



Eco Route
Environmental Consultancy

REGISTRATION NO. 1998/031976/23

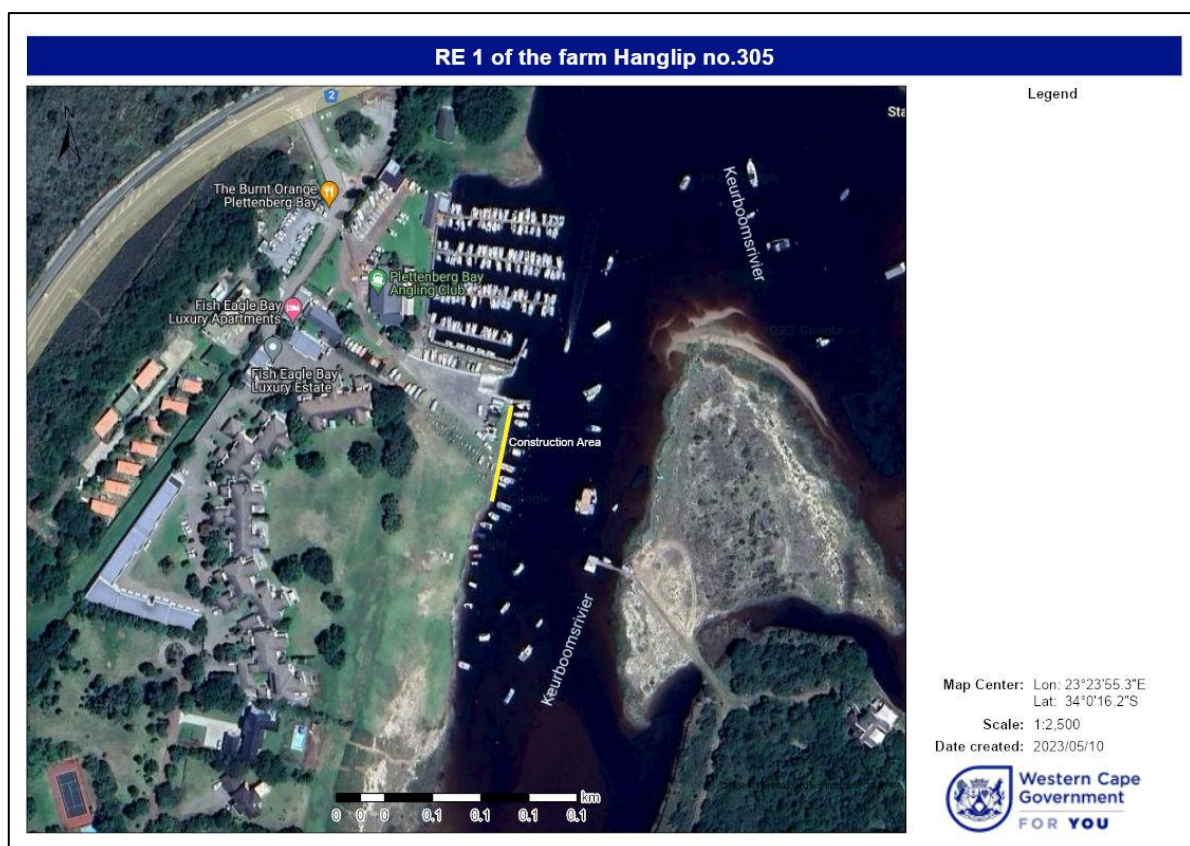
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ENVIRONMENTAL MANAGEMENT AND MAINTENANCE PROGRAMME

In terms of the **National Environmental Management Act** (Act No. 107 of 1998, as amended) & 2014 Environmental Impact Regulations as amended for:

Proposed Stabilisation of a Portion of The Keurbooms River Embankment South of the Plettenberg Bay Angling Club, RE 1 of the farm Hanglip No.305



Date: July 2025

Compiled by: Samantha Teeluckdhari (2023/6443)
Assisted by: Lizelle Genade (Candidate 2023/7793)
Reference: DEA&DP 16/3/3/1/D1/3/0010/25

EAP Signature: S. Teeluckdhari

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STATEMENT OF INDEPENDENCE

I, **Samantha Teeluckdhari** of Eco Route Environmental Consultancy, in terms of section 33 of the NEMA, 1998 (Act No. 107 of 1998), as amended, hereby declare that I provide services as an independent Environmental Assessment Practitioner (EAPASA Reg: **2023/6443**) and receive remuneration for services rendered for undertaking tasks required in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), and the Environmental Impact Assessment Regulations, 2014 (as amended). I have no financial or other vested interest in the project.

ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS:

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

(1) An EMP must comply with section 24N of the Act and include:-

(a) Details of – i) The EAP who prepared the EMP; and ii) The expertise of the EAP to prepare an EMP, including a curriculum Vitae;	This EMP was prepared by Samantha Teeluckdhari of Eco Route Environmental Consultancy. Samantha has a BSS Geography and Environmental Management degree and has 9 years' experience as an Environmental Assessment Practitioner, of which she has spent 8 years at Eco Route. Lizelle Genade of Eco Route Environmental Consultancy has assisted with the compilation of this EMP. Lizelle has a BA. Honours in Environmental Management and is a Candidate EAP. Please see attached CV of the EAP (Appendix 1).
(b) A detailed description of the aspects of the activity that are covered by the EMP as identified by the project description;	Section 1 and 2
(c) a map at an appropriate scale which superimposes the proposed activity, it associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 3
(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities;	Sections 6, 7, 8 and 9
(f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to – (i) avoid, modify, remedy, control or stop any action, activity or process which	Section 10 and 11

(ii) causes pollution or environmental degradation; (iii) comply with any prescribed environmental management standards or practises; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 13
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 13 and 14
(i) an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 13 and 14
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 13 and 14
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 14
(l) a program for reporting on compliance, taking into account the requirements as prescribed by Regulations;	Section 14
(m) an environmental awareness plan describing the manner in which – (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 6, 13 and 14
(n) any specific information that may be required by the competent authority.	All required information has been addressed within this EMPr and annexures.

GLOSSARY OF TERMS

BAR	Basic Assessment Report – A tool used by the EAP to submit to the competent authority if listed activities is triggered in Regulations GNR 327 and GNR 324 as per NEMA to make a decision regarding a proposed development.
DEA&DP	Department of Environmental Affairs and Development Planning – the provincial authority for sustainable environmental management and integrated development planning.
PBAC	Plettenberg Bay Angling Club – the proponent/applicant.
CBA	CBA Critical Biodiversity Area – Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.

EAP	Environmental Assessment Practitioner – An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2) must – (a) be independent. (b) Have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these regulations and any guidelines that have relevance to the proposed activity. (c) Ensure compliance with these Regulations (d) Perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application. (e) Take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and (f) Disclose to the proponent or applicant, registered and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing – i. Any decision to be taken with respect to the application by the competent authority in terms of these regulations; or ii. The objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority. (2) In the event where the EAP or specialist does not comply with sub regulation (1)(a), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicants cost. (3) An EAP or specialist appointed to externally review the work of an EAP or specialist as contemplated in sub regulation (2), must comply with sub regulation (1).
ECO	Environmental Control Officer – A site agent who needs to ensure that all environmental authorisation and conditions are adhered to during the construction phase of the project
EMPr	Environmental Management Programme – can be defined as “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 the positive benefits of the projects are enhanced”.
ESA	Ecological Support Area – Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of Pas or CBAs, and are often vital for delivering ecosystem services.
MMP	Maintenance Management Plan – means a maintenance management plan for maintenance purposes defined and adopted by the competent authority
NEMA	National Environmental Management Act (Act 107 of 1998) as amended 2017 – national environmental legislation that provides principles for decision-making on matters that affect the environment.
PA	Protected Area - A protected area is an area of land or sea that is formally protected by law and managed mainly for biodiversity conservation. Protected areas recognised in the National Environmental Management: Protected Areas Act (Act 57 of 2003) (hereafter referred to as the Protected Areas Act) are considered formal protected areas in the NPAES. This is a narrower definition of

	protected areas than the International Union for Conservation of Nature (IUCN) definition. ¹ The NPAES distinguishes between land-based protected areas, which may protect both terrestrial and freshwater biodiversity features, and marine protected areas.
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1. INTRODUCTION

Eco Route Environmental Consultancy has been appointed by the proponent **Plettenberg Bay Angling Club** to prepare an Environmental Management and Maintenance Programme (EMMP) for the construction and future maintenance of a reno mattress for the stabilisation of a portion of the Keurbooms River embankment located south of the Plettenberg Bay Angling Club, RE 1 of the farm Hanglip No.305, Plettenberg Bay. The location of the embankment stabilisation is within the Garden Route Biosphere Reserve.

The status quo of the bank is not suitable. It is severely eroded and is unable to provide its intended function of protecting the existing infrastructure of the Plettenberg Bay Angling Club/PBAC from flooding of the Keurbooms River.

The PBAC is situated on the western bank of the Keurbooms Estuary (Figure 1). The proposed stabilisation will take place along a +/- 50 m stretch of the riverbank and associated intertidal zone.

It is recommended that a combination of Options 2 and 4 (reprofiling the bank) be implemented. Option 2 out of the three (3) hard engineering options provided by the appointed engineer is most recommended by the aquatic specialist as it is consistent with other bank stabilisation structures that have been implemented at other locations in the estuary and entails reprofiling the bank (1.3 m horizontal to 1 m vertical) using sandbags (800 mm x 500 mm x 170 mm), and covering these with a 0.3 m x 3.0 m reno mattress.

Option 4 will result in lower construction phase impacts but will not yield any positive long-term erosion control benefit if mooring of boats and pedestrian traffic along the banks is allowed to continue. Even if boat mooring and pedestrian traffic are to be controlled, the close proximity of the tarred car park to the edge of the re-profiled estuary bank would most likely compromise the integrity of the bank in the long-term. This option would however be preferable downstream of the tarred car park as there will be sufficient space to accommodate and protect the re-profiled bank. It is therefore recommended that Option 2 be implemented adjacent to the tarred area and - provided that mooring of boats and pedestrian traffic is prohibited - that Option 4 is implemented further downstream (figure 2 below). This recommendation would whilst minimising the footprint of hard engineered structures along the shoreline represents the best compromise of the options assessed.

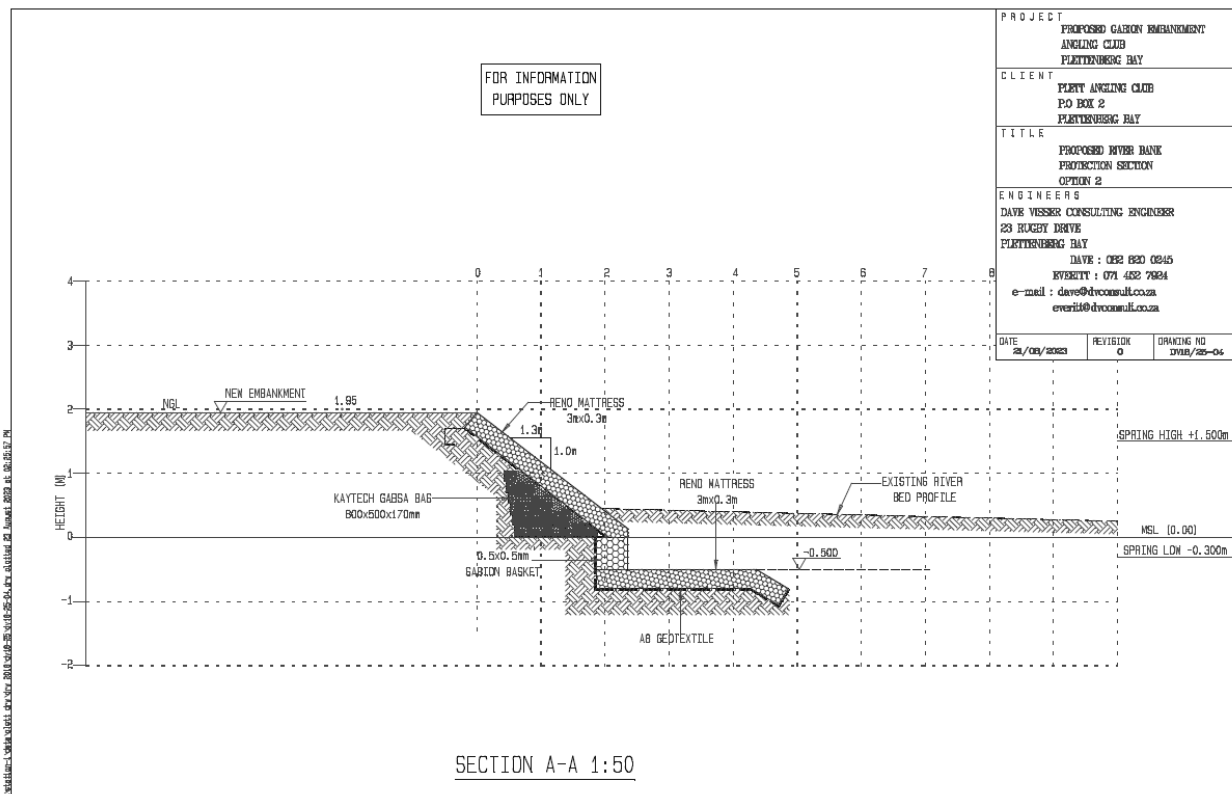


Figure 1: Option 2 – Preferred Alternative



Figure 2: Map illustrating the recommended alternatives options (2 and 4) to be implemented to address bank erosion along the estuary shoreline

2. SITE DESCRIPTION

Erf Number:	RE 1 of the farm Hanglip No.305
Length:	+/- 50m
SG Code:	C03900000000030500001
Co-ordinates:	Start – Lat: 34° 0' 15.30"S Long: 23° 23' 56.25"E End – Lat: 34° 0' 16.85"S Long: 23° 23' 55.91"E

3. LOCALITY

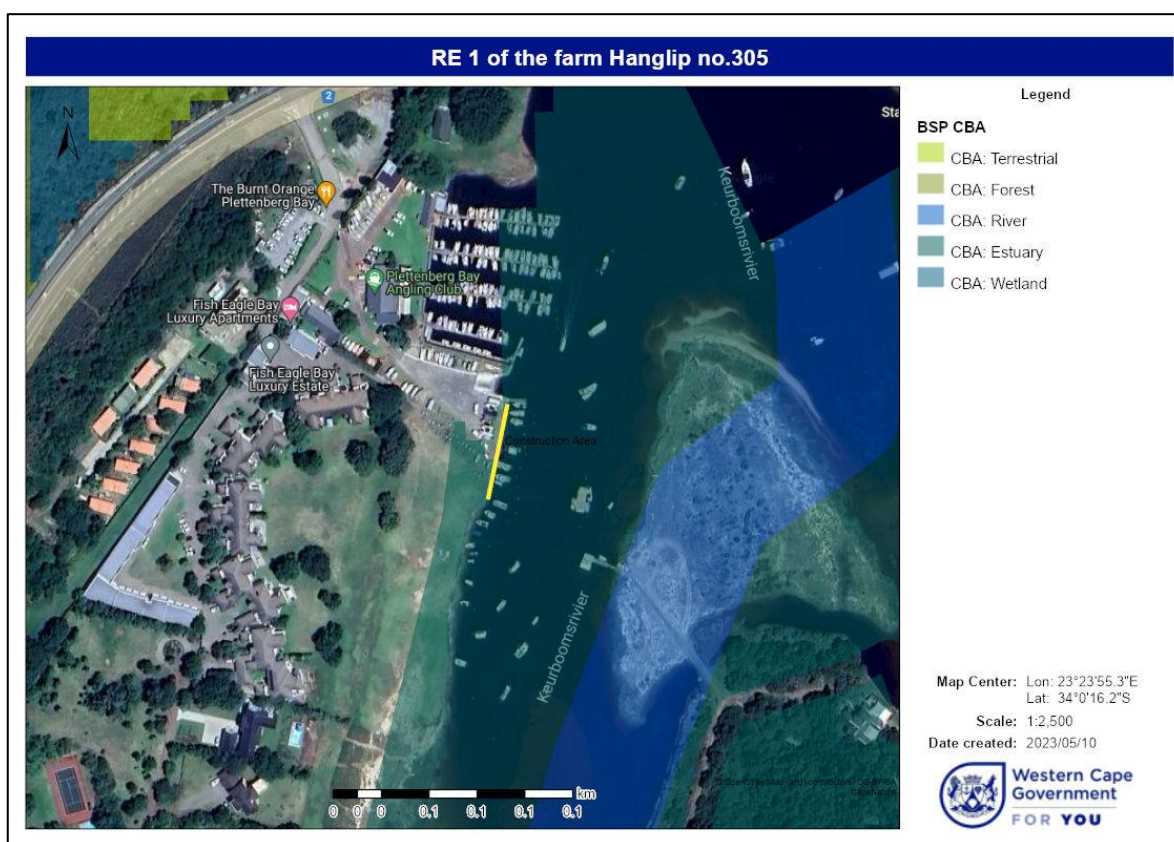


Figure 3: Biodiversity overlay map showing the locality of the construction area

4. PURPOSE OF THE EMMP

The purpose of this EMMP is to ensure that the negative environmental impacts of the proposed activities are managed, mitigated and kept to a minimum during the planning, construction and operation phases of

the proposed riverbank stabilisation. The EMMP focuses on avoiding damage or loss to ecosystems and the services they provide, and to enhance positive environmental impacts where possible.

The EMMP is a living document that is flexible and responsive to new and changing circumstances; however, should a change be made within the EMMP, permission from DEA&DP must first be obtained.

Once the EMMP is approved by DEA&DP it is seen as a legal binding document on the following affected parties:

- 1 Project Proponent
- 2 All contractors
- 3 Sub-contractors and construction staff
- 4 The appointed ECO monitoring the construction phase
- 5 Members of the public utilising the PBAC

Copies of this EMMP must be kept on site and all senior personnel are expected to familiarise themselves with the content of this EMMP.

It is suggested that the EMMP be reviewed on a yearly basis if required. Should any repairs need to be made during operational phase, written authorisation should be obtained from DEA&DP prior to repairing damage to the river mattress during the operational phase. Photographic records should be maintained, and any necessary maintenance and rehabilitation implemented.

5. PHASES OF THE PROPOSED INSTALLATION OF THE RENO MATTRESS

5.1 PLANNING PHASE

The draft EMMP will be circulated to the following State Departments, Municipalities and Organs of State for comments:

STATE DEPARTMENTS			
Name	Contact Person	Contact Details	Email
Dept of Environmental Affairs & Development Planning (DEA&DP)	Steve Kleinhans	Private Bag x6509, George, 6530 044 805 8602 (T) 044 805 8650 (F)	Steve.Kleinhans@westerncape.gov.za DEADPEIAAdmin.George@westerncape.gov.za
Heritage Western Cape	Ayanda Mdludlu	Private Bag x9067, Cape Town, 8000 021-483 9729 (T) 021-483 9845 (F)	ayanda.mdludlu@westerncape.gov.za
Department of Water & Sanitation	John Roberts	Private Bag x16, Sanlamhof, 7532 021 941 6179 (T) 021 941 6082 (F)	RobertsJ@dwa.gov.za

Dept of Agriculture Land Use Management	Cor van der Walt Brandon Layman	Private Bag x1, Elsenburg, 7601 021 808 5099 (T) 021 808 5092 (F)	Cor.VanderWalt@westerncape.gov.za Brandon.Layman@westerncape.gov.za
Biodiversity & Coastal Management Unit, DEA&DP	leptieshaam Bekko Mercia J Liddle Hilda Hayward Ryan Apolles	Private Bag x9086, Cape Town. 8000 021 483 3370 (T) 078 744 9205 (Cell) (leptieshaam Bekko)	leptieshaam.Bekko@westerncape.gov.za Mercia.Liddle@westerncape.gov.za Hilda.Hayward@westerncape.gov.za Ryan.Apolles@westerncape.gov.za
Department of Forestry, Fisheries & the Environment (DFFE)	Melanie Koen Innocent Mapokgole	Private Bag x12, Knysna, 6570 044 302 6902 (T) 044 382 5461 (F)	Mkoen@dffe.gov.za imapokgole@dffe.gov.za
Department of Environmental Affairs: Oceans and Coasts	Tabisile Mhlana	Private Bag X4390, Cape Town, 8000 021 493 7052 (T)	OCEIA@dffe.gov.za tmhlana@dffe.gov.za

ORGANS OF STATE

Name	Contact Person	Contact Details	Email
Breede-Olifants Catchment Management Agency (BOCMA)	Andiswa Sam R Mphahlele	PO Box 1205, George, 6530 023 346 8000 (T) 023 347 2012 (F)	asam@bocma.co.za rmphahlele@bocma.co.za
Cape Nature Land Use Advice	Megan Simons	Private Bag x6546, George, 6530 044 802 5328 (T) 044 802 5313 (F)	msimons@capenature.co.za
SANPARKS	Vanessa Weyer	PO Box 3542, Knysna, 6570 044 302 5613 (T) 074 707 8199 (F)	Vanessa.weyer@sanparks.org
South African Civil Aviation Authority	Canny Mothapo	083 461 6292	environment@caa.co.za

MUNICIPALITIES

Name	Contact Person	Contact Details	Email
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Bitou Municipality	Chris Schliemann Anje Minne	PO Box 255, Plettenberg Bay, 6600 044 501 3324 (T) 086 659 7954 (F) 083 628 4001	cschliemann@plett.gov.za aminne@plett.gov.za
Bitou Municipality	Municipal Manager Mbulelo Memaini	Private Bag X1002, Plettenberg Bay, 6600 044 501 3000 (T) 067 495 845 (M)	mmemani@plett.gov.za
Bitou Municipality	Ward 2 Councillor David Swart	Private Bag x 1002 Plettenberg Bay, 6600 072 769 2342	DSwart@plett.gov.za
Garden Route District Municipality	Mr. Lusanda Menze	P.O. Box 12, George, 6530 044-8031300 (T) 0865556303 (F)	info@gardenroute.gov.za
Garden Route District Municipality	Dr. Nina Viljoen	P.O. Box 12, George, 6530 044-8031300 (T) 0865556303 (F)	nina@gardenroute.gov.za

All comments and concerns will be addressed in the Comments and Response Report attached as Appendix F of the BAR.

6. CONSTRUCTION PHASE

The construction phase deals with (provided by Dave Visser appointed engineer):

- blocking off the work site.
- pre-packing 3 x 2 x 0.3m reno mattress with gabion rock in the yard of PBAC.
- excavate the section of river bed to line & level to 500mm below MSL in 10m sections.
- Trim the reno foundation & place the A8 geotextile.
- Place the pre-packed reno mattress using an excavator & lifting frame.
- Pack the 500 x 500mm gabion basket insitu during low tide.
- Place the Kaytech Gabsa bags, pre-filled with sand from the excavations to correct slope 1.3 to 1.0m.
- Install the sloping 3 x 2 x 0.3m reno mattress on the trimmed slope.

Dave Visser Consulting Engineer was appointed by the proponent to submit engineering drawings for the proposed stabilisation works. The engineering drawings are attached as Appendix B of this EMMP.

To ensure that the ecological integrity of the adjacent river is maintained and preserved, the applicant should ensure that the construction footprint in the marine environment is limited to the construction area. The Contractor should restrict all activities, materials, equipment, and personnel within the area specified or restricted activities to areas that are necessary to undertake the work. The applicant should ensure that materials are appropriately secured to ensure safe passage between destinations, loads including, but not limited to, sandstone chips, fine vegetation or refuse should have appropriate cover to prevent spillage

when the vehicle is in transit. The applicant will be held responsible for any clean-up in the marine environment resulting from failure by the contractors or suppliers to properly secure transported material.

6.1 METHOD STATEMENT

Pre-Construction:

1. The appointed contractor must have the signed appointment from the client in his possession.
2. The health and safety file must be prepared and approved, by the Health and Safety Officer, appointed by the client.
3. All personnel on site must be familiar with the approved EMMP.
4. All personnel on site must be inducted by the appointed ECO.
5. Construction work may only commence at this stage.
6. Adhere to the EMMP during construction.

Construction of Embankment Stabilisation:

1. Site establishment must be done in the area demarcated for this purpose. No-go areas must also be demarcated prior to commencement of construction activities.
2. The extent of the construction must be marked out to satisfaction of the engineer and ECO.
3. Cognisance of tides should govern all operations.
4. Stockpiles of suitable filling material must be established with imported material.
5. The material used for fill must be approved by the engineer and ECO.
6. A screened fence must be erected 4m from the existing embankment, to prevent workers from going beyond the work zone.
7. All waste material must be discarded off site.
8. The method statement provided by Dave Visser Consulting Engineer must be strictly followed for each working section.
9. Clean and restore site.
10. The appointed ECO must, on a weekly basis, submit Environmental Monitoring Reports/ ECO reports to all relevant authorities, with dated photographs and detailing compliance/ non-compliance with the EMMP.

7. OPERATIONAL PHASE

The operational phase of this EMMP will entail the following:

1. Management, repair and maintenance of the reno mattress, if and when required.
2. Prior to any maintenance/repairs occurring on the embankment, DEA&DP to be notified, in writing.
3. Method statements to be submitted to DEA&DP for the maintenance and repair of the embankment.
4. Should DEA&DP request an updated EMMP, this should be adhered to.
5. Contractor appointed for the maintenance and repair of the embankment needs to familiarize themselves with the EMMP.
6. An ECO must be appointed to oversee the maintenance and repair of the embankment.
7. An Environmental Monitoring Report is to be submitted to all relevant authorities after maintenance and repair has occurred on the embankment, containing dated photographs and detailing compliance/ non-compliance with the EMMP.

8. CLOSURE AND DECOMMISSIONING PHASE

There is no defined operating life cycle associated with the embankment stabilisation and management thereof. Should it be decided at some stage to decommission the embankment stabilisation, the proponent is required to abide with the relevant legislations and environmental laws during that period.

An independent auditor must be appointed to audit the site to identify and evaluate the effectiveness of the EMMP. An audit report in compliance with Appendix 7 of the NEMA EIA Regulations 2014, as amended must be sent to DEA&DP on closure of construction.

9. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES DURING THE CONSTRUCTION AND OPERATIONAL PHASE

An environmental impact can be defined as an effect or consequence that a development or activity will have on economic, social and ecological processes.

There are mainly three categories of environmental impacts:

Direct Impacts: These are caused by the development/activity itself on the receiving environment.

Indirect Impacts: These impacts are usually linked closely with a project and may have more profound results than the direct impacts for example pollution of the Keurbooms River as a result of the construction activities.

Cumulative impacts: These impacts can be defined as the ability of natural and social environments to incorporate cumulative stresses placed on them and the likelihood of negative synergistic effects. Cumulative impacts also arise when existing or future development rights set a precedent in an area. The process of cumulative impacts may arise from any of the following events:

- A single large event,
- Multiple interrelated events
- Sudden or catastrophic events or incremental change

The objectives of management of impacts are to:

- Protect the receiving environment against degradation as a result of the construction of the embankment stabilisation.
- Identify mitigation measures to minimize each identified impact before the impact even occurs.
- Ensure the mitigation measures are appropriate, cost effective and financially feasible.
- Avoid, minimise or remedy adverse impacts.
- Ensure that residual impacts are within acceptable levels.
- Monitor the effectiveness of mitigation measures.
- Take action when unforeseen impacts occur.
- Have contingency plans at hand should an unforeseen event occur.

10. ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE CONSTRUCTION OF THE RENO MATTRESS

The proposed stabilisation will occur along a +/- 50m stretch of the riverbank.

The identified Environmental Impacts associated with the stabilisation of the embankment are indicated in the tables below:

Impact 1 – Disturbance of estuarine habitat and biota caused by bank stabilisation options.									
Options 1 to 3: The reno mattress will extend into the bed of the estuary and construction will therefore result in initial disturbance of inter- and subtidal habitat, including loss of <i>Z. capensis</i>. Based on experience from similar structures, the bed is however expected to re-establish over most of the reno mattress over time and it is likely that <i>Z. capensis</i> will also re-establish. Option 4: The bank will need to be re-shaped which could lead to the deposition of material into the estuary. No-Go: Impacts are minor due to continued active erosion of the bank which can affect the quality of supra- and intertidal habitat.									
Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Short term	Short term	Short term	Short term	Short term	Short term	Brief	Brief	Ongoing
Extent	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited
Intensity	High	Moderate	High	Moderate	High	Moderate	Low	Low	Low
Probability	Certain	Certain	Certain	Certain	Certain	Certain	Probable	Unlikely	Probable
Confidence	High	High	High	High	High	High	High	High	High
Reversibility	High	High	High	High	High	High	High	High	High
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	Low
Significance	Minor	Minor	Minor	Minor	Minor	Minor	Negligible	Negligible	Minor
Mitigation: - A comprehensive method statement must be drawn up which provides a clear step by step plan of the sequence of construction activities that will be undertaken. - The method statement should follow a phased approach with the aim of minimising the length of time that excavated bed or banks are exposed to fluctuating tide levels. - Working areas must be clearly demarcated and disturbance (i.e. trampling, smothering etc.) of estuarine habitat outside of these demarcated areas must be minimised as far as is possible. <i>Zostera capensis</i> occurring within the construction footprint must be rescued and kept on the site to be planted in any disturbance buffer (no wider than 2m) later during the phase.									

Impact 2 – Sedimentation of estuary caused by the excavation of the bed and banks of the estuary.									
Option 1 to 3: The eroded embankment requires the excavation of a level platform to 1 m below the existing estuary bed profile. This excavation will need to extend approximately 3 m into the estuary. Excavation of the estuary bed is likely to result in the mobilisation of sand and sediment which can potentially smother in-stream habitats. Option 4: Excavation will be limited mainly the bank and disturbance of the estuary bed is expected to be limited. No-Go: Active erosion of the bank leads to a minor sedimentation impact under the No-Go option.									
Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Brief	Brief	Brief	Brief	Brief	Brief	Brief	Brief	Ongoing
Extent	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited
Intensity	High	Low	High	Low	High	Low	Moderate	Low	Very low
Probability	Certain	Probably	Certain	Probably	Certain	Probably	Probably	Unlikely	Likely
Confidence	High	High	High	High	High	High	High	High	High
Reversibility	High	High	High	High	High	High	High	High	High
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	Low

Significance	Minor	Negligible	Minor	Negligible	Minor	Negligible	Negligible	Negligible	Minor
Mitigation: - Excavations should take place during low tide to minimise the mobilisation and transport of high volumes of sediment into the estuary. - Excavation of the estuary bed and placement of sandbags and reno mattress should take place systematically (i.e. one section at a time) to avoid exposing sections of excavated bed or banks to fluctuating tide levels. The excavation of a section of the bed and placement of stabilising materials should ideally be completed within a single low tide cycle, before moving onto the next section. Excavation of the bank and placement of sandbags therefore needs to be planned according to the time provided by the low tide cycle. - Construction activities should be timed to avoid periods of high rainfall and should be avoided during wet weather conditions. - Construction activities should also be timed in relation to potential rainfall occurring higher up in the Keurbooms river catchment to mitigate against the effects of flooding in the estuary. - Silt barriers must be placed around the working area to limit the migration of sediment from the construction area.									

Impact 3 – Impairment of water quality caused by the operation of heavy machinery operating within the bed and banks of the estuary.

Options 1 to 4: Vehicles and heavy machinery will be required to construct the bank stabilisation structure and will need to be refuelled and maintained at regular intervals. Leaks of hydrocarbon contaminants (i.e. fuel, oil, grease etc.) may occur which could pollute the estuary.

Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Short term	Brief	Short term	Brief	Short term	Brief	Short term	Brief	No Impact
Extent	Limited	Limited	Limited	Limited	Limited	Limited	Limited	Limited	
Intensity	Moderate	Very low	Moderate	Very low	Moderate	Very low	Moderate	Very low	
Probability	Likely	Unlikely	Likely	Unlikely	Likely	Unlikely	Likely	Unlikely	
Confidence	High	High	High	High	High	High	High	High	
Reversibility	High	High	High	High	High	High	High	High	
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	
Significance	Minor	Negligible	Minor	Negligible	Minor	Negligible	Minor	Negligible	

Mitigation:

- All vehicles/machinery should be readily serviced and inspected for leaks. Vehicles/Machinery needing repairs should not be used for construction at the site until repaired and fully operational.
- Any work or maintenance on the vehicles/machinery should be done far away from the watercourse, preferably in a work yard or on a concrete surface.
- Refuelling of vehicles/machinery must take place away from the estuary and on a paved surface to prevent seepage in the event of a spill.
- All vehicles/machinery should be parked off-site, and away from the edge of the watercourse when not in use.

Impact 4 – Noise pollution

Noise caused by machinery and staff during construction.

Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Brief	Brief	Brief	Brief	Brief	Brief	Brief	Brief	No Impact
Extent	Limited	Limited	Limited	Limited	Limited	Limited	Limited	Limited	
Intensity	Low	Very low	Low	Very low	Low	Very low	Low	Very low	
Probability	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	
Confidence	High	High	High	High	High	High	High	High	
Reversibility	High	High	High	High	High	High	High	High	
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	
Significance	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	

Mitigation:

Construction activities must only take place during normal working times between 07:00-17:00 on weekdays.

Machinery may be fitted with silences to dampen noise.

Staff must be reminded that noise levels must be kept low.

Impact 5 – Employment (Positive)

Empowerment of the local community members living close by relating to temporary employment opportunities.

Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Short term	Short term	Short term	Short term	Short term	Short term	Short term	Short term	No Impact
Extent	Limited	Limited	Limited	Limited	Limited	Limited	Limited	Limited	
Intensity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Probability	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Likely	
Confidence	High	High	High	High	High	High	High	High	
Reversibility	High	High	High	High	High	High	High	High	
Resource irreplaceability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Significance	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Minor	

Mitigation:

Due to the proposed stabilisation of embankment, temporary construction would be inevitable.

Shade cloth around construction site.

Ensure site is neat and tidy at all times

10.1 MITIGATION MEASURES

The following mitigation measures must be implemented:

- A comprehensive method statement must be drawn up which provides a clear step by step plan of the sequence of construction activities that will be undertaken.
- The method statement should follow a phased approach with the aim of minimising the length of time that excavated bed or banks are exposed to fluctuating tide levels.
- Working areas must be clearly demarcated and disturbance (i.e. trampling, smothering etc.) of estuarine habitat outside of these demarcated areas must be minimised as far as is possible.
- *Zostera capensis* occurring within the construction footprint must be rescued and kept on the site to be planted in any disturbance buffer (no wider than 2m) later during the phase.
- Excavations should take place during low tide to minimise the mobilisation and transport of high volumes of sediment into the estuary.
- Excavation of the estuary bed and placement of sandbags and reno mattress should take place systematically (i.e. one section at a time) to avoid exposing sections of excavated bed or banks to fluctuating tide levels. The excavation of a section of the bed and placement of stabilising materials should ideally be completed within a single low tide cycle, before moving onto the next section. Excavation of the bank and placement of sandbags therefore needs to be planned according to the time provided by the low tide cycle.
- Construction activities should be timed to avoid periods of high rainfall and should be avoided during wet weather conditions.

- Construction activities should also be timed in relation to potential rainfall occurring higher up in the Keurbooms river catchment to mitigate against the effects of flooding in the estuary.
- Silt barriers must be placed around the working area to limit the migration of sediment from the construction area.
- All vehicles/machinery should be readily serviced and inspected for leaks. Vehicles/Machinery needing repairs should not be used for construction at the site until repaired and fully operational.
- Any work or maintenance on the vehicles/machinery should be done far away from the watercourse, preferably in a work yard or on a concrete surface.
- Refuelling of vehicles/machinery must take place away from the estuary and on a paved surface to prevent seepage in the event of a spill.
- All vehicles/machinery should be parked off-site, and away from the edge of the watercourse when not in use.

11. ENVIRONMENTAL IMPACTS DURING OPERATIONAL PHASE

The identified Environmental Impacts Associated with the operational phase of the stabilisation activities are indicated in the table below:

Operational Phase

Impact 6 – Impact of bank stabilization structure on downstream bank erosion									
Option 1 to 3: Due to the frequency of flooding events the Keurbooms/Bitou Estuary Management Plan (DEADP, 2017) recommended that structures and privately owned and developed land be managed in such a way as to prevent further bank erosion during flood events. It also recommends that a standardised methodology be adopted for the purposes of bank stabilization. In this respect the method proposed for this development is consistent with that adopted in neighbouring estates. Hydrological armouring of stream banks (e.g. wooden retaining wall, rip rap or reno mattress constructions) is a common technique used to stabilise banks for erosion protection. They can cause problems further downstream in that these hardened structures tend to increase the speed of water flow along an armoured reach, as the water has no points of friction to come up against and nothing to slow it down. This additional strength of flow can cause problems further downstream, as water is deflected off the hardened surface and directed at other points of the riverbank. The increased strength and speed of the water can increase erosive forces at these new locations, the result of which is the necessity of installing additional armouring, which merely moves the problem further down the stream. The sloping profile of Option 2 and the porous nature of the reno mattress revetment will improve the ability of the bank to absorb and dissipate the energy associated with large flooding events in comparison to the vertical profile of Option 1 and the less porous Option 3. Furthermore, this construction provides a longer-term solution to stabilizing the bank against flooding events and persistent tidal flow, due to a reduced risk of structural failure. Option 4: Reprofiling the bank will leave very little space between the tarred car/boat park and the sloped bank. The lack of any buffer could lead to erosion of the embankment by surface runoff from the tarred car park. Furthermore, continued mooring of boats and pedestrian traffic along the reprofiled streambank is likely to result in continued erosion of the re-profiled streambank. No Go: Failure to control bank erosion within the PAOI may lead to the erosion problem spreading further downstream									
Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Extent	Local	Local	Local	Local	Local	Local	Local	Limited	Local
Intensity	High	Moderate	High	Moderate	High	Moderate	Moderate	Very Low	Moderate
Probability	Likely	Likely	Likely	Likely	Likely	Likely	Likely	Unlikely	Likely
Confidence	High	High	High	High	High	High	High	High	High

Reversibility	High	High	High	High	High	High	High	High	High
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	Low
Significance	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Negligible	Minor

Mitigation:

Option 1 to 3:

- The transition from the bank stabilisation structure to the remaining natural channel bank must be smooth so that no nick point develops along the channel bank which could lead to unanticipated erosion downstream of the structure. In other words, the southern end of the bank stabilisation structure must “tie-in” to the natural contour of the remaining unprotected channel bank.
- The structure must be routinely inspected to ensure that the integrity of the structure is sound and that it is not causing erosion of the channel further downstream. Any obvious signs of erosion must be immediately attended to.

Option 4:

- Mooring of boats and pedestrian traffic along the re-profiled bank must be strictly prohibited.

Impact 7 – Impact of alternative options on stabilising the estuary bank

Option 1 to 3: All proposed options are likely to be effective in stabilising the estuary bank. There is a higher risk of failure for Option 3 (i.e. geotextile bags may become weathered or physically punctured/torn over time) resulting in a slightly lower positive impact rating.

Option 4: Reprofiling the bank will leave very little space between the tarred car/boat park and the sloped bank. The lack of any buffer could lead to erosion of the embankment by surface runoff from the tarred car park. Furthermore, continued mooring of boats and pedestrian traffic along the reprofiled streambank is likely to result in continued erosion of the re-profiled streambank.

No-Go: The No-Go option represents a minor negative impact due to continued erosion of the bank over time.

Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Permanent	Permanent	Permanent	Permanent	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing
Extent	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Local	Very Limited	Limited
Intensity	High	High	High	High	High	High	Moderate	Low	High
Probability	Likely	Likely	Likely	Likely	Probably	Probably	Likely	Unlikely	Likely
Confidence	High	High	High	High	High	High	Low	Low	High
Reversibility	High	High	High	High	High	High	High	High	High
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	Low
Significance	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Negligible	Minor

Mitigation:

The stabilised bank must be routinely inspected and maintained (particularly after flood events) to ensure that the bank does not fail and that no erosion is occurring.

Impact 8 – Impact of bank stabilisation options on estuarine fauna and flora

Option 1 to 3: Reno mattress will essentially replace the existing eroded estuary bank and a thin section of inter-tidal mud/sand bank. This will alter habitat for burrowing benthic macroinvertebrates. The modification to habitat should however not have any negative impact on the potential occurrence of *H. capensis* given its known utilisation of artificial reno mattress habitat. This section of the estuary is however unlikely to be heavily utilised by larger vertebrate estuarine fauna due to the pre-existing high frequency of boat traffic. Impacts for all three options are minor although Option 2 has slightly lower impacts due to its more natural profile (compared to Option 1) and because spaces in between the rocks packed in the reno mattress offers better potential habitat options for macroinvertebrates (compared to Option 3).

Option 4: Continued mooring of boats and pedestrian traffic along the reprofiled streambank is likely to result in continued disturbance and erosion of the re-profiled streambank resulting in sub-optimal habitat.

No-Go: Impacts are minor given that ongoing erosion of the bank will result in sub-optimal habitat.

Impact	Option 1		Option 2 (Preferred)		Option 3		Option 4		No-Go
	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	Without mitigation	With mitigation	
Duration	Permanent	Permanent	Permanent	Permanent	Permanent	Permanent	Ongoing	Ongoing	Ongoing
Extent	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited	Very limited
Intensity	Moderate	Moderate	Low	Low	Moderate	Moderate	Low	Very Low	Low
Probability	Almost certain	Almost certain	Almost certain	Almost certain	Almost certain	Almost certain	Almost certain	Unlikely	Almost certain
Confidence	High	High	High	High	High	High	High	High	High
Reversibility	High	High	High	High	High	High	High	High	High
Resource irreplaceability	Low	Low	Low	Low	Low	Low	Low	Low	Low
Significance	Minor	Minor	Minor	Minor	Minor	Minor	Minor	Negligible	Minor
Mitigation: Option 1 to 3: - Preference should be given to the option that has the least impact on estuarine fauna (i.e. Option 2). - Revegetation of substrates using rescued plant material in areas of temporary disturbance following the construction phase is an essential part of concluding the construction phase of the project. The following is a description of transplanting methods that could be used: - Bundles of shoots with an attached rhizome segment can be tied together and anchored into the sediment (using a metal anchor); or - Shoots and associated rhizome structures can be bound to elongated stones using biodegradable thread (e.g. cotton or hemp), which are then buried in the sediment." Option 4: - Mooring of boats and pedestrian traffic along the re-profiled bank must be strictly prohibited.									

Cumulative Impacts

While the impacts associated with the bank stabilisation structure are considered negligible to minor, the structure does represent an increase (although very small) in the total length of the estuary bank that will be stabilised by a hard, engineered structure. Historical residential and recreational development along the banks of the estuary has resulted in the removal of natural indigenous estuarine and riparian vegetation from the banks, which makes them far more susceptible to erosion. Furthermore, development within the floodline of the estuary has also imposed artificial boundaries along the estuary resulting in a concentration of flows to a narrower channel, which also contributes to erosion of the embankment. Bank stabilisation interventions are therefore inevitably required to protect the bank and properties and have been implemented along numerous properties bordering the estuary. Increased bank stabilisation results in further confinement of the channel and concentration of flows which may then lead to erosion along remaining unprotected banks. Stabilisation of the banks is therefore expected to be an ongoing requirement in the future. Future residential/urban development along the banks must be set back an appropriate distance from the banks and must maintain natural riparian and estuarine vegetation wherever possible.

11.1 MITIGATION MEASURES

The following mitigation measures must be implemented:

Option 2:

- The transition from the bank stabilisation structure to the remaining natural channel bank must be smooth so that no nick point develops along the channel bank which could lead to unanticipated erosion downstream of the structure. In other words, the southern end of the bank stabilisation structure must "tie-in" to the natural contour of the remaining unprotected channel bank.

- The structure must be routinely inspected to ensure that the integrity of the structure is sound and that it is not causing erosion of the channel further downstream. Any obvious signs of erosion must be immediately attended to.
- Revegetation of substrates using rescued plant material in areas of temporary disturbance following the construction phase is an essential part of concluding the construction phase of the project. The following is a description of transplanting methods that could be used:
 - Bundles of shoots with an attached rhizome segment can be tied together and anchored into the sediment (using a metal anchor); or
 - Shoots and associated rhizome structures can be bound to elongated stones using biodegradable thread (e.g. cotton or hemp), which are then buried in the sediment."

Option 4:

- Mooring of boats and pedestrian traffic along the re-profiled bank must be strictly prohibited.

12. LEGISLATIVE REQUIREMENTS

The proponent, PBAC, is required to comply with all necessary legislation, policies and guidelines. These include, but are not limited to:

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

The National Environmental Management Act (NEMA, Act No. 107 of 1998, as amended) embraces the notion of sustainable development as contained in the Constitution in that everyone has the right:

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

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

- In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
- Avoid degradation of the environment and avoid jeopardising ecosystem integrity;
- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

Section 28 Duty under the National Environmental Management Act (NEMA) to take reasonable measures to prevent pollution or degradation to the marine environment throughout all proposed project phases.

All probable listed activities have been identified; the below table indicates all listed activities associated with the stabilisation activities. The table provides a description of the listed activity and the reason why the activity is applicable to the embankment stabilisation:

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 (GN R983)	Describe the portion of the proposed project to which the applicable listed activity relates.
12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	The proposed activity will be approximately 220 square metres within the Keurbooms River.
15	The development of structures in the coastal public property where the development footprint is bigger than 50 square metres, excluding – (i) the development of structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (ii) the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (iii) the development of temporary structures within the beach zone where such structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared; or (iv) activities listed in activity 14 in Listing Notice 2 of 2014, in which case that activity applies	The proposed activity will be the construction and installation of engineered embankment stabilisation extending approximately 3 meters into the river; locating the activity within coastal public property.

17	Development— (i) in the sea; (ii) in an estuary; (iii) within the littoral active zone; (iv) in front of a development setback; or (v) if no development setback exists, within a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater; in respect of— (a) fixed or floating jetties and slipways; (b) tidal pools; (c) embankments; (d) rock revetments or stabilising structures including stabilising walls; or (e) infrastructure or structures with a development footprint of 50 square metres or more — but excluding— (aa) the development of infrastructure and structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) the development of temporary infrastructure or structures where such structures will be removed within 6 weeks of the commencement of development and where coral or indigenous vegetation will not be cleared; or (dd) where such development occurs within an urban area.	The proposed activity will be the construction and installation of engineered embankment stabilisation approximately 220 square metres in the Keurbooms River labelled as an Estuary in terms of the Wetland Freshwater Priority Areas (FEPAs).
19A	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from— (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea; — but excluding where such infilling, depositing, dredging, excavation, removal or moving— (f) will occur behind a development setback; (g) is for maintenance purposes undertaken in	The proposed activity will require the excavation of more than 5 cubic metres of soil from the Keurbooms River.

	accordance with a maintenance management plan; (h) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (i) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	
Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 (GN R98)	Describe the portion of the proposed project to which the applicable listed activity relates.
14	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. i. Western Cape i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) World Heritage Sites; (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Sites or areas listed in terms of an international convention; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Core areas in biosphere reserves; or	The proposed activity will be approximately 220 square metres within the Keurbooms River. The area for construction is within a CBA and in the Estuarine Functional Zone.

	(hh) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.	
26	Phased activities for all activities— i. listed in this Notice and as it applies to a specific geographical area, which commenced on or after the effective date of this Notice; or ii. similarly listed in any of the previous NEMA notices, and as it applies to a specific geographical area, which commenced on or after the effective date of such previous NEMA Notices— where any phase of the activity was below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; — excluding the following activities listed in this Notice— 7; 8; 11; 13; 20; 21; and 24.	The applicant will be undertaking the bank stabilisation in two stages: Stage 1 – this will be the construction of approximately 30 metres of the total length of the stabilisation activity being applied for. Stage 2 – this will comprise of the remaining +/- 25 metres of the stabilisation activities.

12.2 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1983)

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 the site during construction.

12.3 INTEGRATED COASTAL MANAGEMENT ACT (ACT 24 OF 2008)

In general, integrated coastal management (ICM) promotes the use of defensible scientific information in conjunction with the principles of cooperative governance in order to achieve sustainable coastal development.

13. EMMP ROLES AND RESPONSIBILITIES

Responsibilities must be clearly identified for the different parties involved in implementing the management actions and monitoring.

The following parties play an important role in ensuring compliance to the EMMP:

1. Project Proponent – Plettenberg Bay Angling Club
2. Engineers and Contractors
3. Environmental Control Officer

All fines for non-compliance of EMMP to be predetermined by Engineer, ECO and Project Proponent, this needs to be included in method statement.

13.1 PROJECT PROPONENT

PBAC is the project proponent and will be responsible for the following:

- Adhering to the approved EMMP.
- Ensure that all employed Contractors and Engineers are aware of and understand the conditions of the EMMP.
- Has the right to remove any person or appointed contractors or personnel from site if they contravene the EMMP.
- Ensure that all contracts with contractors/engineers include the authorised EMMP.
- Appoint an Environmental Control Officer.
- The project proponent (holder of the Environmental Authorisation of the EMMP) must notify the competent authority of the commencement of construction activities and future maintenance activities **14 days prior to such commencement taking place.**

13.2 ENVIRONMENTAL CONTROL OFFICER

The name and contact details of the ECO must be forwarded to the DEA&DP case officer, prior to the commencement of construction activities. In the appointment, the proponent delegates authority to this Representative to oversee the environmental requirements of the project. The ECO's specific function will be to monitor the Contractor's compliance to the EMMP and the impact on the environment.

The ECO is responsible for environmental awareness training. Contractors, engineers, site personnel and construction workers receive an induction presentation on the importance and implications of the EMMP prior to commencement of construction. The training must include the following:

- The importance of complying with the EMMP.
- Identification of no-go areas.
- The identified negative environmental impacts and the mitigation measures.
- Request method statements prior to construction commencement.

It is envisaged that the ECO will be on site for the following periods:

- A site visit or visits at the start of the project for as many hours as required.
- A site visit or visits at the completion of the project for as many hours as required.
- Site visits at the start and completion of major portions of the contract as required.
- A minimum of one visit per week for the construction period presuming no major problems are encountered.
- Site visits immediately after any heavy rain, in order to assess erosion and/or sedimentation damage on site.
- Whenever there is an emergency environmental incident.
- The ECO should attend all monthly site meetings.

The ECO will be responsible for monitoring, reviewing and verifying compliance with the EMMP by the Contractor. The ECO's duties in this regard will include the following:

- Assisting the Engineer in ensuring that the necessary environmental authorizations and permits have been obtained;
- Promote sustainable practices along the Keurbooms River;
- Monitoring and verifying that the EMMP is adhered to at all times and taking action if the

specifications are not followed;

- The ECO must keep compliance and non-compliance records and make available to these relevant authorities within 5 days of receipt of this request;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction method statements together with the Engineer;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Giving a report back on the environmental issues at the monthly site meetings and other meetings that may be called regarding environmental matters;
- Keeping record of all activities and incidents on site in the Site Diary concerning the environment;
- Inspecting the site and surrounding areas regularly with regard to compliance with the EMMP;
- Keeping a register of complaints in the site office and recording and dealing with any community comments or issues;
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site;
- Ordering the removal of person(s) and/or equipment not complying with the specifications.
- Issuing of fines for transgressions of site rules and EMMP;
- Suspending all environmental activities should a serious environmental transgression occur, until the transgression is fixed.
- Ensuring that activities on site comply with other relevant environmental legislation;
- Completing start-up, weekly, monthly and site closure checklists;
- Keeping a photographic record of progress on site from an environmental perspective;
- Engage in regular discussions with relevant authorities on any significant non-compliance by the applicant and the steps to be taken to rectify this.
- Undertaking a continual internal review of the EMMP and submitting a weekly ECO Report to all relevant authorities.

13.3 ENGINEERS AND CONTRACTORS

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

- Adhere with the conditions and recommendations of the EMMP or any other legally binding 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;
- Ensure compliance of all site personnel and / or visitors to the EMMP and any other authorisations.
- Remove and relocate any biota present within the construction area. The area should also be surveyed after every high tide as biota can move back in again and get trapped in the area of work as the tide goes out.

14. ENVIRONMENTAL MANAGEMENT PROGRAMME

PRE-CONSTRUCTION PHASE			
TASK	MANAGEMENT TOOLS	RESPONSIBILITY	TIMEFRAME
EMMP INDUCTION	PLANNING		
	The EMMP applies to all appointed Engineers, contractors, ECO and their staff	All	Ongoing
	The contractor is to provide the engineer with a programme	E/C	Prior to construction commencement
	Provide the ECO with all method statements and contingency plans	E/C	
	All site staff, contractors, engineers to have environmental training on the EMMP prior to construction and identifications of no-go areas.	ECO	
	Notify DEA&DP 14 days prior to commencement of construction	ECO/Proponent	
	Induction of Health and safety	Health	
	The required emergency numbers and protocol must be displayed on site	Health	
	Fire prevention equipment must be provided as per the Occupational Health and Safety Act	E/C	
	CODE OF CONDUCT		
	Identify no go areas and site demarcation around the construction footprint. Damage to the environment is prohibited within the no go areas	ECO	Ongoing
	No fishing or disturbing of fauna is permitted from the Keurbooms River and will be subjected to disciplinary action.		
	No Harvesting, trampling, cutting and disturbing of flora (outside the active site) from the Keurbooms River is permitted and will be subjected disciplinary action.		
	Pollution of the construction site and surrounding areas will be subjected to disciplinary action.		
SITE ESTABLISHMENT	SITE CAMP ESTABLISHMENT		
	An Area for the site/ office if required and storage of construction material to be identified, this area to be away from storm water runoff and at least 10 meters away from the Keurbooms River.	E/ECO	Before site setup
	The site office must make provision for: • Parking facilities • Ablution facilities • First aid area • Hazardous substance storage area The site area to be fenced off and secured to prevent non-construction staff entering and posing a risk to security and safety protocols	All	
	Site signs warning public of construction in progress to be put in place.	E/C	
	Waste bins to be placed according to the waste hierarchy	C	

CONSTRUCTION PHASE			
SITE ACCESS	ROUTING/VEHICLES		
	The existing access to the Plettenberg Bay Angling Club to be used.	All	During construction
	All vehicles to adhere to speed limit and traffic rules		
	Care should be taken that local traffic flow patterns is not significantly disturbed		
VEHICLE & EQUIPMENT	MAINTENANCE		
	No vehicles may be repaired on site.	C	During Construction
	No re-fuelling of vehicles on site.	C	
	Emergency repair of equipment should only occur in site camp and not within or close to the watercourse.	C	
	Tarpaulin must be laid down if equipment is to be repaired in designated area to prevent environmental pollution	C	
	All equipment to be serviced and adequately maintained to prevent oil spills, diesel or fuel leaks	C	
	Should the equipment/machinery used be deemed a pollution risk by the ECO, this equipment must be repaired or removed from site	ECO	
WASTE MANAGEMENT AND TOILET FACILITIES	WASTE MANAGEMENT		
	The waste hierarchy must be followed (reduce, Re-use and Recycle). It is suggested that bins be placed according to the waste hierarchy (recycling bins, glass, plastic and paper). The ECO must inspect the waste storage and removal facilities regularly and ensure that the waste levels are acceptable. The bins must be watertight and scavenger proofed.	ALL	Ongoing
	Bins must be provided for builders' waste. These bins should be covered and emptied on a regular basis.	C	
	TOILET FACILITIES		
	Chemical toilet facilities or other approved toilet facilities must be provided on site (1 toilet for every 10 workers). If Chemical toilet facilities are used they must be located as far away from the watercourse as possible to prevent pollution of the watercourse. Toilets must be placed in an area approved by the ECO.	ECO/C	Ongoing
	The toilets are to be cleaned once a week or more frequent if required. The contractor is to supply the ECO with toilet cleaning slips if a chemical toilet is being used. The contractor must ensure that no leakage or spillage occurs when chemical toilets are replaced. The contractor is to ensure sufficient toilet paper is placed every day in the toilets. The ECO must regularly inspect the state of chemical toilets.	C	
	Performing ablution activities outside of designated toilet facilities are strictly prohibited.	ECO/C	
	STORAGE AND MANAGEMENT OF HAZARDOUS		
STORAGE AREA			
Storage of material must be placed as far away as possible from the watercourse and storm water runoff.	ALL	Ongoing	

AMD CONSTRUCTION MATERIALS	Storage areas must be demarcated and no unauthorised access is allowed.		
	Storage areas must be secure to minimize crime and general public access.	E/C	
	HAZARDOUS SUBSTANCES AND MATERIALS		
	Hazardous waste should be stored in a separate bin and be disposed of at a landfill licenced in terms of section 20 of the Environmental Conservation Act 1989 (Act No 73 of 1989) or the National Environmental Management: Waste Act (Act No. 59 of 2008). Any builder's waste that can be re-used can be stockpiled in an area identified by the ECO.	ECO/C	Ongoing
	All hazardous substances and chemicals to be used on site, must be reported to the ECO in order to ensure possible negative environmental impacts are mitigated. This should be written in a contingency plan to be approved by the ECO.	ECO/C/E	Prior to construction
	A re-fuelling area of machines and equipment must be identified by the ECO and Engineer. Drip trays to be placed under refuelling areas. The proximity of buildings and public walkways of these storage areas must be taken into consideration.	ALL	Ongoing
	Firefighting equipment must be placed in close proximity to the refuelling designated area.	C	
	Contractors to submit a method statement and contingency plan for refuelling to be approved by the ECO	C	Prior to construction
No materials are to be stored in unstable or high risk areas	ALL	Ongoing	
FIRE AND SAFETY MANAGEMENT	FIRE PREVENTION		
	No open fires allowed on site	ALL	Ongoing
	No burning of waste is permitted on site		
	Working fire extinguishers and firefighting equipment must be available at all times on site		
	In case of an accidental fire the contractor must alert the Plettenberg Bay Fire Department immediately	C	
	SAFETY		
	A Health and Safety Officer is to be appointed	C/E	Prior to construction
	A first aid kit is to be on site and all emergency numbers to be displayed on site	C	
EARTHWORKS AND EXCAVATION	UNDERTAKING OF EXCAVATION AND EARTHWORKS		
	The area within the embankment stabilisation is to be clearly demarcated for earthworks	C	Ongoing
	No heavy machinery will be permitted at all within the watercourse. All earthwork machinery to stay within the parking area	C	
	Any area to be excavated is to be discussed with the appointed ECO prior to commencement of excavation	C/E	
	No excavations allowed outside the footprint of the construction area.	C/E	
	STORAGE OF EXCAVATED MATERIALS		

	In-situ materials to be excavated will not be allowed to be stored on site and must be removed immediately to a licensed facility	C/E	Ongoing
	SOURCING OF CONSTRUCTION MATERIAL		
	The material used for fill must be approved by the Engineer and ECO	ALL	Prior to construction
STORMWATER	STORMWATER CONTROL MEASURES		
	Redirect all storm water away from the construction area. This can be done with the use of sandbags.	C	Ongoing
NOISE AND VISUAL IMPACTS	NOISE IMPACTS		
	Noise levels must comply with health and safety regulations. The health and safety consultant should ensure compliance with legal limits.	E/C	Ongoing
	VISUAL IMPACTS		
	Storage facilities to be demarcated with green netting where possible and where necessary.	E/C	Ongoing
POLLUTION – METHOD STATEMENT AND CONTINGENCY PLANS	POLLUTION PREVENTION MEASURES		
	The pollution of the receiving environment must be prevented at all costs, therefore it is required to prevent and manage the sources of pollution. The probable sources of pollution are listed below: 1. Spillage and contamination from oil 2. Spillage and contamination of hydraulic fluids 3. Spillage and contamination from fuel 4. Spillage and contamination from chemical toilets 5. Spillage and contamination from construction chemicals, concrete, and cement A method statement and contingency plan written by the contractor to be submitted to ECO for approval	E/C	Prior to construction and ongoing
KEURBOOMS RIVER	FAUNA & FLORA		
	No fishing is permitted.	ALL	Ongoing
	Any fauna found on site may not be harmed, and the ECO is to determine appropriate relocation procedures should this become necessary.		
	No-go areas to be adhered to and no damage or people walking will be permitted in the identified no-go areas.		
No harvesting of plants permitted.			
HERITAGE	DISCOVERY OF HERITAGE RESOURCES		
	If any heritage resources are discovered work will be suspended immediately and the appropriate authorities must be contacted Examples of heritage resources are as follow: ➤ Human remains ➤ Coins/Gold/Silver ➤ Fossils	ALL	Ongoing

	➤ Fossils shell middens/ marine shell heaps ➤ Pottery/ceramics		
RECORD KEEPING	APPOINTED ECO		
	All administrative procedures, permits, required licences to be submitted to ECO.	E/C/PROPONENT	Ongoing
	Record keeping of all site meetings, monitoring reports, approved EMMP, contingency plans and method statements must be clearly documented and kept on site of easy referral.	ECO	
	A site register should also be kept on site for recording of any emergency incidents, negative environmental impacts.	ALL	
	ECO reports to be submitted to DEA&DP on a weekly basis	ECO	
SITE CLOSURE			
SITE CAMP AND STORAGE AREA	SITE CLEAN-UP		
	All Areas cleared of any stockpiled materials.	C	After Construction Completion
	All rubble to be removed to a licensed waste facility.		
	The site to be cleared of all litter.		
	Fences, barriers and demarcations associated with the construction phase are to be removed from site.		
	All leftover building material to be removed from site.		
	All sandbags to be removed from site.		
	All chemical toilets to be removed.		
	ROADS		
	Any damaged road surfaces as a result of construction vehicles entering and leaving the site to be repaired to the satisfaction of the engineer.	C	After Construction Completion
	The engineer to provide a snag list to the contractor for site closure	E	
	AUDIT REPORT		
	An environmental audit report must be completed by an independent auditor in compliance to Appendix 7 of the NEMA EIA Regulations 2014 as amended for the closure of the site and submitted to DEA&DP.	Auditor	After Construction Completion

15. CONCLUSION

This is a draft EMMP and the comments of all Authorities and Registered I&AP's will be taken into consideration for the Final Report. Construction may only commence once DEA&DP have approved the BAR and EMMP.