ENVIRONMENTAL MANAGEMENT & MAINTENANCE PROGRAMME

for

MOLEN CLOSE

RIVER REHABILITATION

on

Remainder of Farm 464, George

In terms of the

National Environmental Management Act (Act No. 107 of 1998, as amended) & 2014 Environmental Impact Regulations (as amended)

Prepared for Applicant: George Municipality

Date: 10 May 2023

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APPROVAL FOR RELEASE

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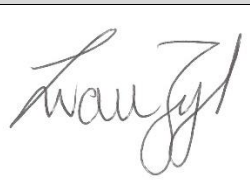
Ms Louise-Mari van Zyl	Ms	

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PURPOSE OF THIS REPORT:

Environmental Management & Maintenance Programme

APPLICANT:

George Municipality

CAPE EAPRAC REFERENCE NO:

GEO752/10

SUBMISSION DATE

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Submitted for:

Stakeholder Review & Comment

Report Issued by:

Cape Environmental Assessment Practitioners

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ORDER OF REPORT

Environmental Management & Maintenance Plan

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

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 EMMPr; including curriculum vitae.	Ms Louise-Mari van Zyl for Cape Environmental Assessment Practitioners. See Appendix 4.
A detailed description of the aspects of the activity that are covered by the EMMPr as identified by the project description.	Section 1
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 1
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 – Environmental Impacts & Mitigations Section 5 - Responsibilities Section 6 – Pre-Construction Design Section 7 – Construction Phase Section 8 – Operation Phase
A description and identification of impact management outcomes required for the aspects contemplated above.	Section 4
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 6 Section 7 Section 8
The method of monitoring the implementation of the impact management actions contemplated above.	Section 9 Section 11
The frequency of monitoring the implementation of the impact management actions contemplated above.	Section 9

Requirement	Description
An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 5
The time periods within which the impact management actions must be implemented.	Not Applicable
The mechanism for monitoring compliance with the impact management actions.	Section 9
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	Section 9
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 5 Section 6 Section 7 Section 8 Section 9
Any specific information that may be required by the competent authority.	Not Applicable.

ABBREVIATIONS AND ACRONYMS

BSP Biodiversity Sector Plan - to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity.

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 - areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan.

DFFE National Department of Forestry, Fisheries & the Environment – the national authority responsible for the sustainable environmental management and integrated planning.

DEA&DP Department of Environmental Affairs and Development Planning – the provincial authority for sustainable environmental management and integrated development planning. The competent authority is this case.

DWS Department of Water & Sanitation Affairs – National authority mandated to enforce the National Water Act (NWA).

EA Environmental Authorisation – Authorisation obtained on completion of an Environmental Impact Assessment in terms of the National Environmental Management Act (NEMA).

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 to observe and enforce the implementation of environmental policies and principles on a development site.

EIA Environmental Impact Assessment - a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

EMMPr Environmental Management Programme – an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented and that positive benefits of the projects are enhanced.

GIS Geographic Information System - system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.

GPS Global Positioning System - a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world.

NEMA National Environmental Management Act (Act 107 of 1998, as amended) – national legislation that provides principles for decision-making on matters that affect the environment.

NEM:BA National Environmental Management: Biodiversity Act (Act No.10 of 2004) – provides for the management and conservation of South African biodiversity within the framework of NEMA.

NFA National Forestry Act (Act No.84 of 1998) - provides for the protection of forests, as well as specific tree species within South Africa.

NSBA National Spatial Biodiversity Assessment – aims to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors.

NWA National Water Act (Act No.36 of 1998) - ensures that South Africa's water resources are protected, used and managed.

1. INTRODUCTION

Cape Environmental Assessment Practitioners (Cape EAPrac) was appointed by the Applicant, George Municipality to develop an Environmental Management & Maintenance Programme (EMMPr) which will be used to promote and ensure environmental monitoring and control during all relevant phases (pre-construction, construction, operational as well as maintenance) associated with the proposed activity. The proposed activity entails the rehabilitation of a portion of an existing riverbank of a perennial watercourse on Remainder of Farm 464, Rosemoor suburb, George (Figure 1) as emergency repairs. The area of main concern is located along erven 21150 & 21151 along Molen Close Street (Figure 2).

Figure 1: Location Plan

The specific section of the riverbank has eroded to the point where the closest house is at risk. The stabilisation and rehabilitation of this particular section of the river is a priority for the George Municipality. Future long-term rehabilitation of the remaining riverbank, up- and downstream of the emergency repair site, is excluded from this emergency action.

The critically eroded site is located within the designated urban edge of George along the Meul River on land owned by the Municipality which is zoned Open Space I. To stabilize the embankment, the preferred alternative is to place gabions inside the perennial watercourse, along erven 21150 & 21151.

The gabions will be positioned in a curving manner to preserve the flow's characteristics and to prevent further erosion up/downstream, or on the opposite side of the riverbank (Figure 3). During construction the stream will be partially diverted to facilitate installation of the gabion boxes.

An existing stormwater outlet is located on the perimeter of Erf 21150 which has exacerbated the bank erosion. During construction, stormwater outflow at this point, can temporarily be diverted by placing sandbags in the proposed area of construction (Figure 4). After construction, the streambed and embankments will be re-instated and rehabilitated in accordance with the requirements of the General Authorisation (GA).

Temporary construction vehicle access to the site will be via Grens Street, along the Eastern riverbank (between the erven and the river channel along the Open Space) to allow machinery that must be used to bring/install materials, to access the site. This temporary access must be rehabilitated post construction (Figure 2).

This activity requires an Environmental Authorisation in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) and General Authorisation (GA), before commencing, as well as for future maintenance and repairs of the structure.

This document provides part of a series of documents that was circulated for public and stakeholder input as part of the Basic Assessment process, before being provided to the provincial competent authority, the provincial Department of Environmental Affairs & Development Planning (DEA&DP) for decision making.

Environmental Authorization was issued on **April 26, 2023**, by the Department of Environmental Affairs & Development Planning (DEA&DP). The Department of Water & Sanitation issued the required **General Authorisation** on **19 October 2022**.

This EMMPr contains **management requirements** and **recommendations** made by *Cape EAPrac*, the appointed specialist as well as in terms of the regulations contained in the **National Environmental Management Act** (NEMA, Act 107 of 1998) and National Water Act (NWA, 1998) and environmental best practice principles.

This EMMPr is updated to include any conditions of the **Environmental Authorisation** (EA) as issued.

Figure 2: Erven 21150 & 21151 (red outlined properties) with the eroded portion of the riverbank immediately West.

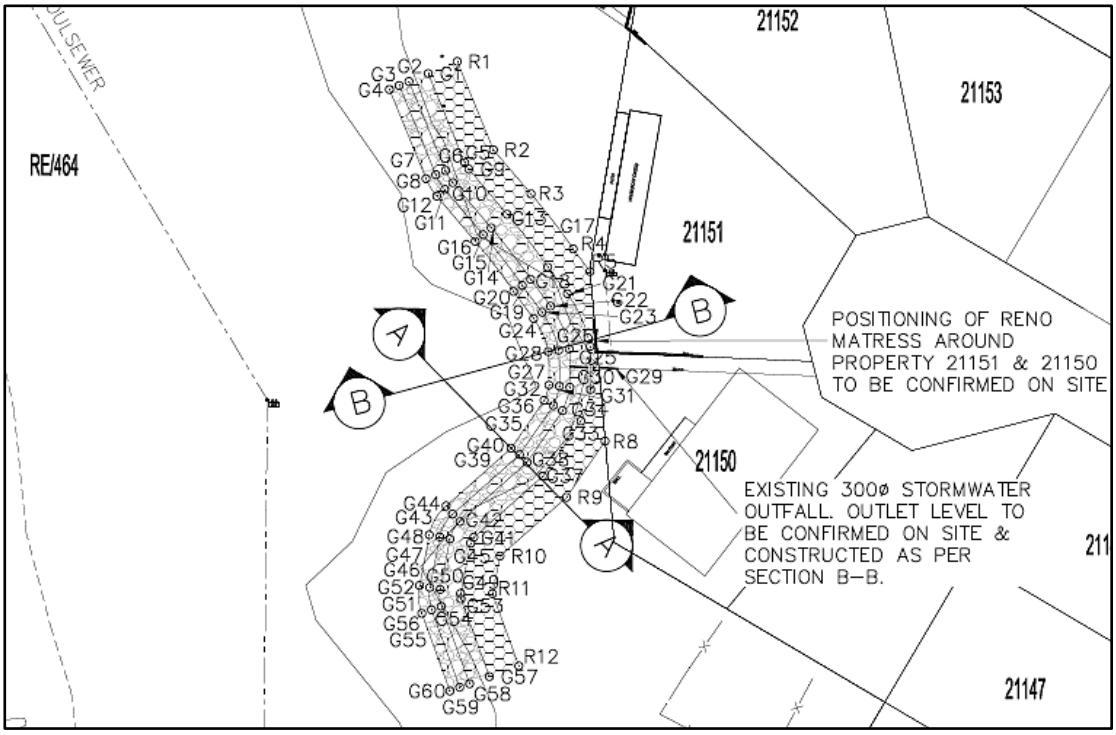

Figure 3: Position of gabions along Erf 21150 & Erf 21151.

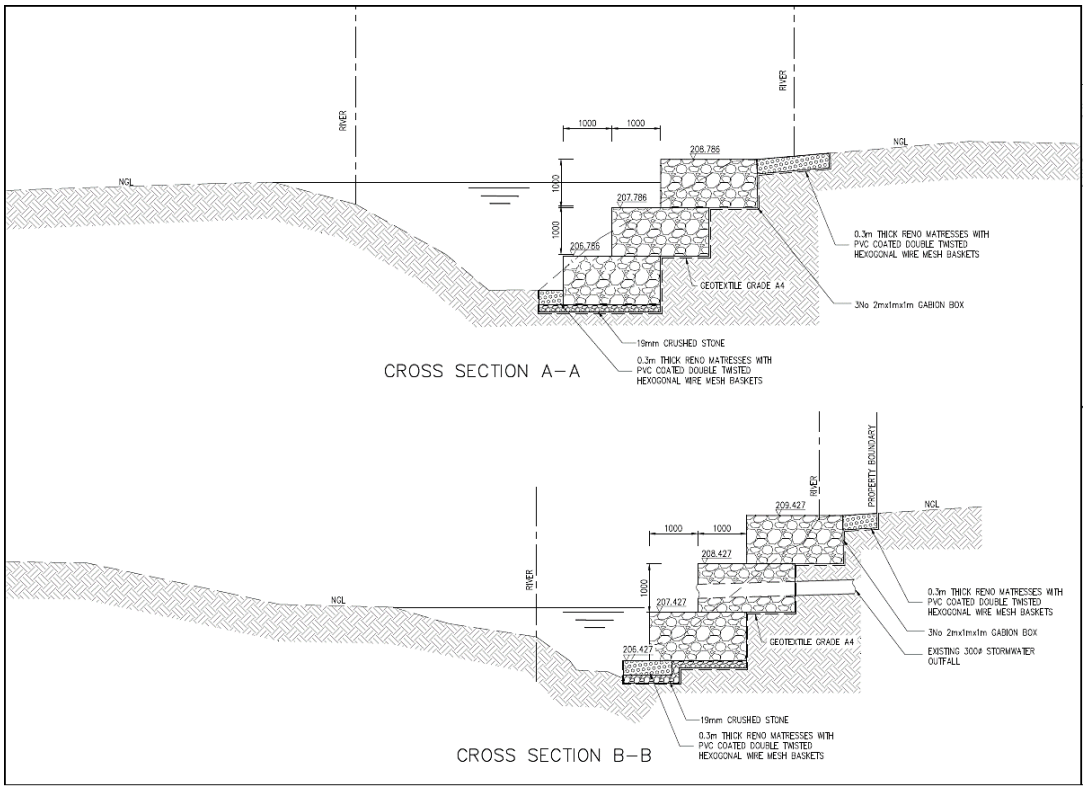

Figure 4: Generic Cross-Section for how gabions/reno mattrasses will be installed along the riverbank.

1.1 PURPOSE OF THE EMMPR

The purpose of this EMMPr is to ensure that the environmental impacts and management of the various phases, of the proposed activity, on the receiving environment are managed, mitigated and kept to a minimum (ie. the **outcome** of implementing the EMMPr). The EMMPr must provide easily understood and clearly defined **actions** that must be implemented during each phase of the proposed

activity. The EMMPr is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is binding on the Applicant (George Municipality), all contractors and sub-contractors to the site.

It must be included as part of any documents / agreements, as well as contractual documents between the Applicant and any contractors. Copies of this EMMPr must be kept on site and all **senior personnel** are expected to familiarise themselves with the content of this EMMPr.

Any changes or deviations to this EMMPr must be authorised by the competent authority in the event that any environmental outcomes are amended.

Condition 5 of the EA stipulates that any changes to, or deviations from the scope of the alternative described in section B of the EA 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 information in order to evaluate the significance and impacts of such changes or deviations, and it may be necessary for the Holder to apply for further authorisation in terms of the applicable legislation.

1.2 STATUS OF THE EMMPR

It is of utmost importance that this EMMPr be read in conjunction with any legally obtained authorisations such as an Environmental Authorisation (EA). This EMMPr is viewed as a dynamic document that must be reviewed and updated on a continual basis.

The EMMPr is valid for the duration of the project (both for construction as well as future maintenance) with each applicable phase corresponding to the identified requirements.

Condition 1 of the EA stipulates that the Environmental Authorisation is granted for a period from date of issue until **30 April 2028** to commence and complete all the listed activities, rehabilitation and monitoring requirements. A further 5 years until **30 April 2033** is granted for maintenance activities to the rehabilitated area where the new structures are installed.

Failing which, the Environmental Authorisation and Environmental Management and Maintenance Programme (EMMPr) shall lapse, unless the environmental authorisation is amended in accordance with the relevant process contemplated in the Environmental Impact Assessment Regulations promulgated under the National Environmental Management Act, 1998 (Act no. 107 of 1998).

1.3 AMENDMENT OF THE EMMR

The manner and frequency for updating the EMMPr is as follows (General Matters #4 & 5 of the EA):

- Any further amendments to the EMMPr, other than those mentioned above, must be approved in writing by the relevant competent authority.
- An application for amendment to the EMMPr must be submitted to the Competent Authority if any amendments are to be made to the impact management outcomes of the EMMPr. Such amendment(s) may only be implemented once the amended EMMPr has been approved by the competent authority.
- The onus is however on the Holder to confirm the legislative process requirements for the above scenarios at that time.

- Where an amendment to the impact management outcomes of an EMMPr is required before an environmental audit is required in terms of the environmental authorisation, an EMMPr may be amended on application by the Holder of the Environmental Authorisation.

2 EMMPR PHASING

2.1 PRE-CONSTRUCTION PHASE

The pre-construction phase refers to the design phase of the project. This will ensure that any requirements and best practise mechanisms are built into the planning / design phase to be developed in the construction and operational phase. In term of this application, the pre-construction can be considered as the site selection and engineering designs and mitigations.

Condition 3 of the EA stipulates that the Environmental Authorisation may only be implemented in accordance with an approved Environmental Management & Maintenance Programme ("EMMPr").

Condition 8 of the EA stipulates that the Environmental Management Programme dated 14 December 2022 and submitted as part of the application for Environmental Authorisation is hereby approved and agreed to.

Condition 18 of the EA stipulates that the affected area must be demarcated prior to commencement of construction activities.

2.2 CONSTRUCTION PHASE

The construction phase refers to the actual construction of the development on the property, and includes all earthworks and installation of bulk services (water, sewerage, roads, stormwater, electricity etc.). In terms of this application, this phase relates to the construction of the civil engineering services and infrastructure.

Condition 2 of the EA stipulates that the Holder is authorised to undertake the listed activities specified in Section B of the EA in accordance with a part of the Preferred Alternative described in the FBAR dated 14 December 2022 on the site as described in Section C of the EA.

The development entails the stabilisation of the embankment of the Meul Riverbank by the placement of reno mattrasses and gabions inside the perennial watercourse along Erven 21150 and 21151, Rosemoor, George. The reno mattrasses and gabions will be positioned in a curving manner to preserve the flow's characteristics and to prevent further erosion as per Annexure 2 of the Environmental Authorisation.

The activity includes temporarily and partially diverting the stream within the streambed to facilitate construction of the gabion boxes along the eastern riverbank. The existing stormwater pipe that discharges at this point (partially responsible for the eroded bank) stormwater will also be diverted by placing sandbags in the proposed area of construction. After construction, the streambed and embankments will be re-instated and rehabilitated. Temporary access to the site will be via Grens Street where it crosses the Molen River, along the elevated eastern bank of the Meul River. This access will be rehabilitated once construction is complete.

Condition 7 of the EA stipulates that seven days' notice, in writing, must be given to the Competent Authority before commencement of any activities.

Condition 9 of the EA stipulates that the EMMPr must be included in all contract documentation for all phases of implementation.

2.3 OPERATIONAL / MAINTENANCE PHASE

The Operation Phase of this project relates to the ongoing management and maintenance required to ensure sustainable development. In terms of this application, this refers to all activities that are undertaken once construction is completed and the site is handed over to the Municipality.

All future maintenance of the structure (i.e., after flooding, erosion, breakage of gabions etc) must be implemented in accordance with this EMMPr (procedures for construction activities to be followed).

The Applicant must ensure that the Operational Phase maintains the underpinning principles 'Duty-of-Care-to-the-Environment' and ideals of sustainable development.

Maintenance of the structure, once installed, must be undertaken in accordance with this management & maintenance plan.

Condition 2 of the EA also stipulates that the listed activities also include maintenance activities for a period of 5 years, which includes visual maintenance and inspection followed by physical maintenance if required. The maintenance activities are only limited to structures and rehabilitation measures included in the authorisation. The development will be implemented approximate to the site development plan contained in Annexure 2 of the authorisation.

2.4 CLOSURE AND DECOMMISSIONING PHASE

Decommissioning refers to the process of removing the operating assets of any development after completion of the operating life cycle.

The decommissioning phase is not applicable because the proposed activity involves the rehabilitation of a river embankment and it is unlikely that the structure will be removed.

Should the need arise in future to remove the structure wholly, the Applicant must consult with the Competent Authority to ensure compliance with legislation applicable at the time.

3 LEGISLATIVE REQUIREMENTS

The project Applicant is required to comply with all necessary legislation and policies applicable to development and management of the development. These include but are not limited to:

3.1 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 provincial Department of Environmental Affairs & Development Planning (DEA&DP)) based on the findings of an Environmental Impact Assessment (EIA).

NEMA 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 (EMMPr), of which this EMMPr is one.

Principles contained in Section 2 of the NEMA, amongst other things, prescribe that environmental management must:

- 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 landowner, to ensure that the abovementioned principles, entrenched in this EMMPr are upheld and complied with.

3.2 ENVIRONMENT CONSERVATION ACT, 1989 (ECA)

The EIA regulations contained in the Environmental Conservation Act (ECA) have been replaced by NEMA. However, property owners 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.

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.

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

In addition to the management of ecosystems, this Act makes provision for the management and control of alien invasive vegetation. This includes the listing of invasive species that are a threat to natural ecosystems. These species must be strictly controlled and / or eradicated. The property has been significantly transformed due to grazing practises but does not contain many alien vegetation species. Only indigenous vegetation should be permitted for landscaping by the proposed HOA and future landowners.

The site has been transformed from Garden Route Granite Fynbos to mowed and maintained kikuyu lawns. Therefore, its Terrestrial Biodiversity should be considered as **low** rather than very high (refer to the Biodiversity Compliance Statement compiled by Dr James Dabrowski).

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.

It is advisable that an integrated waste management system be adopted, which includes waste minimisation, waste recycling and the proper storage and disposal of waste, which does not impact of the health of the environment and human health.

All waste must be collected and disposed of at a waste facility. No waste material may be left on site once construction/maintenance is completed.

3.5 NATIONAL WATER ACT (NWA, ACT 36 OF 1998)

The National Water Act (NWA) gives effect to the constitutional right of access to water. The Act's overall purpose is to ensure that South Africa's water resources are protected, used and managed in ways which take into account a number of factors, including inter-generational equity, equitable access, redressing the results of past racial and gender discrimination, promoting sustainable and beneficial use, facilitating social and economic development, and providing for water quality and environmental protection.

The NWA makes persons who own, control, occupy or use land responsible for taking measures to prevent pollution of water resources, and empowers Government authorities to take measures to enforce this obligation.

An application for registration of water use(s) within the ambit of a **General Authorisation** in terms of section 39 of the National Water Act, 1998 (Act 36 of 1998) was submitted and subsequently approved by the Breede-Gourits Catchment Management Agency (BGCMA).

Implementation, as well as compliance and monitoring of the GA is the responsibility of the BGCMA. Although this EMMPr reflects on general conditions and best practice it does not cover the full spectrum of GA conditions. The Applicant must ensure compliance with the applicable GA conditions.

3.6 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).

No protected trees were found on site. Care must be taken when the temporary access is made that no protected trees along the river bank are damaged.

The purpose of the National Veld and Forest Fire Act is to **prevent and combat veld, forest and mountain fires** throughout the RSA and to provide institutions, methods and practices for achieving this purpose. Institutions include the formations of such bodies 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.

The proposed activity is located within the urban area and does not require any kind of firebreak.

3.7 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The purpose of the National Heritage Resources Act is to:

- Introduce an integrated and interactive system for the management of the national heritage resources;
- Promote good government at all levels,
- Empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- To lay down general principles for governing heritage resources management throughout South Africa;
- To introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- To establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level;
- To set norms and maintain essential national standards for the management of heritage resources in South Africa and to protect heritage resources of national significance;
- To control the export of nationally significant heritage objects and the import into South Africa of cultural property illegally exported from foreign countries;
- To enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources;
- To provide for the protection and management of conservation-worthy places and areas by local authorities; and
- To provide for matters connected therewith.

Due to the nature of the proposed activity, the location of the site and the transformed nature of the surroundings, it is not likely that any heritage or archaeological features will be impacted upon.

Condition 19 of the EA stipulates that should any heritage remains be exposed during excavations or any other actions on the site, these must immediately be reported to the Provincial Heritage Resources Authority of the Western Cape, Heritage Western Cape. 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 may only be disturbed by a suitably qualified heritage specialist working under a directive from the relevant Heritage Resources Authority.

Heritage remains include: meteorites, archaeological and/or paleontological remains (including fossil shells and trace fossils); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artefacts and bone remains; structures and other built features with heritage significance; rock art and rock engravings; shipwrecks; and/or graves or unmarked human burials including grave goods and/or associated burial material.

3.8 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)

The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

In terms of this Act, a Health and Safety Officer and Protocol must be implemented on any sites. The appointment of a Health and Safety Officer is the responsibility of the proponent and contractor and is included in this report to ensure due diligence on construction sites. It is the responsibility of the appointed to HSO to conduct any required audits and as such only the appointment of an HSO will be auditable in terms of this document.

4 ENVIRONMENTAL IMPACTS & MITIGATIONS

The following aquatic related specialist impact assessments / studies were undertaken for the proposal:

- Freshwater / Aquatic Impact Assessment Report (Dr James Dabrowski).
- Faunal Compliance Statement (Dr James Dabrowski)
- Botanical Compliance Statement (Dr James Dabrowski)
- Biodiversity Compliance Assessment (Dr James Dabrowski)

The following environmental impacts of the proposed activity were identified and considered during the environmental process, based on which the associated mitigation measures were recommended for implementation (to reduce negative impacts & enhance positive ones):

Specialist Assessments/Compliance Statement (Dr James Dabrowski, 2022)

Potential Impacts

- Increased stream velocity caused by hardening of the bank
- Scouring of bed and banks caused by stormwater discharge at Erf 21150
- Loss of wetland habitat caused by installation of gabions
- Sedimentation of wetland habitat caused by disturbance of bed and banks
- Disturbance and pollution of wetland habitat during the construction phase
- Scouring caused by the presence of gabion structures
- De-stabilisation of bank caused by the removal of riparian vegetation

4.1 MITIGATIONS

Table 2: List of Mitigation Measures & Associated Management Requirements

Mitigation	Condition of Approval	Included in EMMPr	Construction Phase	Operational /Maintenance Phase	Decomissioning Phase
Mitigations / Recommendations					
Gabions must mimic the curved profile of the embankment.		✓	✓		
The river reach must be routinely monitored to ensure that any constrictions to flow (dumped waste, felled trees, stormwater debris) are removed from the channel.		✓	✓	✓	
The most upstream and downstream ends of the gabions must align (or be flushed) with the existing stream bank.		✓		✓	
After long-term monitoring, determine if additional protection is necessary (opposite side of the bank).		✓		✓	
Applicant must appoint an ECO to oversee construction.	✓	✓	✓	✓	
The stormwater outlet pipe, must be designed adequately to dissipate the energy.		✓	✓		
Clearly demarcate areas where instream construction activities will take place.		✓	✓		
Stockpiles of materials must be placed outside the channel of the watercourse (on as flat as possible) and protected (through use of sandbags and/or tarpaulins).		✓	✓		
Prevent uncontrolled access of vehiles into the watercourse.		✓	✓	✓	
Construction activities must be timed to coincide with a dry period. Due to the emergency state of this project and George's unpredicted weather changes, it is advised that the holder of the EA first contact with the ECO & aquatic specialist to determine whether it is the right time to start construction (based on the most recent weather reports).		✓	✓		
A temporary check dam (using sandbags) should be established upstream of the construction to create dry working conditions should work not be undertaken during a dry period.		✓	✓	✓	
A flexible pipe should be used to transfer water from upstream.		✓	✓		
Temporary straw-bales can be placed across the channel (downstream of the streambank) to trap high levels of sediment in the event of a high rainfall.		✓	✓	✓	
Demarcate the area(s) chosen for the stockpiling of imported materials and put-up notices declaring what must be stockpiled where i.e. bank material vs riverbed material separately.		✓	✓	✓	
Development of a construction schedule.		✓	✓		
Post-installation, stabilise exposed banks with indigenous vegetation.		✓	✓	✓	
Gabions will be packed by manual labour.		✓	✓		
No operating vehicles within 5m of the edge of the channel. The 5m setback line will be relaxed, where necessary, to accommodate for operating vehicles in consultation with the ECO.		✓	✓	✓	

Mitigation	Condition of Approval	Included in EMMPr	Construction Phase	Operational /Maintenance Phase	Decomissioning Phase
Oil and fuel leaks of excavators and all other machinery must be checked daily.		✓	✓	✓	
No fuel storage, refuelling, vehicle maintenance or vehicles depts to be allowed within the delineated area of the wetland.		✓	✓		
Bunds should be placed around refuelling, fuel storage and servicing areas. These areas must not be located within any natural drainage areas or preferential flow paths and must be located more than 20m away from the delineated area of each wetland.		✓	✓	✓	
Chemical toilets (1 toilet / 10 persons).		✓	✓		
Waste from chemical toilets must be disposed of regularly by a registered waste contractor.		✓	✓		
No mixing of cement / concrete on bare ground or within the watercourse.		✓	✓		
Instruct workers & contractors properly of the environment (environmental inductions).		✓	✓	✓	
All waste generated on-site must be adequately managed.		✓	✓		
Separation and recycling of different waste materials should be supported.		✓	✓		
All gabions must be inspected on a routine basis. Any faults must be immediately asap to prevent unwanted environmental damages.		✓		✓	
Scouring or undercutting caused by gabion weirs must be rehabilitated following the inputs of an aquatic ecologist.		✓		✓	
Withdrawn lawns from the edge of the streambank and a 5m riparian buffer, consisting of appropriate indigenous plants must be re-established along the length of the eastern bank post-construction. It should be noted that a lot of factors including municipal budget and the property owners along this embankment might hinder this mitigation.		✓		✓	
Any construction camp, storage, washing and maintenance equipment, storage of construction materials, or chemicals, as well as any sanitation and waste management facilities – (a) is located outside the 1 in 100-year flood line or riparian habitat of the river. (b) is removed within 30 days after the completion of any works.		✓	✓	✓	
Construction must start upstream and proceed in a downstream direction.		✓	✓		
All excavated material from the banks of the watercourse must be stored and clearly demarcated until the works have been completed. The excavated material must be backfilled.		✓	✓	✓	
Following completion and during annual inspection to determine the need for maintenance, ensure that all disturbed areas are – (a) cleared of construction debris and other blockages; (b) re-vegetated with indigenous vegetation suitable to the area		✓		✓	

Mitigation	Condition of Approval	Included in EMMPr	Construction Phase	Operational /Maintenance Phase	Decomissioning Phase
Monitor water quality during construction. Water samples must be taken (both upstream & downstream) before, during and after construction to ensure that the water quality isn't affected.		✓	✓	✓	
Gabions must be inspected regularly and after every large storm, to detect damages or abnormalities. Any vegetation growing out of the gabion boxes must be removed. Broken or damaged panels can be repaired on site. If several gabion baskets are broken advice should be sought from the Engineer and maintenance must be undertaken under supervision of an ECO.		✓		✓	
Gabion baskets must be inspected for differential settlement caused by major storm events.		✓		✓	
Best Practise					
Construction work must take place during normal work hours.		✓	✓	✓	
Traffic management must be in place during construction		✓	✓		

5 RESPONSIBILITIES

This section deals with the responsibilities of various parties during the Construction Phase of any development.

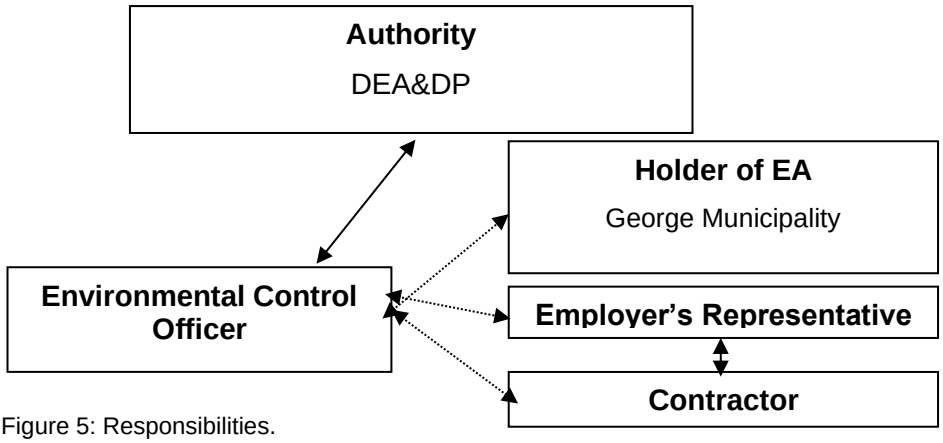

Figure 5: Responsibilities.

5.1 HOLDER OF THE EA

The holder of the EA / property owner is the overseeing entity responsible for ensuring that all activities undertaken on the property comply with the Environmental Authorisation (EA) and associated Environmental Management & Maintenance Programme (EMMPr) (& any other approval / licence / permit), as well as the management and maintenance of the open space areas and river habitat.

The responsibilities of the holder of the EA / property owner include, but are not limited to the following:

- Ensure that **all tender documentation** include reference to, and the need for compliance with, the EA and EMMPr as well as any other legally binding documentation, which include and are not limited to Approval/s.

- Be conversant with, and ensure that all Contractors, Sub-contractors, Engineers (and future senior site managers / personnel) are made aware of, and understand the conditions and recommendations, contained in the abovementioned documentation;
- Ensure that all Contractors, Sub-contractors and Engineers (during construction activities) are made aware of their 'Duty of Care to the Environment' and that any damage or degradation of the natural environmental within the bounds of the property will be not be tolerated and must be dealt with / remedied at the cost of the perpetrator;
- Take remedial and/or disciplinary action in circumstances where persons are found to be in contravention of the abovementioned legally binding documentation.

Condition 4 of the EA stipulates that the Holder shall be responsible for ensuring compliance with the conditions by any person rendering a service to the Holder.

Condition 10 of the EA stipulates that the Holder must appoint a suitably experienced Environmental Control Officer ("ECO") for the duration of the construction and rehabilitation phases of implementation contained herein.

Condition 12 of the EA stipulates that a copy of the EA, EMMPr, any independent assessments of financial provision for rehabilitation and environmental liability, audit reports and compliance monitoring reports must be kept at the site of the authorised activities and be make available to anyone on request, and where the Holder has website, such documents must be made available on such publicly accessible website.

Condition 13 of the EA stipulates that access to the site referred to Section C in the EA must be granted, and the 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 in the EA.

5.2 ENGINEERS AND CONTRACTORS

The Engineers and Contractors are often the parties responsible for physically carrying out the activities for which majority of the recommendations in this EMMPr are intended. Service providers and Contractors include: services, building contractors, 'handy-men' and engineers overseeing the installation and maintenance of services etc. The responsibilities indicated here are also relevant to Sub-Contractors.

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

- Be conversant and compliant with the EA, the EMMPr, and any relevant License, Permit or any legally binding documentation relevant to their operations;
- 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 holder of the EA/GA in complying with the EMMPr, and in the event that any industry regulated standards are in contradiction with the EMMPr or any other authorisations.
- Review and amend to any construction activities to align with the EMMPr and Best Practice Principles;

- Ensure compliance of all site personnel and / or visitors to the EMMPr and any other authorisations.

5.3 ECOLOGICAL CONTROL OFFICER (ECO)

It is recommended that a suitably qualified Environmental Control Officer (ECO) be appointed to oversee all activities for the duration of the construction phase (i.e. construction activities, rehabilitation) as well as any maintenance work that must be undertaken that will involve earthworks or machine works. The ECO must have at least 3 years' experience and proven competency as an ECO.

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

- Provide environmental induction training to Contractors on site prior to construction activities commencing
- Provide maintenance, update and review of the EMMPr if necessary;
- Liaison between the Project Holder of the EA, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMMPr;
- Compilation of Environmental Control Reports (ECR) to ensure compliance with the EA, EMMPr and duty of care requirements, where necessary;
- Compilation of the Environmental Audit Report or Environmental Completion Statement, after completion of construction (or as otherwise defined in the Environmental Authorisation), where necessary;
- Ensuring / guiding and monitoring compliance with the EA and EMMPr and any legally binding documentation;
- Facilitating consultation with relevant environmental authorities (e.g. DEA&DP, DFFE, CapeNature or Municipality);
- Facilitating the application for any required amendment of the EA/EMMPr;
- Provide guidance and interpretation of the EA and EMMPr where necessary;
- Issuing site instructions to the contractor for corrective actions required;
- 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;
- The duration and frequency of these visits may be increased or decreased at the discretion of the ECO;
- Attendance of site meetings if required;
- 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;
- Maintain a public complaints register in which all complaints and action taken must be recorded. This information must also be included in the ECR.

Condition 11 of the EA stipulates that the ECO must-
11.1. be appointed prior to commencement of any construction works,
11.2. ensure compliance with the EMMPr and the conditions contained herein,
11.3. keep record of all activities on site; problems identified; transgression noted and a task schedule of tasks undertaken by the ECO,
11.4. remain employed until all development activities are concluded, and the post construction rehabilitated, and monitoring requirements are finalised.

5.4 ECO SITE VISIT FREQUENCY

The following site frequency for ECO site visits has been determined:

- Daily during all earthworks and installation of the gabions/reno mattresses, or work undertaken in the river channel.
- Every week during rehabilitation.
- Maintenance activities must be monitored on an ad hoc basis depending on the type of maintenance.

Ad hoc site visits may be undertaken in the event of any incidents or specific requests from the project holder of the EA or project team.

5.5 ENVIRONMENTAL INDUCTION & TRAINING

The holder of the EA in consultation with the Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EA and EMMPr. The presentation shall 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, if this is deemed necessary.

As a minimum, training must include:

- Explanation of the importance of complying with the EA and EMMPr 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 EMMPr and its specification (no-go areas, etc.);
- Explanation of the management structure of individuals responsible for matters pertaining to the EMMPr.

Where staff turnover is 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.

6 PRE-CONSTRUCTION DESIGN CONSIDERATIONS

It is recommended that sustainable design considerations are implemented during the planning phase to ensure that the impacts associated with the development are avoided, minimised or managed before construction commences.

6.1 STORMWATER MANAGEMENT PREPARATION

Management Statement	Impacts & Risks Avoided
To prepare the site to minimise the negative impacts of stormwater	Damage to the environment caused by stormwater runoff

Management Actions

a. Final design of the stormwater system must take place prior to construction to ensure timeous implementation.

Refer to Site Development Plan & Method Statement compiled by Nadeson Consulting Services (Appendix 2).

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site Plans	Once off	Architect / Engineer	Prior to construction	Audit	Once off

6.2 GABION DESIGN

Management Statement	Impacts & Risks Avoided
To prepare the site to minimise the negative impacts of erosion	Damage to the environment caused by further erosion

Management Actions

b. Final design of gabions must take place prior to construction to ensure timeous implementation. Nadeson Consulting Services designed the gabions in a curved manner to prevent increased stream velocity and consequent further erosion.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Site Plans	Once off	Architect / Engineer	Prior to construction	Audit	Once off

7 CONSTRUCTION CONSIDERATIONS

These Construction Phase requirements are aimed at using Best Practise Principles and / or specialist recommendations to manage the impacts on the environment during the construction of the development.

7.1 STORMWATER MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To minimise the generation of contaminated stormwater.	Minimise sedimentation, erosion and / or undercutting

Management Actions

a. Divert stormwater by placing sand bangs in the proposed area of construction which prevent the area from being saturated before placing gabions.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off

Any areas that are identified by the ECO as being prone to erosion must be suitably protected. During construction, the contractor shall protect all areas susceptible to erosion by installing temporary works (e.g., sandbags) and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

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. A suitable rehabilitation method statement must be submitted to the ECO for approval.

7.2 DUST CONTROL

Management Statement/Outcome	Impacts & Risks Avoided
To ensure there is no health risk or loss of amenity due to emission of dust to the environment.	Ensure land coverage with biomass chips / vegetation / damping to minimise dust

Management Actions					
a. Implement a dust prevention strategy, developed at the project planning stage					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Once off	Developer / contractor	Pre implementation	Audit	Once off
The strategy should include the following amongst others: • Speed control to minimise dust on site. • Exposed stockpile materials must be adequately **protected** against wind (covered) and should be sited taking into consideration the prevailing wind conditions. • Trucks bringing in materials must be covered to prevent dust and small particles escaping and potentially causing damage to people and property.					

7.3 NOISE

Management Statement/Outcome	Impacts & Risks Avoided
To ensure nuisance from noise and vibration does not occur.	Nuisance impacts to neighbours and visitors.

Management Actions					
a. Fit and maintain appropriate mufflers on earth-moving and other vehicles on the site.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction and operation	Audit	As required
b. Enclose noisy equipment such as generators and pumps.					

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required
c. Provide noise attenuation screens, where appropriate.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	Initially when vehicle or machinery is introduced to the site and thereafter monthly. As required if complaints registered.	Contractor	During construction	Audit	As required
d. Where an activity is likely to cause a noise nuisance to nearby residents, restrict operating hours to between 7 am and 6 pm weekdays and 7 am to 1 pm Saturday, except where, for practical reasons, the activity is unavoidable.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
As required	As required if complaints registered.	Contractor	During construction	Audit	As required

7.4 TRAFFIC CONTROL

Management Statement/Outcome	Impacts & Risks Avoided
To manage and minimise the nuisance effect created by construction traffic.	The development entrance access will be via Grens Street along the river channel and construction traffic is likely to temporarily affect users along Grens Street as well as residents along Molen Close Street.

Management Actions					
a. Implement a traffic management strategy during construction.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method Statement	Daily	Contractor	During construction	Audit	As required

- Construction related activities should be timed where possible to avoid peak periods.
- No construction workers, apart from security personnel, should be allowed to stay on site overnight.
- Contractors appointed by the developer must ensure that workers are transported to and from the site daily.
- Construction related activities should comply with all relevant building regulations. In this regard activities on site should be restricted to between 07h00 and 18h00 during weekdays and 08h00 and 13h00 on Saturdays. No work should be permitted after 13h00 on Saturdays and on Sundays.
- Temporary access to be rehabilitated once construction is complete.

7.5 WASTE MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To minimise the waste load discharged to the environment.	Improve waste disposal methods during construction Reduce waste volumes to landfill sites

Management Actions					
a. Reduce wastes by selecting, in order of preference, avoidance, reduction, reuse and recycling.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Record of volumes of material removed	As required	Contractor	As required	Audit	Records
b. Maintain a high quality of housekeeping and ensure that materials are not left where they can be washed or blown away to become litter.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance

Photographic	Weekly	Contractor	As required	Audit	Records
c. Provide bins for construction workers and staff at locations where they consume food.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	Weekly	Contractor	As required	Audit	Records
d. Conduct ongoing awareness with staff of the need to avoid littering.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Induction	Once off	Contractor	As required	Audit	Attendance register

7.6 STOCKPILE MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To manage soil stockpiles so that dust and sediment in run-off are minimised.	Pollution due to dust and sediment run off
Management Actions	
a. Minimise the number of stockpiles, and the area and the time stockpiles are exposed.	

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Photographic	As required	Contractor	As required	Audit	Records

b. Keep topsoil and underburden stockpiles separate.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	Daily when stripping topsoil	Contractor	Continuously during construction	Audit	Records
c. Ensure that stockpiles and batters are designed with slopes no greater than 2:1 (horizontal/vertical).					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
d. Stabilise stockpiles and batters that will remain bare for more than 28 days by covering with mulch or anchored fabrics or seeding with sterile grass.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly
e. Establish sediment controls around unstabilised stockpiles and batters.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly

f. Suppress dust on stockpiles and batters, as circumstances demand.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual inspection of stockpiles	As required	Contractor	Continuously during construction	Audit	Monthly

7.7 STORING FUELS & CHEMICALS

Management Statement/Outcome	Impacts & Risks Avoided
To ensure that fuel and chemical storage is safe, and that any materials that escape do not cause environmental damage.	Avoid hydrocarbon pollution to soil and watercourses / coastal environments

Management Actions

a. Minimise fuels and chemicals stored onsite.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

b. Install bunds and take other precautions to reduce the risk of spills.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

c. Implement a contingency plan to handle spills, so that environmental damage is avoided.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

7.8 MINIMISING EROSION

Management Statement/Outcome	Impacts & Risks Avoided
To minimise the quantity of soil lost during construction due to land-clearing.	• Avoid overland flow by capture and store water from roof • Avoid siltation by installing silt traps

Management Actions					
a. Schedule measures to avoid and reduce erosion by phasing the work program to minimise land disturbance in the planning and design stage.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
b. Keep the areas of land cleared to a minimum, and the period areas remain cleared to a minimum					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records

c. Base control measures to manage erosion on the vulnerability of cleared land to soil loss, paying particular attention to protecting slopes.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
d. Mulch, roughen and seed cleared slopes and stockpiles where no works are planned for more than 28 days, with sterile grasses.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor	As required	Audit	Method statement records
e. Keep vehicles to well-defined haul roads.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site plan	As required	Contractor	As required	Audit	Final site plan
f. Rehabilitate cleared areas promptly.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor	Continuously during construction	Audit	Final Rehabilitation statement

7.9 REHABILITATION & BOTANICAL MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To ensure that degradation to existing botanical/aquatic components are minimised and that any rehabilitation is undertaken with conservation orientated approach.	To minimise the disturbance to existing flora To minimise the introduction and/or spread of weed species

Management Actions

a. Demarcate sensitive areas to avoid damage during construction.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	As required	Contractor / Owner	Continuously	Audit	Visual / photographic

b. Rehabilitation and landscaping may only make use of indigenous vegetation.

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	As required	Contractor / Owner	Continuously	Audit	Visual / photographic

7.10 FAUNA MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To ensure that impacts to native faunal species is minimised and / or avoided.	To minimise the impact to fauna

Management Actions

a. Prevent unnecessary mortalities of indigenous fauna					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Ad hoc	As required	Contractor	Continuously	Audit	Visual / photographic

7.11 SOCIAL REQUIREMENTS

Management Statement/Outcome	Impacts & Risks Avoided
To ensure equitable, fair and safe social interaction on construction sites	Loss of employment opportunities to the region

Management Actions

a. It is strongly recommended that the Contractor make use of local labour as far as possible for the construction phase of the project.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Employment records	Ad hoc	Contractor	Ad hoc	Audit	Once off

b. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the Developer and the Contractor.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Site records	Ad hoc	Contractor	Ad hoc	Audit	Once off

Targets

- The contractor should endeavour to source local suppliers.
- The contractor must ensure that suitable procurement policies are in place that supports local economic growth.
- Locally manufactured products must be used as far as possible.

Site Security

Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor.

Considering this, contractors need to be proactive 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 internal and external crime elements as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant.

7.12 METHOD STATEMENTS

Management Statement/Outcome	Impacts & Risks Avoided
To ensure efficient communication mechanisms in the implementation of environmental performance requirements	Prevention of potential impacts are avoided during construction by means of correct communication

Management Actions

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

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Method statement	Ad hoc	Contractor	As required	Audit	Once off

Based on the specifications in this EMMPr, the following method statements are required as a minimum (more method statements may be requested as required at any time under the direction of the ECO):

- Demarcation of No-Go areas
- Site clearing
- Hazardous substances and their storage.
- Materials requirements & Sourcing.
- Solid waste control system.
- Fire control and emergency procedures
- Petroleum, chemical, harmful and hazardous materials storage, if any.
- Stormwater Management and Water Quality Control.
- Erosion Control.

7.13 HEALTH AND SAFETY

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

8. General duties of employers to their employees:

- 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.
- Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-
    - 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;
    - 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;
    - 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;
    - 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 must 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;
    - 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;
    - 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;
    - taking all necessary measures to ensure that 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;
    - enforcing such measures as may be necessary in the interest of health and safety;
    - 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
    - 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. Health & Safety on site is the responsibility of the contractor and the proponent. Although this is not the function of the ECO, it is a standard requirement for building construction and must be monitored and evaluated by a suitably qualified Health & Safety person. It will not form part of any environmental audit in the future.

8 OPERATIONAL/MAINTENANCE PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The Operational/Maintenance Phase of this EMMPr refers to the day to day management activities that are required to ensure sustainability and the achievement of the principles and objectives of the development. The requirements are applicable to the proponent, any HOA that is put in place, all employees and all visitors to the property.

8.1 STORMWATER MANAGEMENT

Management Statement/Outcome	Impacts & Risks Avoided
To ensure management of stormwater during operation phase	• To prevent erosion due to stormwater impact

Management Actions

a. No stormwater runoff should be allowed to concentrate onto open spaces and roadways downstream of the property .

Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Ensure soft landscaping	Ongoing	Developer / HOA	As required	Audit	Audit

- Concentration of stormwater runoff will be minimised through the application of landscaping techniques, i.e. by creating grass lined swales, undulations and depressions, vegetation.

8.2 BOTANICAL / LANDSCAPING / REHABILITATION

Management Statement/Outcome	Impacts & Risks Avoided
To ensure that indigenous vegetation is encouraged within urban areas.	• Ongoing spread of alien invasive species. • Ensure protected species are taken into consideration.

Management Actions

a. Home owners must practice ongoing alien invasive management.					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	Ongoing	Owner	As required	Audit	Audit
b. Retain and manage protected and indigenous vegetation (Rehabilitated Indigenous vegetation on the Molen River embankment).					
Method of monitoring implementation	Frequency of Monitoring	Responsible Party for implementing management action	Time period	Mechanism for monitoring Compliance	Programme for reporting on Compliance
Visual / photographic	Ongoing	Owner	As required	Audit	Audit
• Rehabilitate with appropriate indigenous vegetation to promote soft landscaping. • Replace vegetation if it dies off.					

9 MONITORING, MAINTENANCE & VALIDTY OF EMMPR

9.1 MONITORING

Monitoring is an important tool in determining the effectiveness of management actions by measuring changes in the environment. These could be in the form of fixed-point photography where an area is photographed on a regular / seasonal basis to ascertain changes, monitoring of a particular aspect such as landscape integrity parameters, recordings of animal movement from fixed point etc. The most important aspect of any monitoring programme is **consistency and continuity**. This will ensure a level of scientific accuracy to determine baselines / thresholds and measure changes / deviations, which then drive management reactions.

Any required monitoring reports must be made available to the competent authority as required.

The type and frequency of monitoring must include:

- During construction photographs must be taken from pre identified fixed points and a comprehensive record maintained by the ECO;
- Incident Reports;
- Site meeting minutes.

9.2 POST- CONSTRUCTION MAINTENANCE & VALIDTY OF EMMPR

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

A "Maintenance Management Plan" means a *management plan for maintenance purposes defined or adopted by the competent authority.*

The following is recommended:

- Conduct an As-built survey of the completed structure and Municipality to keep this on record for future maintenance work.
- Any reports of damage to the structure to be followed-up by Municipality.
- Municipality to conduct visual inspection post heavy rains / flooding for any damage to the structure. Detect damages / abnormalities (bulging, broken components, corrosion of mesh baskets, vegetation growth or vandalism). Remove any vegetation growing out of the gabion boxes.
- DEADP & BGCMA to be notified, seven (7) days in advance, of any maintenance work.
- Appoint an ECO to monitor maintenance work.
- Holder of the EA must supply ECO with a Method Statement for maintenance work in order to determine inspection frequency.
- ECO completion report once maintenance is complete.
- Maintenance work to be undertaken in line with EMMPr & as-built survey (engineer to confirm compliance with "as-built").

Gabion structures are typically very robust and have a long lifespan (20-30 years). This EMMPr must be valid for a minimum of twenty (20) years to cover future maintenance activities.

9.3 MONITORING TIMEFRAMES SUMMARY

Table 3: Monitoring Timeframe Summary

MONITORING TIMEFRAMES		
Type	Frequency	Criteria
ECO visits	As per section 5.4	Site photographs / site diary
Record keeping	Monthly	Site photographs, method statements, site meeting minutes (if applicable)
	3 month post construction	Completion Statement
Auditing	One year post construction	Compliance with the EA, EMMPr, municipal permits. Note that GA compliance is the responsibility of the BGCMA.

Condition 8 of the EA stipulates that the Environmental Management & Maintenance Program ("EMMPr") dated 14 December 2022 and submitted as part of the application of Environmental Authorisation is hereby approved and agreed to.
8.1.1. All references to 'operational phase' in the EMMPr are also regarded to include maintenance;

8.1.2. The monthly record keeping (ECO reports) referred to in Par.9.3. of the EMMPr will be submitted to the competent authority on a monthly basis.

9.4 ENVIRONMENTAL AUDITS

A final construction phase Completion Statement must be submitted within 3 months of completion of construction / site handover.

This Completion Statement must include the monitoring results as above, where applicable to construction.

An independent Environmental Audit must be undertaken one (1) year post construction.

Condition 14 of the EA stipulates that the Holder must, for the period during which the environmental authorisation and EMMPr remain valid ensure the compliance with the conditions of the environmental authorisation and the EMMPr, is audited.

9.5 AUDIT REPORTS FREQUENCIES AND FORMAT

The table below provides a summary of the timeframes for the various Audit Reports specified in the EA.

Condition 15 of the EA stipulates that the frequency of auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMMPr, must adhere to the following programme:

15.1. A final Environmental Audit Report must be submitted to the Competent Authority within three (3) months of the conclusion of the stabilization, rehabilitation, and monitoring requirements thereof.

15.2. An audit report must also be submitted each time after maintenance activities are concluded.

Table 4: Audit Reports Timeframe Summary

ENVIRONMENTAL AUDIT TIMEFRAMES		
Type	Frequency	Criteria
Construction audit	Within three (3) months of the conclusion of the stabilization, rehabilitation, and monitoring requirements thereof.	Compliance with the Environmental Regulations for Audits (in terms of chapter 5 of regulation 982). Compliance with the conditions of the EA and EMMPr.
Future audit reports.	Within three (3) months after maintenance activities are concluded.	Compliance with the Environmental Regulations for Audits (in terms of chapter 5 of regulation 982). Compliance with the conditions of the EA and EMMPr.

Condition 16 of the EA stipulates that the Environmental Audit Report(s) must-
16.1. be prepared and submitted to the Competent Authority, by an independent person with the relevant environmental auditing expertise. Such person may not be the ECO or EAP who conduct the EIA process,
16.2. provide verifiable findings, in a structured and systematic manner, on-

16.2.1. the level of compliance with the conditions of the environmental authorisation, EMMP and the EMMPr and whether this is sufficient or not; and
16.2.2. the ability of the measures contained in the EMMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.
16.3. identify and assess any new impacts and risks as a result of undertaking the activity;
16.4. evaluate the effectiveness of the EMMPr or both;
16.5. identify shortcomings in the EMMPr;
16.6. identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMMPr;
16.7. indicate the date on which the construction work was commenced with and completed or in the case where the development is incomplete, the progress of the development and rehabilitation;
16.8. indicate the date on which the operational phase was commenced with and the progress of the rehabilitation;
16.9. include a photographic record of the site applicable to the audit; and
16.10. be informed by the ECO reports.

In terms of the 2014 EIA Regulations, Audit Reports must be submitted to the registered Interested & Affected Parties within 7 days of submission to the competent authority.

In order to comply with the 2014 EIA Regulations, any audits must be undertaken using the following format:

Table 5: Environmental Audit Requirements

Appendix 7 of Regulation 326 of the 2014 EIA Regulations, as amended contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these objectives & requirements were incorporated into this Audit Report.	
Objective	**Description**
The objective of the environmental audit report is to -	
(a) Report on – (i) the level of compliance with the conditions of the environmental authorisation and the EMMPr, and where applicable, the closure plan; and (ii) the extent to which the avoidance, management and mitigation measures provided for in the EMMPr, and where applicable, the closure plan achieve the objectives and outcomes of the EMMPr, and closure plan.	
(b) Identify and assess any new impacts and risks as a result of undertaking the activity.	
(c) Evaluate the effectiveness of the EMMPr, and where applicable, the closure plan.	
(d) Identify shortcomings in the EMMPr, and where applicable, the closure plan.	
(e) Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMMPr, and where applicable, the closure plan.	
Requirement	**Description**

Appendix 7 of Regulation 326 of the 2014 EIA Regulations, as amended contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these objectives & requirements were incorporated into this Audit Report.	
Objective	**Description**
(1) An Environmental audit report prepared in terms of these Regulations must contain -	
(a) Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.	
(b) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.	
(c) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.	
(d) A description of the methodology adopted in preparing the environmental audit report.	
(e) An indication of the ability of the EMMPr, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) Ensure compliance with the provisions of environmental authorisation, EMMPr, and where applicable, the closure plan.	
(f) A description of any assumptions made, and any uncertainties or gaps in knowledge.	
(g) A description of an consultation process that was undertaken during the course of carrying out the environmental audit report.	
(h) A summary and copies of any comments that were received during any consultation process.	
(i) Any other information requested by the competent authority.	

Any other requirements of the EA or any other authorisations must be incorporated into an Audit where necessary.

Condition 17 of the EA stipulates that the Holder must, within 7 calendar days of the submission of the audit report to the Competent Authority, notify all potential and registered I&APs of the submission and make the report available to anyone on request and on a publicly accessible website (if applicable).

10 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

Not Applicable.

11 NON-COMPLIANCE

Any person is liable on conviction of an offence in terms of regulation 49(a) of the National Environmental Laws Second Amendment Act (Act 30 of 2013) to imprisonment for a period not exceeding ten (10) years or to a fine not exceeding R10 million or 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 or the Holder of the EA if no representative is in place. It is the responsibility of the Holder of the EA, and not the ECO, to report such matters of non-compliance to the competent Authority.

11.1 PROCEDURES

The Holder of the EA shall comply with the environmental specifications and requirements of this EMMPr, any Approval / License issued and Section 28 of NEMA, on an on-going basis and any failure on his part to do so will entitle the authorities to **impose a penalty**[1].

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

- The competent authority shall issue a **Notice of Non-compliance** to the Holder of the EA, stating the nature and magnitude of the contravention.
- The Holder of the EA shall **act to correct the transgression** within the period specified in by the authority.
- The Holder of the EA shall provide the competent authority with a **written statement** describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Holder of the EA failing to remedy the situation within the predetermined time frame, the competent authority may recommend halting the activity.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the competent authority shall be entitled to undertake or to cause to be undertaken such **remedial works** as may be required to make good such damage at the cost of the Project applicant.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMMPr, disagreement regarding the implementation or method of implementation of conditions of the EMMPr, etc. any party shall be entitled to require that the issue be referred to **specialists and / or the competent authority** for determination.
- The competent authority shall at all times have the right to **stop work** and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

[1] A penalty may not necessarily be a monetary fine but could also be a stoppage in work time, additional mechanisms to prevent pollution or degradation at the cost of the proponent or even a directive to cease activities from the competent authority.

12 REFERENCES

Aquanotion, 2008. www.twoflush.com/conservbody.htm. Aquanotion Ltd, Alberta, Canada.

Cape EAPrac, 2022. *Basic Assessment Report for Molen Closer River Rehabilitation.* Cape Environmental Assessment Practitioners, George, South Africa.

Eartheasy, 2008. www.eartheasy.com - Solutions for Sustainable Living.

eHow Home, 2011. www.eHow.com - *How to Safely Dispose of Energy Efficient Light Bulbs*.

Lochner, P. 2005. *Guideline for Environmental Management Plans.* CSIR Report No ENV-S-C 2005-053H, Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.