



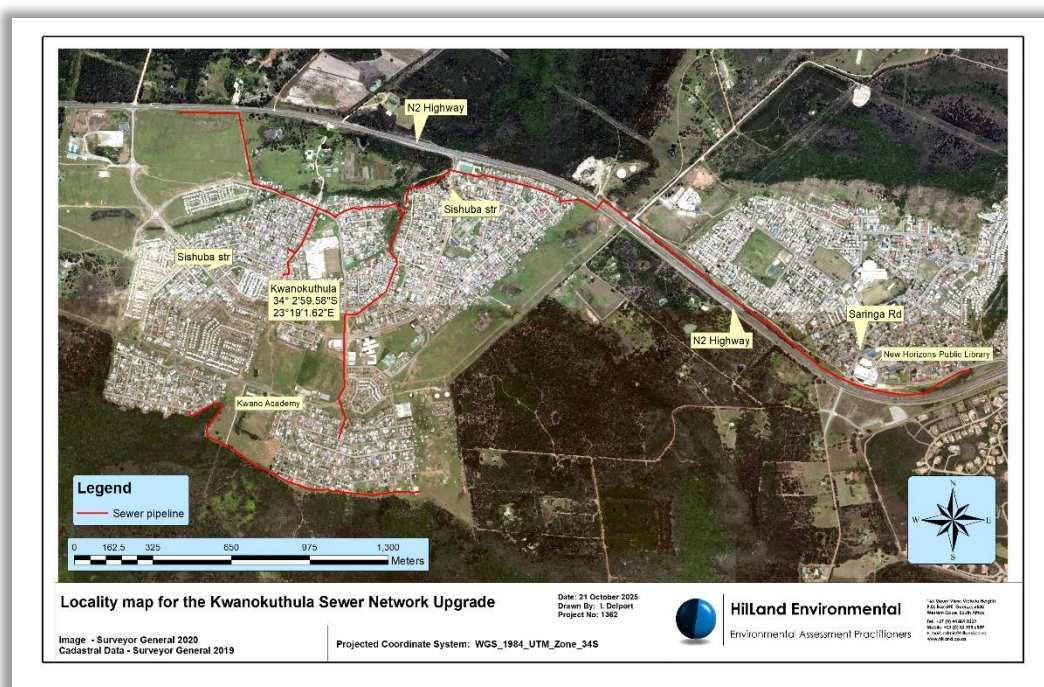
HilLand Environmental

Environmental Assessment Practitioners

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) AND MAINTENANCE MANAGEMENT PLAN (MMP)

FOR

THE UPGRADE AND MAINTENANCE OF THE KWANOKUTHULA SEWER INFRASTRUCTURE, PLETTENBERG BAY



Compiled by	HilLand Environmental
HilLand reference	PLE26/1362/
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Public review and comment – Submission with draft BAR

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Annexure A	Locality Map
Annexure B	Preferred SDPs
Annexure C	No-Go Maps
Annexure D	Environmental Induction Sheet and Register
Annexure E	Method Statement Form
Annexure F	Register of Rescued Indigenous Vegetation
Annexure G	Protected Plant Species Lists
Annexure H	CV of EAPs
Annexure I	Engineering Method Statement
Annexure J	Heritage Chance Find Procedures

National Environmental Management Act

An EMPr must comply with Section 24N of NEMA and the Environmental Impact Assessment Regulations 2014 (GN 982 Appendix 4) which requires that it must include the following:

REQUIREMENTS	REPORT SECTION
(a) details of- (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Annexure H - CVs
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.1
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Annexure B and C
(d) a description of the impact management [objectives] outcomes, 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 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
(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 4-7
(f) a description of proposed impact management actions, identifying the manner in which the impact management [objectives and] outcomes contemplated in paragraph (d) [and (e)] will be achieved, and must, where applicable, include actions to – (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	Section 4-7
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 3.1, 3.1.2 and 8
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f)	Section 3.1, 3.1.2 and 8
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 3, 7, 4-8
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 3, 7, 4-8
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 3, 7, 4-8
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 3, 7, 4-8
(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 3 and 8
(n) any specific information that may be required by the competent authority.	N/A
1. Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

This document includes a maintenance management plan that has been done in accordance with the Departments requirements for the content of an MMP:

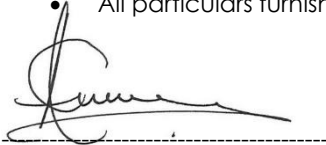
REQUIREMENTS	REPORT SECTION
• A description of the objectives of the MMP; • A description of the relevant legislation and policies within which the MMP is prepared; • A description of the site and a locality map; • A description of the proposed maintenance activities; • A description of the tasks that will be performed (method statement); • A description of the potential impacts on the receiving environment and any management and/or mitigation measures to minimise the potential impacts associated with the maintenance activity; • Any specialist inputs that were obtained; and • The roles and the responsibilities of the role players who will be involved in the maintenance activity.	Section 3 Section 2 Appendix A and section 1 Section 1 and 7 Section 1 and 7 and annexure I Section 4-8 Throughout the EMPr/MMP Section 3

EAP DECLARATION OF INDEPENDENCE

I, Cathy Avierinos (EAPASA – 2019/1053), as the appointed environmental assessment practitioner ("EAP") hereby declare that:

In terms of the general requirement to be independent:

- Other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or Application and that there are no circumstances that may compromise my objectivity;
- Work performed for this study was done in an objective manner irrespective of how such findings may be favourable or not to the client;
- I do not have any influence over the decision-making process undertaken by the governing authorities;
- I declare that there are no circumstances that may compromise my objectivity in undertaking this study or producing this report;
- All facts and findings will be presented in an objective manner in accordance with my professional and scientific experience and the data derived from the study;
- I have the necessary qualifications and experience to undertake the study;
- All particulars furnished in this report are true and correct.



Signature of EAP

HillLand Environmental

Company

07 April 2026

Date

1 INTRODUCTION, ACTIVITY PROPOSAL AND MAINTENANCE PHASE

HillLand Environmental, independent Environmental Assessment Practitioners (EAPs), have been appointed **Lyners Consulting Engineers** as the engineers representing **Bitou Municipality**, to produce an Environmental Management Programme (EMPr) and Maintenance Management Plan (MMP) for the upgrade and long-term maintenance of Kwanokuthula Sewer Network, Plettenberg Bay. This will ensure compliance with the regulations contained in the National Environmental Management Act (NEMA, No. 107 of 1998, as amended) and Environmental Impact Assessment Regulations, 2014 (as amended).

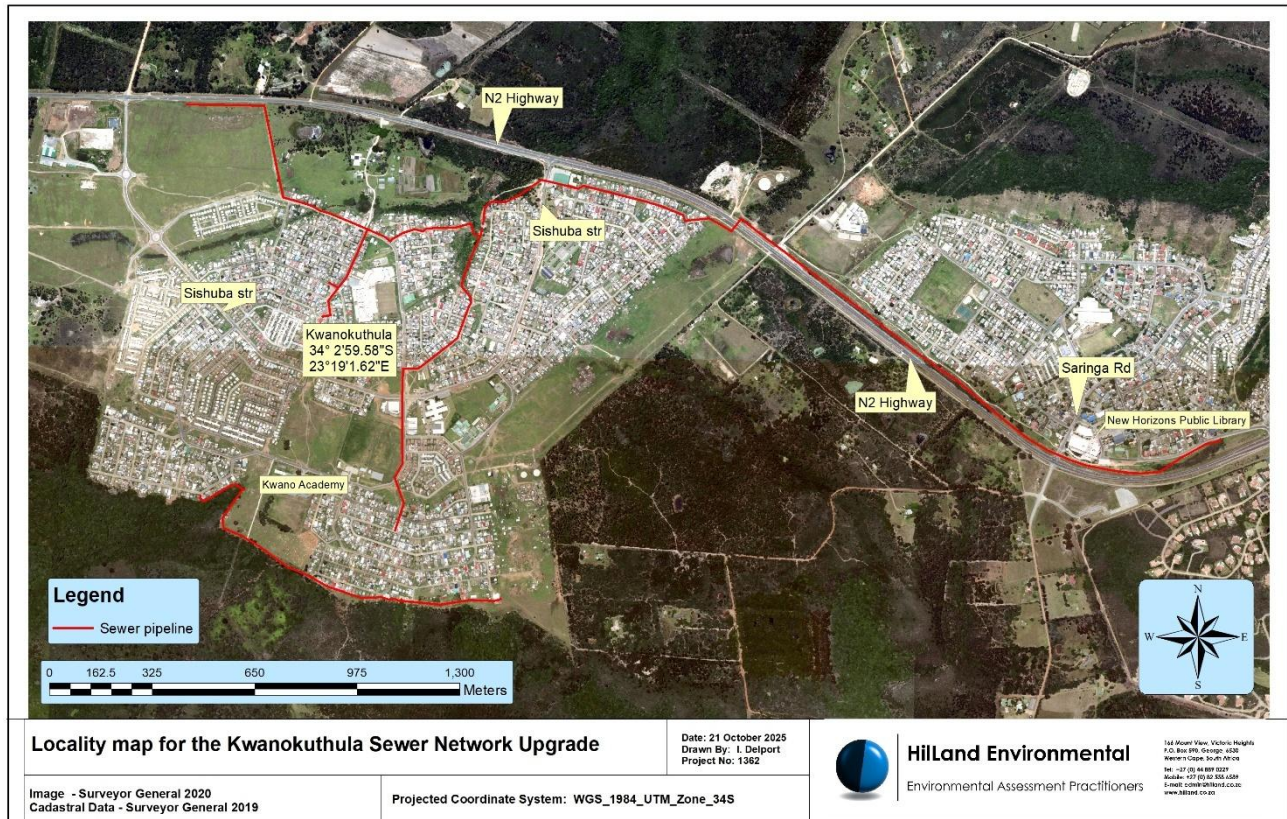


Figure 1: Locality map

This EMPr/MMP (as amended to include the conditions of the Environmental Authorisation (EA) and adoption of MMP, when issued) is **binding to the applicant and ALL successors** in part of the upgrade and maintenance of the Kwanokuthula sewer network, Plettenberg Bay.

This EMPr is submitted as per the requirements of a Basic Assessment and adoption of MMP in terms of NEMA.

The monitoring of compliance of this EMPr is mandatory in terms of the construction phase and compliance reporting is required at the **end** of the construction phases of the relevant upgrades. It is anticipated that the EA will require a completion audit at the end of the construction phase.

Please note that this EMPr/MMP is a **dynamic** document, which will grow and be changed with new developments in the field as the need arises.

This EMPr/MMP will remain in effect (once approved by DEADP) for the initial upgrade of the sewer network, pump stations and riverbank stabilisation as proposed and the continued maintenance of the system:

- The EMPr will be implemented during the proposed upgrades as assessed from commencement until completion of construction of all phases.
- The MMP will remain in effect for a period of 5 years after completion of the authorised upgrades and will be renewable every 5 years going forwards thereafter.
- Reporting will be done in accordance with the EMPr/MMP

1.1 ACTIVITY PROPOSAL

The existing sewer infrastructure is aged and undersized for the current demand and need. This has resulted in frequent blockages, pipe failures and sewage overflows within the residential, open space areas and eventually to the Roodefontein Dam which is one of Plettenberg Bay's clean water sources.

In addition, the proposed upgrades allow for bulk service link for future expansion areas in Kwanokuthula (housing, education and commercial facilities).

The proposal entails the upgrading of the Kwanokuthula sewer infrastructure in Plettenberg Bay (PHASE 1 and 2). The proposal includes:

- upgrade of existing pipes and associated infrastructure (e.g. pipelines and manholes)
- installation of new bulk connections to future development areas
- realignment of the network where it is in a midblock
- upgrades and expansion of the pump stations (pump station (PS) 1 and 3) to be able to accommodate the network upgrades and associated capacity increases
- implementation of gabion riparian stabilisation at pump station 1 to protect pump station 1's infrastructure

The maximum diameter pipes to be installed up to 355mm, with the capacity to reach a maximum flow rate of 300 l/s. A working area of up to **6m for pipe installations** will be required. Where the servitude, existing structures or the bordering forest areas limit working area, the working area will be reduced to stay within the existing servitude.

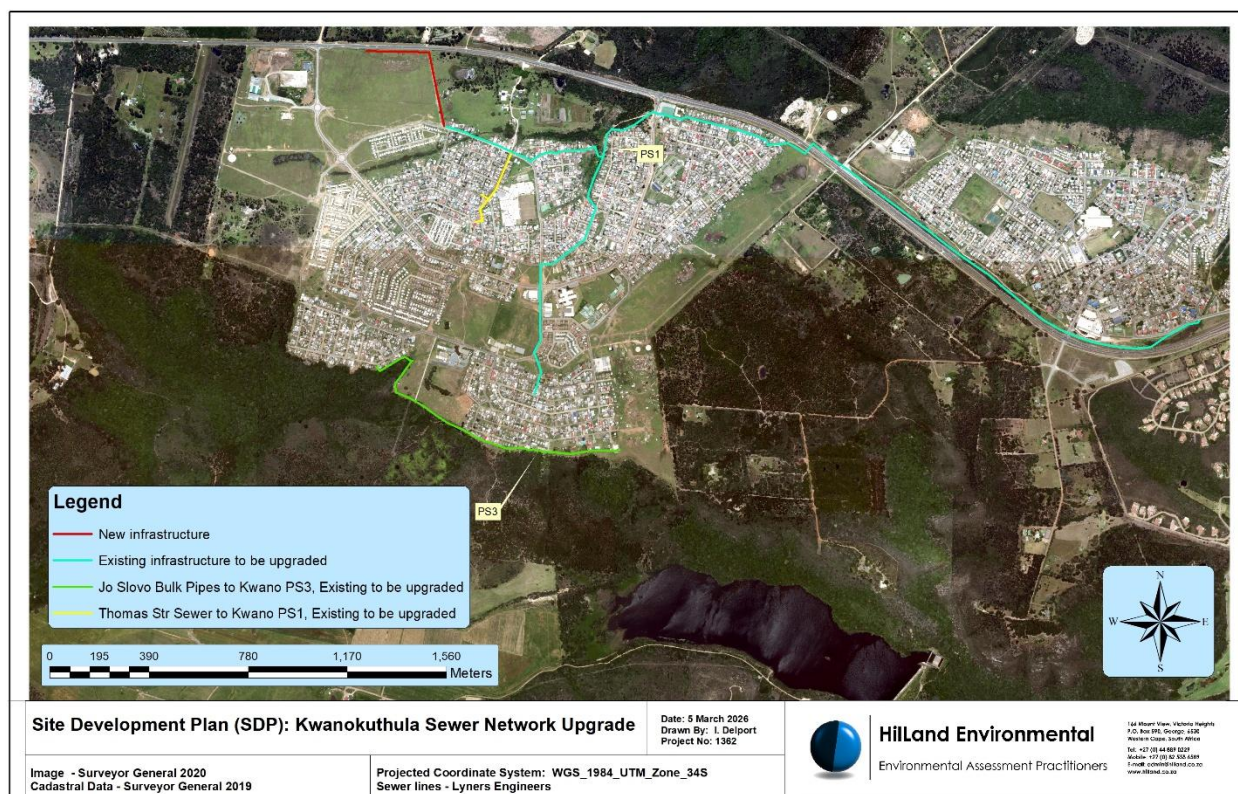


Figure 2: Plan showing all the pipelines that will be upgraded and new pipeline to be installed to future development areas

During the upgrades various watercourse crossings required. The following typical stream crossing detail will be implemented in order to protect the pipelines from erosion and prevent future pollution risk:

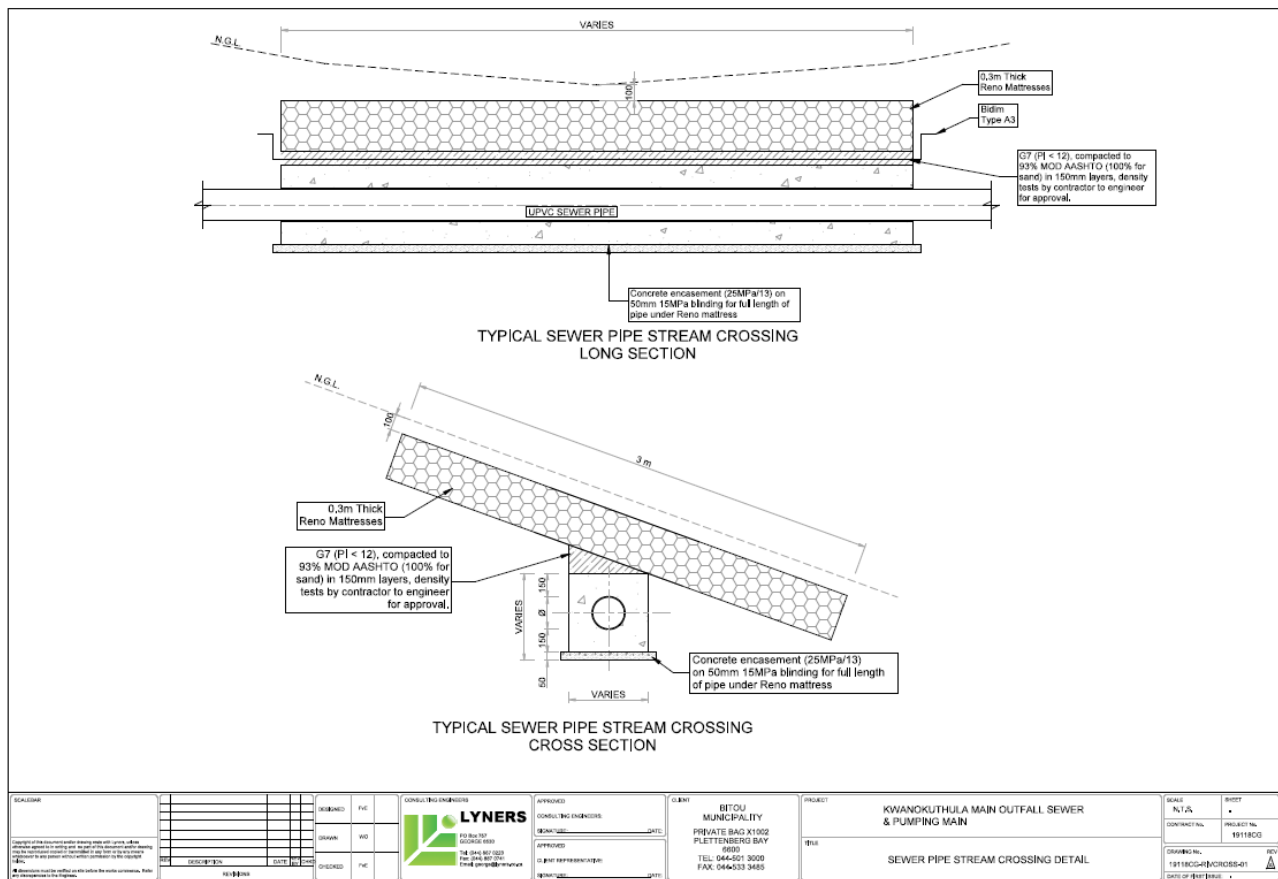


Figure 3: Typical stream crossing detail (Lyners Consulting Engineers, 2025)

Pump station (PS) 1 and 3 will be upgraded in order to accommodate the upgraded network. PS 1 will be expanded beyond the existing yard area.

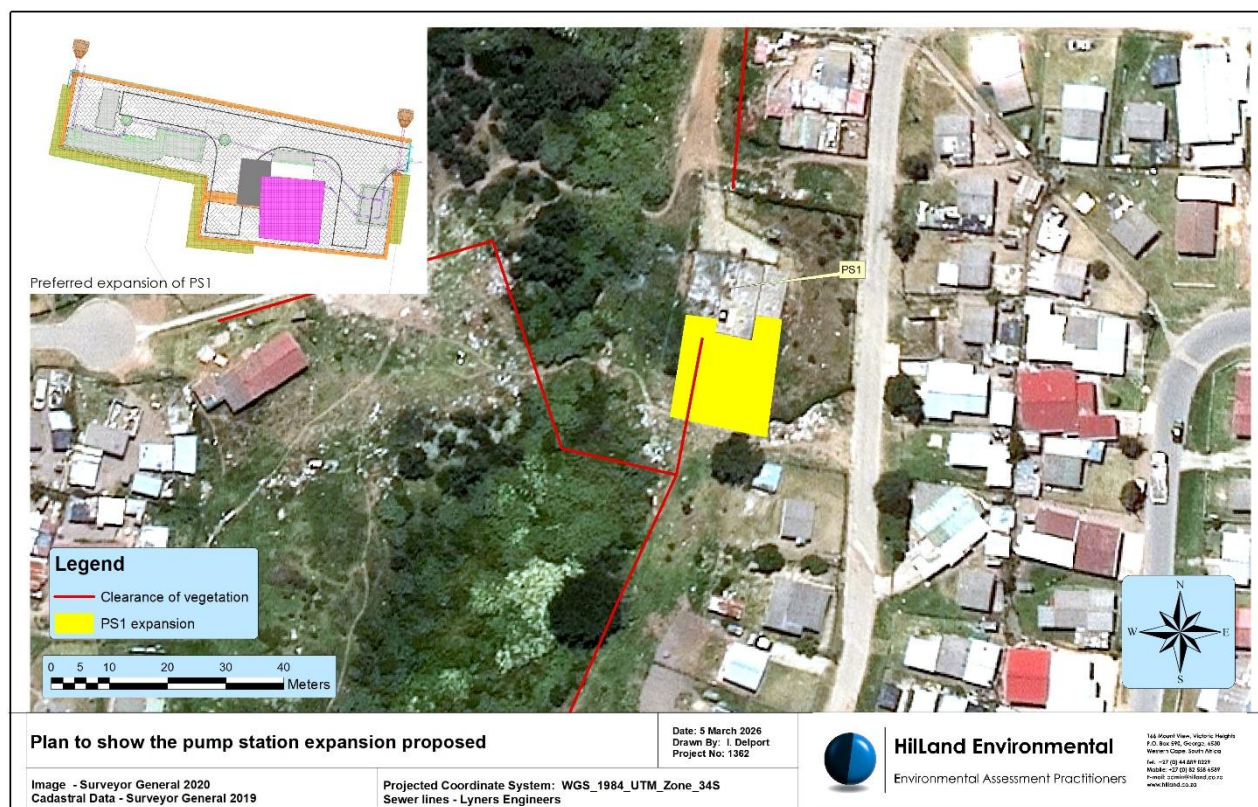


Figure 4: Plan to show the expansion of PS1 and the clearance of vegetation that have been applied for

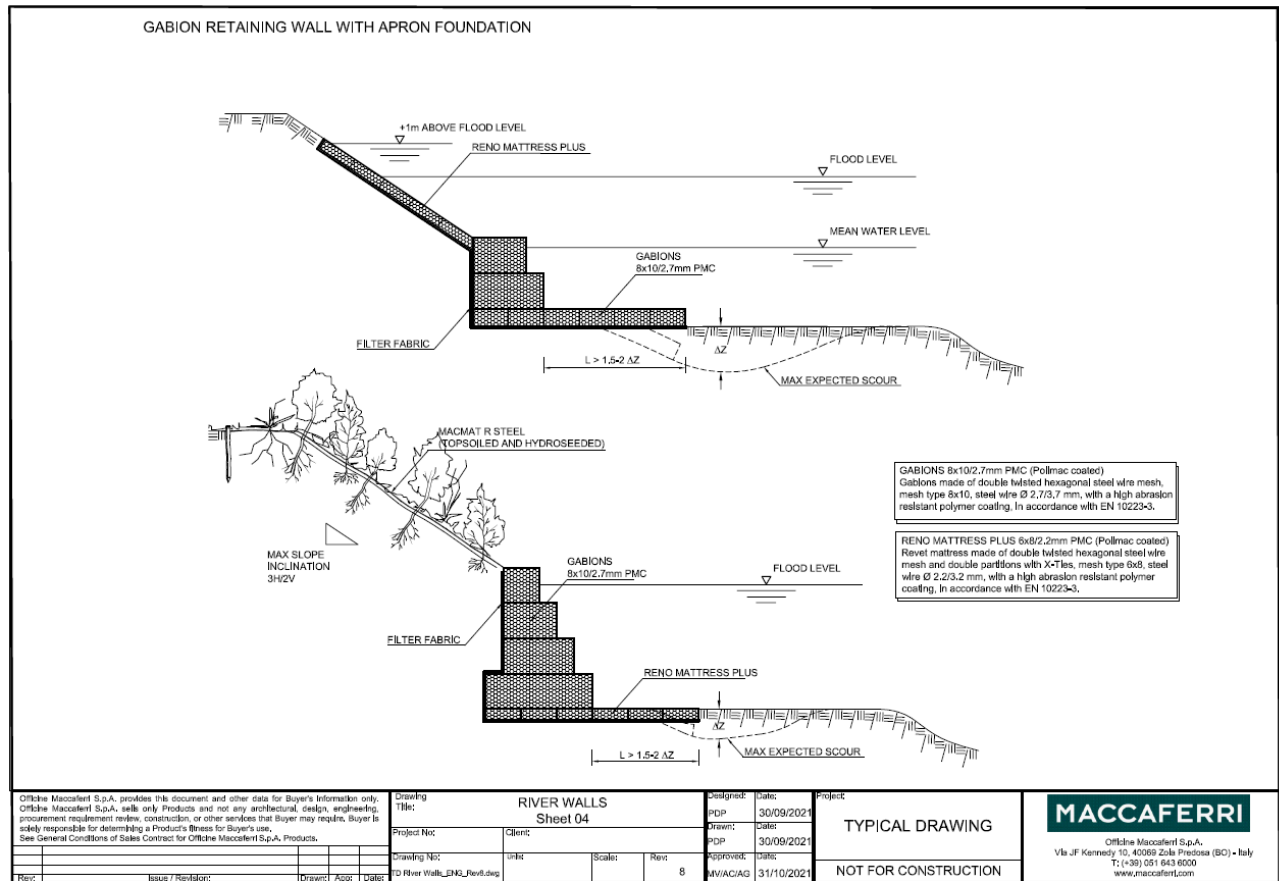


Figure 6: Typical design (Lyners Consulting Engineers, 2026)

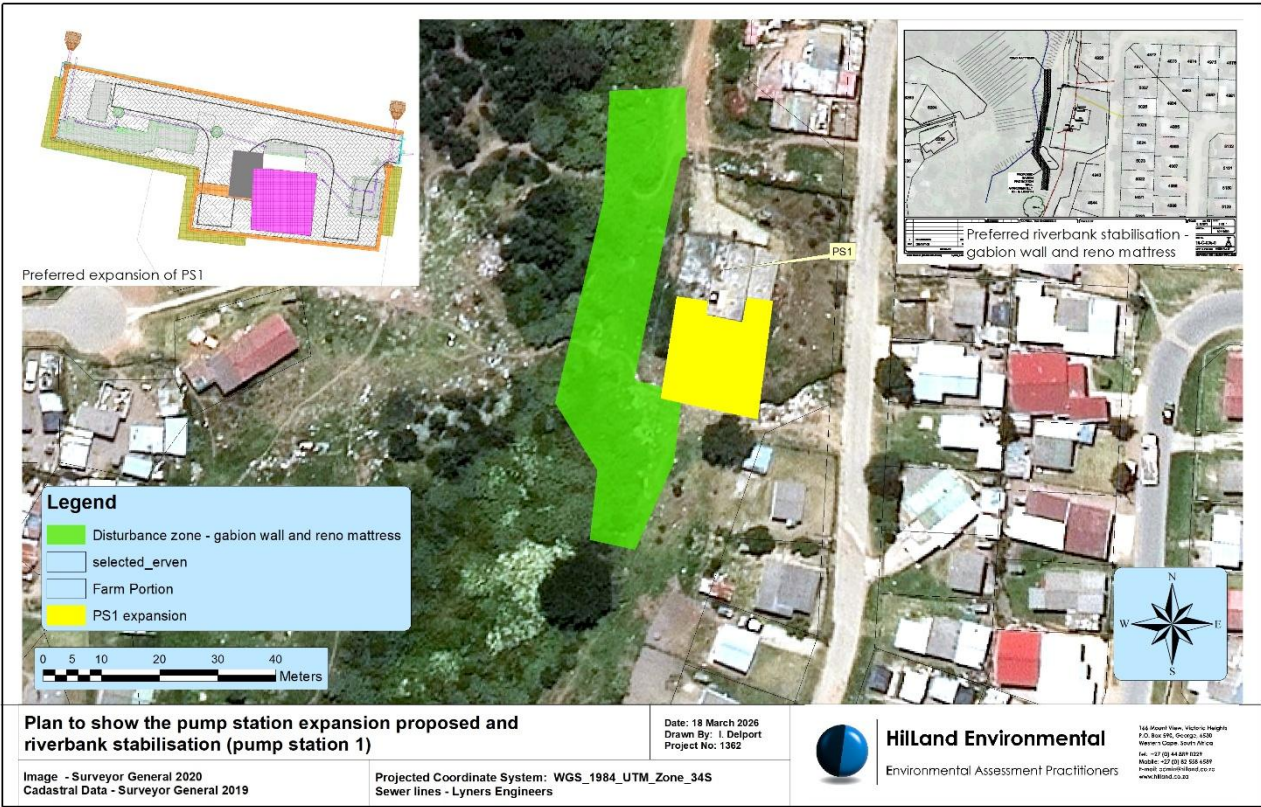


Figure 7: Construction plan showing the disturbance zones associated with the pump station expansion and the riverbank stabilisation as proposed

All work will be undertaken in accordance with the engineering method statement and this EMPr/MMP that incorporates mitigation measures recommended by various specialists that formed part of the assessment.

1.2 MAINTENANCE PHASE

Annexure x, Form A and B must be filled in for any future maintenance activities that are to be undertaken (i.e. works undertaken after the completion of the initial installation).

Form A must be completed prior to commencement of activities and is to be approved by DEADP prior to works commencing. The works can continue in terms of this MMP.

Form B to be submitted on completion of the maintenance activity.

The maintenance management plan will be applicable and must be implemented when maintenance work is to be undertaken within a watercourse or in an area that is zoned Undetermined or Open Space.

The following areas are applicable:

- **Joe Slovo Bulk Sewer:**

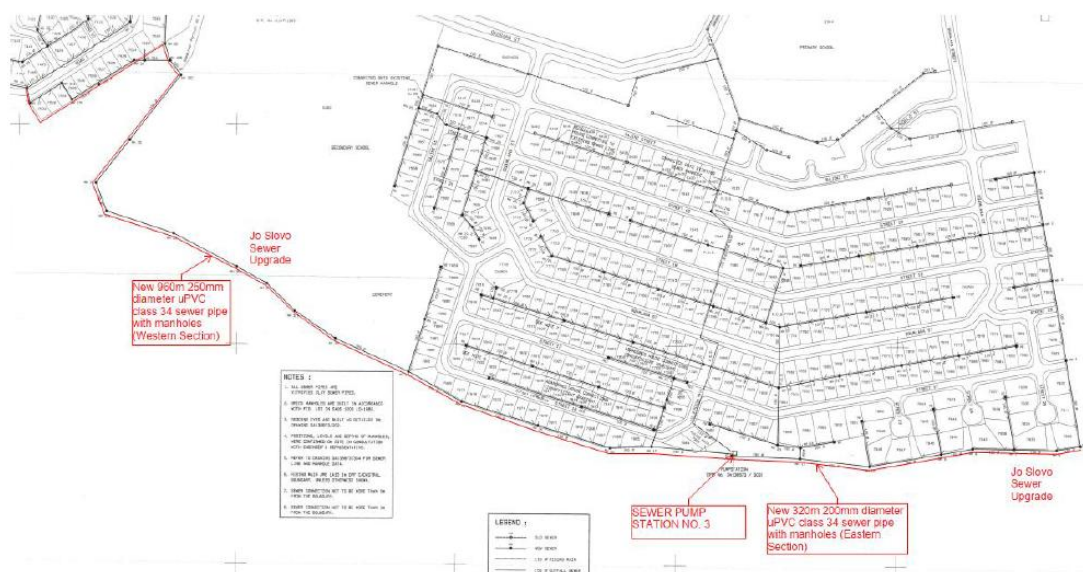


Figure 11: LOCATION OF JOE SLOVO BULK SEWER

Figure 8: Joe Slovo pipeline – future maintenance along this pipeline will require implementation of the MMP based on aquatic habitats identified (see below) and zoning of property

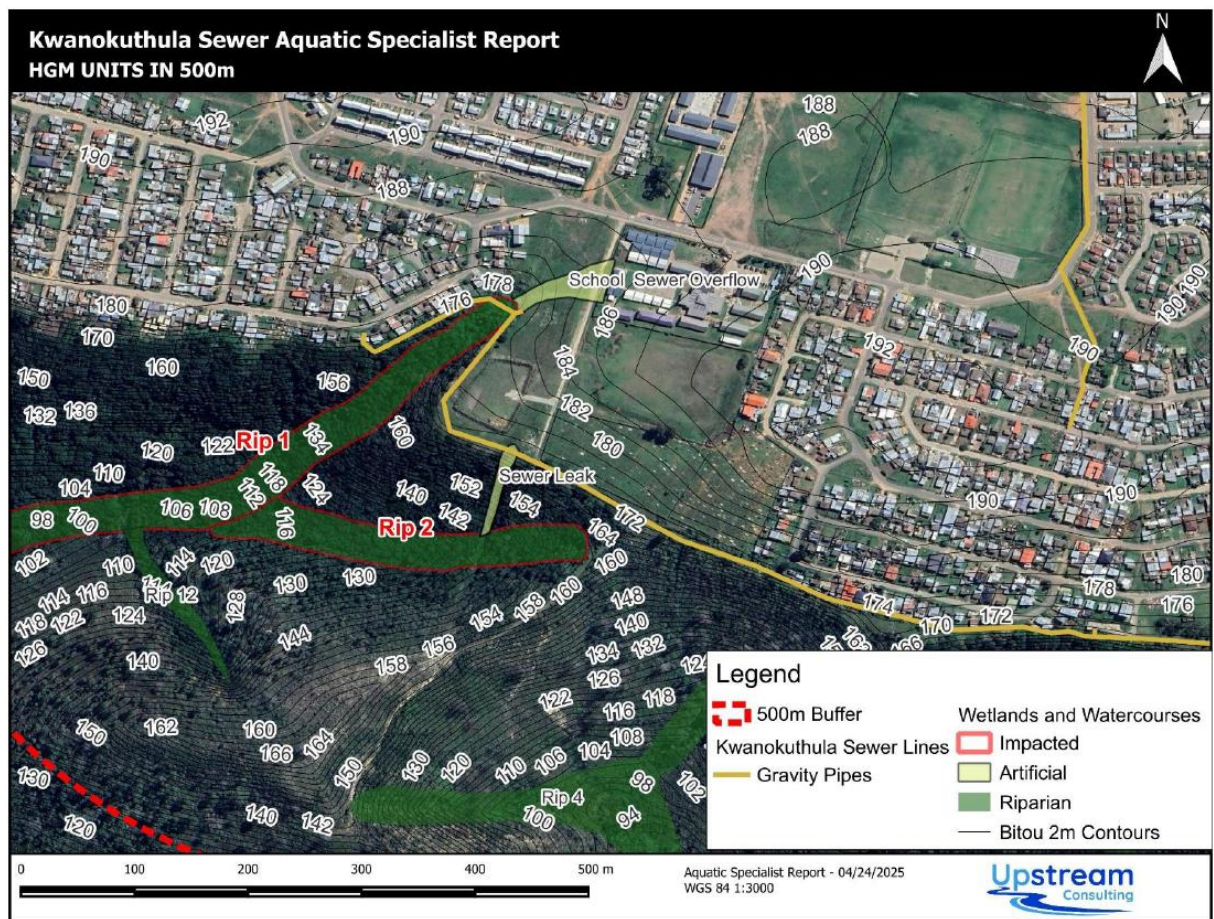


Figure 10: Map of the delineated aquatic habitat of impacted RIP 1 and RIP 2 riparian HGM units.

Figure 9: Aquatic habitats identified (Upstream Consulting, 2025)

- PS 1, BPS 25.3 25.7, 25.8, 25.9, 25.10, 25.11:

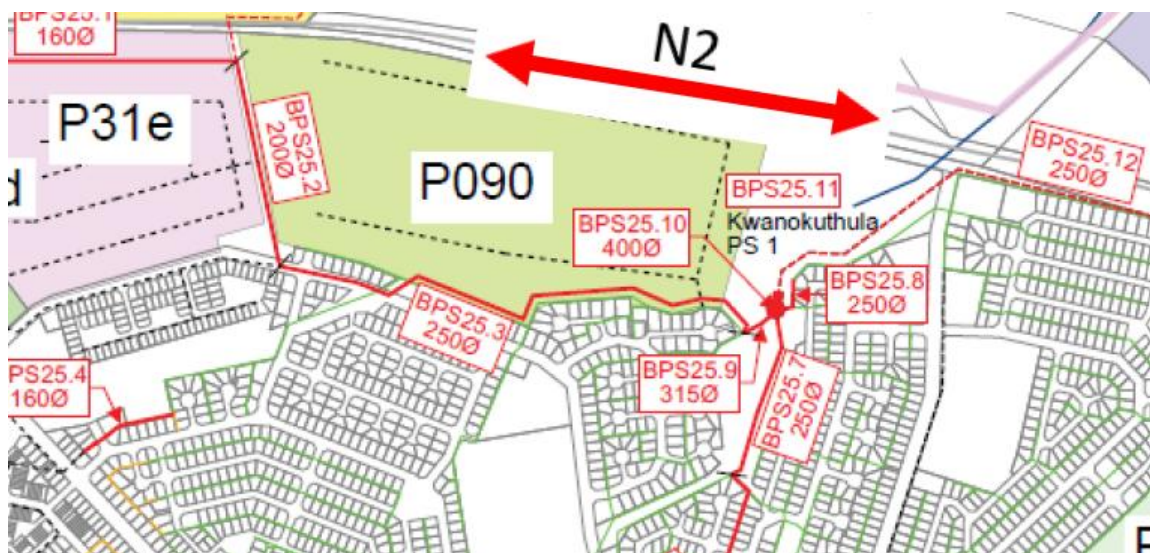


Figure 10: MMP to be implemented for any future maintenance along the pipelines, pump stations and riverbank stabilisation implemented as part of the approval process

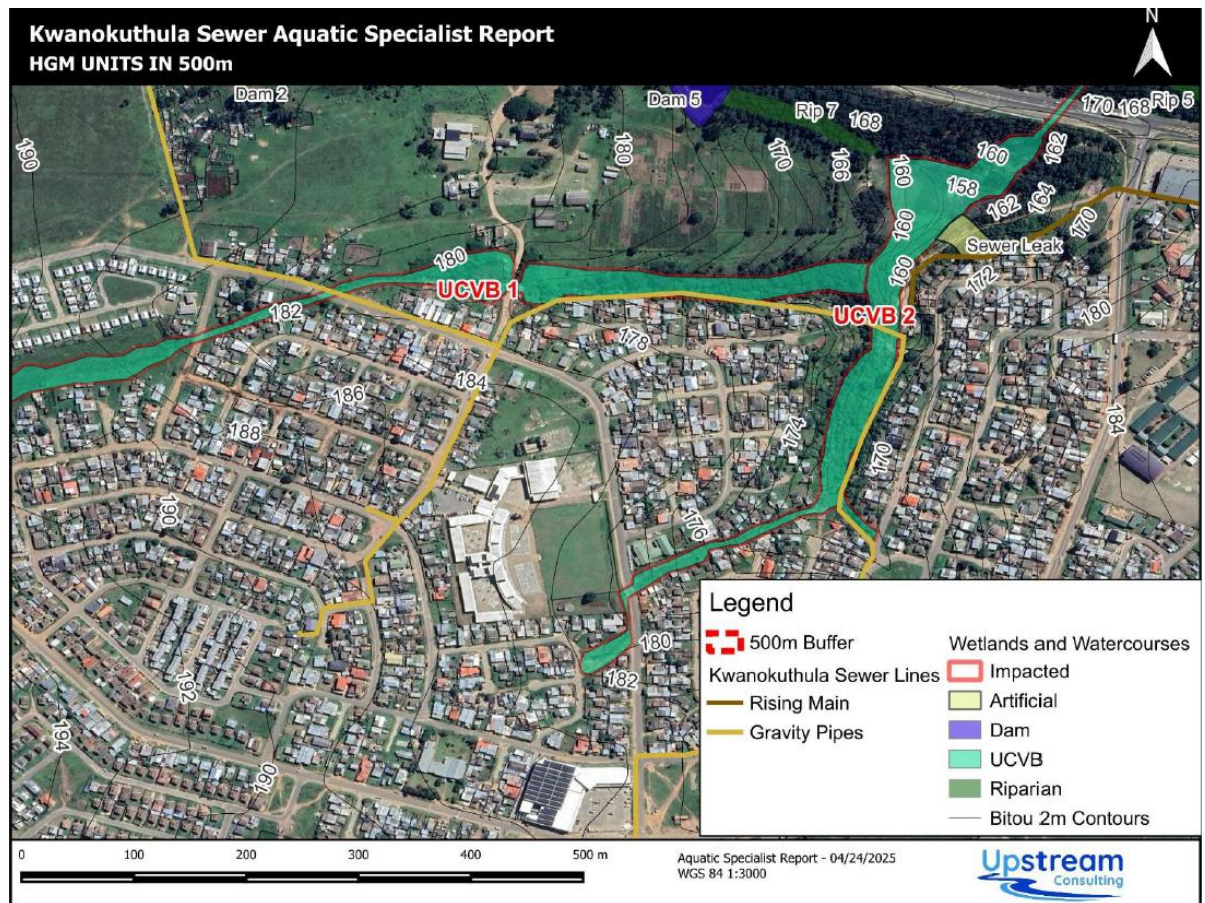


Figure 11: Map of the delineated aquatic habitat of impacted UCVB 1 and UCVB 2 HGM units.

Figure 11: Aquatic habitats identified (Upstream Consulting, 2025)

- **BSP 27.4**

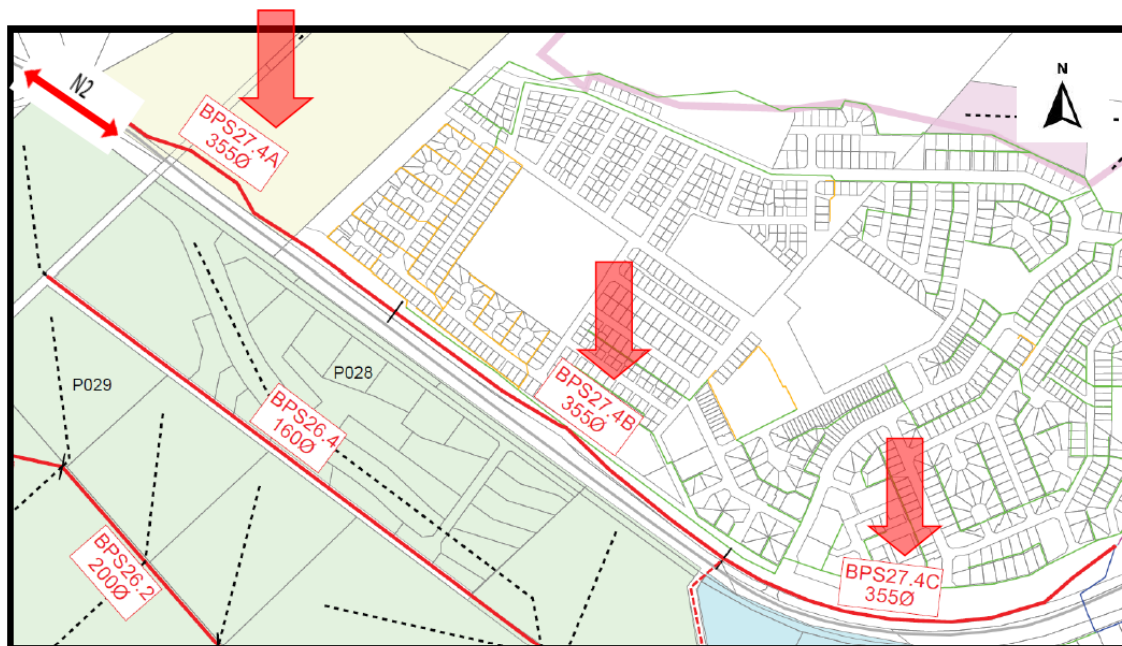


Figure 6: LOCATION OF BPS 27.4A, BPS 27.4B & BPS 27.4C

Figure 12: Maintenance along this pipeline will require implementation of the MMP based on the aquatic habitats identified (see below) and zoning of property

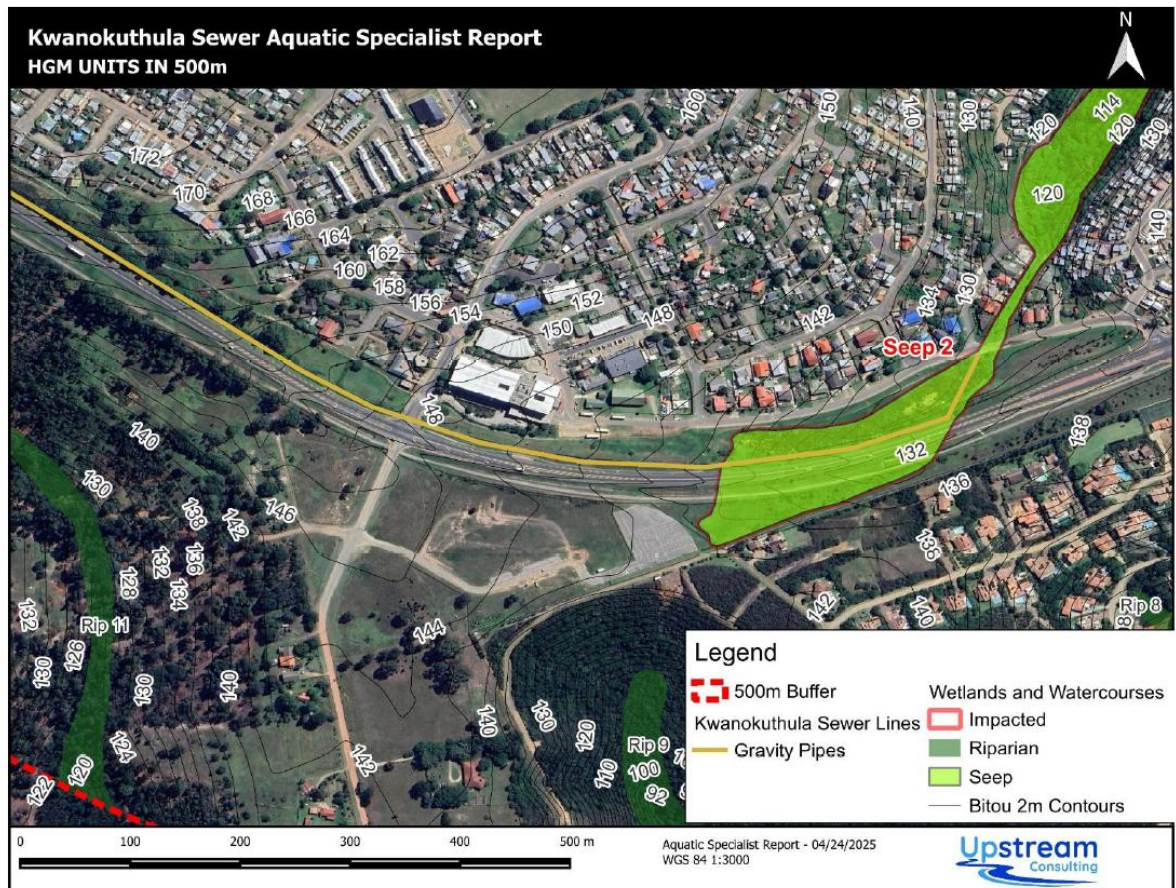


Figure 12: Map of the delineated aquatic habitat of impacted Seep 2 HGM unit.

Figure 13: Aquatic habitats identified (Upstream Consulting, 2025)

- BPS 25.2 and 25.1 – these will be within an urban area in future so an MMP will not be applicable.

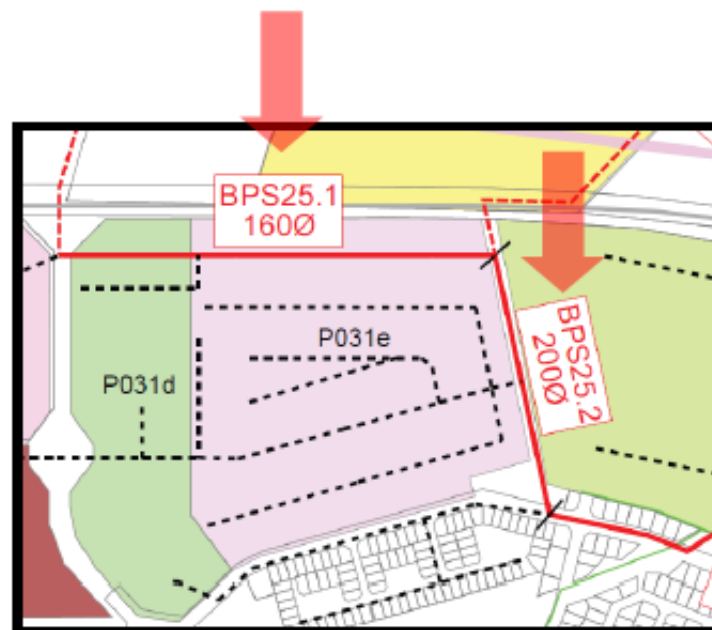


Figure 14: Future maintenance of these pipelines will be within an urban area – general duty of care will apply.

2 RELEVANT LEGISLATION

2.1 NEMA AND NEMA EIA REGULATIONS

The following listed activities are applicable:

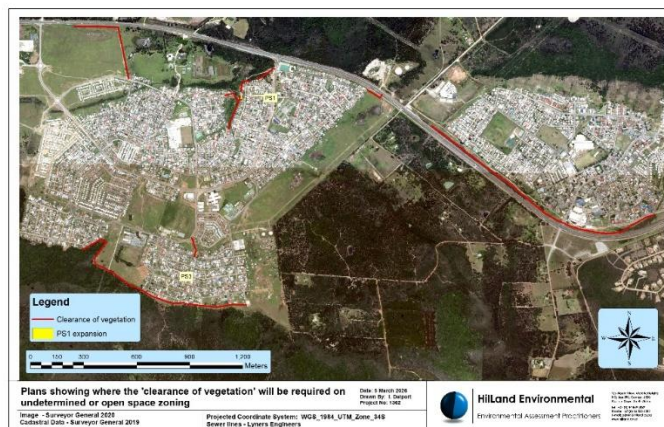
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1	Describe the portion of the proposed development to which the applicable listed activity relates.
10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for <u>the</u> bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve <u>or railway line reserve</u>; or (b) where such development will occur within an urban area.	In the urban areas, the exclusion will apply and this activity does not require environmental authorisation. Outside the urban areas this needs to be authorised. The authorisation of this listed activity will be required for areas outside the urban area where the pipeline exceeds 1000m in length, the maximum pipe diameter is 0,35m, therefore (i) will not be applicable, but all pipelines will have the capacity to have a peak throughput of 120 l/s or more which will require authorisation. Authorisation required LN1, Act 10(ii) for where the pipes are not located in NEMA defined urban areas. Future maintenance of sewer lines within an urban area will not require NEMA considerations other than the General Duty of Care.
12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of the development	The proposal will require the development of infrastructure or structures 100m² or more (cumulatively) crossing or close to identified and delineated watercourses. The exclusion of urban areas and road reserves applies. Certain of these areas fall within the urban edge, however, DEADP are likely to deem the areas to be “outside the urban area” as they fall on the edges of the developed area, in these areas the exclusion will not be applicable and this listed activity requires authorisation. Ongoing maintenance along the open space areas and watercourses will need to comply with the MMP.

	and where indigenous vegetation will not be cleared.	
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; applicable only for future maintenance. (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	There is likely to be movement of more than 10m³ of material within a watercourse and as such this activity will require authorisation. Future maintenance of these pipelines and infrastructure crossing the watercourses will be done in accordance with an approved MMP.
46	The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure— (i) has an internal diameter of 0,36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion— (aa) relates to the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or (bb) will occur within an urban area.	Expansion of infrastructure for bulk transportation of sewage is excluded in road reserves and urban areas. Expansion outside the urban area where peak throughput is 120litres per second or more and the capacity will increase by 10% or more will require a NEMA EA.
48	The expansion of— (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or (ii) dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding— (aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;	Infrastructure crossing watercourses or within 32m of a watercourse, and it may exceed 100m². The urban areas and road reserve exclusion will apply in such areas. In certain areas the upgrades are not located within the NEMA defined urban area or road reserve and therefore will require authorisation.

i. The vegetation clearing will be in the areas mapped "green" which are not endangered or critically endangered – not applicable

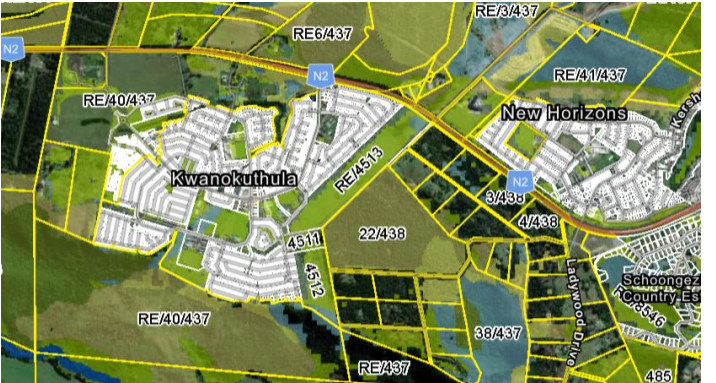
iv. **Clearing required in the areas zoned as “Undetermined zone / Open Space” will need authorisation if more than 300m² is required to be cleared for construction purposes.**

Future maintenance along this route will need to be done in terms of the MMP.



Plan showing the sewer line upgrades and expansion of PS1 that will require clearance of vegetation on land zoned undetermined or open space zoning

This calculates to approximately 23 924m² (allowing a 6m working area)

14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	 Infrastructure outside the urban area, within 32m of a watercourse exceeding 10m² and within a CBA or ESA will require NEMA Environmental Authorisation. Future maintenance along this route will need to be done in terms of the MMP.
23	The expansion of— (i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback adopted in the prescribed manner; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies;	Expansion of infrastructure outside the urban area, within 32m of a watercourse exceeding 10m² and within a CBA or ESA will require NEMA Environmental Authorisation Future maintenance along this route will need to be done in terms of the MMP.

	(bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or (hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined	
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This report will be updated to include conditions of Environmental Authorisation (EA) once issued by DEADP, Region 3.

2.1.1 CONDITIONS OF AUTHORISATION AND MMP ADOPTION

The Environmental Authorisation (EA) and MMP adoption (once issued) will be attached to the Final EMPr/MMP.

It is binding on the contractors, sub-contractors, agents, consultants and construction staff associated with the project and long-term maintenance activities.

If the EA and MMP adoption conditions are not included at this point, then the reader is NOT reading the final approved EMPr /MMP and should request such a document prior to continuation.

2.2 NATIONAL WATER ACT (NWA)

The project will require water use authorisation under Section 21(c) and (i) of the National Water Act (Act No. 36 of 1998) prior to commencement. A Water Use Licence Application (WULA) is in process.

This report will be updated to include the conditions contained in the WUL once issued by the Breede-Olifants Catchment Agency (BOCMA).

2.3 NATIONAL FOREST ACT (NFA)

Two areas of the pipeline borders specialist identified forest areas. Upgrade and maintenance work within these areas will remain in the existing transformed servitude areas. However, should the disturbance, removal, pruning and or transplant of any protected tree or forested areas be required, a licence in terms

of Section 7 of 15 of the National Forest Act (NFA) will be required. The ECO is to be consulted to determine the need for a NFA licence. When it is applicable, the licence needs to be in place prior to the activity being undertaken.

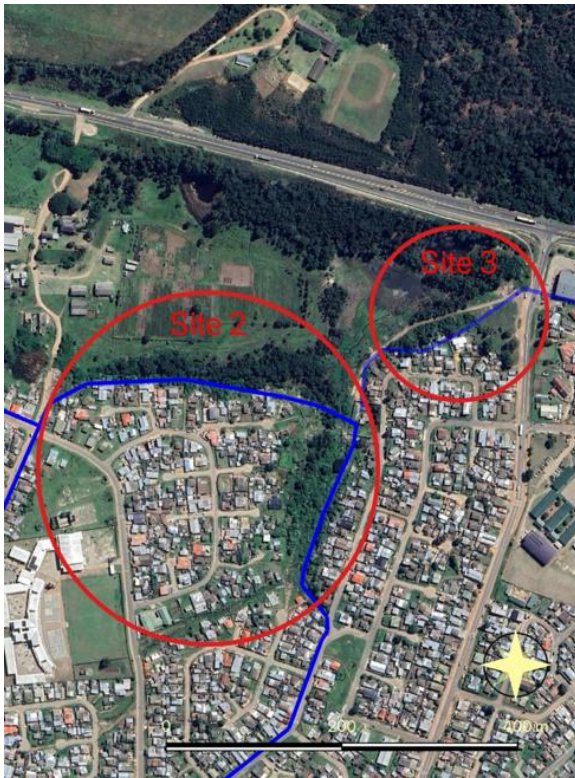


Figure 15: Site 2 assessed by the specialist, BPS 25.3 and 25.10 applicable (Hoare, 2026)



Figure 16: Site 5 and 6 assessed by the specialist, Joe Slovo network applicable (Hoare, 2026)

3 TERMS OF REFERENCE OF EMPR AND MMP OBJECTIVES

The main terms of reference of this EMPr is to identify and mitigate any potential negative environmental impacts that may be associated with the construction in accordance with the site layout plan.

The full and approved EMPr must be made available to all contractors working on the project and must be included in all tender / contract documentation. Certain fundamental aspects are therefore of importance:

The EMPr and these requirements are binding on all contractors and their sub-contractors.

It is the responsibility of the applicant/ holder /developer /owner to ensure that any contractor(s) or sub-contractor(s) is made aware of the environmental requirements.

The contractor will be required to make good any damage caused through their actions or the actions of their sub-contractors (in addition to any penalties for non-compliance issued).

The main objective of the MMP section is for the continual maintenance and management of the Kwanokuthula.

Once construction is complete (upgrade of the network, expansion of PS1 and riverbank stabilisation as discussed in this report), the MMP is to be used to guide any construction require for any future maintenance (in any form) in the identified areas (see section 1.2).

The MMP will ensure that the pre-construction, construction and rehabilitation activities required for the maintenance are conducted in the most environmentally acceptable manner. It includes various mitigation measures that must be implemented and monitored during the phases of implementation.

Please note that any changes to the **MMP must be approved by the DEADP** prior to implementation.

3.1 ENVIRONMENTAL CONTROL OFFICER (ECO) AND MUNICIPAL ENVIRONMENTAL OFFICER (EO)

An environmental control officer (ECO) must be appointed to oversee the EMPr **construction phase**, ensure compliance with the Environmental Authorisation (EA, once issued) and the approved Environmental Management Programme (EMPr) and to assist with issues as they may arise on site.

The ECO can be an independent practitioner or the Municipal Environmental Officer (EO).

It will be the ECO's responsibility to ensure that the mitigation / rehabilitation measures and recommendations referred to in the EA (once issued) are implemented and complied with by the holder (and his appointed contractor).

The **applicant (holder)** will be responsible for the remuneration of the ECO and any other expenses encountered in the process of environmental monitoring of the construction.

It will be the Municipal EO/ appointed ECO's responsibility to ensure that the mitigation / rehabilitation measures and recommendations referred to in the EA (once issued) and EMPr are implemented and complied with by the holder.

The Municipal EO / appointed ECO must oversee **maintenance activities** in accordance with the adopted MMP.

Where applicable, the **applicant (holder)** will be responsible for the remuneration of the ECO and any other expenses encountered in the process of environmental monitoring of the construction.

3.1.1 SELECTION OF THE ECO / EO

The appointed ECO/EO must be able to demonstrate that (s)he is of sufficient competency to undertake the required task. This includes:

- Previous experience of environmental control of similar sites.
- Working experience with contractors.
- Knowledge of the particular project and expected areas of concern.

3.1.2 ROLES AND RESPONSIBILITIES OF THE ECO/EO

The ECO/EO will undertake the following tasks:

- Ensure **compliance** with the EMPr/MMP at all times during the pre-construction and construction phase;
- Ensure **compliance** with relevant management conditions of the EA and adoption of MMP (once issued) during the pre-construction and construction phase;
- To work in close co-operation with the engineer, contractor(s) and Municipality (holder);
- Meet with the contractors to set out the environmental parameters within which they must work (pre-construction and construction phase);
- Provide an **Environmental Induction (Environmental Education)** with **all** contractors prior to the commencement of any work (pre-construction phase (prior to commencement of activities));

- Indicate where **all no-go areas** are to be demarcated and to ensure adherence to these delimitations at the induction session **BEFORE** any construction or site clearance commences on-site (pre-construction phase);
- Indicate where **plant rescue** may be necessary, and what species should be rescued on this site (pre-construction phase);
- Indicate where **erosion protection and siltation prevention measures** are required or need to be supplemented and to ensure correct implementation;
- Advice on **rehabilitation/landscaping measures** to be implemented;
- Check up on general environmentally friendly construction practices (e.g. no littering, safe and secure environment, contamination risks, etc.);
- Ensure that the correct earthworks practices are adhered to; e.g. **no** encroachment into the surrounding vegetation, separation of topsoil and subsoil, correct stockpiling and stripping of topsoil);
- Provide a report back at site meetings (if necessary) (during the pre-construction and construction phase) to report on and assess the success of the environmental control and to determine any further environmental control measures which may be necessary;
- An **ECO/EO inspection every second week** to be undertaken by the ECO/EO **during construction near watercourses or open space areas.**
- It is recommended that the ECO/EO provides the contractor and client with feedback following the visit to provide mitigation measures for implementation. The contractor must then ensure that these measures are implemented as soon as possible;
- The ECO/EO has the discretion to undertake more frequent visits if he/she feels this is justified due to the actions of the contractors and to make ad hoc visits in order to ensure compliance;
- The ECO/EO is to keep a site diary; a photographic record of activities taking place on site as well as copies of all monthly reports submitted to the Department, a schedule of current site activities including the monitoring of such activities and complaints register of all public complaints and the remedies applied to such complaints;
- The **ECO/EO should conduct a monthly inspection** for the **first 2 months of the rehabilitation phase** to ensure all sites are suitably rehabilitated and secure.
- **Monitoring report** to be submitted to DEADP and the Municipality monthly for the duration of the construction phase for all watercourse crossings and open space areas outside the urban areas.
- Upon completion the construction phase, **a final monitoring report** must be submitted by the ECO **to sign-off compliance with environmental requirements of the EA** and to enable the structures to fall into their maintenance phase in accordance with the MMP. The report must be submitted to DEADP and the local authority.
- **During maintenance phase** – Form A to be submitted to DEADP for approval prior to commencement of any maintenance works in or near watercourses and Form B upon completion of the maintenance. **This is required for each and every maintenance event.**
- **Any issues noted on site(s) must be immediately reported to the contractor and resolved;**
- It must be noted that the **ECO/EO HAS THE AUTHORITY TO SUSPEND WORK ON SITE FOR ANY ACTION BEING UNDERTAKEN THAT DOES NOT COMPLY WITH THE ENVIRONMENTAL REQUIREMENTS OF THE SITE.** Such a stop order has immediate effect and will be communicated through the resident engineer to the contractor responsible.

4 MANAGEMENT OUTCOMES AND OBJECTIVES FROM THE ASSESSMENT

The following has been identified in the assessment:

Environmental Aspect	Identified Impact	Impact Management Actions	Outcome (Post-Mitigation)
Aquatic Environment (Wetlands & Watercourses)	Disturbance of wetlands, sedimentation, and potential pollution during construction	Implement EMPr/MMP - Limit work to demarcated areas and existing servitudes - Install erosion and sediment control measures - No stockpiling within watercourses - Implement stormwater management - Use trenchless methods where feasible - Minimise footprint in sensitive areas - Rehabilitate banks to pre-construction condition	Temporary disturbance contained and rehabilitated; improved long-term water quality due to elimination of sewage leaks Riparian areas restored; no long-term degradation of riverbanks
Water Quality	Risk of contamination from construction activities (fuels, cement, waste)	- Proper storage of hazardous substances - Spill kits available on-site - Immediate clean-up of spills - Prohibit washing of equipment in watercourses	No significant deterioration in water quality; overall improvement in water quality due to upgraded sewer system
Terrestrial Biodiversity	Vegetation clearing and habitat disturbance	- Restrict clearing to development footprint- Avoid unnecessary disturbance - Rehabilitate disturbed areas with indigenous vegetation - Implement alien invasive plant control	Minimal habitat loss; disturbed areas successfully rehabilitated with indigenous vegetation
Soils & Erosion	Soil erosion and sedimentation during excavation and trenching	- Implement erosion control measures (e.g., silt fences, sandbags)- Stabilise exposed soils promptly- Backfill and compact trenches immediately after installation	Erosion risks minimised and controlled; no long-term soil degradation
Waste Management	Generation of construction waste and potential illegal dumping	-removal of illegally dumped waste, rubble and litter - Provide waste collection facilities- Dispose of waste at licensed facilities - No on-site burning or burying of waste	Site remains clean; no pollution from waste; compliance with waste legislation
Nuisance impacts Noise, visual, dust, disturbance to the community	Dust generation during construction Noise from construction equipment and activities Temporary disturbance to local community during construction	- Wetting of exposed surfaces and haul roads - Restrict working hours to daytime - Maintain equipment in good condition - Notify nearby residents where necessary - Maintain access to properties - Communicate construction schedules - Implement health and safety measures	Dust suppressed to acceptable levels; no significant nuisance to surrounding areas Temporary and localised noise impacts with no long-term effects Short-term inconvenience offset by long-term benefits (improved sanitation, public health, and service delivery)

5 SPECIFICALLY REQUIRED ENVIRONMENTAL MANAGEMENT PRACTICES

5.1 PRE-CONSTRUCTION PHASE

5.1.1 ENVIRONMENTAL INDUCTION (EDUCATION)

All construction staff must be briefed by the ECO/EO (for the implementation of the EMPr or MMP, as the case may be) in an environmental education programme regarding the environmental status and requirements of the site, prior to any activities commencing on site.

This will include providing general guidelines for minimizing environmental damage during construction, as well as education with regards to basic environmental ethics, such as prevention of littering, the lighting of fires, etc.

Records of environmental training (attendance register and training content) must be kept. Please refer to Annexure D of this EMPr.

5.1.2 METHOD STATEMENTS

The Engineer's method statement attached to Annexure I must be implemented.

The ECO may request additional method statement setting out the following:

- Location of the construction site camp and site/area
- Access to the sites
- Demarcation of the working areas
- Temporary stormwater / erosion and sedimentation control
- Protection of natural features

- Cement and concrete batching
- Reshaping and rehabilitation
- As recommended by the specialist, Upstream Consulting: A construction method statement must be compiled and available on site. It must consider the construction footprint and include methods to avoid unnecessary disturbance and prevent material being washed into any of the freshwater ecosystems.

Where it was requested, the EO/ECO is to approve the method statement(s) **before** the works may commence. A pro-forma method statement showing what is required is attached in Annexure E.

5.1.3 SITE AGENT

The contractor must appoint a responsible agent to ensure that they comply with this EMPr/MMP and any conditions of approvals.

This party is to report directly to the EO/ECO, engineer and contractor on matters concerning the environment, will need to attend the environmental induction and be briefed on the requirements by the EO/ECO. It is recommended that communication regarding queries, concerns and updates is done through phone calls, electronic photos, emails and reports.

5.1.4 LOCAL LABOUR

It is strongly recommended that local labour is used for the construction phase of this project. "Local" implies persons from the Plettenberg Bay area.

5.1.5 ABLUTION FACILITIES

The contractor must provide chemical ablution facilities for all construction personnel working on-site **to be provided before work commences**.

One (1) facility for every 15 persons on site is required. Toilets must be of a neat construction and must be provided with doors and locks and must be secured to prevent them from blowing over. Sanitation provision and servicing shall be to the satisfaction of the environmental control officer.

Should the contractor propose linkage to the existing municipal sewage system, their method statement must include measures to ensure that the system is maintained.

The contractor must ensure that the toilet(s) are emptied regularly and also before weekends and public holiday periods.

Failure to use the chemical toilet provided and making use of the vegetation either on or offsite will result in maximum penalty fine being awarded in addition to requiring the contractor to clean up.

5.1.6 VEGETATION CLEARANCE, PLANT RESCUE PROGRAMME AND TOPSOIL RECOVERY

Removal of vegetation must be **phased and only undertaken in the phase in progress**. Do not allow any disturbance to the adjoining natural vegetation cover or soils.

Working areas, where clearing is to occur, are defined as the pipeline network with 6m construction working area, expansion area of PS1 and riverbank stabilisation (at PS1) and narrow working area around the footprint. PS3 upgrade is to remain within the existing fenced yard. As recommended by the botanical specialist, work in proximity to the natural forest areas, should a larger working area be required than the

existing transformed servitude area, additional clearing to be done closer to the urban area and **not** extend into the forest down slope.

As the proposal is located within existing transformed areas it is not anticipated that any plant rescue will be required. However, the contractor and appointed ECO/EO must walk through the immediate working area to identify any plants that can be rescued prior to commencement.

Rescued plants can be directly transplanted into undisturbed areas beyond the working zone. A full record of plant rescue needs to be kept in the environmental file on site.

For successful transplant a sod including the desired plant with its roots intact should be removed and replanted. Plants that are to be kept within the temporary nursery should be planted into black plastic bags and watered (as required).

Although none were identified by the specialist, in the event that any **endangered species or protected tree species** listed in Schedule 3 and 4, in terms of the Western Cape Nature Conservation Laws Amendment Act, 2000 (Act No. 3 of 2000) and National Forest Act (NFA), be discovered during vegetation clearance, may **not** be removed without the relevant **permit and license**. Please see Annexure G for this list of species as adapted from these Acts.

The removal, damage or disturbance of flora and fauna **outside** of the immediate working areas are not permitted.

Topsoil, if still present on site, is to be stockpiled in a level area away from the watercourse and must be protected to prevent wash away. This topsoil is to be used in the rehabilitation phase.

Where there is no remaining topsoil, the municipality is to advise if they have topsoil at an alternative stockpile site for use in rehabilitation, or alternatively topsoil must be purchased for use in rehabilitation.

Any *in situ* topsoil which remains on site will contain seeds that naturally occur in the area (including alien seeds which will need later removal and control).

It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. Any use of herbicides in removing alien plant species is required to be investigated by the ECO/EO before use (Upstream Consulting).

Pre-construction phase of section where work will be undertaken (upgrade and future maintenance)	
Activity, size and scale	Clearance of vegetation and topsoil recovery within the working areas
Mitigation measures to implemented and timeframe for implementation	- Plant rescue to be implemented prior to commencement (where required) - Vegetation clearing to remain within the allowable working areas, area outside of the working areas will be regarded as 'no-go' areas. Additional clearing to be closer to the urban area. - Topsoil rescue to be implemented where possible Above to be implemented during the pre-construction phase.
Method and frequency of Monitoring Implementation	- Working areas to be walked through and plant- and topsoil rescue to be done in conjunction with the ECO/EO. - Once off inspection prior to commencement of the working section.
Responsible persons	- Contractor - ECO/EO
Compliance monitoring	Include in monitoring report or update

5.1.7 PROTECTION OF FAUNA (ANIMALS)

Disturbance to fauna within the construction area is to be avoided and where a conflict arises the ECO should be asked for assistance (e.g. snakes found in trenches etc.). Any fauna encountered must be carefully captured and relocated to suitable adjacent habitat by or under the direction of the ECO.

The contractor(s) shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction area (disturbance footprint/working zone) as a result of their activities. Clearing of natural vegetation shall be kept to a minimum (restricted to the disturbance areas). The removal, damage and disturbance of natural vegetation without the written approval of the ECO are prohibited.

The contractor(s) shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place.

5.2 CONSTRUCTION PHASE

5.2.1 ACCESS TO THE SITES

Access to the working areas to remain from existing roads, streets or servitude areas. No roads may be widened, and no additional access tracks/haul roads may be created except if approved by the ECO/EO prior to creation.

Access to the area is to be monitored during construction. Constant regard must, therefore, be taken to safety, especially as it is a densely populated urban area.

Any damage to the access road(s) caused by the contractor will need to be repaired at their cost.

During the construction phase, it is essential that traffic flow is correctly managed as the street provides access to various properties in the area.

5.2.2 DEMARCATION OF THE NO-GO AREAS

Work needs to remain within the above specified working areas – pipelines will have allowable 6m working area, extension of PS1 & PS3 – work within the new and existing yard and riverbank stabilisation will have a narrow working area. Areas outside of the specified will be regarded as no go areas. Deviation must be approved by the ECO/EO first.

Adequate signage must be erected for the public.

All people working on site must be made aware of the boundaries in which work is to be done.

The following applies:

- All construction/installation activities must be restricted to the approved plan and must remain within the demarcated areas;
- No encroachment or activities may take place outside of the working areas, if not approved by the ECO/EO;
- No-go areas will be required to be demarcated by the contractor to ensure that they are visible at all times, to all personnel;
- The selection of no-go demarcation materials must take the site location into account and the risk of theft of such material must be taken into account in the choice or selection of the no-go demarcation methods selected.

Access into No-Go areas by machinery is strictly forbidden as this will result in a greater area of disturbance than approved. A spot fine will be imposed against the contractor in the event of contravention of the no-go policy up to a maximum of R10 000 per incident and may result in the project being stopped and UNLAWFUL NEMA actions or penalties being incurred.

Construction phase of section where work will be undertaken (upgrade and future maintenance)	
Activity, size and scale	Demarcation of the working areas during construction and any future maintenance
Mitigation measures to implemented and timeframe for implementation	Working areas to be demarcated and no disturbance allowed into sensitive areas (forest and aquatic) where no work is required. To be implemented during construction and future maintenance phase of the specific working area
Method and frequency of Monitoring Implementation	During these periods: - Contractor to implement, maintain and monitor - ECO/EO to monitor
Responsible persons	- Contractor - ECO/EO
Compliance monitoring	Non-compliance to be reported and rectified by the contractor

5.2.3 CONTRACTOR'S SITE CAMP

- Due to the restricted space, excessive dumping and threat of theft of materials no camp site is anticipated to be used for these small repairs. Materials brought to site as needed to avoid the risk of theft.
- Ablution facilities (chemical toilets) are to be provided and maintained at each active working site for use of the staff at a ratio of one (1) toilet to every 15 workers.
- Site generated litter to be kept in the site bakkie.
- No open fires are to be permitted.
- If a site camp is to be established, the area is to be approved by the ECO/EO and rehabilitated following use.

5.2.4 WASTE MANAGEMENT

Historically dumped material (building rubble / litter etc.) within the working area must be removed from the site before construction / installation commences and the end location of the material removed needs to be confirmed as a lawful waste site.

Site generated litter to be kept in the site bakkie. The contractor(s) must ensure that all site personnel are instructed in the proper disposal of all waste.

The contractor will need to ensure that no illegal dumping takes place while the site is under his control.

Any hazardous waste discovered on site must be disposed of at an approved hazardous landfill site.

5.2.5 CONCRETE AND CEMENT WORKS

- Mixing areas must be defined on-site and **clearly** demarcated.

- Cement powder has a high alkalinity pH rating, which can contaminate and affect both soil and water pH dramatically. A shift in pH can have serious consequences on the functioning of the soil, water organisms and plants.
- All concrete must be mixed on trays / on thick plastic and not on the soil. No concrete and cement mixing is allowed in areas outside of the proposed hardened surfaces.
- **Bunding** through the use of sandbag walls around any mixing areas is recommended.
- When using Readymix concrete, care must be taken to prevent spills from the trucks while offloading.
- **Cement contaminated water may not leave the disturbance areas and enter any natural areas.**
- The contractors and sub-contractors need to ensure that the used cement bags do not create a litter problem.
- Where cement is placed directly on the ground, the contaminated soil must be removed and disposed of appropriately.
- Excess or spilt concrete should be disposed of at a suitable registered landfill site.
- No water for the mixing of cement may be sourced from any watercourses.
- **No** construction equipment may be cleaned near a water body (in a designated cleaning area that is well bunded only).
- **No mixing to be done in environmentally sensitive areas or areas where there is a high risk of cement contaminated water entering the ecosystem (including groundwater).**

Construction phase of section where work will be undertaken (upgrade and future maintenance)	
Activity, size and scale	Cement and concrete work during construction and any future maintenance
Mitigation measures to implemented and timeframe for implementation	Cement and concrete works to comply with above mitigation measures
Method and frequency of Monitoring Implementation	During these periods: - Contractor to implement, and monitor - ECO/EO to monitor
Responsible persons	- Contractor - ECO/EO
Compliance monitoring	Non-compliance to be reported and rectified by the contractor Monitoring to be undertaken by contractor and ECO/EO

5.2.6 SEDIMENTATION, SOIL EROSION AND STORMWATER MANAGEMENT

As recommended by the specialist, Upstream Consulting:

The transformation of sections of line from a natural to disturbed by earthworks has several impacts of sedimentation and erosion and the following mitigation measures need to be implemented to mitigate for these impacts:

Recommendation by specialist	To implement during construction / maintenance or notes
Stabilise any erosion features and do not concentrate flows into any freshwater ecosystems.	To be implemented and maintained by contractor and Municipality Temporary measures such as sandbags, silt fencing, erosion sausages etc. to be implemented where indicated by the ECO/EO
Prevent erosion any crossings and design upgraded structures accordingly	Engineer to ensure
Do not encroach into freshwater aquatic habitat with excavations or drains where possible outside of the delineated construction footprints.	Work to remain within delineated working areas and no encroachment into no go areas
Sedimentation must be minimised with appropriate measures. Any construction causing bare slopes and surfaces to be exposed to the elements must include measures to protect	ECO/EO to advise where necessary and contractor/Municipality as the case may be to implement and maintain as necessary

against erosion using covers, silt fences, sandbags, earthen berms etc.	
All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable.	Sites to be approved by ECO/EO
Construction must have contingency plans for high rainfall events during construction. Even in the operational phase, measures to contain impacts caused during high rainfall events must be planned for and available for use.	Contractor and Municipality to implement

5.2.7 WATER POLLUTION MANAGEMENT

As recommended by the specialist, Upstream Consulting:

The impacts of the development on water quality are often beyond the physical extent of the site. Below is a list of mitigation measures that can be implemented to mitigation the impacts of water pollution:

Recommendation by specialist	To implement during construction / maintenance or notes
Ensure that measures are in place to prevent and minimize any discharge of raw sewage from entering the surrounding environment.	- Implement measures such as the use of sandbags to prevent sewage entering surrounding environment, construct a secondary containment pond if necessary to hold sewage in the case of an overflow preventing it from entering the surrounding environment. Adequate clean up to be implemented. - Regular maintenance to be implemented to prevent blockages, leaks and overflows during the maintenance phase. - Spill kits and containment equipment shall be available on-site at all times. - Rehabilitation measures (soil remediation, re-vegetation) shall be implemented immediately following any contamination event. - Excavators and all other machinery and vehicles must be checked for oil and fuel leaks daily. No machinery or vehicles with leaks are permitted to work in the watercourse;
Develop a stormwater management mitigation in the EMP with measures to prevent any contaminated or 'dirty' water from entering watercourses.	- Implement sandbags, silt traps, silt fences etc where necessary. - Construction activities shall be scheduled to avoid peak rainfall periods where feasible. - Stormwater from 'clean' areas to be diverted away from construction zones. - Exposed soils to be stabilised through rehabilitation – topsoil replacement and vegetation cover to geotextiles to minimise erosion
The Department of Water Affairs regional office should be notified, as soon as possible, of any significant chemical spill or leakage to the environment where there is the potential to contaminate surface water or groundwater.	Notification to be done by the contractor to the ECO/EO that must action immediately
Develop and implement emergency response plans to address accidental discharges or treatment failures. This includes having backup systems in place and protocols for immediate action to contain and mitigate any potential impacts on the freshwater ecosystems.	Municipal to have a response plan in place such as provisioning of back-up power supplies, provide redundant treatment capacity, provide spill containment equipment etc.

5.2.8 MITIGATION OF HYDROLOGICAL CHANGES

Changes to the hydrological regime of freshwater systems can have significant impacts, the following mitigation measures are to be implemented as recommended by the aquatic specialist, Upstream Consulting:

Recommendation by specialist	To implement during construction / maintenance or notes
Soft infrastructure must be considered where practical. For example, permeable surfaces can be done via permeable concrete block pavers (such as Amorflex), brick pavers, stone chip, and gravel and may contribute to slowing surface flows (especially if maintained).	- Engineer, contractor and Municipality to consider
The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the construction footprint where possible.	- Engineer, contractor and Municipality to implement

Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil. Contingency plans must be in place for high rainfall events which may occur during construction.	- Engineer, contractor and Municipality to implement and have in place - Construction activities associated with work close or within a watercourse to coincide with low rainfall probability to avoid erosion events
The project will need to comply with all regulations of the National Water Act (Act 36 of 1998), including the protection of downstream users, and minimise any potential ecological impacts upon water resources.	- Engineer, contractor and Municipality to implement

5.2.9 MITIGATION OF AQUATIC HABITAT DISTURBANCE

As recommended by the specialist, Upstream Consulting:

The transformation of much of the landscape to urban land use has increased the value of the wetlands a refugia for species. This mitigation measures will ensure those important ecosystem services are protected:

Recommendation by specialist	To implement during construction / maintenance or notes
A construction method statement must be compiled and available on site. It must consider the construction footprint and include methods to avoid unnecessary disturbance and prevent material being washed into any of the freshwater ecosystems.	- ECO/EO to request method statement
The edges of the construction footprint relative to the aquatic habitat must be clearly staked out and demarcated prior to construction commencing.	- As indicated under section 5.2.2
Removal of vegetation must be phased and only for the continuation of project phases. Do not allow any disturbance to the adjoining natural vegetation cover or soils.	- As indicated in section 5.1.6
Access to and from the development area should be either via existing roads or within the construction servitude. Any contractor found working within No-Go areas must be fined as per fining schedule/system setup for the project.	- As indicated within this report
Following construction, it is important to stabilise any steep, bare areas via geotextiles and/or revegetation.	- Refer to rehabilitation section
It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use.	- See alien control section
Where required and vegetation has been cleared, it is recommended that cover components be reinstated appropriately. Only indigenous species are to be considered.	- Refer to rehabilitation section
An ECO must be appointed to oversee and conduct monitoring activities requiring specialist input or analysis. Refer to Draft Monitoring Plan in Appendix 3.	- Monitoring plan attached as Section 15 of this report.

6 SITE CLOSURE AND REHABILITATION PHASE

Once construction and maintenance within a specific section has been completed, the following are to be implemented (where applicable/relevant):

- All construction materials to be removed from the site
- Rehabilitation of the working areas to include replacement of reshaping, replacement of topsoil, planting of indigenous vegetation / grasses, implement sand bags, erosion sausages, geotextiles etc as indicated by ECO/EO
- Riverbank stabilisation: reshaped to suit the surrounding landscape behind the gabion baskets and stormwater infrastructure, and this must be stabilised using appropriate methods, including the planting of indigenous grasses and any other methods deemed necessary by the engineer and ECO to reinstate the site.

The ECO is to advise on the rehabilitation measure that should be implemented as it will be case specific. If applicable, any silt traps need to be cleared on a regular basis to ensure that silt traps remain effective.

Rehabilitation of construction or specific maintenance activities	
Activity, size and scale	Rehabilitation of disturbed areas following construction or maintenance
Mitigation measures to be implemented and timeframe for implementation	Case specific measures as advised by ECO/EO to be implemented following construction or maintenance To be implemented immediately
Method and frequency of Monitoring Implementation	During these periods: - Contractor to implement, and monitor - ECO/EO to monitor
Responsible persons	- Contractor - ECO/EO
Compliance monitoring	ECO/EO to monitor rehabilitation Once satisfied, final compliance report to be submitted

7 MAINTENANCE MANAGEMENT ACTIVITIES

Regular maintenance of the sewer network and all associated infrastructure must be undertaken to ensure failures.

Riverbank stabilisation – gabions and reno-mattress must be regularly inspected for subsidence, collapse or vandalism and immediate repairs and compaction is essential to prevent failure of the structure.

All above pre-construction, construction and rehabilitation phase measures must be implemented where there is maintenance works to be undertaken. This includes monitoring by the Municipal ECO or appointed ECO to ensure that mitigation measures are implemented, and no environmental damage is caused by the required maintenance.

If new infrastructure or disturbance of new areas outside of the existing servitude / yard / stabilisation areas, the ECO must be consulted to advise on NEMA applicability.

Alien invasive vegetation removal must form part of the routine maintenance of the sewage network and associated infrastructure and must continue to prevent invasion of exotic and alien invasive vegetation within disturbed areas. No plant material may be burned or buried on site.

8 MONITORING REQUIREMENTS AND REPORTS

- An **induction** meeting with the ECO/EO and all contractor(s) to ensure that they are aware of the requirements of this EMPr/MMP and the EA and adoption of MMP before the commencement any activities. Induction registers to be kept for all contractors on site.
- The ECO/EO must inspect work areas prior to commencement and that all pre-construction measures are implemented.
- Site inspection during construction and future maintenance phase (when maintenance work is being done):
 - An **ECO/EO inspection every second week** to be undertaken by the ECO/EO **during construction near watercourses or open space areas.**

- It is recommended that the ECO/EO provides the contractor and client with feedback following the visit to provide mitigation measures for implementation. The contractor must then ensure that these measures are implemented as soon as possible;
 - The ECO/EO has the discretion to undertake more frequent visits if he/she feels this is justified due to the actions of the contractors and to make ad hoc visits in order to ensure compliance;
 - The ECO/EO is to keep a site diary; a photographic record of activities taking place on site as well as copies of all monthly reports submitted to the Department, a schedule of current site activities including the monitoring of such activities and complaints register of all public complaints and the remedies applied to such complaints;
 - The **ECO/EO should conduct a monthly inspection** for the **first 2 months of the rehabilitation phase** to ensure all sites are suitably rehabilitated and secure.
 - **Monitoring report** to be submitted to DEADP and the Municipality monthly for the duration of the construction phase for all watercourse crossings and open space areas outside the urban areas.
 - Upon completion the construction phase, **a final monitoring report** must be submitted by the ECO **to sign-off compliance with environmental requirements of the EA** and to enable the structures to fall into their maintenance phase in accordance with the MMP. The report must be submitted to DEADP and the local authority.
- **During maintenance phase** – Form A to be submitted to DEADP for approval prior to commencement of any maintenance works in or near watercourses and Form B upon completion of the maintenance. **This is required for each and every maintenance event.**

9 AUDITING REQUIREMENTS

- An independent EAP must be appointed to conduct an audit of the EA implementation on completion of the construction phase (non-operational component) - submitted to the CA within three (3) months of completion of the construction phase.
- The audit is to report on the success of the implementation of the EA and the EMPr and to officially hand the sites over to their Maintenance phase in accordance with the MMP – as adopted.
- Auditing requirements are to cover ONLY the construction and rehabilitation phase and do not extend to the operational / maintenance phase – during the maintenance phase use of Forms A and B (see Annexure 14) and compliance with the MMP only is required.
- The audit report must comply with Appendix 7 of the EIA regulations and this includes the Audit being made available to all Registered I&AP's on submission to DEADP.

10 ADDITIONAL LEGISLATIVE REQUIREMENTS

10.1 NOISE

The contractor must comply with the regulations pertaining to noise. SANS 10400 is applicable.

10.2 SOLID WASTE

National Environmental Management: Waste Amendment Act 2014 (Act 26 of 2014) consists of the regulations regarding waste management. The landowner must adhere to the regulations regarding solid waste management under this act.

10.3 PENALTIES FOR NON-COMPLIANCE

Penalties in terms of Chapter 9 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, are applicable for any action, which leads to damage to the natural environment.

In addition to the penalties in terms of the Act (NEMA), spot fines up to a maximum value of R10 000 per offence can be instituted at the discretion of the ECO for any breach or non-compliance in terms of the EMPr and EA (FINES ISSUED WILL INCREASE EXPONENTIALLY FOR REPEAT OFFENCES).

In the event of damage being caused, the contractor will be responsible for the cost of cleanup, repair or rehabilitation as necessary, as well as being liable for the fine.

11 CONCLUSION

This Environmental Management Programme (EMPr) and Maintenance Management Plan (MMP) for the upgrade of the sewer network, associated infrastructure and riverbank stabilisation.

The structures authorised in terms of NEMA need to comply with the EMPr and auditing requirements, while the remaining sites need to comply with the MMP as adopted by the CA.

It is recommended that the MMP remains in effect for 5 years and is renewed thereafter every 5 years.

The assumption is made that the works will be able to continue immediately on approval and that the flood relief funding will have been extended accordingly. Any delay in the funding

availability will require an extension of time equivalent to the delay caused as a result of such funding delays and this MMP will remain in effect until the project can be successfully concluded

This EMPr is binding on all contractors on site and constitutes Best Practice for construction activities.

This EMPr may be updated with specific conditions required by the Environmental Authorisation, once issued.

12 DEFINITIONS

“Activity” means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the Act as a listed activity or specified activity. Activity in this document refers to the activities as listed in Listing Notice 1, 2 and 3 of the Environmental Impact Assessment Regulations, 2014 (as amended).

“Bush Encroachment” means stands of plants of the kinds specified in column 1 of Table 4 of the Conservation of Agricultural Resources Act (Act No. 43 of 1983) where individual plants are closer to each other than three times the mean crown diameter.

“Diverting” as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, cause the instream flow of water to be rerouted temporarily or permanently.

“Ecological Infrastructure” refers to naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction.

“Estuary” has the meaning assigned to it in the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)

“Flood event” is the event where land is inundated by the overflowing of water from a river channel and where this event causes significant damage to infrastructure or results in watercourse erosion and/or sediment deposition.

NOTE that flooding can be a natural phenomenon in many river or wetland systems which, due to encroachment and human modification of the form and function of the affected system, may have evolved into a potential hazard to life or property.

“Flow-altering” as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, alter the instream flow route, speed or quantity of water temporarily or permanently.

“General Authorisation” in this document refers to the General Authorisation in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) or Section 21(i) (GN. 509 of 26 August 2016).

“Impeding” as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, hinder or obstruct the instream flow of water temporarily or permanently, but excludes the damming of flow so as to cause storage of water.

“Indigenous vegetation” refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

“Maintenance” means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

“Maintenance Management Plan” means a management plan for maintenance purposes defined or adopted by the competent authority.

“River Management Plans” as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), any river management plan developed for the purposes of river or storm water management in any municipal/metropolitan area or described river section, river reach, entire river or sub quaternary catchment that considers the river in a catchment context.

“River reach”, a length of river characterised by a particular channel pattern and channel morphology, resulting from a uniform set of local constraints on channel form. A river reach is typically hundreds of meters in length.

“Stretch” a section of watercourse, delineated between two or more mapped coordinates, within which proposed maintenance activities are to take place as guided by a MMP.

“Thalweg” refers to the line of lowest elevation within a valley or watercourse.

“Watercourse” means:

- (a) a river or spring;
- (b) a natural channel in which water flows regularly or intermittently;
- (c) a wetland, lake or dam into which, or from which, water flows; and

any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and

a reference to a watercourse includes, where relevant, its bed and banks.

“Wetland” means, land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

13 ACRONYMS

CBA	Critical Biodiversity Area
DEA&DP	Department of Environmental Affairs & Development Planning
DWS	Department of Water & Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
GA	General Authorisation, in terms of the National Water Act, 1998 (Act No. 36 of 1998)
GN	Government Notice
IB	Irrigation Board
MEC	Member of Executive Council
MMP	Maintenance Management Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
SANParks	South African National Parks Authority
WUA	Water Users Association
WULA	Water Use Licence Application

14 MAINTENANCE PHASE FORM A AND B

REPORTING FOR INTENT TO UNDERTAKE MAINTENANCE ACTIVITIES – FORM A				
Section A: Landowner Details				
Name	Surname	Farm No.	Erf No.	Today's Date
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	Activity Type:	Reference code (make reference to MMP)	Footprint area (m ²)	Volume of material (m ³)
Equipment to be used:	Description of method for planned activity:			Date when work will commence:
Date of last flood event for site:	Note any further damage and comments regarding the state of the site			
Section C: Photographs of activity location before maintenance				
Before A Coordinates: S E				
Before B Coordinates: S E Date of photos taken:				

REPORTING FOR COMPLETION OF MAINTENANCE ACTIVITIES – FORM B				
Section A: Landowner Details				
Name	Surname	Farm No.	Erf No.	Today's Date
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	Activity Type:	Reference code (make reference to MMP)	Footprint area (m ²)	Volume of material (m ³)
Equipment that was used:	Description of method for completed activity and if commence date changed			Date activity completed
Date of last flood event for site:	Note any challenges or difficulties experienced in following the MMP method statement			
Section C: Photographs of activity location after maintenance				
After A Coordinates: S E				
After B Coordinates: S E Date of photos taken:				

15 DRAFT MONITORING PLAN

- **RESPONSIBLE PERSON**

- **Appointment:**

A SACNASP-registered scientist must be appointed to oversee and conduct monitoring activities requiring specialist input or analysis.

- **Monitoring Schedule:**

- **Before Construction:** Conduct baseline monitoring.
- **During Construction:** Perform monitoring monthly.
- **Post-Construction:** Conduct monitoring annually, or as recommended by the scientist after the first operational phase monitoring report.

- **Duties:**

- Conduct site inspections, collect water quality samples, and perform fixed-point photography.
- Analyse the results and compile a brief report detailing compliance levels and recommendations.
- Submit the report to the relevant authorities.

- **MONITORING POINTS**

- **Identification and Marking:**

Establish permanent and clearly mark (or GPS point) three monitoring points:

1. Upstream: To provide background conditions unaffected by the development.
2. At the mine: To assess direct impacts of runoff.
3. Downstream: To evaluate the cumulative effects of the development.

- **Documentation:**

Use fixed-point photography to create a visual record at each monitoring point, supporting observational notes.

- **MONITORING FREQUENCY**

- Baseline Data: Collect data before any commencement on site.
- During Construction: Conduct monitoring monthly.
- Operational Phase: Conduct monitoring annually, or as advised by the scientist following initial reporting.

- **VARIABLES TO MEASURE**

Water Quality

Test for parameters such as:

- ☐ Total Suspended Solids (mg/l)
- ☐ Nitrate Nitrogen (mg/l as N)
- ☐ Nitrite Nitrogen (mg/l as N)
- ☐ Ammonia Nitrogen (mg/l as N)
- ☐ Ortho Phosphate (mg/l as P)
- ☐ E. coli (count per 100 ml)
- ☐ Ammonium (mg/l as N)
- ☐ Total Kjeldahl Nitrogen (mg/l as N) – not that important
- ☐ Total Phosphate (mg/l as P)
- ☐ Total Residual Chlorine (µg/L) – not that important
- ☐ Free chlorine (mg/l) – not that important
- ☐ EC
- ☐ pH
- ☐ COD
- ☐ and any specific pollutants like hydrocarbons or heavy metals.

- Sample Collection: Use sterilized bottles for sample collection and ensure samples are analysed in an accredited laboratory.
- On-Site Testing: Utilize field kits for measuring pH, DO, and temperature.

Flow Patterns

Observations: Note whether water is present, its level, and its movement (e.g., standing, slow, fast flow).

Visual Observations: Regularly observing water levels and flow patterns at specific points along the watercourse can provide insights into any noticeable changes. You can use simple markers like stakes or painted rocks at key locations to track water levels over time.

Erosion and Sedimentation

- Visual Inspections: Check for signs of erosion, bank instability, and sediment accumulation.
 - Control Structures: Inspect sediment control measures and stormwater outlets for functionality.

Vegetation

- Invasive Species: Identify any alien invasive plants and document any encroachment into buffer zones.
- Habitat Condition: Record signs of vegetation degradation or habitat change.

- **REPORTING AND ADAPTIVE MANAGEMENT**

- **Record-Keeping:**

Maintain a detailed logbook (e.g., Excel spreadsheet) of all monitoring activities, including:

- Weather conditions
- Observations
- Collected data

Photographic Records: Take regular photographs from fixed points to observe any changes in flow characteristics, water clarity, and the presence of sediment.

- **Reporting Schedule:**

- During Construction: Submit quarterly reports.
- Post-Construction: Submit annual reports.

- **Report Content:**

- Analysis of trends of
- Photographs of
- Deviations from baseline conditions
- Recommendations for corrective actions

- **Non-Compliance Response:**

- Notify authorities immediately upon identifying non-compliance.
- Consult with the SACNASP scientist to determine corrective measures.
- Implement actions to rectify issues and achieve compliance within one week.

- • **ADAPTIVE MANAGEMENT**

- **Additional Measures:**

If necessary, and only after consultation with the scientist/ authorities, implement additional controls, such as:

- Installing sediment traps
- Adjusting stormwater management structures
- Reinforcing erosion control mechanisms

- **Plan Review:**

Reassess the effectiveness of monitoring and mitigation measures and update the plan as needed, in consultation with aquatic specialists.

- **Stakeholder Communication:**

Engage with relevant stakeholders and authorities if significant impacts occur and collaborate on solutions.