waste** must take place at a **licensed** landfill (the Contractor must ascertain where the closest licensed landfill site is situated).

6.11.1 Solid Waste

The **Contractor** shall ensure that all facilities are maintained in a **neat** and **tidy** condition and the site shall be kept free of **litter** – MAINTAIN GOOD HOUSE-KEEPING. Measures shall be taken to **reduce the potential for litter** and negligent behavior with regard to the disposal of all refuse. At all places of work the Contractor shall provide litterbins, containers and refuse collection facilities for later disposal. There should be litterbins within each construction area.

Solid waste that **cannot** be recycled or re-used may be temporarily stored on site in a designated area approved by the ECO prior to collection and disposal. Ideally, this designated refuge area should be within the contractor's site camp. Solid waste must be removed on a **weekly** basis to a licensed waste disposal site. Recyclable waste should be recycled whenever possible.

Waste storage **containers** shall be covered, **tip-proof**, **weatherproof** and **scavenger proof**. The waste storage area shall be **fenced off** to prevent wind-blown litter.

No **burning**, **on-site burying** or **dumping** of waste shall occur. Used (empty) **cement bags** shall be collected and stored in **weatherproof containers** to prevent windblown cement dust and water contamination. Used cement bags may **not** be used for any other purpose and shall be disposed of on a **weekly basis** via the solid waste management system.

All solid waste shall be disposed of offsite at a **licensed** landfill site. The Contractor shall supply the ER and ECO with **certificates of disposal**.

6.11.2 Construction Rubble and Waste

All construction **rubble** must be disposed of at an approved site (no construction rubble may be spoiled anywhere on site or adjacent to site). **NO** construction rubble may be used as fill or any other areas on site.

6.11.3 Scrap Metal

Recycling of scrap metal is **recommended**. Scrap metal must be disposed of offsite at suitable facilities.

6.11.4 Hazardous Waste

Any potentially **hazardous** waste (including bitumen, fuel, oils, paints etc.) shall be disposed of at approved hazardous landfill site. The Contractor shall provide **disposal certificates** to the ECO.

Waste containing oils / paint thinners etc. must be kept separate from the general waste stream, sealed in a drum and collected and disposed of by a **recognised service provider** at a licensed hazardous waste site (e.g. Vissershok, Cape Town). Used **oil** and **grease** must be removed from site to an approved used oil **recycling company**.

Unused or **rejected** asphalt or bituminous products (should any of the internal roads through the settlement areas be surfaced) must be returned to the supplier's **production plant**. Under **NO** circumstances may, **bituminous** or **paint** products be spoiled on the site.

Where possible, the maintenance of vehicles should take place off site.

Condition 19 of the EA: No surface or ground water may be polluted due to any actions on the site. The applicable requirements with respect to relevant legislation pertaining to water must be met.

The conditions contained in the WULA must be adhered to.

6.12 SANITATION

Chemical ablution facilities must be available for the use by construction staff for the duration of the construction period. The following must therefore be implemented:

- Toilet and hand washing facilities must be available to the site personnel at all times. These must be situated in the site camp;
- **One toilet for every 15 personnel** is required;
- Portable ablution facilities may not be positioned with 50m of the edge of the Schaapkop River Valley slope;
- The toilets should be secured to ensure that they do not blow over in windy conditions;
- The workforce must not use forested areas or the river as a toilet – these areas are NO-GO;
- The facilities must be serviced on a regular basis to prevent any spillage;
- The servicing contractor must dispose of the waste in an approved manner;
- The ECO must be provided with the service providers' details and the service schedule for the site;
- All toilet facilities must be removed from site on completion of the contract period; and
- Should the construction period be interrupted by a builders break, the toilets should be emptied and removed from site prior to the break.

6.13 CONCRETE BATCHING

Cement powder has a high alkaline pH that may contaminate and adversely affect both soil pH and water pH negatively. A rapid change in pH can have consequences on the functioning of soil and water organisms as well as on the botanical component.

Concrete batching may only take place in areas **approved** by the **ECO**. Concrete mixing areas must have **bund walls** or a **settling pond** in order to prevent cement run off. Once the settling ponds dry out, the concrete must be **removed** and dispatched to a suitable disposal site. Ideally, all concrete batching should take place on an area that is to be **hard surfaced** as part of the development (possibly within the future access road or within the footprint of a future pumpstation building).

In order to avoid resource contamination, concrete batching areas may **not** be located within **30m** of the riparian zone or 1:100 year flood line (whichever is the greatest) or where there is a potential for any spilled concrete to enter a watercourse or groundwater.

If an area **outside** of the **site camp** is identified for batching it must first be **approved** by the **ECO** and all topsoil must be stripped and stockpiled for reuse.

Batching at satellite sites (such as drainage culverts underneath the bulk services alignment) **must be done on a batching plate** i.e. wood or metal sheet, to prevent soil and water contamination.

6.14 FUEL STORAGE

The above-ground **storage** of fuel is subject to **authorization** in terms of the National Environmental Management Act (NEMA, as amended) if more than **30m³** is stored on site at any one time.

Should a temporary fuel storage facility be required, the Contractor must ensure that he/she **complies** with **legislation** and that the following measures are in place:

- Temporary fuel storage must take place within the **contractors site camp** in an area **approved** by the **ECO**;
- No **storage** of fuel may take place on any other portion of the site;
- **Mobile fuel units** used to refuel plant on site must make use of **drip trays** when refueling;
- **Double lined** storage tanks should be used;
- All storage tanks must be **ISO 9001** certified;
- Storage facilities may **not** be located within **60m** of River valley or where there is a potential for any spilled fuel to enter a watercourse or groundwater;
- Fuel storage facilities should be located on **flat ground**. No cut and fill should take place immediately on or adjacent to fuel storage areas;
- **Bund walls** must be constructed to contain at least **110%** of the total capacity of the storage tanks;
- Bund walls must be constructed of **impermeable material** or lined to ensure that petroleum products cannot escape;
- A **suitable material** should be placed in the base of the bund walls to soak up any accidental **spillages**;
- The tanks should be **locked** and **secured** when not in use;
- **Automatic shut-off nozzles** are required on all dispensing units;
- Storage tanks should be **drained** within **one week** of **completion** of activities (unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction program extends over the **Christmas shutdown**, the contractor must ensure that storage **tanks** are **emptied** prior to this period;
- All storage tanks, containers and related equipment should be regularly **maintained** to ensure the safe storage and dispensing of fuel. The Engineer is to sign off on the **condition** suitability of the storage tanks;
- **Defective** hoses, valves and containment structures should be promptly **repaired**;
- Vehicle and equipment **fuelling** should be undertaken on a **hard impermeable** surface or over **drip pans** to ensure spilled fuel is captured and cleaned up; and
- The area must be totally **rehabilitated** on **completion** of the contract and all contaminated material must be taken to a **licensed** dumping site for that purpose.

6.15 DUST MANAGEMENT

Every effort to **minimize dust pollution** on the site must be undertaken especially considering the properties close location of other existing residential areas in Thembalethu. Construction vehicles must adhere to **speed limits** and minimization of haul roads must be implemented. During dry,

dusty periods haul roads should be kept **dampened** to prevent excess dust. **No potable water** may be used for damping haul roads.

As an **alternative**, products such as road environment dust suppressants (Reds) would be recommended in order to minimize the use of water for controlling dust pollution. This is to be determined by the ECO during construction as required.

Exposed stockpile materials (e.g. topsoil or base-layer / building sand) must be adequately **protected** against wind (covered), and should be sited taking into consideration the prevailing wind conditions.

6.16 ACCESS / TRAFFIC MANAGEMENT DURING CONSTRUCTION

The **management** of **construction traffic** is vital to ensuring the **safety** of the existing and future service accesses and road network within and in the vicinity of the development, as well as fostering a good relationship between the Municipality, the Contractor and the residents of the surrounding Thembalethu area.

- Existing access roads and tracks must be used as far as possible for construction traffic access road (no new accesses should be created, unless aligned along proposed permanent roads / access tracks).
- **Conflicts** between construction vehicles and public vehicles should be minimised and **priority** given public vehicles.
- **Access** to areas on the site where construction is taking place should be **restricted** by means of **signage**.
- **Liaison** should take place with the local **residents** of Thembalethu (through the Community Liaison Officer - CLO) and the George Municipality regarding construction traffic concerns.
- **Information** such as notices and letters could be extended to those residents that will be directly **affected directly**.
- Construction **traffic** should be **restricted** to **daylight hours**, and outside peak traffic times in the morning and afternoon.

Adequate and clearly visible road **signage** should be implemented on the site, at the new access points, throughout the duration of the construction period according to the specifications of the South African Road Traffic Signs Manual (**SARTSM**).

6.17 TEMPORARY LIGHTING DURING CONSTRUCTION

Regarding the temporary lighting during construction, the following refers:

- Lighting on site is to be sufficient for **safety** and **security** purposes of the Site Camp only, but shall **not** be **intrusive** to on-site or neighbouring residents, disturb wildlife, or interfere with road traffic;
- Should overtime/night work be authorised, the contractor shall be responsible to ensure that lighting does not cause undue disturbance to on-site or neighbouring residents nor the riparian habitat; and
- Only **low flux** and **low frequency** lighting shall be utilised.

6.18 THEFT AND OTHER CRIME

An **increase** in **crime** during the **construction phase** is an always an area of concern, particularly in instances where construction takes place with an established residential area. **Theft** and other **crime** associated with construction sites is not only a **concern** for surrounding residents, but also the Municipality and the Contractor.

Considering this, contractors need to be **pro-active** in order to curtail theft and crime on and resulting from the construction site. It is recommended that the contractor develop a **jobsite security plan** prior to commencement of construction. This jobsite security plan should take into account **protection** of the **construction site** from both i**nternal** and **external** crime elements, as well as the protection of the **on-site community** from internal crime elements. All **incidents** of theft or other crime should be **reported** the **South African Police Service**, no matter how seemingly insignificant. A **copy** of the **jobsite security plan** should be included in the first **environmental control report** to be submitted to the DEA&DP by the ECO. The site demarcation/fencing during construction, should be of a nature to curtail access into the Contractor Site Camp after hours and it is recommended that a **security guard** be placed on duty during after-hours and weekends.

6.19 RE-VEGETATION / REHABILITATION PLAN

The potential rehabilitation of disturbed areas will be limited to areas along the bulk infrastructure alignment corridor and river / stream crossings. This re-vegetation can stimulated and fast-tracked by the physical planting of locally occurring indigenous plants – particularly any rescued plants that were removed as part of the plant rescue programme. If budgetary constraints allow, additional trees can be supplemented. The plant species selected should be those that will attract fauna (particularly birds) able to promote further natural seed **dispersion** and **pollination**.

The following trees should be considered for replanting along the pipeline servitudes. These are to be used in addition to the plants rescued for transplant prior to construction.

- *Ekebergia capensis* (Cape Ash)
- *Grewia occidentalis* (Cross-berry)
- *Virgillia oroboides* (Keurboom)
- *Burchellia bubalina* (Wild Pomegranate)
- *Buddleja salviifolia* (Sagewood)
- *Halleria lucida* (Tree Fuchsia)
- *Syzygium cordatum* (Water Berry)
- *Nuxia floribunda* (Forest Elder)
- *Afrocarpus falcatus* (Outeniqua Yellowwood)
- *Afrocarpus latifolius* (Real Yellowwood)
- *Celtis africana* (White Stinkwood)
- *Vepris lanceolata* (White Ironwood).

The tree planting should take place after removal of alien vegetation and within the construction period. Input from Cape Nature and the Department of Forestry must be sought for confirmation of the plant species.

All areas disturbed by excavation / construction activities should be re-vegetated with an indigenous seed mix in consultation with an indigenous plant expert, ensuring that during rehabilitation, only indigenous shrubs, trees, and grasses are used in restoring the biodiversity.

Compacted and disturbed areas on steep slopes must be shaped and scarified to natural forms to follow and parallel to the original contour. Topsoil should be returned to areas where subsoils have been exposed or compacted and indigenous grass seed or sods (Kweek / *Cynodon dactylon* & Buffalo / *Stenotaphrum secundatum)* should be placed to stimulate fast re-vegetation / groundcover and reduce erosion risks. Fast-growing annual grasses, such as Teff or Rye may be added to the grass seed mix to speed up this re-vegetation process.

Kweek to Teff seed should be mixed and sown at a ratio of 1:2 (1: Kweek, 2:Teff), at a distribution rate of approx. 20 – 25kg per hectare. As a general principle, the grass seed should be sown at a depth of no more than double that of the size of the seed. In all cases, this will amount to a depth of no more than 5mm i.e. it is NOT necessary to bury the seed once sown. Simply hand-rake the soil

(loosen) for seeding, sow the seed over the soil, then tamp loose soil down with the front of the rake or spade.

Kweek / Buffalo grass sods can be pegged into place on very steep slopes, aligned parallel to the contours, as a further erosion control and rehabilitation measure. Disturbed steep slopes should also be covered with a layer of mulch / brush to shelter germinating seeds and stimulate re-vegetation and stabilization by plant growth.

6.20 ENVIORNMENTAL IMPACTS AND MITIGATION MEASURES IDENTIFIED DURING BULK SERVICES UPGRADE PIPELINE ROUTE AMENDMENT APPLICATION IN 2024

6.20.1 Construction Phase Impacts

6.20.1.1 Excessive disturbance to soil and plants in the watercourse and riparian areas

Mitigation Measures:

- Prior to construction, the minimum footprint of disturbance must be delineated and should include vehicle access points, material stockpile areas, refueling areas and actual work areas. A No-Go aera must be delineated 2 m beyond the disturbance footprint. The delineated No-Go area must be indicated using construction mesh attached to wooden droppers or similar materials. Alternatively, danger tape could be used if the previously mentioned materials could be stolen, but is less effective.
- As far as possible the watercourse should be accessed from a single point only to reduce disturbance to features such as the bed and banks.
- Signage indicating No-Go areas must be printed and placed on fencing.
- All contractors must be briefed that vehicles, workers and materials may not encroach into No-Go areas around watercourses.
- As far as possible, try to keep vehicles out of the watercourse, working from the banks from the inside towards the outside to minimise disturbance. Excavators/Backacters should operate from the maximum distance possible to reduce soil compaction and disturbance.

6.20.1.2 Erosion of soil from disturbed areas resulting in downstream deposition and destabilisation of banks or slopes

Mitigation Measures:

- Weekly and daily checks for predicted rainfall. Proactive steps to be taken in response to predicted rainfall.
- Do not continue work during rainfall, and ensure the site is prepared to minimise erosion and sediment-laden runoff in advance of rainfall.
- The site office / vehicle should have a store of materials suitable for rapid preparation and response to rainfall such as shade-cloth (silt-fencing & check dams), wooden droppers, sand bags, hessian fabric, and fencing wire.
- All material stores should be kept on flat areas and be bunded to prevent material loss during rainfall.
- When construction commences in the watercourse, erect an instream silt fence using sand bags to hold down shade netting (90%) which should aim to intercept very low base flows of water and trap any silt. Excess silt must be removed from the trap to retain its effective use.
- Soil from the trench for installation of the pipeline should be preferably placed on the upslope side of the trench so it washes back into it in the event of rain, and not down the slope. Alternatively, small sections of trenching must be undertaken at a time to reduce the risk of soil washing downslope.

- Monitor the site during / following periods of rainfall, and install check dams at points where runoff collects using sand bags and hessian or shade cloth (90%).
- Following rainfall, water pumped out of trenches or other excavations must not be directed to the watercourse. A temporary coffer dam can be created using shadecloth as a filter material to contain silt-laden water which can then flow through vegetation into the watercourse where feasible.

6.20.1.3 Materials and vehicle management

Mitigation Measures:

- All construction materials (topsoil, subsoil, building sand) must be stockpiled as far from the watercourse or slope edge as possible.
- Materials to be removed must be taken away without delay to reduce the risk of spilling or washing down slopes, and limiting space in the work area.
- Retain the upper 30cm of topsoil including vegetation during grubbing. This material should be stockpiled separately to other materials, kept uncontaminated, and protected with shadecloth and bunding.
- There is limited space to work along the pipeline route, and stockpiled materials must not be placed in a way that they force vehicles to move around them into sensitive or unstable areas.
- Vehicle refueling areas must be located as far from the watercourse as possible, and a spill kit must be on hand in case of fuel spills.
- Vehicles leaking fuel (diesel or oil) may not be permitted to work on site.
- No materials may be dumped into the watercourse.

6.20.1.4 Post construction rehabilitation and site closure

Mitigation Measures:

- Ensure all soil surfaces are reshaped to avoid preferential flow paths and very steep gradients.
- All areas disturbed during the construction phase must have topsoil from the site mixed with indigenous grass seed (*Stenotaphrum secondatum and Cyonodon dactylon*) replaced to a depth of 30 cm above subsoils.
- Where sloping areas occur it will be necessary to stake a cover of soil saver matting over the grass seed / top soil mix to prevent movement downslope until vegetation can establish.
- Alien vegetation must be removed 2 months and 6 months post replacement of the soil until the grass is established.
- Ensure any litter from construction works or personnel is removed from the site. No litter, food scraps, or waste materials can be left at the site.

6.20.2 Operational Phase Impacts

6.20.2.1 Additional rubbish dumping in the watercourse due to improved access along benching

Mitigation Measures:

- Create a barrier across the road restricting access to municipal personnel working on the pipeline for maintenance only. The barrier would need to be lockable, and made of a material that can't be stolen or tampered with. A lockable bollard could achieve this, and could at least restrict vehicle access.

6.20.2.2 Pipeline blockages and sewage spills

Mitigation Measures:

- Add signage to manholes and pipelines informing passersby of the manhole ID and telephone number to call and report leaks. These should ideally be in English, Afrikaans and isiXhosa and can be spray painted onto infrastructure to prevent loss of signs.
- Ensure manhole lids are tamper-proof to prevent them from being easily removed for the purpose of dumping in drains.
- Minimise the number of pipe joints directly over watercourse crossings.

6.20.2.3 Channel incision or erosion due to changes in bed and channel characteristics at crossings

Mitigation Measures:

- The full length of the newly installed pipeline and watercourse crossing points must be inspected 6- and 12- months following completion of project by the site engineer. The purpose is to identify any areas of erosion, undercutting, instability or structural failure.
- If channel incision is occurring due to high velocity inflows, this could jeopardise concrete bridge supports of the sewer line and must therefore be controlled. One possibility is to install a series of small gabion check dams along the stream bed upstream and downstream which are aimed at reducing flows and encouraging sedimentation, building up the stream bed.

7 SOCIAL REQUIREMENTS

7.1 USE OF LOCAL LABOUR

It is strongly recommended that the contractor make use of **local labour** as far as possible for the construction phase of the project.

Records should be kept of all personnel under the main contract, as well as those under any subcontractors EMPrloyed by the contractor.

The main contractor must provide the breakdowns of their contract, as well as all sub-contractors. The following criteria for classification must be recorded and submitted to the ECO and the Engineer.

Staff Type	Local to the George Area		SCape (excluding the George Area)		Outside The Southern Cape	
	Number	Percentage	Number	Percentage	Number	Percentage
Semi-skilled						
Operators						
Artisans						
Junior Management						
Senior Management						
Professionals						

Apart from the **labour records** detailed above, **financial records** should be kept indicating the financial contribution to the local economy through the input into wages and the use of local suppliers.

8 HERITAGE REQUIREMENTS

Should any **evidence of human burials** or **heritage remains** be **exposed** during excavations, all works must be stopped immediately, and these must be immediately **reported** to the Provincial Heritage Resource Authority of the Western Cape, namely **Heritage Western Cape** in terms of the national Heritage Resources Act (Act No. 25 of 1999). Heritage remains uncovered or disturbed

during earthworks may not be disturbed further until the necessary approval has been obtained from Heritage Western Cape.

Condition 22 of the EA: Should any heritage / **archaeological remains** be exposed during excavations or any actions on site, these must be immediately reported to the Provincial Heritage Resources Authority of the Western Cape, **Heritage Western Cape** (in accordance with the applicable legislation). Heritage remains uncovered or disturbed during earthworks must not be further disturbed until the necessary approval has been obtained from Heritage Western Cape. Heritage remains include: archaeological remains (including fossil bones and fossil shells), coins, indigenous and/or colonial ceramics, any articles of value or antiquity, marine shell heaps, stone artifacts and bone remains, structures and other built features, rock art and rock engravings, shipwrecks and graves or unmarked human burials.

Condition 23 of the EA: A qualified archaeologist must be contracted where necessary (at the expense of the applicant and in consultation with the relevant authority) to remove any human remains in accordance with the requirements of the relevant authority.

9 METHOD STATEMENTS

Method statements are **written submissions** by the **Contractor to** the **Engineer** and **ECO** in response to the **requirements** of this **EMPR** or to a **request** by the **Engineer** or **ECO**. The Contractor shall be required to prepare method statements for several **specific construction activities** and/or environmental management aspects.

The Contractor shall **not commence** the activity for which a method statement is required until the **Engineer** and **ECO** have approved the relevant method statement.

Method statements must be submitted at least **five (5) days** prior to the date on which approval is required (start of the activity). Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

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

Additional method statements can be requested at the ECO's discretion at any time during the construction phase.

The method statements shall cover relevant details with regard to:

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

9.1 METHOD STATEMENTS REQUIRED:

Based on the specifications in this EMPr, the following method statements are likely to be required as a minimum: (more method statements may be requested as required at any time under the

direction of the ECO). All method statements must be compiled and implemented to the satisfaction of the ECO.

- **Plant rescue and Site clearing**;
- **Demarcation** of work and NO-GO areas;
- **Hazardous substances** declaration of use - **Petroleum**, **chemical**, harmful and hazardous materials;
- **Cement** and **concrete batching**;
- Traffic accommodation (if necessary);
- **Solid waste** control system;
- **Wastewater / stormwater** control system, particularly stormwater management (temporary and permanent) in the vicinity of the on-site breeched dam.
- **Erosion remediation** and stabilisation;
- **Fire control** and emergency procedures;
- **Alien vegetation**-clearing programme;
- **Trenching and Pipeline installation** for sensitive areas along the Schaapkop River.

10 OPERATIONAL REQUIREMENTS

The operational requirements of this EMPR should be updated in the compilation of an Environmental Maintenance Management Programme (EMMP) to be implemented by the George Municipality. This EMMP should include the inspection schedules and maintenance / management protocols applicable to the entire bulk service system / network into the future.

10.1 ENVIRONMENTAL MAINTENANCE MANAGEMENT PROGRAMME (EMMP)

The George Municipality will be responsible for the operational management and maintenance of the bulk services – the following must be considered in the EMMP:

- The **George Municipality** must ensure that the **conditions** of the **Environmental Authorisation (EA)** and **Water Use Licence Authorisation (WULA)** are adhered to;
- The **management** of the sewer servitude / corridor, which includes the follow-up eradication and prevention of further encroachment of alien invasive plant species, and on-going inspection / management / maintenance of the sewer infrastructure, as specified in of this **EMPr,** must be continued and monitored into the future. Only **local indigenous** plant species may be planted as part of rehabilitation efforts along the sewer servitude corridor and watercourse.
- The **systematic removal of alien vegetation** from the bulk services servitude should form part of the long-term and on-going Alien Plant Control / Management Programme, which identifies and removes existing alien vegetation, as well as prohibiting the introduction of new or potential alien plant species from within the adjacent residential Settlement Areas. This Alien Management Programme must include a **management fund** to ensure that follow-up alien plant removal can be implemented every six months into the future and not only a construction-related or post construction phase activity.
- Regular monitoring of the bulk services servitudes (especially along the Schaapkop River) for **evidence of erosion** and **evidence of sewerage leaks / blockages** must be a key component of the proposed EMMP. Should any signs of erosion or pollution be identified, the source of such must be immediately rectified and disturbed area rehabilitated as soon as possible.
- **Community meetings and awareness campaign**, with Ward Councillors and Municipal officials, are recommended, in which existing and new residents of Thembalethu are encouraged to separate their household waste so that it may be disposed of via recycling and general waste streams and NOT into the sewer system; the consequences of abusing / vandalizing the sewer system (from an environmental & social perspective), as well as be

notified of need to protect and rehabilitate the adjacent watercourse environment and associated indigenous vegetation.

11 HEALTH AND SAFETY

The contractor must ensure **compliance** with the Occupational Health and Safety Act (No. 85 of 1993). Of key importance is the following (Section 8 of the aforesaid Act):

General duties of employers to their employees

(1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.

(2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-

(a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;

(b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;

(c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;

(d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

(e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;

(f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;

(g) taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;

(h) enforcing such measures as may be necessary in the interest of health and safety;

(i) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and

(j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

The Occupational Health and Safety Act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

The main **contractor** must ensure **compliance** with the **Occupational Health and Safety Act**. The main **contractor** must ensure that all **sub-contractors comply** with the Occupational Health and Safety Act.

Condition 21 of the EA: The applicable requirements with respect to relevant legislation pertaining to occupational health and safety must be adhered to.

11.1 EMERGENCY RESPONSE PLAN

An emergency response plan must be developed for the **incidents of fire** and leakage of the **sewerage reticulation system**. This plan should be developed with the George Municipality and should, as a minimum, include the following:

- Placing of firefighting equipment;
- Training of staff;
- Awareness raising of emergency procedures amongst residents; and
- Monitoring and maintenance programme.

12 IMPLEMENTATION SCHEDULE

This Updated EMPr is applicable to all construction activities related to the installation of the bulk services upgrade in Thembalethu. The following table is provided to assist the Municipality, design team, Engineer and Contractor with the effective implementation of this EMPr. The table below serves as a quick reference guide / summary of key environmental management requirements for implementation of the EMPr that must be adhered to, but must be read in conjunction with the entire document.

A detailed project programme for the construction phase will be developed by the Engineer and Contractor prior to commencement of each section / phase of the services installation. Provisions of this EMPr must be included in the detailed project programme.

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
Design & Pre-Construction Phase					
Environmental Awareness / Familiarisation with the contents of the EMPr, EA and WULA.	• Loss of indigenous vegetation during construction; • Disturbance of watercourse habitat / water resources; • Erosion & silt pollution; • Fire risks – alien plant biomass & general waste from settlements.	Attendance of a pre-construction environmental compliance workshop/s.	Prior to commencement of site clearing & earthworks.	ECO, Engineers, Contractor & Project Management.	ECO to include details of this in the first environmental control Report.
Site Camp establishment / Minimise pollution / Security	• Pollution of surrounding environment by poor waste / concrete management; • Theft & vandalism of construction	• Strip topsoil, gravel, run-off management, fencing etc. • Install waste management system & concrete	Prior to commencement of site clearing & earthworks.	ECO, Engineers, Contractor & Project Management.	ECO to include details of this in the first environmental control Report.

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
	equipment, fuel from plant etc.	batching site as per EMPr; • Compile Site Security Plan.			
Prevent damage / loss of Surrounding Habitat / Demarcation of Development Areas and No-Go Areas.	• Loss of indigenous vegetation during construction; • Disturbance of watercourse habitat / water resources; • Erosion & silt pollution; • Fire risks – alien plant biomass & general waste from settlements.	• Construction area / corridor to be clearly demarcated. All areas / vegetation outside development area are considered no-go.	Prior to commencement of site clearing & earthworks.	Contractor with input from the Engineer & ECO. Contractor responsible for maintaining demarcation throughout the construction phase.	ECO to maintain photographic record of demarcation.
Environmental Awareness / Compliance Training	• Employment opportunities and skills development during construction & operation (positive).	As defined in the EMPr.	Prior to commencement of site clearing & earthworks.	ECO & Contractor	Contractor to provide details to ECO. ECO to provide details in monthly reports.
Protection of Remnant Forest, Fynbos & Protected Trees / Habitat.	• Removal of vegetation & listed or protected plant species during construction; • Habitat loss for avifaunal species; • Physical removal of the trees in riparian zones at crossings; • Loss of topsoil; • Erosion	• Avoid sensitive areas; • Reduce disturbance footprint; • Prevent / resist erosion; • Obtain Permit / License for removal, trimming or transplant of protected plant species or disturbance of Forest vegetation. Permit application/s to be informed be list of protected plant species found by ECO or ecological specialist within the final facility	• As part of design / alignment detail of sewer; • Prior to any trimming of branches/roots and transplant of trees / plants.	Engineer	ECO, Engineer & Contractor to provide photographic record

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
		development footprint.			
Avoid damage to River banks – Design & alignment of Electrical overhead line.	• Destabilisation of river banks. • Soil erosion & siltation into River; • Disturbance & removal of riparian vegetation.	Designs / alignment must ensure: • Pylons not within 32m from the edge of the River; • If the above is not, excavations may not exceed 10 cubic metres of material, and pylon foundations may not exceed 10m² in size. • Avoid disturbance / removal of vegetation during spanning of the electrical cables across river valley; • No access / servitude track permitted within the River valley.	Prior to commencement of site clearing & earthworks.	Engineer	Contractor to provide details to ECO. ECO to provide details in monthly reports.
Construction Phase					
Protection of Remnant Forest, Fynbos & Protected Trees / Habitat.	• Removal of vegetation & listed or protected plant species during construction; • Habitat loss for avifaunal species; • Physical removal of the trees in riparian zones at crossings; • Loss of topsoil; • Erosion; • Fire	• Avoid open trenches, where animals can become trapped – close excavations same day. • Avoid damage to root systems of indigenous trees – dig tranches by hand where necessary. • Avoid sensitive areas; • Reduce disturbance footprint; • Prevent / resist erosion;	Throughout construction	Contractor & Engineer	ECO, Engineer & Contractor to provide photographic record

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
		• Implement Forestry Licence condition. • No fires, designated smoking areas / receptacles, fire-fighting training & equipment.			
Avoid damage to River banks – Installation of Electrical overhead line.	• Destabilisation of river banks. • Soil erosion & siltation into River; • Disturbance & removal of riparian vegetation.	Construction must ensure: • Pylons not within 32m from the edge of the River; • If the above is not, excavations may not exceed 10 cubic metres of material, and pylon foundations may not exceed 10m² in size. • Avoid disturbance / removal of vegetation during spanning of the electrical cables across river valley; • No access / servitude track permitted within the River valley.	Throughout construction phase	Engineer, Contractor & ECO.	Contractor, Engineer & ECO
Avoid wild / uncontrolled fires	• Damage to remnant habitat & infrastructure; • Erosion.	• Remove alien plant biomass; • Provide designated smoking areas & cigarette butt receptacles; • Emergency procedures: contact details of emergency services, firefighting equipment & staff training. • No fire on site.	Throughout construction phase	Contractor	Contractor, Engineer & ECO

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
Minimise impact of construction vehicles	• Land disturbance, changing run-off characteristics and increasing erosion risks; • Soil erosion & silt pollution; • Disturbance & displacement of fauna; • Dust impacts; • Noise impacts; • Pollution impacts – oil, fuel, grease spills.	Implementation of EMPr requirements.	Throughout construction phase	Contractor	Contractor, Engineer & ECO
Prevent concrete contamination	• Increasing the surface run-off velocities & reducing run-off infiltration; • Increased erosion & sedimentation in riparian zone; • Soil & water pollution;	○ Control of Site Camp & satelite batching sites; ○ Use of batching plates; ○ Immediate clean-up of cement spills; ○ Containment & removal of empty cement bags on weekly basis. ○ Use of delivered ready-mix concrete where possible.	Throughout construction phase	Contractor	Contractor, Engineer & ECO.
Protection of Heritage / Archaeological Resources	• Unearthing of significant heritage remain during earthworks;	Contact ECO & Heritage WCape (HWC).	Stop earthworks until HWC instructions / permits obtained.	Contractor Appointed Archaeologist	Contractor, Engineer & ECO.
Protection of all topsoil resources on site.	• Increasing the surface run-off velocities & reducing run-off infiltration; • Increased erosion & sedimentation	As per the requirements of the EMPr i.e. erosion/siltation control; brush/straw packing & re-seeding.	Throughout the construction phase.	Contractor	Contractor, Engineer & ECO.

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
	in riparian zone; • Soil & water pollution;				
Limit Noise	• Disturbance of watercourse fauna; • Disturbance of adjacent residential settlements.	Noise abatement as per the requirements of the EMPr.	Design, throughout the construction and operation phase	Contractor	Contractor, Engineer & ECO.
Protection of protected plant species and on-going re-vegetation & rehabilitation.	• Land disturbance, changing run-off characteristics and increasing erosion risks • Loss of topsoil • Placement of spoil material during construction • Removal of vegetation and listed or protected plant species during construction • Soil erosion during construction • Soil erosion during operation • Dust impacts during construction • Unearthing of significant finds during construction	Implementation of Plant Rescue, Re-vegetation & Rehabilitation Plan as per this EMPr.	Design phase and throughout the construction phase.	Design Team, Engineer and Contractors	Contractor, Engineer & ECO.
Control of alien invasive plant species within site corridor.	• High biomass – fire risks; • On-going invasion into riparian habitat;	On-going removal of alien plant species from sewer corridor / servitude.	Throughout construction period.	Contractor	Contractor, Engineer & ECO.
Prevention of theft, vandalism & other crime.	• Damage to sewer infrastructure / structures;	Development of a job site security plan.	Before commencement of construction.	Contractor	Contractor & Municipality ECO to include

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
					details of this in the first environmental control Report.
On-going Environmental Education / Compliance training	• Compliance with EMPr provisions (positive)	As defined in the EMPr.	During construction.	ECO & Contractor	ECO & Contractor to provide details to ECO.
Prevent pollution resulting from poor waste management.	• Pollution of watercourse environment.	○ Implement integrated waste management measures as per EMPr; ○ Implement correct fuel and oil handling & storage procedures. ○ Implement emergency spill response plan.	Duration of the project lifespan.	ECO & Contractor	Contractor, Engineer & ECO.
Operational Phase					
Control of alien plants	• Fire risks – accumulated biomass; • On-going dispersal of seed & invasion of alien plants into River environment; • Soil erosion during operation	• Compile & implement long-term alien plant plan; • Follow-up removal every six months for 10-years; • Regular monitoring and removal of alien invasive plant species.	Throughout operation	Holder of EA - Municipality	Holder of EA - Municipality
Prevent sewerage leaks / spills, caused by blockages, vandalism & theft.	• Pollution of watercourse environment; • Health impacts	• Compile & implement long-term EMMP, including inspection schedules & maintenance protocols; • Regular monitoring & maintenance of sewer	Throughout operation	Holder of EA - Municipality	Holder of EA - Municipality

Item / Management Outcome	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
		infrastructure ; • On-going education & awareness sessions of community members.			
Stormwater quality control	• Ground and surface water pollution & erosion along sewer servitude & at River / tributary crossings, due to leaks / blockages / damages to sewer infrastructure.	• Compile & implement long-term EMMP, including inspection schedules & maintenance protocols; • Regular monitoring & maintenance of sewer servitude and infrastructure ;	Throughout operation	Holder of EA - Municipality	Holder of EA - Municipality
Closure & Decommissioning Phase					
	Items, management, responsibilities and monitoring as per construction and operation phase, as above.				
Decommissioning of bulk service infrastructure.	• Ground and surface water pollution & erosion along sewer servitude & at River / tributary crossings, due to leaks / blockages / damages to sewer infrastructure.	Closure of infrastructure in compliance with legislation and this EMPr.	Unlikely	Holder of EA - Municipality	Holder of EA - Municipality

13 NON-COMPLIANCE

Any person is liable on conviction of an offence, in terms of sub regulation (1) of the National Environmental Management Act (NEMA), to imprisonment for a period not exceeding two years or to a fine not exceeding an amount prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

It is the responsibility of the ECO to report matters of non-compliance to the employer's Representative (e.g. Project Engineer), who in turn is tasked with reporting such matters to the Holder of the Authorisation. It is the responsibility of the Holder of the Authorisation (the Applicant), and not the ECO, to report such matters of non-compliance to the relevant Authority.

Condition 15 of the EA: Non-compliance with a condition of the EA or EMPr may result in suspension of the EA and may render the holder liable for criminal prosecution.

Condition 16 of the EA: Notwithstanding the environmental authorization (EA), the holder must comply with any other statutory requirements that may be applicable to the undertaking of the listed activities.

14 DECOMMISSIONING PHASE MANAGEMENT REQUIREMENTS

It is not likely that decommissioning of bulk service infrastructure associated with large-scale the residential / settlement developments of Thembalethu, George will take place in the near future. The possibility does exist that certain sections or structures as part of the sewer network may need to be repaired or upgraded in the future. In this event, or if the entire sewer alignment requires decommissioning for some reason, all relevant legislation and policies must be complied with for the given period.

In general, should the bulk service infrastructure need to be decommissioned, the following should be undertaken:

- Only identified structures or infrastructure must be removed within a demarcated area to prevent unnecessary damage to the surrounding vegetation or watercourse environment;
- Materials that can be recycled should be correctly sorted and stacked for removal to appropriate waste stream sites;
- The disturbance footprint area of the must be fully rehabilitated.

15 MONITORING

Monitoring of the construction progress must be done by means of **photographic documentation** by the ECO. This information must be included in the Environmental Control Report/s as detailed above.

Condition 10 of the EA: The applicant (*read Holder of EA)* must compile and submit an **Environmental Audit Report six months after commencement** of construction and **thereafter annually** with the last report 12 months after completion of construction activities. Such audit report must indicate the date on which construction activities were commenced with and when it was completed and detail compliance with the mitigation / rehabilitation measures and recommendations referred to in the EMPR and conditions of the Environmental Authorisation.

Furthermore, it is recommended that an **audit** be undertaken **6 months** after completion of construction to monitor the rehabilitation of the site, and off-site drainage system, and to assess whether any residual or additional impacts that may have occurred. This audit should be considered as the **Environmental Completion Statement** for the construction phase.

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