



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

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PURPOSE OF THIS REPORT:

Environmental Management Programme

APPLICANT:

George Municipality

CAPE EAPRAC REFERENCE NO:

GEO752/06

SUBMISSION DATE

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Submitted for:

Stakeholder Review & Comment

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ORDER OF REPORT

Environmental Management Plan

- Appendix 1 : Locality Plans
- Appendix 2 : Site Plans
- Appendix 3 : Environmental Guidelines for construction
- Appendix 4 : EAP Company Profile
- Appendix 5 : Environmental Authorisation (Pending)

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ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

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

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

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

Requirement	Description
An indication of the persons who will be responsible for the implementation of the impact management actions.	<u>Section 5</u>
The time periods within which the impact management actions must be implemented.	Not Applicable
The mechanism for monitoring compliance with the impact management actions.	<u>Section 9</u>
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	<u>Section 9</u>
<p>An environmental awareness plan describing the manner in which –</p> <p>(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and</p> <p>(ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.</p>	<p><u>Section 5</u></p> <p><u>Section 6</u></p> <p><u>Section 7</u></p> <p><u>Section 8</u></p> <p><u>Section 9</u></p>
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.
EMPr	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 Programme (EMPr) which will be used to promote and ensure environmental monitoring and control during all relevant phases (pre-construction, construction and operational) 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). The area of main concern is located along erven 21150 & 21151 along Molen Close Street (Figure 2).

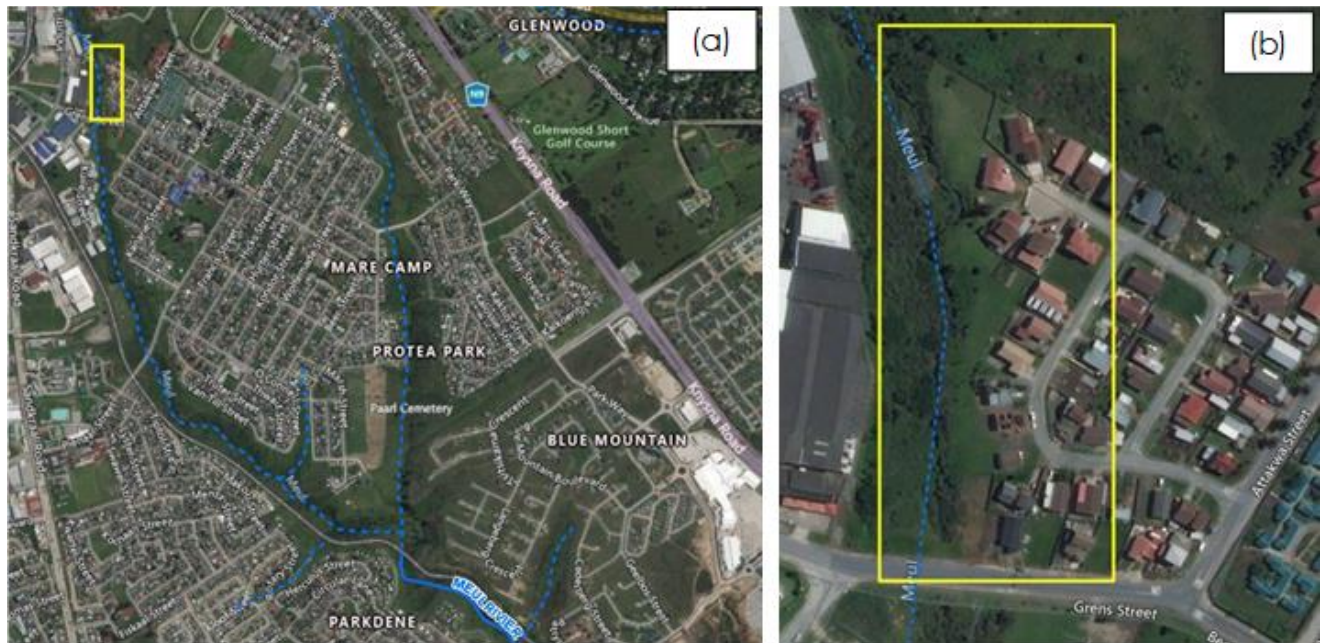


Figure 1: Location Plan

The site is located within the designated urban edge of George and is zoned Open Space I. To stabilize the embankment, the preferred alternative is to place gabions inside the perennial watercourse along erven 21150 & Erf 21151. The gabions will be positioned in a curving manner to preserve the flow's characteristics and to prevent further erosion (Figure 3). The stream will be partially diverted to facilitate construction of the gabion boxes. An existing Stormwater outlet is located on the perimeter of Erf 21150. The stormwater can be diverted by placing sandbags in the proposed area of construction (Figure 4). After construction, the streambed and embankments will be re-instated. Temporary access to the site will be via Grens Street which 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) before commencing. This document provides part of a series of documents that is being circulated for public and stakeholder input as part of the Environmental Impact Assessment (EIA) process, before being provided to the provincial competent authority, the provincial Department of Environmental Affairs & Development Planning (DEA&DP) for decision making.

This EMPr 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 best practice principles. The EMPr must be updated to include any conditions of the **Environmental Authorisation** (EA) as issued.



Figure 2: Locality of erven 21150 & 21151 (red outlined properties).

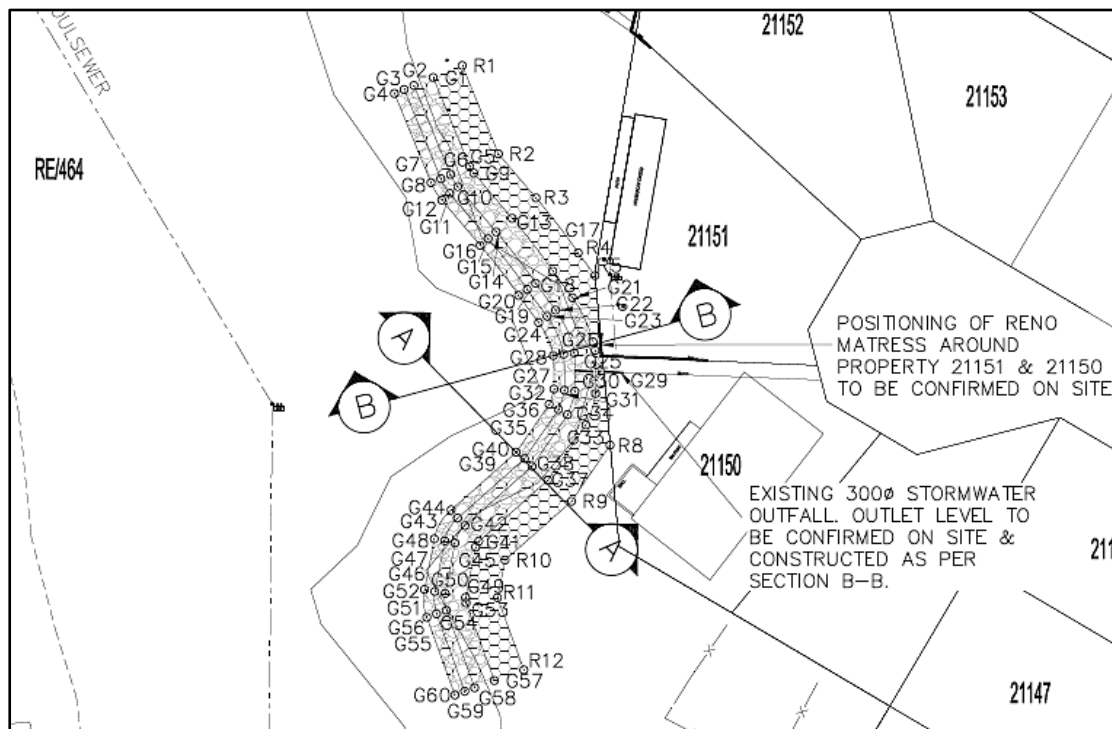


Figure 3: Position of gabions along Erf 21150 & Erf 21151.

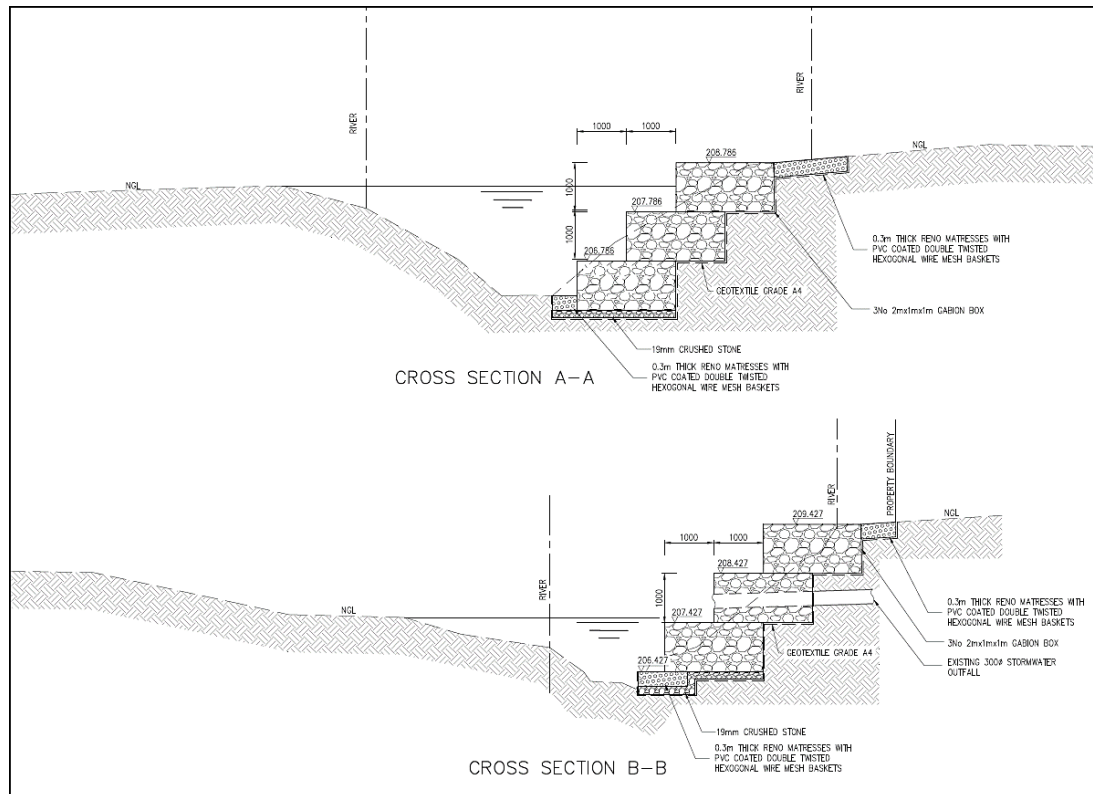


Figure 4: Generic Cross-Section for how gabions/reno mattresses will be installed along the riverbank.

1.1 PURPOSE OF THE EMPR

The purpose of this EMPr 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 EMPr). The EMPr must provide easily understood and clearly defined **actions** that must be implemented during each phase of the proposed activity. The EMPr 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 EMPr must be kept on site and all **senior personnel** are expected to familiarise themselves with the content of this EMPr.

Any changes or deviations to this EMPr must be authorised by the competent authority.

1.2 STATUS OF THE EMPR

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

The EMPr is valid for the duration of the project with each applicable phase corresponding to the identified requirements.

2 EMPR 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.

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.

2.3 OPERATIONAL PHASE

The Operation Phase of this project relates to the ongoing management required to ensure sustainable development within designated urban areas. In terms of this application, this refers to all activities that are undertaken once the site is handed over for residential use. Construction of houses undertaken during the operational phases must still apply the principles provided in terms of the Construction Phase of this EMPr.

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.

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.

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 (EMPr), of which this EMPr 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 EMPr 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 Terrestrial 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.

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 is in process.

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.

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 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 specialist impact assessments / studies were undertaken for the proposal:

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

The following environmental impacts of the proposed activity were identified and considered during the EIA 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**

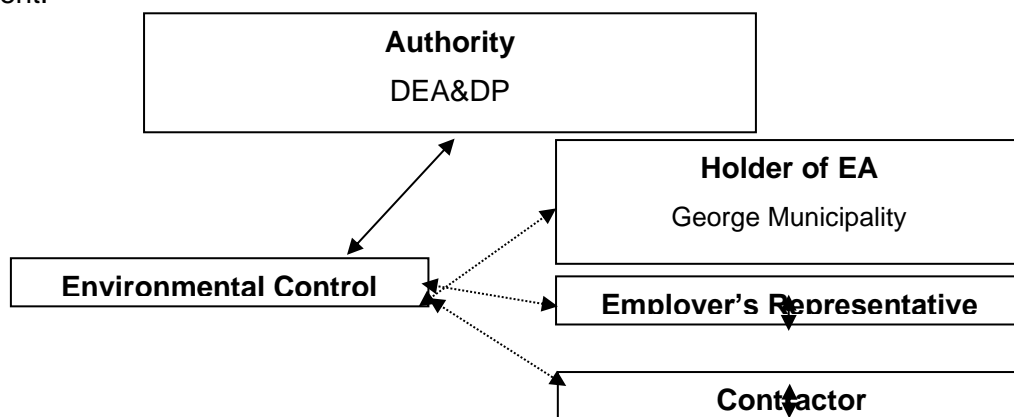
Table 2: List of Mitigation Measures & Associated Management Requirements

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
Mitigations / Recommendations					
Gabions must mimic the curved profile of the embankment		✓	✓		
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 construction activities will take place		✓	✓		
Stockpiles of materials must be placed outside the watercourse and protected areas		✓	✓		
Construction activities must be timed to coincide with a dry season		✓	✓		

Mitigation	Condition of Approval	Included in EMPr	Construction Phase	Operational Phase	Decommissioning Phase
Sandbags should be established upstream of the construction		✓	✓		
A flexible pipe should be used to transfer water from upstream		✓	✓		
Temporary straw-bales can be placed across the channel (downstream of the streambank)		✓	✓		
Development of a construction schedule		✓	✓		
Post-installation, stabilise exposed banks		✓		✓	
Gabions will be packed by manual labour		✓	✓		
No operating vehicles within 5m of the edge of the channel		✓	✓		
Oil and fuel leaks 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		✓	✓		
Chemical toilets (1 toilet / 10 persons)		✓	✓		
No mixing of cement / concrete on bare ground		✓	✓		
Instruct workers properly of the environment		✓	✓		
All gabions must be inspected on a routine basis		✓	✓	✓	
Rehabilitation scouring or undercutting caused by gabion weirs		✓	✓	✓	
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.		✓	✓	✓	
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.



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 Programme (EMPr) (& any other approval / licence / permit), as well as the management and maintenance of the open space areas (protected vegetation).

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 EMPr as well as any other legally binding documentation, which include and are not limited to:
 - the Municipal 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 environment 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.

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 EMPr 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 EMPr, 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 in complying with the EMPr, and in the event that any industry regulated standards are in contradiction with the EMPr or any other authorisations.
- Review and amend to any construction activities to align with the EMPr and Best Practice Principles;
- Ensure compliance of all site personnel and / or visitors to the EMPr and any other authorisations.

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, services, road works) as well as any maintenance work that must be undertaken that will involved 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 EMPr 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 EMPr;
- Compilation of Environmental Control Reports (ECR) to ensure compliance with the EA, EMPr 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 EMPr 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 environmental authorisation, permit or licence;
- Provide guidance and interpretation of the EA and EMPr 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.

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;
- 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 POST-CONSTRUCTION MAINTENANCE

Gabions should be inspected annually and after every large storm:

- Detect damages / abnormalities (bulging, broken components, corrosion of mesh baskets, vegetation growth or vandalism).
- Remove any vegetation growing out of the gabion boxes.
- Repair broken or damaged panels on site with extra rock and mesh panels.

- Sought advice from the Engineer if several gabion baskets are broken.
- Inspect the gabion baskets for differential settlement after each major storm event.

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

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 <u>STORMWATER MANAGEMENT PREPARATION</u>	
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 <u>GABION DESIGN</u>					
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 <u>STORMWATER MANAGEMENT</u>	
Management Statement	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
<p>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.</p> <p>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.</p>					
7.2 <u>DUST CONTROL</u>					
Management Statement			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
<p>The strategy should include the following amongst others:</p> <ul style="list-style-type: none"> • 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			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
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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	Impacts & Risks Avoided
To manage and minimise the nuisance effect created by construction traffic.	The development entrance access will be via Grens Street and construction traffic is likely to temporarily affect users.

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			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			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 <u>STORING FUELS & CHEMICALS</u>					
Management Statement			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 <u>MINIMISING EROSION</u>					
Management Statement			Impacts & Risks Avoided		
To minimise the quantity of soil lost during construction due to land-clearing.			<ul style="list-style-type: none"> 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			Impacts & Risks Avoided		
To ensure that degradation to existing botanical 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 <u>FAUNA MANAGEMENT</u>					
Management Statement			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 <u>SOCIAL REQUIREMENTS</u>					
Management Statement			Impacts & Risks Avoided		
To ensure equitable, fair and safe social interaction on construction sites			Loss of employment opportunities to the region		
Management Actions					

<p>a. It is strongly recommended that the Contractor make use of local labour as far as possible for the construction phase of the project.</p>					
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
<p>b. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the Developer and the Contractor.</p>					
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
<p>Targets</p> <ul style="list-style-type: none"> - 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. <p>Site Security</p> <p>Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor.</p> <p>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.</p>					
<p>7.12 <u>METHOD STATEMENTS</u></p>					
<p>Management Statement</p>			<p>Impacts & Risks Avoided</p>		
<p>To ensure efficient communication mechanisms in the implementation of environmental performance requirements</p>			<p>Prevention of potential impacts are avoided during construction by means of correct communication</p>		
<p>Management Actions</p>					

<p>a. Method statements are written submissions by the Contractor to the ECO in response to the requirements of this EMPr 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.</p>					
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
<p>Based on the specifications in this EMPr, 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):</p> <ul style="list-style-type: none"> • 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. • Beach work schedule and duration. • Stormwater Management and 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 EMP 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 <u>STORMWATER MANAGEMENT</u>					
Management Statement			Impacts & Risks Avoided		
To ensure management of stormwater during operation phase			<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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 <u>BOTANICAL / LANDSCAPING</u>	
Management Statement	Impacts & Risks Avoided
To ensure that indigenous vegetation is encouraged within urban areas.	<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> Rehabilitate with appropriate indigenous vegetation to promote soft landscaping. Replace vegetation if it dies off. 					

9 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;
- Incident Reports;
- Site meeting minutes.

9.1 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, EMPr, municipal permits and any other approvals

9.2 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 Environmental Audit should be undertaken one (1) year post construction.

9.3 AUDIT REPORTS FREQUENCIES AND FORMAT

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

Table 4: Audit Reports Timeframe Summary

ENVIRONMENTAL AUDIT TIMEFRAMES		
Type	Frequency	Criteria
Final Construction Audit	Two years post construction	Audit on operational aspects of the EA and EMPr

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 – <ul style="list-style-type: none"> (i) the level of compliance with the conditions of the environmental authorisation and the EMPr, and where applicable, the closure plan; and (ii) the extent to which the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan achieve the objectives and outcomes of the EMPr, 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 EMPr, and where applicable, the closure plan.	
(d) Identify shortcomings in the EMPr, and where applicable, the closure plan.	
(e) Identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr, and where applicable, the closure plan.	
Requirement	Description
(1) An Environmental audit report prepared in terms of these Regulations must contain -	
(a) Details of – <ul style="list-style-type: none"> (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 EMPr, and where applicable the closure plan to – <ul style="list-style-type: none"> (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; 	

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
(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, EMP, 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.

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 EMPr, 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 EMPr, disagreement regarding the implementation or method of implementation of conditions of the EMPr, 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

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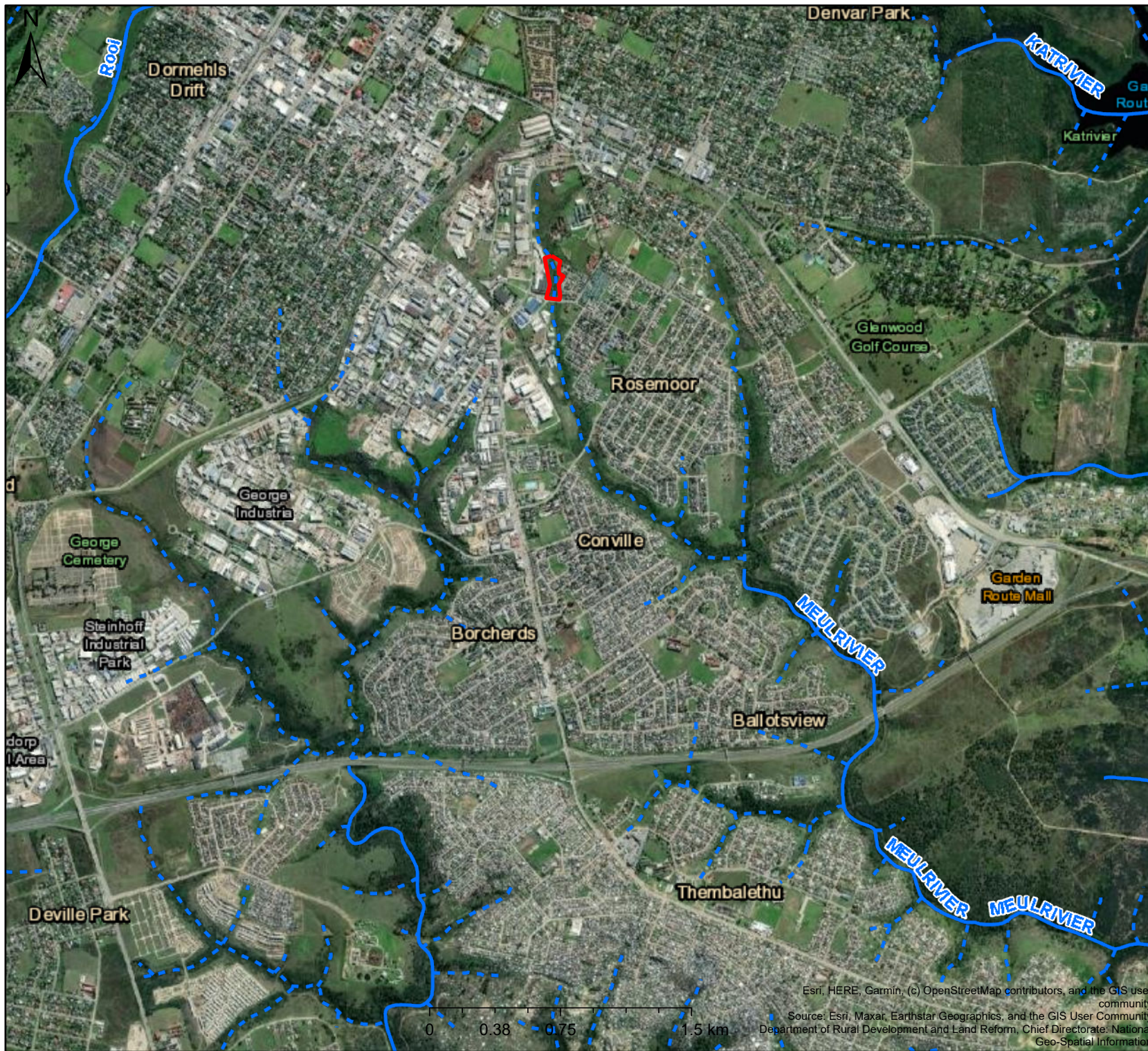
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Site Locality Map



Legend

Rivers

- Perennial
- - - Non-Perennial

Rivers (DWS)

- - - NonPerennial

Map Center: Lon: 22°28'34.8"E
Lat: 33°59'1.1"S

Scale: 1:36 112

Date created: July 27, 2022

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Department of Rural Development and Land Reform, Chief Directorate: National Geo-Spatial Information



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Site Locality Map

Legend

Rivers

- - - Non-Perennial

Map Center: Lon: 22°28'27.8"E
 Lat: 33°58'15.1"S

Scale: 1:4 514

Date created: July 27, 2022



**Western Cape
 Government**
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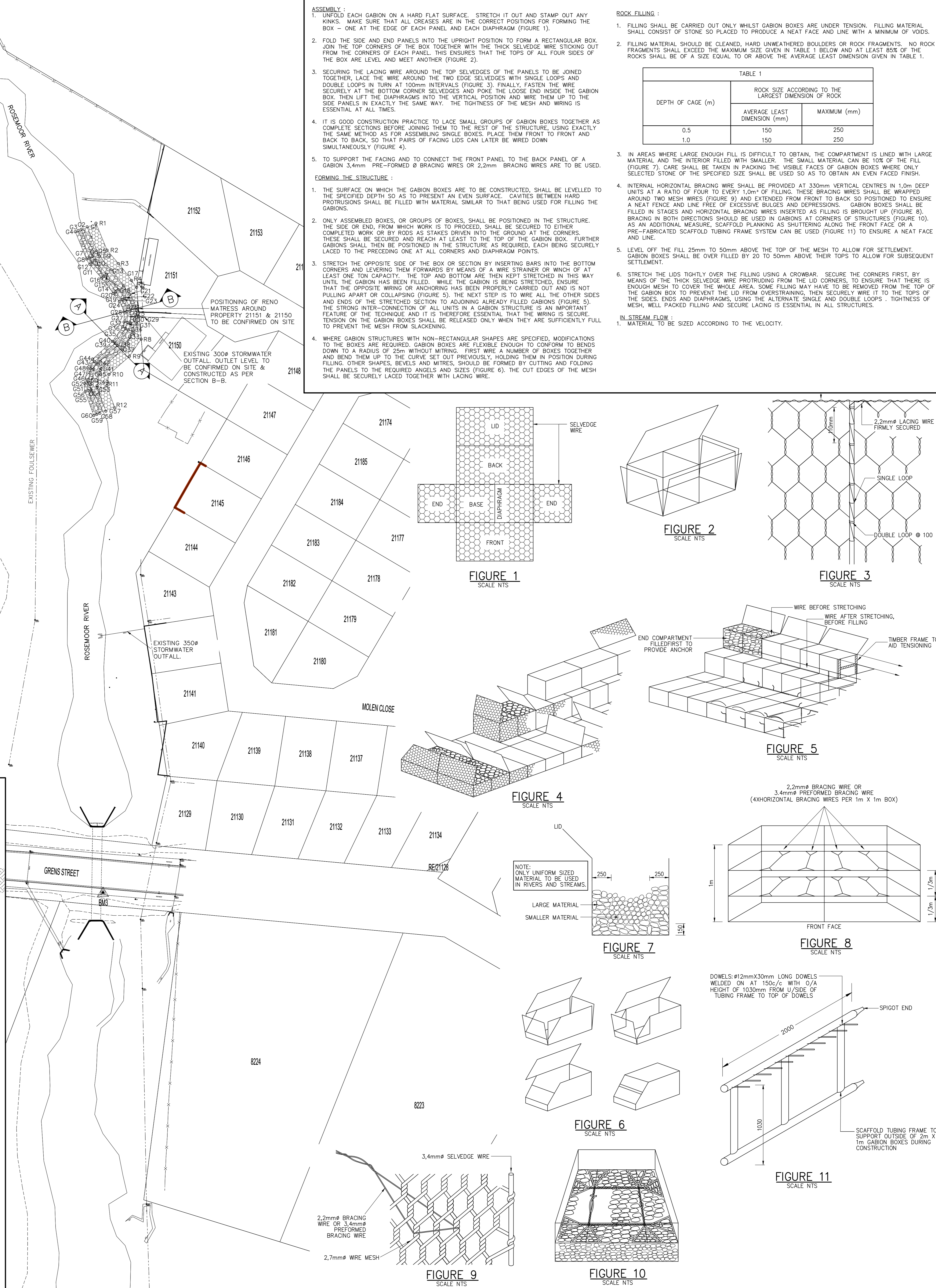
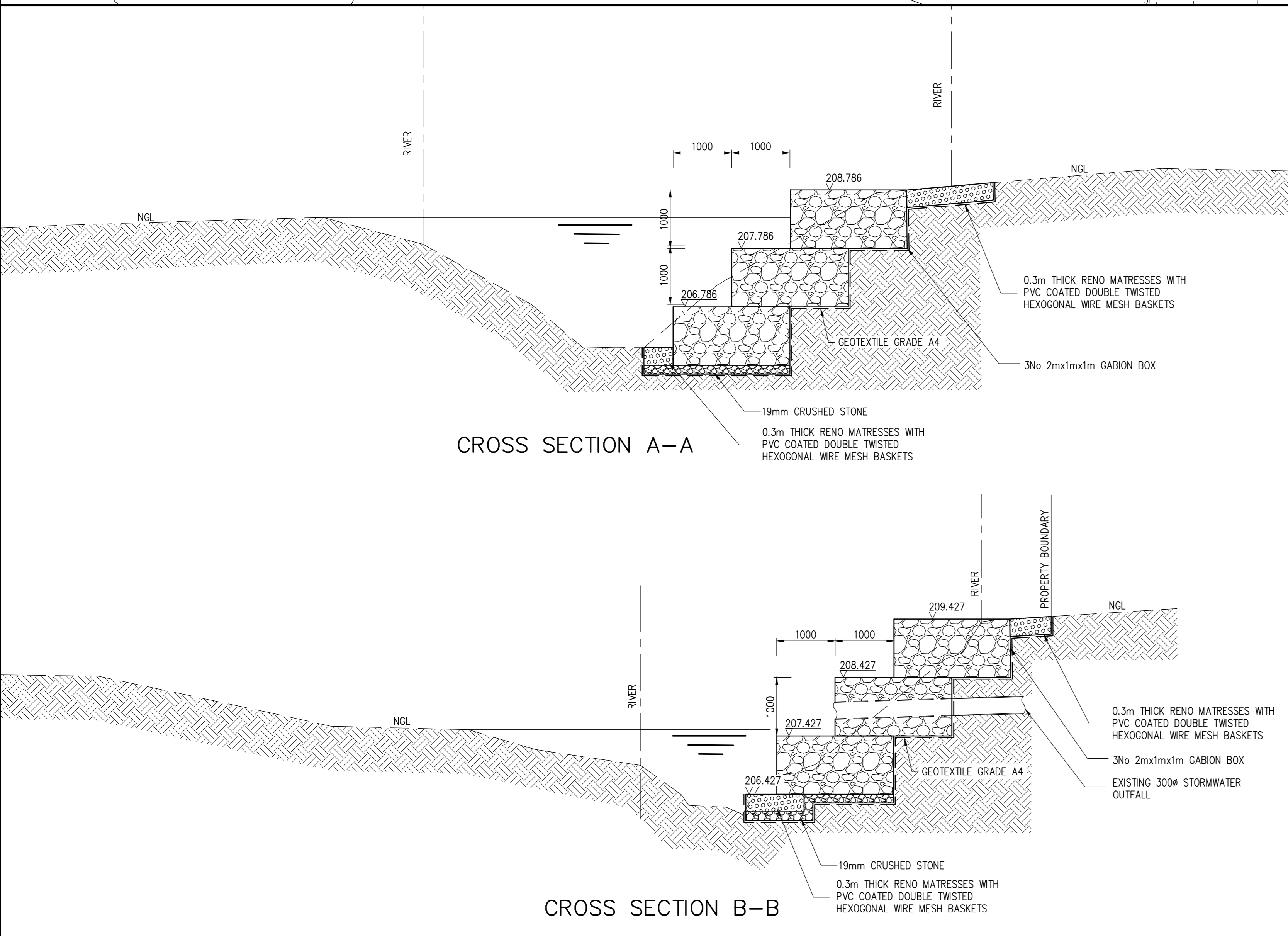
Agriculture

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 Department of Rural Development and Land Reform, Chief Directorate: National Geo-Spatial Information

GABIONS SETTING OUT COORDINATES WGS84			
POINT	Y-COORD 0.000	X-COORD 3 700 000	ELEVATION
G1	48538.620	3760472.101	209.781
G2	48540.470	3760472.860	209.781
G3	48541.396	3760473.239	208.781
G4	48542.321	3760473.618	207.781
G5	48535.129	3760480.618	209.612
G6	48536.980	3760481.376	209.612
G7	48537.905	3760481.755	208.612
G8	48538.831	3760482.135	207.612
G9	48534.761	3760481.222	209.613
G10	48536.285	3760482.518	209.613
G11	48537.047	3760483.165	208.613
G12	48537.809	3760483.813	207.613
G13	48531.095	3760485.533	209.647
G14	48532.619	3760486.829	209.647
G15	48533.381	3760487.477	208.647
G16	48534.143	3760488.125	207.647
G17	48527.213	3760490.586	209.576
G18	48528.840	3760491.750	209.576
G19	48529.653	3760492.332	208.576
G20	48530.467	3760492.914	207.576
G21	48525.341	3760493.118	209.507
G22	48526.949	3760494.307	209.507
G23	48527.754	3760494.901	208.507
G24	48528.558	3760495.496	207.507
G25	48523.167	3760498.152	209.422
G26	48525.157	3760498.387	209.422
G27	48526.152	3760498.508	208.422
G28	48527.147	3760498.633	207.422
G29	48523.102	3760502.254	209.150
G30	48525.098	3760502.055	209.150

GABIONS SETTING OUT COORDINATES WGS84			
POINT	Y-COORD 0.000	X-COORD 3 700 000	ELEVATION
G31	48526.096	3760501.951	208.150
G32	48527.094	3760501.843	207.150
G33	48524.050	3760505.268	208.996
G34	48525.792	3760504.271	208.996
G35	48526.667	3760503.779	207.996
G36	48527.546	3760503.291	206.996
G37	48527.685	3760510.537	208.731
G38	48529.193	3760509.201	208.731
G39	48529.012	3760508.482	207.734
G40	48530.701	3760507.865	206.731
G41	48534.269	3760516.363	208.468
G42	48535.594	3760514.865	208.468
G43	48536.302	3760514.157	206.660
G44	48536.919	3760513.368	206.468
G45	48534.587	3760516.920	208.437
G46	48536.550	3760516.536	208.437
G47	48537.531	3760516.344	207.437
G48	48538.513	3760516.152	206.437
G49	48535.529	3760521.732	208.618
G50	48537.492	3760521.348	208.618
G51	48538.473	3760521.156	207.618
G52	48539.455	3760520.964	206.618
G53	48535.487	3760522.266	208.602
G54	48537.367	3760522.950	208.602
G55	48538.306	3760523.292	207.602
G56	48539.246	3760523.634	206.602
G57	48532.793	3760529.669	208.632
G58	48534.672	3760530.353	208.632
G59	48535.612	3760530.695	207.632
G60	48536.551	3760531.037	206.632

RENO MATRESS SETTING OUT COORDINATES WGS84		
POINT	Y-COORD 0.000	X-COORD 3 700 000
R1	48535.844	3760470.963
R2	48532.399	3760479.370
R3	48528.810	3760483.590
R4	48524.773	3760488.840
R5	48522.934	3760491.328
R6	48520.182	3760497.814
R7	48520.109	3760502.535
R8	48521.451	3760506.783
R9	48525.424	3760512.542
R10	48531.773	3760518.161
R11	48532.478	3760521.763
R12	48529.974	3760528.643



- ASSEMBLY :**
- UNFOLD EACH GABION ON A HARD FLAT SURFACE. STRETCH IT OUT AND STAMP OUT ANY KINKS. MAKE SURE THAT ALL CREASES ARE IN THE CORRECT POSITIONS FOR FORMING THE BOX - ONE AT THE EDGE OF EACH PANEL AND EACH DIAPHRAGM (FIGURE 1).
 - FOLD THE SIDE AND END PANELS INTO THE UPRIGHT POSITION TO FORM A RECTANGULAR BOX. JOIN THE TOP CORNERS OF THE BOX TOGETHER WITH THE THICK SELVEDGE WIRE STICKING OUT FROM THE CORNERS OF EACH PANEL. THIS ENSURES THAT THE TOPS OF ALL FOUR SIDES OF THE BOX ARE LEVEL AND MEET ANOTHER (FIGURE 2).
 - SECURING THE LACING WIRE AROUND THE TOP SELVEDGES OF THE PANELS TO BE JOINED TOGETHER, LACE THE WIRE AROUND THE TWO EDGE SELVEDGES WITH SINGLE LOOPS AND DOUBLE LOOPS IN TURN AT 100mm INTERVALS (FIGURE 3). FINALLY, FASTEN THE WIRE SECURELY AT THE BOTTOM CORNER SELVEDGES AND POKE THE LOOSE END INSIDE THE GABION BOX. THEN LIFT THE DIAPHRAGMS INTO THE VERTICAL POSITION AND WIRE THEM UP TO THE SIDE PANELS IN EXACTLY THE SAME WAY. THE TIGHTNESS OF THE MESH AND WIRING IS ESSENTIAL AT ALL TIMES.
 - IT IS GOOD CONSTRUCTION PRACTICE TO LACE SMALL GROUPS OF GABION BOXES TOGETHER AS COMPLETE SECTIONS BEFORE JOINING THEM TO THE REST OF THE STRUCTURE, USING EXACTLY THE SAME METHOD AS FOR ASSEMBLING SINGLE BOXES. PLACE THEM FROM FRONT TO FRONT AND BACK TO BACK, SO THAT PAIRS OF FACING LIDS CAN LATER BE WIRED DOWN SIMULTANEOUSLY (FIGURE 4).
 - TO SUPPORT THE FACING AND TO CONNECT THE FRONT PANEL TO THE BACK PANEL OF A GABION 3.4mm PRE-FORMED BRACING WIRES OR 2.2mm BRACING WIRES ARE TO BE USED.

ROCK FILLING :

- FILLING SHALL BE CARRIED OUT ONLY WHILEST GABION BOXES ARE UNDER TENSION. FILLING MATERIAL SHALL CONSIST OF STONE SO PLACED TO PRODUCE A NEAT FACE AND LINE WITH A MINIMUM OF VOIDS.
- FILLING MATERIAL SHOULD BE CLEANED, HARD UNWEATHERED BOULDERS OR ROCK FRAGMENTS. NO ROCK FRAGMENTS SHALL EXCEED THE MAXIMUM SIZE GIVEN IN TABLE 1 BELOW AND AT LEAST 85% OF THE ROCKS SHALL BE OF A SIZE EQUAL TO OR ABOVE THE AVERAGE LEAST DIMENSION GIVEN IN TABLE 1.

DEPTH OF CAGE (m)	ROCK SIZE ACCORDING TO THE LARGEST DIMENSION OF ROCK	
	AVERAGE LEAST DIMENSION (mm)	MAXIMUM (mm)
0.5	150	250
1.0	150	250

- FORMING THE STRUCTURE :**
- THE SURFACE ON WHICH THE GABION BOXES ARE TO BE CONSTRUCTED, SHALL BE LEVELLED TO THE SPECIFIED DEPTH SO AS TO PRESENT AN EVEN SURFACE. CAVITIES BETWEEN HARD PROTRUSIONS SHALL BE FILLED WITH MATERIAL SIMILAR TO THAT BEING USED FOR FILLING THE GABIONS.
 - ONLY ASSEMBLED BOXES, OR GROUPS OF BOXES, SHALL BE POSITIONED IN THE STRUCTURE. THE SIDE OR END, FROM WHICH WORK IS TO PROCEED, SHALL BE SECURED TO EITHER COMPLETED WORK OR BY RODS AS STAKES DRIVEN INTO THE GROUND AT THE CORNERS. THESE SHALL BE SECURED AND REACH AT LEAST TO THE TOP OF THE GABION BOX. FURTHER GABIONS SHALL THEN BE POSITIONED IN THE STRUCTURE AS REQUIRED, EACH BEING SECURELY LACED TO THE PRECEDING ONE AT ALL CORNERS AND DIAPHRAGM POINTS.
 - STRETCH THE OPPOSITE SIDE OF THE BOX OR SECTION BY INSERTING BARS INTO THE BOTTOM CORNERS AND LEVERING THEM FORWARD BY MEANS OF A WIRE STRAINER OR WINCH OF AT LEAST ONE TON CAPACITY. THE TOP AND BOTTOM ARE THEN KEPT STRETCHED IN THIS WAY UNTIL THE GABION HAS BEEN FILLED. WHILE THE GABION IS BEING STRETCHED, ENSURE THAT THE OPPOSITE WIRING OR ANCHORING HAS BEEN PROPERLY CARRIED OUT AND IS NOT PULLING APART OR COLLAPSING (FIGURE 5). THE NEXT STEP IS TO WIRE ALL THE OTHER SIDES AND ENDS OF THE STRETCHED SECTION TO ADJOINING ALREADY FILLED GABIONS (FIGURE 5). THE STRONG INTER-CONNECTION OF ALL UNITS IN A GABION STRUCTURE IS AN IMPORTANT FEATURE OF THE TECHNIQUE AND IT IS THEREFORE ESSENTIAL THAT THE WIRING IS SECURE. TENSION ON THE GABION BOXES SHALL BE RELEASED ONLY WHEN THEY ARE SUFFICIENTLY FULL TO PREVENT THE MESH FROM SLACKENING.
 - WHERE GABION STRUCTURES WITH NON-RECTANGULAR SHAPES ARE SPECIFIED, MODIFICATIONS TO THE BOXES ARE REQUIRED. GABION BOXES ARE FLEXIBLE ENOUGH TO CONFORM TO BENDS DOWN TO A RADIUS OF 25m WITHOUT MITRING. FIRST WIRE A NUMBER OF BOXES TOGETHER AND BEND THEM UP TO THE CURVE SET OUT PREVIOUSLY, HOLDING THEM IN POSITION DURING FILLING. OTHER SHAPES, BEVELS AND MITRES, SHOULD BE FORMED BY CUTTING AND FOLDING THE PANELS TO THE REQUIRED ANGLES AND SIZES (FIGURE 6). THE CUT EDGES OF THE MESH SHALL BE SECURELY LACED TOGETHER WITH LACING WIRE.

- INTERNAL HORIZONTAL BRACING WIRE SHALL BE PROVIDED AT 330mm VERTICAL CENTRES IN 1.0m DEEP UNITS AT A RATIO OF FOUR TO EVERY 1.0m² OF FILLING. THESE BRACING WIRES SHALL BE WRAPPED AROUND TWO MESH WIRES (FIGURE 9) AND EXTENDED FROM FRONT TO BACK SO POSITIONED TO ENSURE A NEAT FACE AND LINE FREE OF EXCESSIVE BULGES AND DEPRESSIONS. GABION BOXES SHALL BE FILLED IN STAGES AND HORIZONTAL BRACING WIRES INSERTED AS FILLING IS BROUGHT UP (FIGURE 8). BRACING IN BOTH DIRECTIONS SHOULD BE USED IN GABIONS AT CORNERS OF STRUCTURES (FIGURE 10). AS AN ADDITIONAL MEASURE, SCAFFOLD PLANKING AS SHUTTERING ALONG THE FRONT FACE OR A PRE-FABRICATED SCAFFOLD TUBING FRAME SYSTEM CAN BE USED (FIGURE 11) TO FORM A NEAT FACE AND LINE.
- LEVEL OFF THE FILL 25mm TO 50mm ABOVE THE TOP OF THE MESH TO ALLOW FOR SETTLEMENT. GABION BOXES SHALL BE OVER FILLED BY 20 TO 50mm ABOVE THEIR TOPS TO ALLOW FOR SUBSEQUENT SETTLEMENT.
- STRETCH THE LIDS TIGHTLY OVER THE FILLING USING A CROWBAR. SECURE THE CORNERS FIRST, BY MEANS OF THE THICK SELVEDGE WIRE PROTRUDING FROM THE LID CORNERS, TO ENSURE THAT THERE IS ENOUGH MESH TO COVER THE WHOLE AREA. SOME FILLING MAY HAVE TO BE REMOVED FROM THE TOP OF THE GABION BOX TO PREVENT THE LID FROM OVERTRAINING, THEN SECURELY WIRE IT TO THE TOPS OF THE SIDES, ENDS AND DIAPHRAGMS, USING THE ALTERNATE SINGLE AND DOUBLE LOOPS. TIGHTNESS OF MESH, WELL PACKED FILLING AND SECURE LACING IS ESSENTIAL IN ALL STRUCTURES.

IN STREAM FLOW :

- MATERIAL TO BE SIZED ACCORDING TO THE VELOCITY.

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GENERAL NOTES:

- ALL WORK TO BE EXECUTED IN ACCORDANCE WITH RELEVANT SECTIONS OF SABS 1200 AND THE PROJECT SPECIFICATIONS.
- THIS DRAWING IS NOT TO BE SCALED.
- THE CONTRACTOR SHALL CHECK THE POSITION OF GABION BOXES, PRIOR TO COMMENCING ANY CONSTRUCTION. POSITIONING TO BE CONFIRMED ON SITE BY THE ENGINEER.

LEGEND

- GABION BOXES
- RENO MATRESS
- STORMWATER PIPE

BA	DATE	ML	INIT	DESCRIPTION
17/08/2022				ISSUE FOR APPROVAL
				REVISION

NADESON CONSULTING SERVICES
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 PO Box 51121, V&A Waterfront, 8002.
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 E cape@nadeson.net

Client	GEORGE MUNICIPALITY		
Project	ROSEMOOR RIVER		
Drawing Title	GABION SETTING OUT LAYOUT		
Design	ML	Design Check	AD
Drawn	ML	Checked	AD
Date	17/08/2022	Scale	1:500
Project No	E025	Drawing No	C0001
		Revision	0A

- GENERAL NOTES:
1. ALL WORK TO BE EXECUTED IN ACCORDANCE WITH RELEVANT SECTIONS OF SABS 1200 AND THE PROJECT SPECIFICATIONS.
 2. THIS DRAWING IS NOT TO BE SCALED.
 3. THE CONTRACTOR SHALL CHECK THE POSITION OF CAGON BOXES, PRIOR TO COMMENCING ANY CONSTRUCTION. POSITIONING TO BE CONFIRMED ON SITE BY THE ENGINEER.



NO.	DATE	INIT	DESCRIPTION
1	17/08/2022	ML	ISSUE FOR APPROVAL

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Consultant Signature

CLIENT
 GEORGE MUNICIPALITY

Project
 ROSEMOOR RIVER

Drawing Title
 SITE PLAN

Design	ML	Design Check	AD
Drawn	ML	Checked	AD
Date	17/08/2022	Scale	1:500
Project No	E025	Drawing No	C6000
		Revision	0A

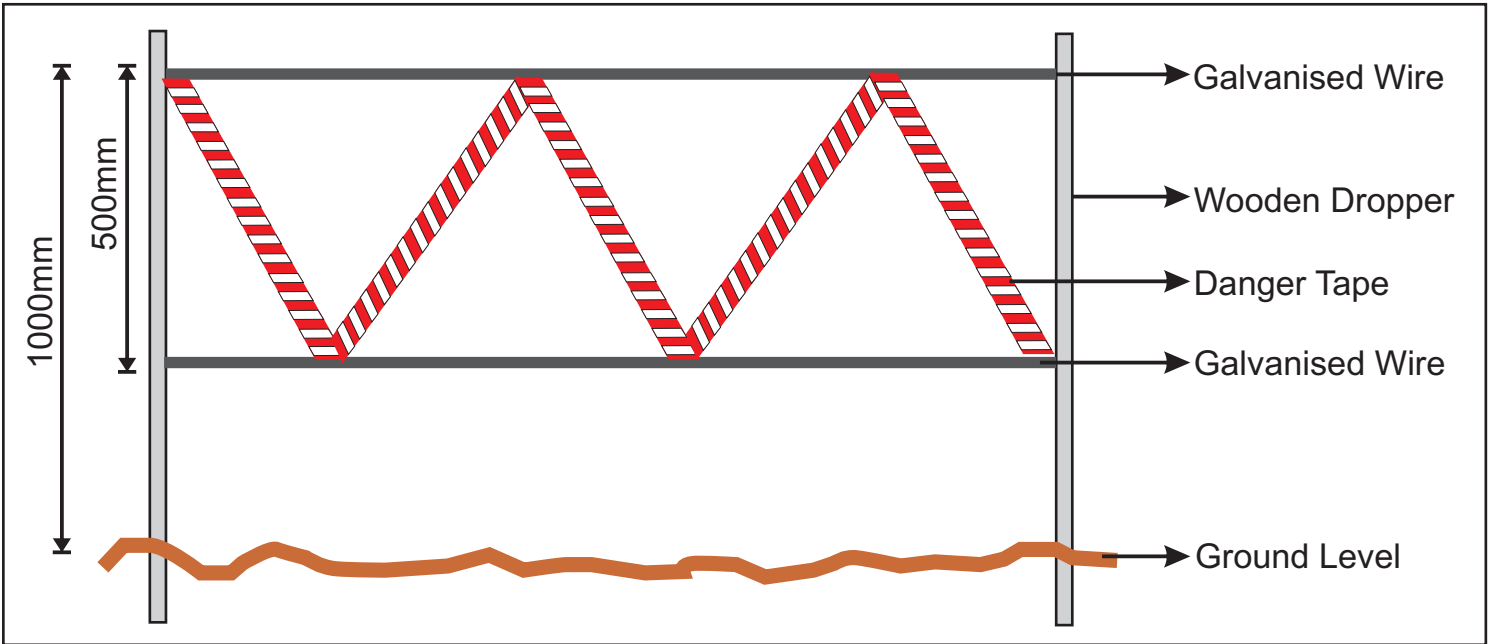


Plate A: Showing a cross section of a typical method of demarcation of no-go areas.

Where demarcation is required on a down slope, it can be more cost effective to include the required silt protection mechanisms on the same support structure as the demarcation. This is detailed in **Plate B** below and must be read in conjunction with the details on erosion control included in the previous diagram.

GENERAL CONSIDERATIONS FOR DEMARCATION OF NO GO AREAS

- The demarcation must include all areas that are going to be disturbed in the total construction (including all service lines)
- The no -go areas may not be accessed by any person (including lunch, tea breaks etc.). Without the explicit written permission from te ECO.
- Maximum fines will be issued for any non compliance with regards to the no go policy.

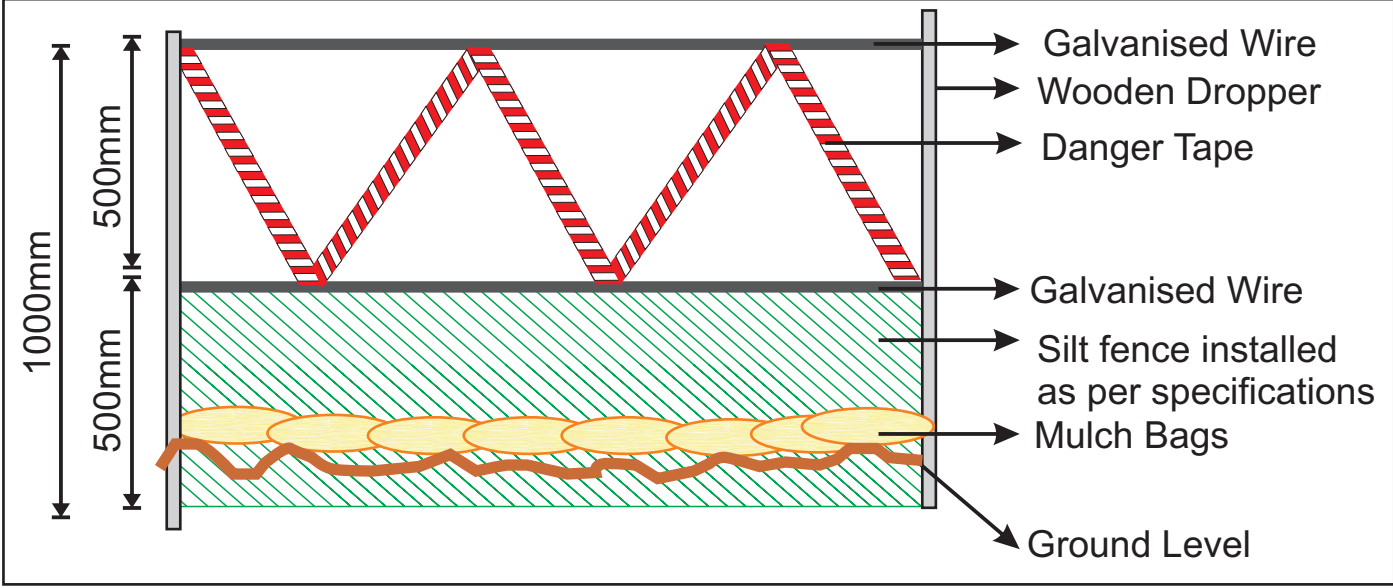
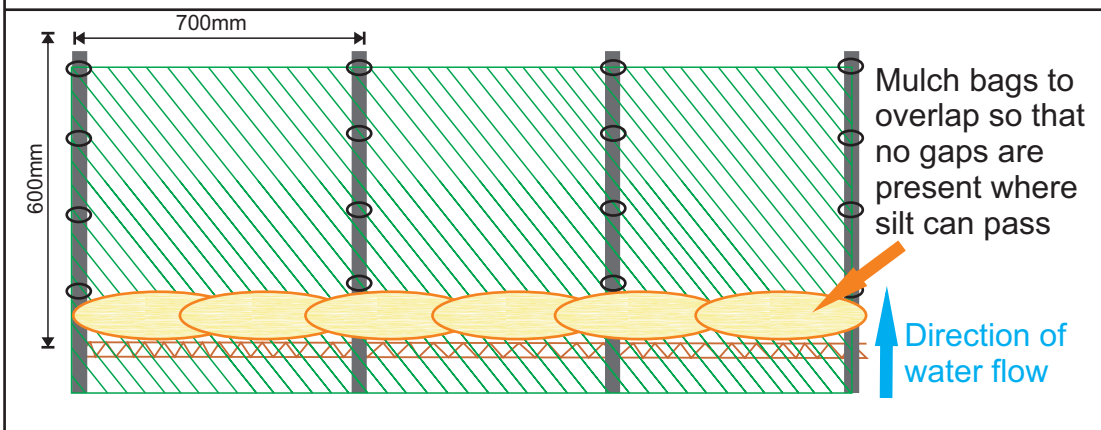


Figure 1: Demarcation of No - Go Areas During Construction



Cape Environmental Assessment Practitioners (Pty) Ltd

Frontal View



The purpose of a silt fence is to create a temporary barrier to maintain sediment on a construction site in order to prevent soil erosion and pollution through sediment and nutrient loading. Silt fences are designed to detain sediment from the disturbed construction area and also prevent sheet erosion by decreasing the velocity of the run off.

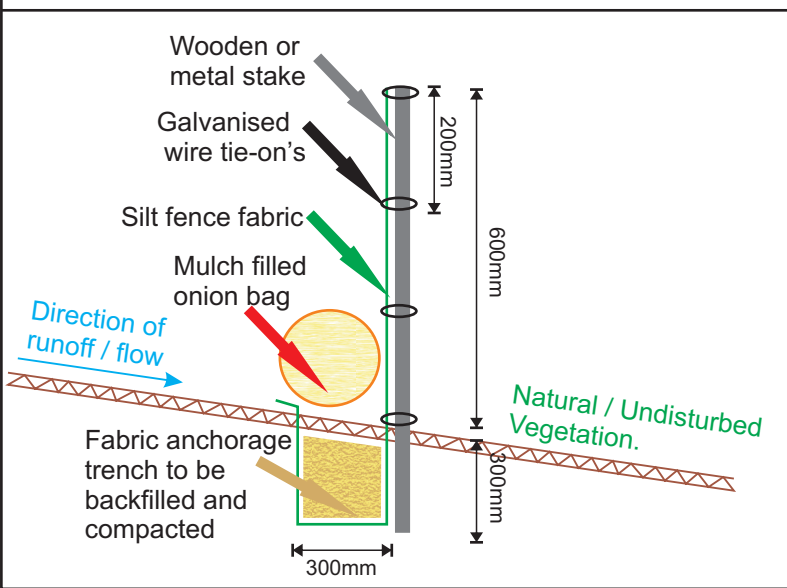
Technical Specifications

- Silt fence fabric to consist out of 50% shade cloth or a geotextile such as biddim (if biddim is used, it is not necessary to place mulch bags).
- Wooden droppers are suitable for the stakes. If the construction program takes place over an extended time frame it may be necessary to use treated droppers or metal stakes.
- The support stakes should not be placed further than 700mm apart on the down slope side of the fabric.
- The fabric should be secured to the stakes using galvanised wire ties not further than 200mm apart.
- The fabric anchorage trench should be at least 300mm deep.

Planning, Placing and Maintenance

- The silt fence is to be installed on all disturbed slopes where sheet erosion may take place.
- This type of silt fence is not suitable for areas where water is concentrated. i.e. gulleys and storm-water outlets.
- The silt fences should be along the contour lines
- The rows of silt fences should be bowed to prevent erosion and loss of silt on the ends of the fence line.
- Silt fences should be inspected weekly and before every forecast rainfall event. Any damage must be repaired immediately.
- Silt deposits should be cleared after each rainfall event. **CLEARED SILT MUST NOT BE PLACED DOWN SLOPE OF THE FENCE.**

Cross-section View



Top View

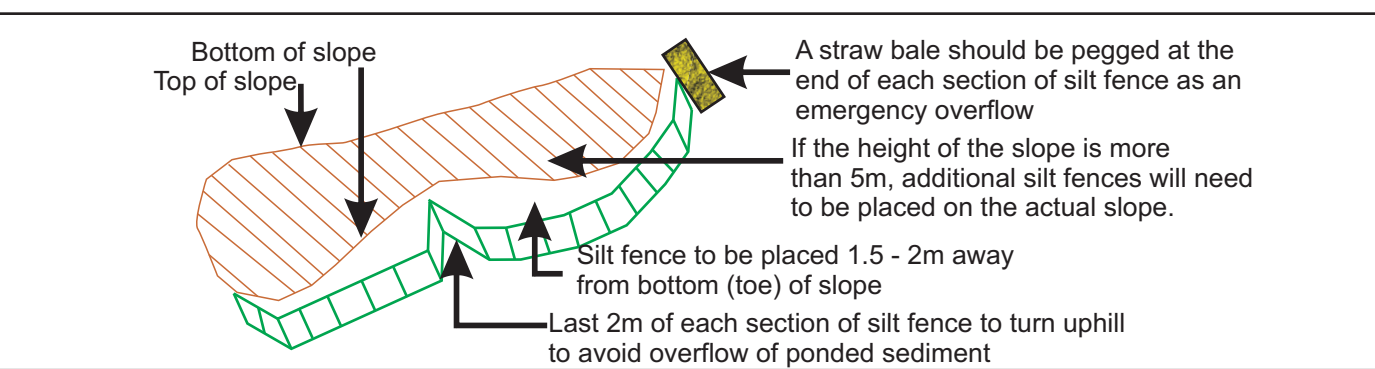
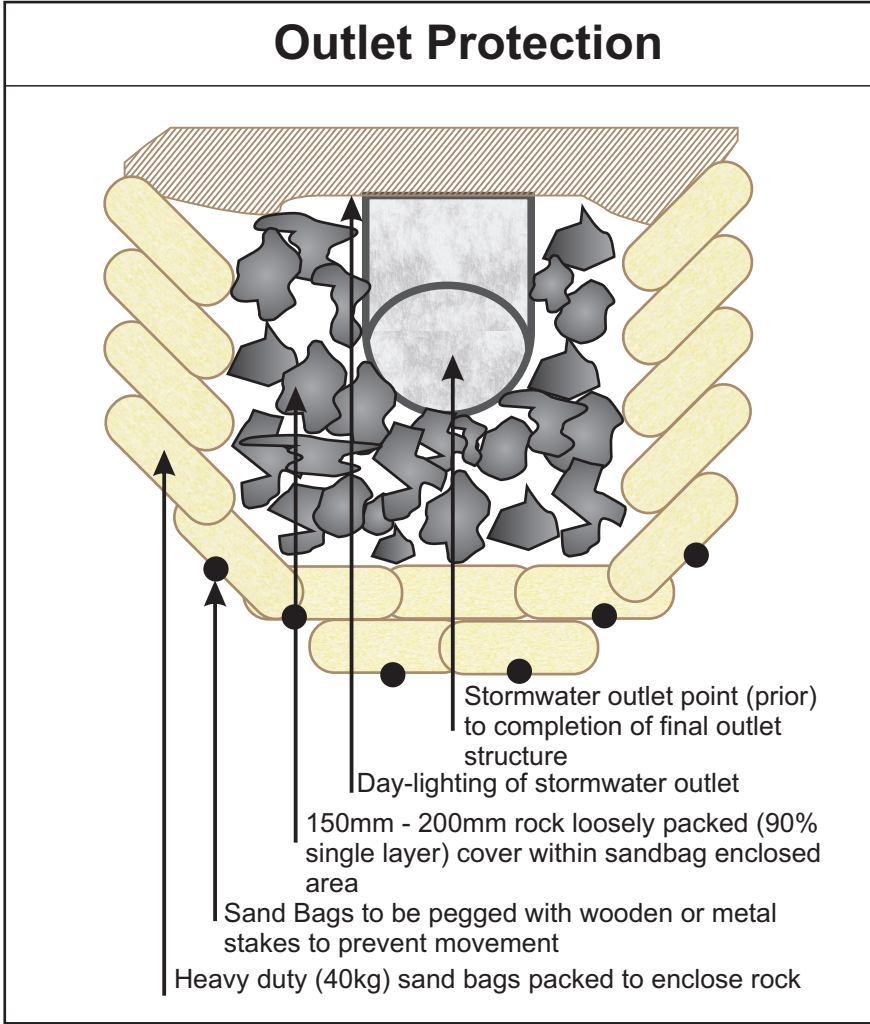
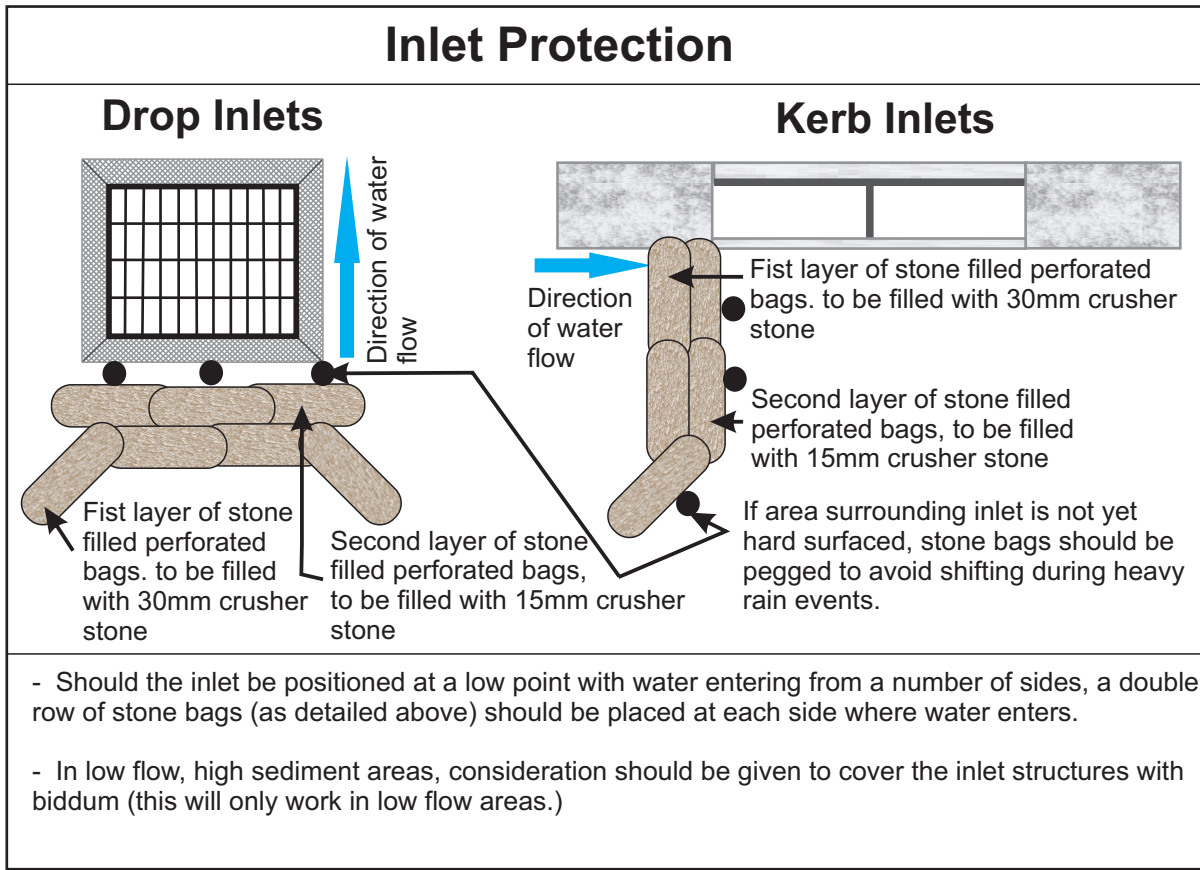


Figure 2: Specifications for Silt Fences





- The methodology referred to above is effective as a temporary measure to be used during construction and is in no way intended to replace the permanent measures that must be installed. These permanent measures must be constructed as per the engineers specifications.
- Stormwater systems should ideally be constructed during low rainfall periods in order to allow for permanent protection measures to be put in place before the rainy season.
- Consideration should be given to encase the outlet structure with a geo-fabric such as biddum. This should first be clarified with the site engineer to ensure compatibility with the stormwater system.

Figure 3: Specifications for Temporary Stormwater Management During Construction

Key Environmental Considerations for Haul Roads

The most important environmental factor to be considered regarding access and haul roads, is the location thereof. Haul roads should be designed to make use of future permanent internal roads and access points.

The haul roads should never be construction in areas that will not be permanently transformed with the development. Nor should they be constructed in any sensitive area.

Another safety and environmental hazard caused by haul road surface is dust problems. Roads should be designed with enough fines to act as binders for the larger particles. However, an excess of fines will result in these particles being released to the atmosphere when repeated stress is applied by the equipment tires. All haul roads that do not have a "sealed" surface, will create dust. The dust problem is mainly dealt with by application of water.

Minimisation of Dust on Haul Roads

- Every effort to minimize dust pollution on the site must be undertaken.
- Construction vehicles must adhere to speed limits and minimization of haul roads must be implemented. During dry, dusty periods haul roads should be kept dampened to prevent excess dust.
- No potable water may be used for damping haul roads.
- As an alternative, products such as road environment dust suppressants (Reds) would be recommended in order to minimize the use of water for controlling dust pollution. This is to be determined by the ECO during construction as required.

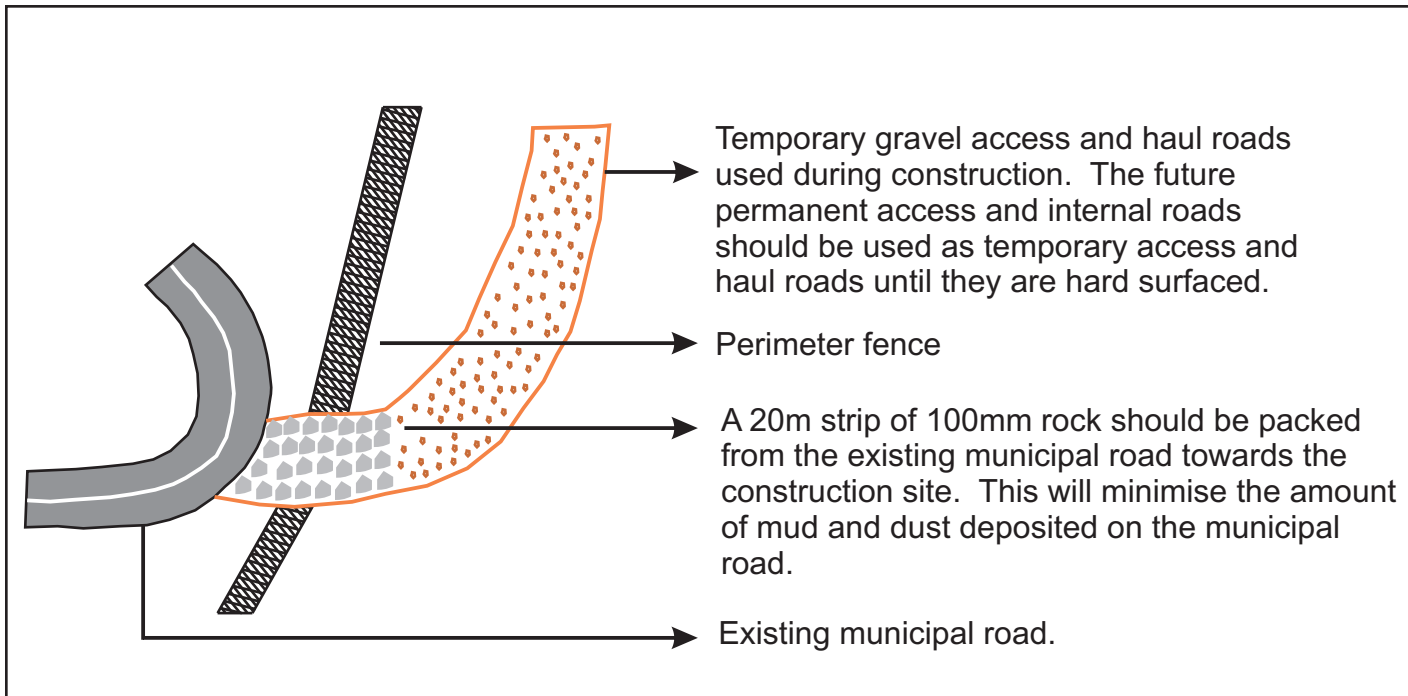


Figure 4: Management of Haul and Access Control During Construction



Cape Environmental Assessment
Practitioners (Pty) Ltd



Cape EAPrac Company Profile

Registered Environmental Assessment Practitioner:
Number 2019/1444

Cape Environmental Assessment Practitioners (Pty) Ltd was established in March 2008 by Directors **Doug Jeffery** and **Louise-Mari van Zyl**. The full time professional team includes: **Melissa Mackay** (Practitioner / GIS / ECO), **Dale Holder** (Practitioner / GIS / ECO), **Siân Holder** (Practitioner / Environmental Education), **Onke Nandipha** (Junior Practitioner / ECO) and **Carin Naudé** (Business Administrator).

The firm implements legislation under the National Environmental Management Act (NEMA), National Environmental Management: Waste Act (NEM:WA) and the National Environmental Management: Air Quality Act (NEM:AQA).

Our main services include:

- Environmental Impact Assessments (EIA's & Basic Assessments)
- Environmental Management Policies & Plans (EMMP's)
- Environmental Control & Monitoring (ECO)
- Environmental Audits
- Environmental Education & Interpretation
- Environmental Constraints Analysis
- Public Participation & Stakeholder Engagement
- Outeniqua Sensitive Coastal Area Permits (OSCA)
- Forestry Applications (for removal/pruning of protected species)
- GIS & Mapping
- Retrospective Damage Assessment (Section 24G)
- Rehabilitation Plans
- Coastal Water Discharge Permits
- Air Quality Licence Applications (AEL's)
- Waste Management Licence Applications (Waste Licence)

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Cape Environmental Assessment Practitioners (Pty) Ltd



The Team

Doug Jeffery - Director

Doug Jeffery obtained a Bsc with majors in Botany and Zoology at the University of Cape Town (UCT) and went on to obtain his MSc in Botany also at UCT. He has worked extensively in the Western-, Southern- and Eastern Cape both as a professional Botanist and co-ordinating EIA processes for over 20 years. He has been registered with the South African Council for Natural Scientific Professions as a Natural Scientist since 1990. He is also registered with the Environmental Assessment Practitioners Association of South Africa.



email: doug@dougjeff.co.za

Melissa Mackay Senior Practitioner / GIS / ECO

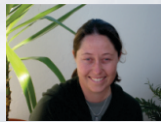
Melissa obtained her National Diploma in Nature Conservation from PE Technicon in 1996 and a BTech from NMMU in 2013. She gained experience in various fields, including animal handler & farm manager in the United Arab Emirates (1997-1999), Tourism Manager for the Western Cape Nature Conservation Board (now Cape Nature) and onboard observer on commercial fishing vessels. She started working as an Environmental Practitioner in 2006. Her main duties include Process Management for Environmental Impact Assessment, GIS & Mapping, Damage Assessments, Environmental Management Plans, ECO and Public Participation. She is registered as an EAP with the Environmental Assessment Practitioners Association of South Africa.



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Siân Holder - Practitioner / ECO

Siân has a National Diploma in Nature Conservation, a BTech Nature Con (NMMU) and a Masters Degree in Environmental Education (Rhodes University). She worked at Tsitsikamma National Park as an Environmental Education Officer on environmental education programmes for Wilderness Foundation SA. She then served as the Experiential Education Manager and wilderness guide for Wilderness Foundation. She joined the environmental consulting vocation in 2008.



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Louise-Mari van Zyl Director / Principal Practitioner



Louise-Mari van Zyl holds a Masters degree in Geography & Environmental Sciences from the University of Stellenbosch. She worked as an Environmental Assessment Practitioner (EAP) since 2002 on projects in the Eastern, Southern, Western & Northern Cape provinces. She is registered as an EAP with the Environmental Assessment Practitioners Association of South Africa.

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Dale Holder Senior Practitioner / GIS / ECO

Dale graduated from the Technicon Pretoria in 1999 with a National Diploma in Nature Conservation. He worked as a Socio-Ecologist for SANParks and as Project Manager for the Department of Marine and Coastal Management. He started working as an environmental practitioner in 2002. He has experience in Environmental Planning, Environmental Management Plans and Frameworks, Process Management of Environmental Impact Assessments, GIS & Mapping, Environmental Control and Rehabilitation Management & Design.



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Carin Naudé Business Administrator

Carin obtained a BBA degree through UNISA. She gained extensive experience in business management and administration since 1988. She joined Cape EAPrac in June 2008 and is responsible for the day to day administrative functions of the business. Her acquired knowledge and leadership skills enables the rest of the team to function efficiently in their respective fields.



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Onke Nandipha Junior Practitioner / ECO

Onke obtained a BSc in Environmental Sciences (2017) and a BSc Honours in Geography in 2018. He is appointed to gain practical knowledge and experience in the environmental management field. His excellent communication skills in both English and Xhosa, combined with his knowledge and understanding of environmental management makes him a valuable asset on projects where language barriers are a constraint.



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PROJECT EXPERIENCE INCLUDES

Reverse Osmosis Desalination; Sensitive Environmental Management including National Parks/Conservation Areas & World Heritage Sites; Renewable Energy Projects (Solar & Wind); Waste Management License Applications for Waste Disposal Sites, Sewerage Plants & Abattoirs; Waste-to -Energy Projects including Biogas Facilities; Marine Aquaculture; Filling Stations; Air Emission Processes for Sawmills, Brick Works & Processing Plants; ECO responsibilities on Private & State Housing Developments, Provincial & Municipal Roads and Infrastructure, Private, Provincial & Municipal applications for development of infrastructure, housing & commercial components

LIST OF ONGOING **CAPE EAPRAC**
PROJECTS IS AVAILABLE
ON REQUEST.
PLEASE VISIT OUR
WEBSITE FOR MORE DETAILS
www.cape-eaprac.co.za

