



ENVIRONMENTAL MANAGEMENT PROGRAMME

for

HOUSE VOGEL / THE HAPPY PLACE

on

Erf 2103, Piesang Valley, Plettenberg Bay

In terms of the

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

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Date: 11 August 2021

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PURPOSE OF THIS REPORT:

Environmental Management Programme

APPLICANT:

Ms Saskia Vogel / Tanaka Foundation

CAPE EAPRAC REFERENCE NO:

BIT517/12

SUBMISSION DATE

11 August 2021

ENVIRONMENTAL MANAGEMENT PROGRAMME

House Vogel / The Happy Place

Erf 2103, Piesang Valley, Plettenberg Bay

Submitted for:

Stakeholder Review & Comment

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ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

Appendix 4 of Regulation 326 of the 2014 EIA Regulations, as amended 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 326 of 201 EIA Regulations

Requirement	Description
Details and expertise of the EAP who prepared the EMPr; including curriculum vitae.	Melissa Mackay See Cover Page. Appendix 10.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	<u>Section 1.3</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 should 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	<u>Section 4</u> <u>Section 6</u> <u>Section 7</u> <u>Section 8</u>

Requirement	Description
(iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
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>
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.	<u>Section 9</u>
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>
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.	<u>Section 5</u> <u>Section 6</u> <u>Environmental Induction and</u> <u>Section 7</u> <u>Section 8</u>
Any specific information that may be required by the competent authority.	EA Pending

EMERGENCY CONTACT DETAILS

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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.
CMP	Conservation Management Plan – an environmental management tool used to ensure the responsible management of environmentally sensitive / conservation worthy areas within and/or surrounding a particular development and ensure that any adverse impacts of the operation of a project on specified protected areas are prevented and that positive benefits of the projects are enhanced.
DEA	National Department of Environmental Affairs – 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.
DAFF	Department of Agriculture, Forestry and Fisheries – the national authority responsible for the agricultural, forestry and fishery sector and its management. DAFF is mandated to enforce the National Forestry Act (NFA). Permits for the removal or pruning of protected tree species e.g. Milkwoods must be obtained from this entity.
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.
HOA	Home Owners Association - an organization/board of homeowners of a particular subdivision, condominium or planned unit development. The purpose of a HOA is to provide a common basis for preserving, maintaining and enhancing their homes and property, and in this case their open space corridors / areas within the Estate in accordance with this CMP.
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.
PCO	Pest Control Operator / Officer – The use of pesticides and herbicides in South Africa is governed by the Agricultural & Stock Remedies Act (Act 36 of 1947). This law requires that persons applying or advising on the use of pesticides or herbicides be registered as Pest Control Operators (PCO) in their relevant field.

1 INTRODUCTION

Cape Environmental Assessment Practitioners (*Cape EAPrac*) was appointed by the Applicant, **Ms Saskia Vogel**, to develop an Environmental Management Programme (EMPr) which will be used to promote and ensure environmental monitoring, control and management associated with the construction and operation of a rescue and rehabilitation facility on Erf 2103, Piesang Valley, Plettenberg Bay. This process is undertaken in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended).

An application for a Part 2 Amendment of the existing Environmental Authorisation has been submitted to the Department of Environmental Affairs & Development Planning (DEA&DP). The Part 2 Amendment Assessment process is triggered as the change in scope from a single residential dwelling as authorised, to a rescue and rehabilitation centre for dogs and cats is deemed to be a significant change.

The property, Erf 2103, Piesang Valley is located off the Piesang Valley Road adjacent to the Piesang River. The property is zoned for Agriculture and is included within the urban edge of Plettenberg Bay. The Piesang Valley Road divides the property into north and south portions, with the majority of the land mass located to the north.



Figure 1: Erf 2103 Piesang Valley, Plettenberg Bay (Google Earth Pro 2021)

This Environmental Management Programme (EMPr) contains management requirements and recommendations made by *Cape EAPrac*, participating specialists and stakeholders, as well as in terms of best practice. This EMPr has been updated to include recommendations that arose from the Basic Assessment process, as well as conditions of the authorisations.

This EMPr has been compiled with due consideration of Sections 24N and 33 of NEMA and relevant guidelines for Environmental Management Plans. These requirements and recommendations make reference to pre-construction, construction, operation activities and decommissioning phases.

This EMPr must be included in ALL tender and contract documentation associated with this project.

Section 28 of NEMA provides for the Duty of Care principle that “...obliges every person who causes, has caused or may cause significant environmental degradation to take reasonable measures to

prevent such degradation from occurring, continuing or recurring". This clause forms the underpinning philosophy of this EMPr.

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 development on the receiving environment are managed, mitigated and kept to a minimum. These phases include clearing of land, construction of new dwelling and infrastructure, management of remainder and overall sustainability. The EMPr must provide easily understood and provide clearly defined actions that should be implemented during each phase of the development of the proposal. The EMPr is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is binding on the Proponent (Ms Saskia Vogel / The Tanaka Foundation), all contractors and sub-contractors and visitors to the site. It must be included as part of any tender documents / agreements, as well as contractual documents between the Proponent or individual land owners and any contractors. Copies of this EMPr must be kept on site and all home and land owners 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), DAFF Licence, CapeNature Permit or Municipal Certification. This EMPr is viewed as a dynamic document that should 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. In terms of the EA, the activities must commence on site within 5 years from the date of issue (6 October 2016) and have been concluded within 3 years of commencement of construction.

1.3 PROPOSED DEVELOPMENT (PREFERRED ALTERNATIVE)

The EA approved the following:

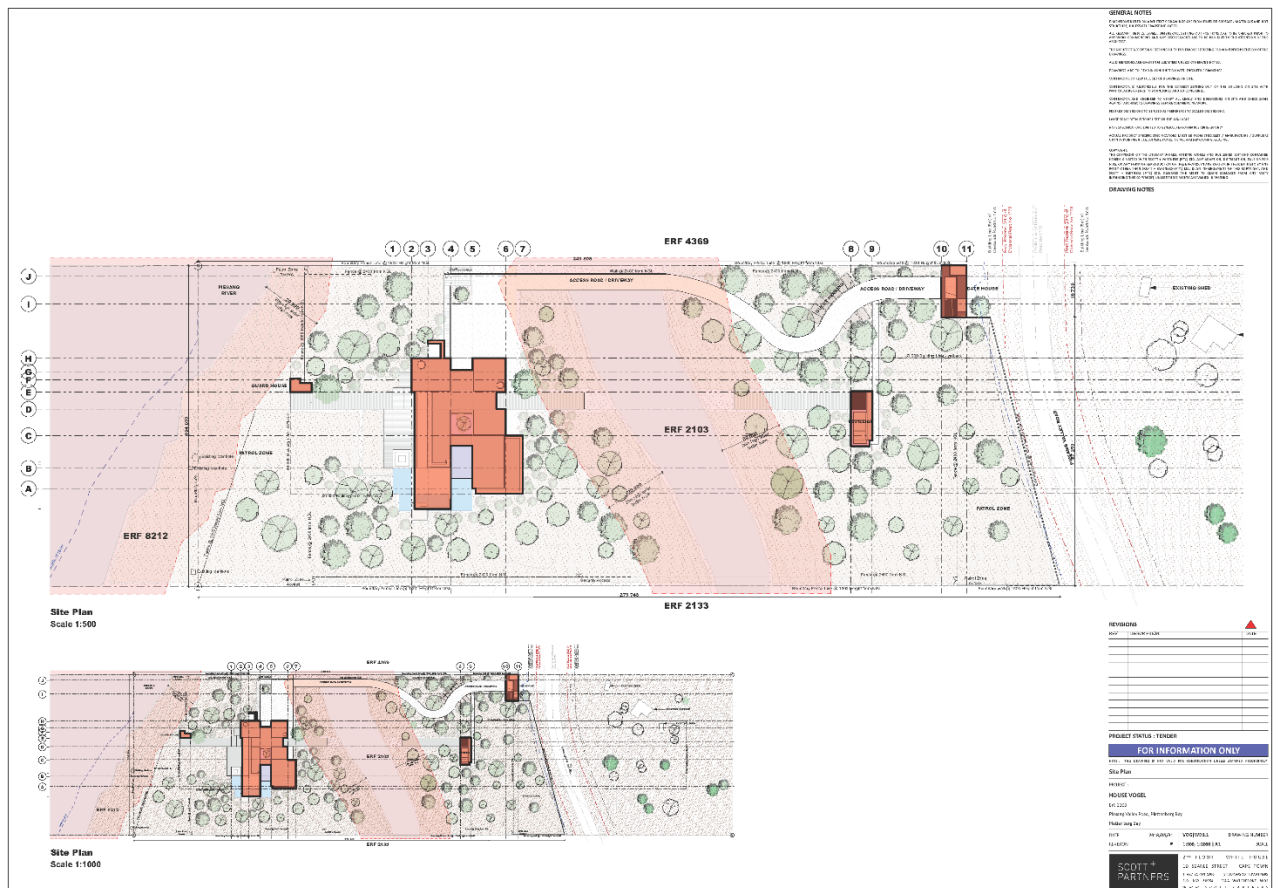


Figure 2: Approved SDP

Alternative 1 (Preferred Alternative)

The proposal entails the moving or infilling of sand/soil from an estuary or within 100 metres from an estuary to construct the following:

- a double storey dwelling and basement with a footprint of $\pm 1300\text{m}^2$
- Decking / boardwalks for dwelling area $\pm 815\text{m}^2$
- Access and parking areas of $\pm 1780\text{m}^2$
- A pavilion for entertaining guests of $\pm 125\text{m}^2$
- Decking / boardwalk for pavilion of $\pm 135\text{m}^2$;
- Gatehouse of $\pm 124\text{m}^2$;
- Guard house of $\pm 23\text{m}^2$.

This is a coverage of **±4302m²**.

The amended proposal is for the following:

- Rehabilitation Centre of $\pm 60\text{m}^2$;
- 10x Kennel dog huts (2m x 3m ea) with a footprint of 6m^2 within 10x10m fencing each (total area $\pm 1000\text{m}^2$);
- 3x Kennel dog huts (2m x 3m ea) with a footprint of 6m^2 within 5x5m fencing each (total area $\pm 75\text{m}^2$);
- Training Centre of $\pm 110\text{m}^2$;
- 2 x Cottages with a footprint of $\pm 76\text{m}^2$;
- Access and parking of $\pm 1780\text{m}^2$.

The entrance and access road and previous guest parking area will be retained. Thus the proposed coverage for the facility is **±3101m²**. It must be noted that the approved layout included a basement to the residence whereas the revised proposal will not. All structures will be raised above ground

on stilts, including the dog kennels.

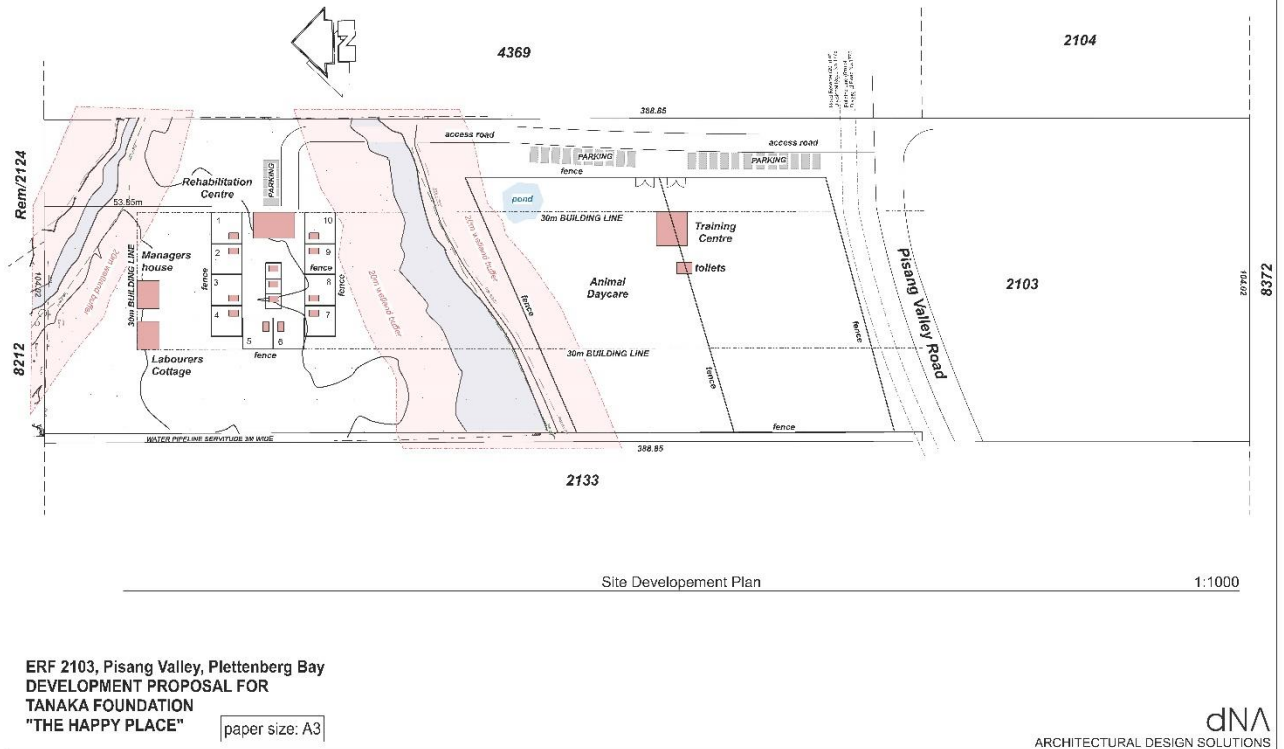


Figure 3: Proposed SDP

PROPOSED TRAINING CENTRE DESIGN

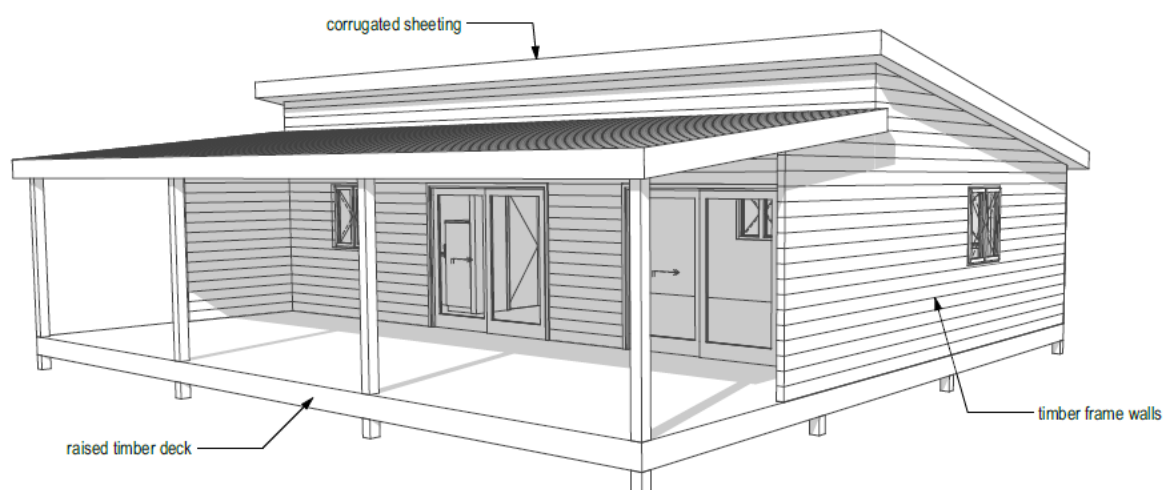


Figure 4: Proposed Training Centre

PROPOSED STAFF COTTAGE DESIGN

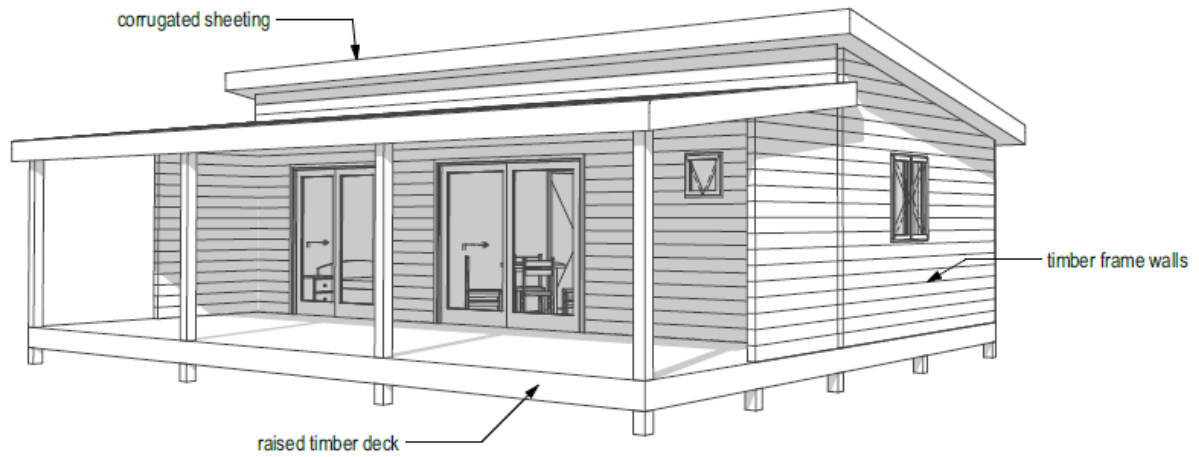


Figure 5: Proposed Staff Cottage Design

PROPOSED REHABILITATION CENTRE DESIGN

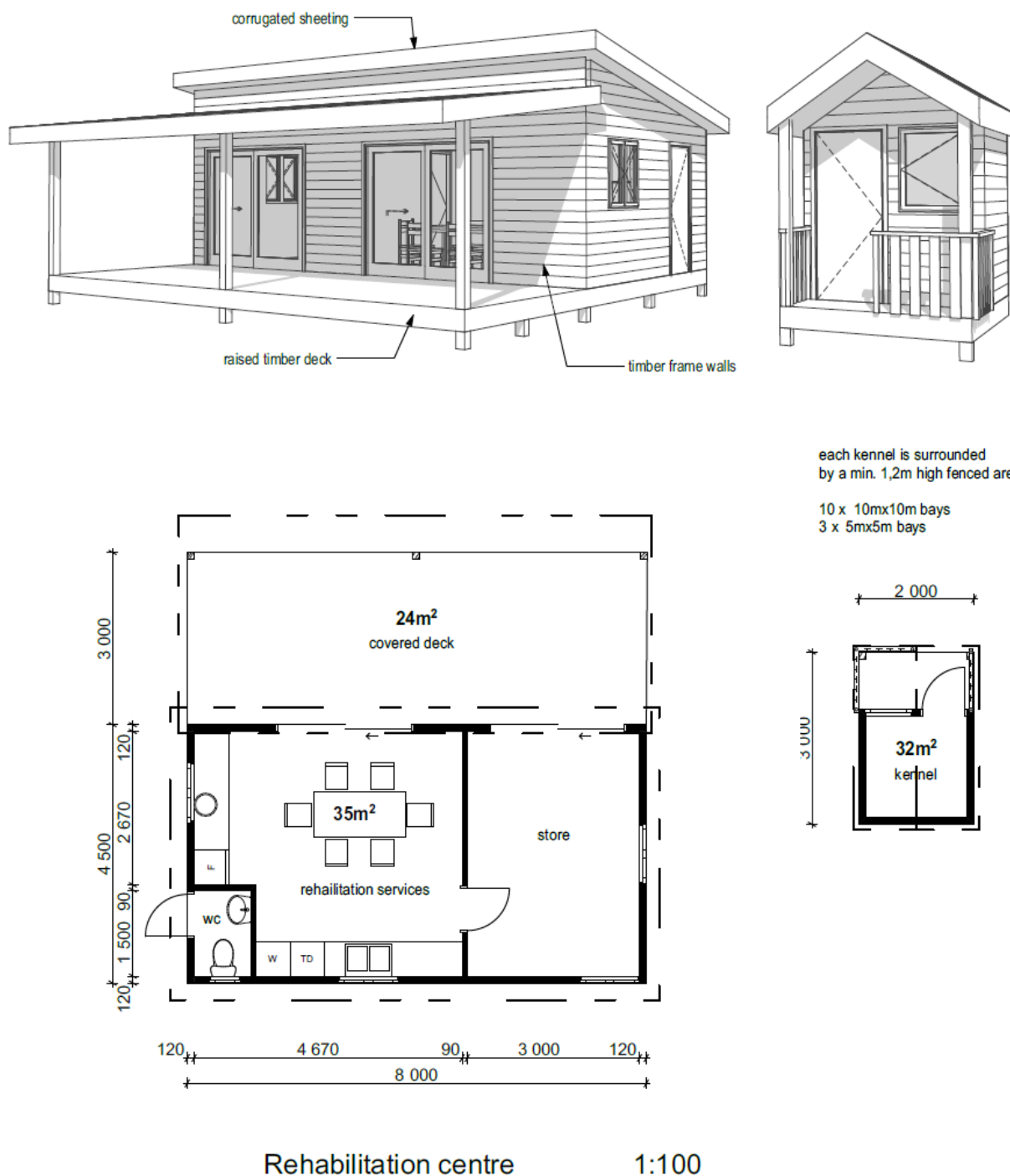


Figure 6: Proposed Rehabilitation Centre Design

The reason for the change is that Ms Vogel and her family have relocated all their business and personal interests out of South Africa and no longer envisage building a residence on this property. As a passionate supporter of animal rights, she will be providing the property to the tenants to establish and run the centre.

In addition to above, the amendment will include the change of the rights of the EA from Ms Vogel to the Tanaka Foundation, who will be responsible for the operation and management of the facility.

1.3.1 Environmental Authorisation:

Environmental Authorisation (EA) for the single residential dwelling was issued on 17 September 2018. The amendment to accommodate the above mentioned proposal has been applied for from the provincial Department of Environmental Affairs & Development Planning (DEA&DP). The original EA and EMPr came into effect as the holder commenced with construction of the access road and upgrade to the culvert crossing the remnant tidal channel. These works have been completed and any new EA, long with this EMPr will come into effect once it is authorised.

1.3.2 Municipal Approval:

Erf 2103 is zoned Agriculture 1 and the development of rescue and rehabilitation facility is in line with the zonation. However, the development will require building plan approval from the Bitou Municipality in the event that an EA is approved.

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.

The location of the site for the construction to minimise environmental impacts forms part of this phase.

2.2 CONSTRUCTION PHASE

The construction phase of the development refers to the **actual construction** of the development, including all earthworks and bulk services construction. The construction programme will be included in this EMPr once it has been finalised. Any construction activities must have the relevant approvals in place before they may commence. Extensions due to delays are always a possibility and in the event that the end date for construction is extended, this EMPr must still be considered binding. This EMPr may be incorporated into any relevant applications (municipal building plans, OSCA etc.), but where site specific management actions are required, these must be developed.

The practical actions proposed in this EMPr and by the aquatic specialist have been done so to protect and improve the integrity of the Piesang River and the remnant tidal channel.

2.3 OPERATIONAL PHASE

The operational phase commences once the various construction activities on the development are completed and handed over to the Landowner (occupation certificate from the municipality). This EMPr includes several recommendations regarding the Operational Phase of the development, which should not be seen as exhaustive. The Proponent should ensure that the Operational Phase maintains the underpinning principles 'Duty-of-Care-to-the-Environment' and ideals of sustainable development. This phase is not necessarily associated with the NEMA listed activities as the impacts are mostly related to the construction phase.

The commitment by the applicant to restoration and rehabilitation of the remainder of the grazed areas supports regional conservation outcomes whilst fulfilling the applicant's right to construct on the land.

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.

As the proposed development will be for a rescue centre inside the urban area, it is unknown if it will be decommissioned in the near future. As such, specific management recommendations for demolishing are not included with this EMP. In the event that decommissioning is required, all relevant legal processes must be complied with.

3 LEGISLATIVE REQUIREMENTS

The proponent, contractors and visitors are 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 national Department of Environmental Affairs) based on the findings of an Environmental Assessment. It also embraces the notion of sustainable development as contained in the Constitution of South Africa (Act 106 of 1996) in that everyone has the right:

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

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

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

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

It is incumbent upon the landowner, Ms Saskia Vogel to ensure that the abovementioned principles, entrenched in this EMP, are upheld and complied with.

In terms of **NEMA**, the project is undergoing a Basic Assessment process for which an Environmental Authorisation may be issued.

3.1.1 Listed Activities Approved in EA

NEMA specifies various 'listed activities' that require prior environmental authorisation. The following listed activities are applicable to this development:

Table 3: NEMA Listed Activities House Vogel

Listed activity as described in GN 327, 984 and 985 as applicable	Description of project activity
EIA Regulations Listing Notice 1 (2017): Government Notice (GN) No. R327	
<u>GN R327 Item 19:</u> The infilling or depositing of any material of more than 10m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m ³ from a watercourse.	The access to the proposed residential dwelling will be across the remnant tidal channel that crosses the property from west to east. There is an existing dirt route which will be formalised and improved to aid in the function of the channel.
<u>GN R327 Item 19A(ii):</u> The infilling or depositing of any material of more than 5m ³ into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5m ³ from – (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100m inland of the high water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea.	The proposed rescue centre will be located within 100m of the high water mark of the Piesang River which is an estuarine environment.
Both of the activities listed above were approved in terms of the current EA for the multi storey single residential dwelling and pavilion. The access road and upgrades to the culvert over the remnant tidal channel have been completed in terms of the current EA. There are no new listed activities associated with the proposed amendment to the EA.	

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.

In addition Regulations 506, 507, 508 and 509 of July 2013 relating to the control of alien invasive species must be considered and complied with.

3.3.1 Western Cape Biodiversity Sector Plan (WCBSP)

A Biodiversity Sector Plan (BSP) provides a way forward in reconciling the conflict between development and the maintenance of natural systems. It provides biodiversity information needed for land-use planning and decision-making and other multi-sectoral planning processes (between Cape Nature / SANParks, DEA&DP and Department of Water & Sanitation, district and local municipalities etc.), advising which areas can be lost to development, and which areas of critical biodiversity value, and their support zones, should be protected against any impacts. Central to the WCBSP is the **Critical Biodiversity Area (CBA) Map**, which together with its associated guidelines and GIS maps, were consulted in the assessment of the development proposal.

- CBAs aim to incorporate: (i) areas that need to be safeguarded in order to meet national biodiversity thresholds (ii) areas required to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services; and/or (iii) important locations for biodiversity features or rare species.
- ESAs are 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.

There are no areas identified as CBAs on Erf 2103 and the remnant tidal channel has been shown as an ESA2 with a requirement to restore from other land use.

The proposals in the BAR to improve functionality of the tidal channel will achieve this objective.

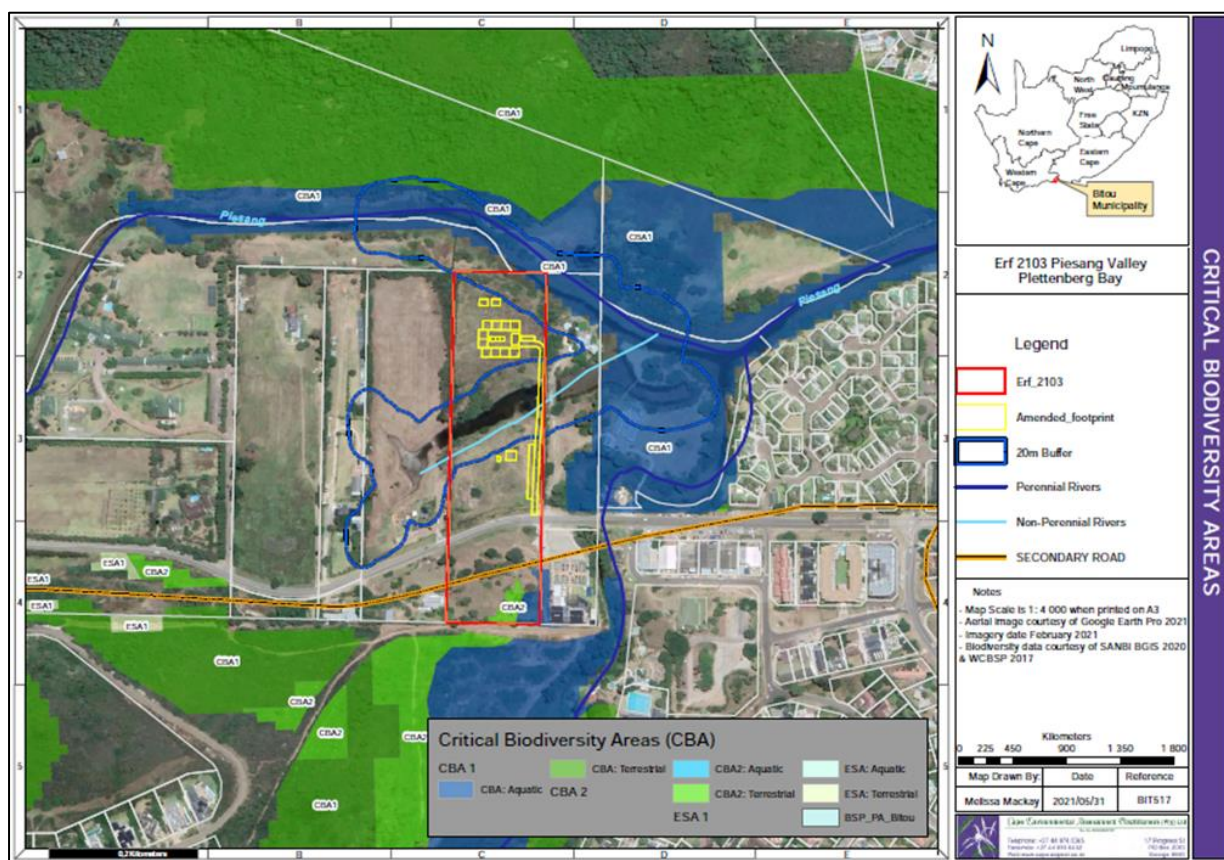


Figure 7: Critical Biodiversity Areas

3.3.2 Alien Invasive Species Regulations & List, 2014 (No. R. 598)

Along with the abovementioned National List of Threatened Ecosystems (2014), NEM:BA provides a List of Alien and Invasive Plant Species (2014), which require control or management.

Chapter 5 of NEM:BA deals specifically with these species which may pose a threat to biodiversity and aims to – *'to **prevent the unauthorized introduction and spread** of alien species and invasive species to ecosystems and habitats where they do not naturally occur; **to manage and control** alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular; and **to eradicate** alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats'*.

NEM:BA speaks of 'restricted activities' in relation to both protected/threatened indigenous species and alien invasive species. Restricted activities related to alien or listed invasive species, include -

- *importing into the Republic, including introducing from the sea, any specimen of an alien or listed invasive species;*
- ***having in possession or exercising physical control over** any specimen of an alien or listed invasive species; selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of an alien or listed invasive species; or*
- ***growing, breeding or in any other way propagating any specimen** of an alien or listed invasive species, or causing it to multiply;*
- *conveying, moving or otherwise translocating any specimen of an alien, in relation to a specimen of a listed threatened or protected species;*
- *selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of an alien or listed invasive species; or*
- *any other prescribed activity which involves a specimen of an alien or listed invasive species.*

Regulation 65(1) of NEM:BA specifies that *'a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7'*. Related to this, Regulation 65(2) specifies that *'a permit referred to in subsection (1) may be issued only after a prescribed assessment of risks and potential impacts on biodiversity is carried out'*.

Chapter 9, Sections 101 & 102 of NEM:BA speak to 'Penalties & Offences', *where any person who contravenes or fails to comply with a provision of these regulations is guilty of an offence and is liable, on conviction, to -*

(a) a fine not exceeding five million rand, and in the case of a second or subsequent conviction, to a fine not exceeding R10 million; or

(b) imprisonment for a period not exceeding 10 years; or

(c) to both such fine and imprisonment.

Alien Invasive Species Regulations & List, 2014 (No. R. 598)

Control and management of Alien Invasive Plants Species, within the ambit of the NEM:BA, is guided by the definition of different categories or lists (Categories 1 (a & b), 2 & 3) according to their current invasive state and potential to become invasive. These categories are, as per the NEM:BA Regulations (October 2014):

Category 1a - Invasive species requiring compulsory control: **Remove and destroy**. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

Category 1b - Invasive species requiring compulsory control as part of an invasive species control programme. **Remove and destroy**. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.

Category 2 - Invasive species regulated by area. A **demarcation permit** is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants that occur in riparian zones.

Category 3 – Invasive species regulated by activity & subject to exemptions. An **individual plant permit** is required to undertake any restricted activities involving a Category 3 species. No permits will be issued for Cat 2 plants that occur in riparian zones.

It must be noted that the NEM:BA definition of “control” in relation to an alien or invasive species means:

- (a) *To combat or eradicate an alien or invasive species; or*
- (b) *Where such eradication is not possible, to prevent as far as may be practicable, the recurrence, re-establishment, re-growth, multiplication, propagation, regeneration or spreading of an alien or invasive species.*

The aquatic specialist identified the following alien invasive species, amongst others, on site which must be removed:

- *Acacia longifolia* (Long-leaved wattle)
- *Acacia saligna* (Port Jackson)
- *Acacia mearnsii* (Black wattle)
- *Cortaderia selloana* (Pampas grass)
- *Eucalyptus spp*
- *Lantana camara*
- *Opuntia spp.* (Cactus spp)
- *Pennisetum clandestinum* (Kikuyu grass)
- *Pinus spp* (Pine)

Appendix 7 provided input on alien invasive management and aids.

Please refer to *Section 7.2* below for a description of the abovementioned alien species (for identification purposes) and details on how alien invasive species should be removed from the property.

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.

Erf 2103 will be serviced by the municipality in terms of waste collection, however it is recommended that the proponent practise separation at source of materials that can be recycled.

3.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The CARA aims to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

As with NEM:BA, alien invasive plant / weed species listed in terms of CARA must be controlled and/or removed. In the case of the operation of the Vogel development, the conservation of soil and

water resources (particularly stormwater) is applicable, in the sense that measures must be in place to avoid the pollution or degradation of these resources within the open space areas of the property.

3.6 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. No Water Use Licenses or Permits are required for this development, however stormwater management across the property and entering the estuary during construction and operation must be in line with efforts to prevent pollution.

3.7 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).

In the case of the Vogel development, no protected trees have been identified on the developable areas, and the proponent intends planting species that are indigenous to the area.

Species that are protected in terms of the NFA include:

Acacia erioloba (Camel thorn), Acacia haematoxylon (Gray camel thorn), Adansonia digitata (Baobab), Afzelia quanzensis (Pod mahogany), Balanites subsp. maughamii (Torchwood), Barringtonia racemosa (Powder-puff tree), Boscia albitrunca (Shepherd's tree), Brachystegia spiciformis (Msasa), Breonadia salicina (Matumi), Bruguiera gymnorhiza (Black mangrove), Cassipourea swaziensis (Swazi onionwood), Catha edulis (Bushman's tea), Ceriops tagal (Indian mangrove), Cleistanthus schlechteri var. schlechteri (False tamboti), Colubrina nicholsonii (Pondo weeping thorn), Comretum imberbe (Leadwood), Curtisia dentata (Assegai), Elaeodendron transvaalensis (Bushveld saffron), Erythrophysa transvaalensis (Bushveld red balloon), Euclea pseudobenus (Ebony guarri), Ficus trichopoda (Swamp fig), Leucadendron argenteum (Silver tree), Lumnitzera racemosa var. racemosa (Tonga mangrove), Lydenburgia abottii (Pondo bushman's tea), Lydenburgia cassinoides (Sekhukhuni bushman's tea), Mimosa caffra (Coastal red milkwood), Newtonia hildebrandtii var. hildebrandtii (Lebombo wattle), Ocotea bullata (Stinkwood), Ozoroa namaquensis (Gariiep resin tree), Philenoptera violacea (Apple-leaf), Pittosporum viridiflorum (Cheesewood), Podocarpus elongatus (Breede River yellowwood), Podocarpus falcatus (Outeniqua yellowwood), Podocarpus henkelii (Henkel's yellowwood), Podocarpus latifolius (Real yellowwood), Protea comptonii (Saddleback sugarbush), Protea curvata (Serpentine sugarbush), Prunus africana (Red stinkwood), Pterocarpus angolensis (Wild teak), Rhizophora mucronata (Red mangrove), Sclerocarya birrea subsp. caffra (Marula), Securidaca longependunculata (Violet tree), Sideroxylon inerme subsp. inerme (White milkwood), Tephrosia pondoensis (Pondo poison pea), Warburgia salutaris (Pepper-bark tree), Widdringtonia cedarbergensis (Clanwilliam cedar) and Widdringtonia schwarzii (Willowmore cedar).

3.8 NATIONAL VELD AND FOREST FIRE ACT (ACT 101 OF 1998)

The purpose of the National Veld and Forest Fire Act is to **prevent and combat veld, forest and mountain fires** throughout the 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.

All landowners are required in terms of this Act to prepare and maintain **firebreaks** on the boundary of their property and any adjoining land. Only the Minister may exempt a landowner from providing firebreaks.

In areas that are considered a high fire risk, especially in vegetation types that tend to be fire driven ecosystems, it is recommended that a fire management plan is put in place, or the owner becomes a member of the local FPA and fall under the umbrella of the regional fire management strategy. **The Southern Cape is considered to be a fire driven ecosystem.**

The development is located within the urban area and as such does not require any kind of firebreak. However, given its zoning and potential risk from the areas to the north of the property, it is highly recommended that the proponent become a member of the Southern Cape Fire Protection Agency. Information on firewise management is included in Appendix 9.

3.9 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.

The development does not impact on any heritage resources and is within the urban edge / built environment. Final comment will be obtained from Heritage Western Cape. In terms of the proposed development, if any evidence of archaeological remains are unearthed, this must be communicated

to the Heritage Western Cape immediately. See the Heritage Requirements Section 7.16 below for detailed instructions as to communicating any finds.

3.10 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 during construction.

3.11 SANS 10400 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

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

3.12 NATIONAL BUILDING REGULATIONS

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

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

4 ENVIRONMENTAL IMPACTS & MITIGATIONS

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

4.1 IMPACTS

Botanical:

Overall, the sensitivity of site is very low due to the extended grazing activities. This is supported in the WCBSP, where the area is identified as having No Natural Remaining (NNR) vegetation. There are isolated clumps of thicket with larger shrubs and trees that have evaded grazing.

The proponent has committed to restoring and rehabilitating the locally indigenous ecosystem (Garden Route Shale Fynbos and South Outeniqua Sandstone Fynbos) in a manner that is not landscaped but more in keeping with natural ecosystems.

Only species identified for the two ecosystem types may be planted. A list of commercially available or propagatable species has been included in Appendix 6.

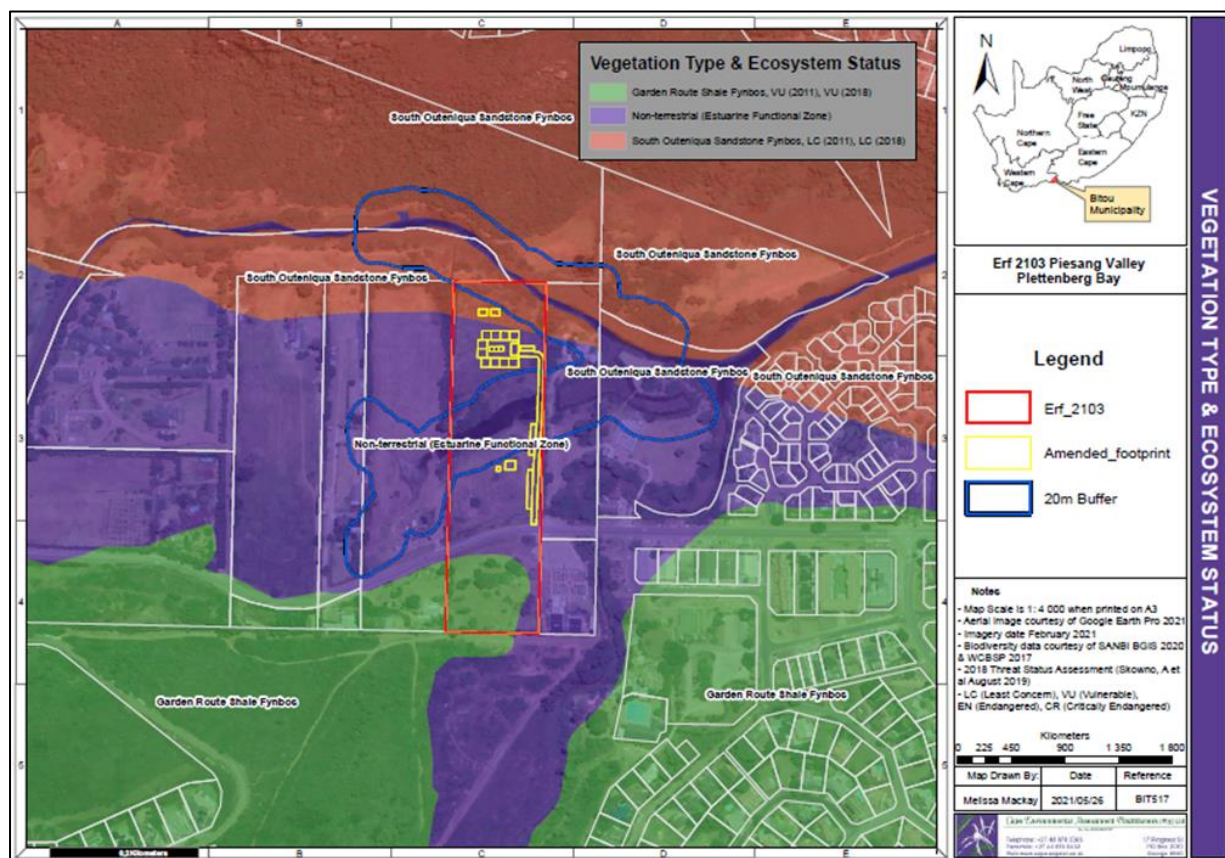


Figure 8: Ecosystem types

Aquatic:

The aquatic specialist identified the following impacts that could occur on the Piesang River and the remnant tidal channel. It must be noted that both are already considered critically modified and the mitigations proposed are more likely to significantly improve the functionality of the systems.

Impact 1: Changes to the hydrological regime due to increase hard surfaces with an increased potential for erosion.

This impact is associated with an increase in the rate and volume of surface water runoff which leads to erosion and sedimentation of the tidal channel and further down, the Piesang River.

Impact 2: Impact of changes to water quality.

This impact is associated with increased erosion, sedimentation and potential pollution during construction.

Impact 3: Loss of any bed / banks or wetlands areas due to clearing of vegetation of infilling (if required for road access).

This impact is mostly associated with the restoration of the culvert in the remnant tidal channel. Although there may be some temporary loss, the restoration of the channel will ultimately improve its functionality. **THE RESTORATION OF THE CULVERT HAS BEEN CONCLUDED.**

Noise:

Construction noise impacts may take place, but these can be mitigated to acceptable levels with management recommendations. This impact is considered a nuisance impact that affects immediate neighbours temporarily.

4.2 MITIGATIONS

The mitigation measures identified during the EIA process are listed below. The management requirements associated with these mitigations will ensure that the development retains the impact

significant ratings predicted by the specialist are included throughout this document. In other words the practical actions recommended are intended to ensure a conservation orientated outcome whilst supporting development in identified areas.

Table 2: List of Mitigation Measures & Associated Management Requirements

Mitigation	Management Requirement
(a) The current layout (Amended Alternative) should be adhered to which will minimise the overall loss of any wetland habitat.	Section 1.3
(b) Suitable erosion protection such as gabions or stone pitching should also be included, to prevent any erosion/sedimentation, where it is envisaged that surface water flows will increase.	Section 6.1 Section 7.3, 7.5 & 7.6
(c) The proposed culvert should be sized to accommodate connectivity between the wetlands / water course, and so that it does not result in back flooding. This will also be important to allow for the potential rehabilitation of the central wetland area, that with more regular inundation, coupled to the clearing of old building rubble and adjacent alien invasive trees, ecosystem function and habitat will return.	Section 1.3 Section 7.3, 7.5 & 7.6 CULVERTS HAVE BEEN COMPLETED
(d) Clearing of the remaining natural vegetation as it has been proposed in the layout plan will be kept to a minimum and the grass species will be replaced with trees and vegetation consistent with the ecosystem type.	Section 1.3 Section 8.1 & 8.2
(e) Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early.	Section 7.11 Section 8.3
(f) Littering and contamination of water sources during construction must be prevented by effective construction camp and on-site management.	Section 7.9 Section 8.3
(g) Emergency plans must be in place in case of spillages onto road surfaces and wetlands /water courses.	Section 7.11
(h) No stockpiling should take place within a water course or wetland.	Section 7
(i) All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.	Section 7
(j) Stockpiles must be located away from river channels / wetlands.	Section 7
(k) Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and	Section 1.3 Section 7

the re-vegetation of any disturbed riverbanks, such as at the proposed road crossing.	
(l) The construction camp and necessary ablution facilities meant for construction workers must not be in any of the delineated watercourses or wetland areas (including 20m buffer).	Section 7.1, 7.3 & 7.4
(m) For the operational phase, any sewer lines and or conservancy tanks must be inspected on a regular basis or emptied prior to becoming full.	Section 8.3.4
(n) Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.	Section 7.1
(o) Only indigenous plant species consistent with the identified ecosystem type must be used in the re-vegetation process. The species list mentioned in this study should be used as a guide	Section 7.14 Section 8.1 & 8.2
(p) All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination into wetlands or rivers. Washing and cleaning of equipment should also be done within berms or bunds, in order to trap any cement and prevent excessive soil erosion. These sites must be re-vegetated after construction has been completed.	Section 7.2, 7.3 & 7.11
(q) Mechanical plant and tankers/bowsers must not be refuelled or serviced within or directly adjacent to any river channel or wetland area.	Section 7.2, 7.3 & 7.11
(r) Erosion control measures must be put in place prior to any construction activities that would result in soil being exposed.	Section 7.1, 7.5 & 7.6
(s) Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil, works or materials during a storm event.	Section 7.1
(t) Appropriate action must be taken in advance to protect works should a storm event be forecasted.	Section 7.1, 7.5 & 7.6
(u) Any damage and loss of soil resulting from a storm is to be remedied immediately.	Section 7.1, 7.5, 7.6 & 7.14
(v) The construction camp and necessary ablution facilities meant for construction workers must be well removed from the wetlands.	Section 7.1, 7.2 & 7.4
(w) All stockpiled material must be located outside wetlands.	Section 7.1, 7.2 & 7.12
(x) There should be no toilet facilities placed close to wetlands areas or water courses.	Section 7.1, 7.2 & 7.4

(y) No maintenance of machinery is to take place close to wetland areas unless adequate measures have been instituted to ensure that no hydrocarbons ingress into the soil or water.	Section 7.1, 7.2, 7.3, 7.8 & 7.11
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5 RESPONSIBILITIES

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

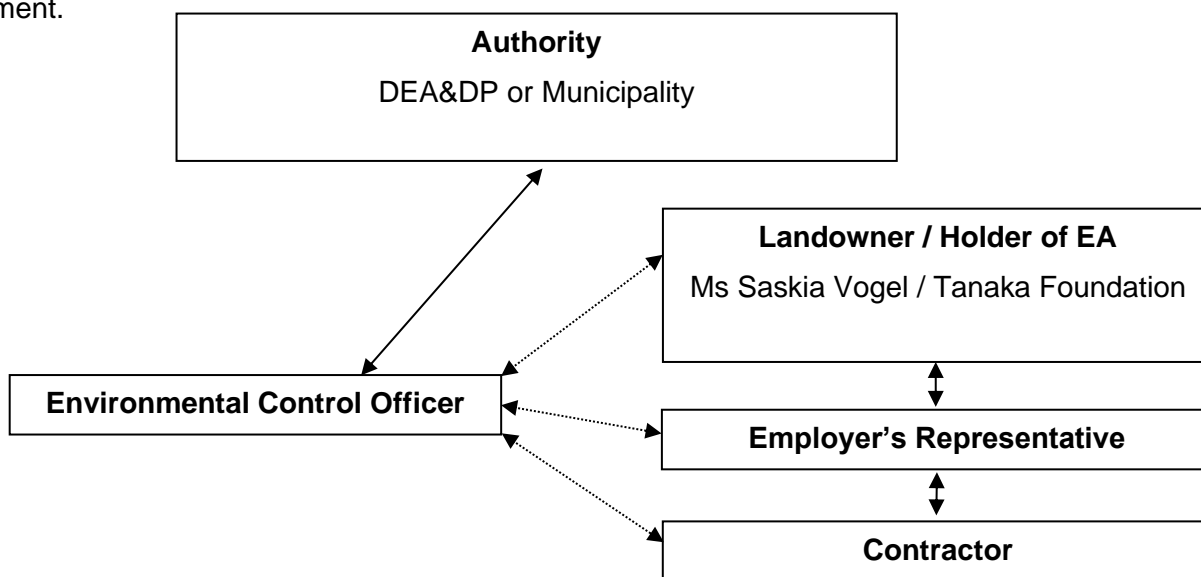


Figure 9: Responsibilities

5.1 HOLDER OF THE AUTHORISATION

The Holder of the Authorisation / property owner (Ms Saskia Vogel / Tanaka Foundation) is the overseeing entity responsible for ensuring that all activities undertaken on the property comply with any future Environmental Authorisation (EA) and associated Environmental Management Programme (EMPr) (& any other approval / licence / permit), as well as the management and maintenance of the remainder of the property into the future.

The responsibilities of the EA Holder / 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, EMPr as well as any other legally binding documentation, which include and are not limited to:
 - Municipal Approval/s (rezoning, subdivision, service agreements & building plans etc.);
 - 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, Engineers (during construction activities), as well as all future visitors and service providers (during operation) are made aware of their 'Duty of Care to the Environment' and that any damage or degradation of the natural environmental within the bounds of the property will be not be tolerated and must be dealt with / remedied at the cost of the perpetrator;
- Take remedial and/or disciplinary action in circumstances where persons are found to be in contravention of the abovementioned legally binding documentation.

5.2 ENGINEERS, CONTRACTORS & SERVICE PROVIDERS

The Engineers, Contractors and Service Providers 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: garden / landscaping 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 and the ECO 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). The ECO must have a minimum of a tertiary level qualification in the natural sciences field. The ECO should 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 Proponent, 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, EMPr and any legally binding documentation;
- Facilitating consultation with relevant environmental authorities (e.g. DEA&DP, DAFF, CapeNature or Municipality), where necessary;
- Facilitating the application for any required environmental authorisation, permit or licence, where necessary;
- 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:

- Weekly during initial site clearing and demarcation activities;
- Every second week after site clearing and during installation of civil services (roads, services etc.) and construction of the buildings;
- Monthly once civil construction is completed, must coincide with site meetings, where necessary;
- Ad hoc site visits may be undertaken in the event of any incidents or specific requests from the project proponent or project team.

5.5 ENVIRONMENTAL INDUCTION & TRAINING

The ECO 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 EMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The Contractor should provide a translator from their staff for the purpose of translating, should this be necessary.

As a minimum, training should include:

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

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

6 PRE CONSTRUCTION DESIGN CONSIDERATIONS

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

6.1 STORMWATER MANAGEMENT

The impacts associated with stormwater / run off during construction were highlighted by the aquatic specialist assessment.

During the construction phase, the risk of erosion related impacts associated with stormwater run-off is at its highest, and which can damage to both the environment and the works. The cost of the

proper planning and implementing of stormwater management systems is small compared to the cost of repairing damage or retrofitting solutions.

Therefore, it is prudent to implement sufficient stormwater management elements, before any construction activities take place, to prevent such damage.

The construction aspects of the stormwater management plan must be implemented before other construction work commences.

- The proposed culvert should be sized to accommodate connectivity between the wetlands / water course, and so that it does not result in back flooding. This will also be important to allow for the potential rehabilitation of the central wetland area, that with more regular inundation, coupled to the clearing of old building rubble and adjacent alien invasive trees, ecosystem function and habitat will return. **CULVERT CONSTRUCTION HAS BEEN COMPLETED**
- Implement Best Management Practices in Stormwater Management.
- Roads and parking areas should make use of the Sustainable Urban Design (SUDS) principles to minimise hard surface runoff and allow permeability.
- Apply the principles of Low Impact Development (LID) in the design of the drainage systems.
- The capture and storage of rainwater from roofs is recommended, and the discharge of the overflows from rainwater tanks should be promptly returned to natural overland sheetflow.

6.2 WATER CONSERVATION

Water conservation in South Africa is of vital importance. Our water resources are under extreme pressure from pollution, over abstraction and development and all efforts to minimise usage should be implemented. No potable water may be used for the irrigation of gardens or any other outdoor uses. The following must be included in the design of all buildings proposed by land owners who will be constructing their own homes, and should be taken into consideration by existing homeowners.

6.2.1 Rain Water Harvesting

Capturing of rain water will minimise the demand pressure on the municipal service systems. Gutters and rainwater tanks must be built into the architectural designs.

Rainwater should be used to irrigate all private and landscaped gardens. Consideration should be given to provide solar pumps at each rainwater tank in order to more effectively supply the units and irrigation purposes. The overflow from tanks should be directed into the stormwater system.

6.2.2 Dual Flush Toilets

Conservative estimates have shown that a saving of more than 22 000 liters per household can be achieved annually with the installation of dual flush toilets (Aquanotion, 2008). All households and ablution facilities should be fitted with dual flush systems.

6.2.3 Low flow Shower Heads

The installation of low flow shower heads can not only reduce water consumption by up to 50%, but also the energy required for water heating by up to 50% (Eartheasy, 2008).

It has been estimated that a saving of up to 57 000 liters of water per annum per household can be achieved through the installation of low flow shower heads. Low flow shower heads make use of either aerators or pulse systems to reduce the flow without compromising the quality of the shower. The choice of shower head is up to the individual owner, but must have a flow of less than seven liters per minute.

6.2.4 Low Flow Taps

Low flow tap use aerators to reduce the flow of the water. These are either built into the faucet or added as an aftermarket product. The faucets in bathrooms should have a peak flow of less than 10 liters per minute.

It is not necessary to install aerators in kitchen sinks as they are seldom run without a plug. All bathroom basins must be fitted with low flow faucets.

6.2.5 Washing Machines

It is recommended that washing machines that are to be installed should be front loading washing machines as opposed to top loading washing machines. Apart from much lower energy and water requirements, front loader washing machines have a number of advantages that make them a better environmental choice:

- **Less wear and tear on washed materials** – Washed materials therefore last longer and result in a net resource saving;
- **Faster drying times** - Because of the horizontal axis and faster spin speeds, more water is removed and the materials dry faster which results in energy saving if a clothes dryer is used.;
- **Quieter operation** – Therefore less noise pollution; and
- **Less detergent** - Far less is required compared to top loaders. Fewer chemicals therefore reach treatment plants and ultimately waterways.

6.2.6 Geyser and Pipe Insulation

Apart from the savings in terms of energy as detailed below, insulating geysers and pipes save water, as shorter periods of running the tap to get hot water are required.

All structures should have insulation on geysers and all hot water pipes.

6.2.7 Waterwise Landscaping

Waterwise landscaping principles must be incorporated into any areas close to the dwelling that will be landscaping. The applicant has committed to restoring and rehabilitating the property using locally indigenous vegetation that is in keeping with the identified ecosystem types. This should already support waterwise principles.

The following principles apply to waterwise gardening:

- Grow water-wise plants – generally the best suited plants are those indigenous to the area, as they seldom need additional watering;
- Group plants according to their water needs – this avoids wasting water on plants that don't need it;
- Consider the quality and type of the lawn. Lawns use unacceptable amounts of water, so consider reducing lawn areas to a minimum. Use tougher, low-water lawn types such as Buffalo (coastal areas) or Kweek (inland) rather than Kikuyu.
- Maintain the garden – remove unwanted plants, plant more perennials than summer annuals, as they have deeper root systems and so need less watering.
- Improve the soil and mulch. Soil water-holding capacity is improved by higher organic matter content. Mulching (covering the soil with a thick layer of bark, compost, straw etc.) keeps the soil much more moist.
- Plant in the right season – For winter rainfall areas this is in autumn and early winter so the plants have a chance to develop their root systems before the dry season. In summer rainfall areas it is spring and early summer for the same reason.
- Water correctly – avoid watering during the heat of the day or in windy conditions.

- The best irrigation system is drip irrigation – it uses 25% of water used by normal irrigation systems with the same effect, and can even be placed under lawns.

6.2.8 Grey Water

Grey water is the water that comes from the bath, shower, basins, laundry and the kitchen sink. It is not to be confused with Black water, which is sewage that comes from the toilet. Black water is toxic and requires very specific methods of treatment in order to be safe for re-use. Grey water, however, can easily be recycled and re-used for a variety of uses. These include:

- Irrigation of gardens;
- Water for flushing toilets;
- Any outdoor use;
- Dampening dusty areas or roads.

Grey water systems require precise methods to clean the water. There are various companies and organisations that can assist with implementing a grey water system.

6.3 ENERGY CONSERVATION

The provision of energy has become a controversial topic, and has led to the reconsideration for many people of how they source and use energy in their homes. It is important for people to create a habit of conserving energy on a daily basis.

Solar energy is created by light and heat which is emitted by the sun, in the form of electromagnetic radiation. With modern technology, we are able to capture this radiation and turn it into usable forms of solar energy such as electricity.

Many of the suggestions below generally require inclusion during the design phase of new developments, but can just as easily be incorporated into existing dwellings.

6.3.1 Solar Heating Water Systems

Solar heated water systems are an innovative way of producing hot water without putting additional pressure on gas or municipal power supply. There are many different types available on the market, and home owners should consider all their requirements (e.g. number of people using facility, location of house, angles of roof) before making a choice.

6.3.2 Energy Efficient Lighting

In terms of Best Practice, it is required that energy saving lighting fixtures be used throughout the entire development. It is therefore specified that Light Emitting Diode (LED) or Compact Fluorescent (CF) lighting be used as opposed to incandescent lighting. This is required for all internal and external lighting, including street lighting. Proximity switches should be used in areas where lighting for pedestrians is required.

NO external High Pressure Sodium (HPS) or Metal Halide (MH) spot or floodlights should be installed.

CF lighting uses quantities of mercury in the bulbs and tubes which pose serious environmental hazards. The mercury from one CF bulb can pollute many thousand litres of water if not treated correctly (Eden District Municipality, 2011). CF lighting (energy saving bulbs and tubes) must be correctly disposed of at registered Hazardous waste sites. Companies like Pick n Pay and Woolworths offer facilities to collect CF bulbs for recycling and disposal. The following should be considered when handling CF bulbs (eHow Home, 2011):



Disposing of Burnt Out Bulbs

- Seal the bulb inside two plastic bags, or one thick freezer bag, before disposal.
- Find the nearest recycling station that handles hazardous materials. Check with your city's municipal office to see if there is a recycling program in your town.
- Take the bulbs to the recycling station. Ask the people there about the process of giving them your bulbs and follow all their instructions.
- Tell everyone you know who is using energy efficient bulbs how to properly dispose of them as the use of these bulbs is growing.

If a Bulb Breaks

- Open a window and leave the room. Let no one inside for at least 15 minutes.
- Collect the fragments and powder with stiff paper or cardboard. Wear disposable rubber gloves. Do not use a vacuum cleaner.
- Clean the entire area with a wet wipe or wet paper towel. Use adhesive tape to collect excess powder.
- Seal all pieces and cleanup materials in a plastic bag. Follow the above procedures on disposal or recycling. Wash your hands completely afterward.
- Dispose of the vacuum bag in the same manner the next time you vacuum the area. If it's a canister vacuum, wipe it completely clean.

6.3.3 Energy Efficient Appliances

Energy efficient appliances are becoming widely available. Follow the Energy Guide labels on appliances to help selection of correct models. Any appliance that has to heat up water or air will use more energy, as will an appliance that boasts additional extras such as ice making, dispensing and auto defrosting on fridges or heat drying on dishwashers.

6.3.4 Solar Cooling Systems

Where required by homeowners, the home owner should consider the use of solar cooling systems such as absorption or adsorption chillers as opposed to conventional air conditioning units.

6.3.5 Evaporative Cooling Systems

Consideration should be given to evaporative cooling systems as these cut down considerably on energy usage for appliances such as air conditioners. Furthermore, the system ensures that fresh air circulates within housing units, which improves on environmental health risks.

Fresh air is drawn from outside the house (the hotter the better) and passes through moistened pads which cools it down and filters it before flowing through outlets in the house.

There are certain parameters required for evaporative cooling systems, which should be thoroughly investigated prior to installation.

6.3.6 Geyser and pipe insulation

Apart from the savings in terms of energy as detailed below, insulating geysers and pipes save water, as shorter periods of running the tap to get hot water are required.

All structures should have insulation on geysers and all hot water pipes.

7 CONSTRUCTION PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

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

7.1 SITE CLEARANCE PLAN

Site clearance should be undertaken in a systematic manner within the demarcated areas to minimise the impacts of construction on the site. The following table provides a methodology to implementing site clearance according to this EMP and the EA.

Table 3: Site Clearance Methodology

No	Action	Scheduling
1	Survey approved layout on site.	Prior to construction
2	Establish site camp and material stockpile sites (incl. waste disposal area, portable toilets etc. The construction camp and necessary ablution facilities meant for construction workers must not be in any of the delineated watercourses or wetland areas (including 20m buffer).	Prior to construction.
3	Demarcate work areas using correct demarcation methods.	Prior to construction.
4	Demarcate protected areas as no-go areas .	Prior to construction.
5	Erosion control measures must be put in place prior to any construction activities that would result in soil being exposed.	Prior to construction.
6	Weather forecasts from the South African Weather Bureau of up to three days in advance must be monitored on a daily basis to avoid exposing soil, works or materials during a storm event	Construction
7	Commence with mechanical vegetation clearing within the demarcated work areas only.	Construction
8	Vegetation clearing should occur in parallel with the construction progress to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.	Construction
9	Any biomass from the clearing activities must be stockpiled within the development footprint at an area / areas approved by the ECO. The biomass must be chipped in situ and stockpiled within designated areas within the footprint.	Construction
10	Any cleared areas that will not be immediately constructed, must be covered with the wood chips or other mulch to prevent wind erosion.	Construction

7.2 ESTABLISHMENT OF CONTRACTORS SITE CAMP

The Contractors Site Camp, and associated stockpile site, must be established to provide a safe base for operations, security of materials and to prevent unnecessary impacts on the environment during the construction phase. It should not be erected on any areas considered sensitive, within the identified 20m buffer area and no indigenous vegetation may be removed, damaged or disturbed without prior approval. The following points must be taken into consideration when siting the contractor's camp:

- If an ECO is a requirement of any authorisation, the site camp must be established with the ECO's input;
- The Contractors Site Camp must be situated within the development area. Site Camps that are allowed off site may only be erected once written permission from the landowner is obtained and any other necessary authorisations are in place;
- The site camp may not be located anywhere within the identified 20m buffer of the aquatic systems;
- The site camp must be clearly demarcated and fenced off with shade netting or any other approved material;
- Topsoil from the site camp area must be stripped and stockpiled for reuse during rehabilitation. This must be done to ensure no contamination of the topsoil while the site camp is in use;
- No stockpiling may take place within the identified 20m buffer of the aquatic systems;
- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;
- All construction material must be stored in the site camp, unless otherwise approved by an ECO;
- No personnel may overnight in the site camp, except in the case of a night watchman / security if required;
- No fires are allowed;
- Fuel may only be stored in the site camp;
- Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early;
- Storage of waste must take place within the site camp and must be removed on a regular basis;
- The site camp must be provided with sufficient ablution facilities (toilets and potable water) of which the content must be disposed of regularly and at the suitable facilities;
- No ablution facilities may be located within the identified 20m buffer of the aquatic systems;
- The site camp must not impede or interfere excessively with vehicular use of the road and pedestrian access to the estuary;
- All relevant permits must be valid and kept on site.

7.3 DEMARCATION OF WORK AREAS

The demarcation of work areas is of extreme importance to ensure that damage is restricted to the future developed area and that areas outside this demarcated area are protected and not damaged unnecessarily. The process for this is as follows:

- The exact footprint of the construction areas to be surveyed and pegged ;
- The contractor in conjunction with the ECO, if any, must walk and inspect the areas determined and mark the full extent of the area to be disturbed (allowing sufficient space for the construction activity);
- This disturbance is to be clearly marked with a double strand of wire with danger tape placed between strands as detailed in Appendix 3, Figure 1;
- All areas outside this demarcated area are considered as "no-go" areas for any construction activity including movement of staff;
- Construction staff must be briefed as part of the environmental induction on the requirements regarding the no-go areas;
- Non-compliance with no go demarcation may be penalised.

7.4 SANITATION

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

- Toilet and washing facilities must be available to the site personnel at all times;
- These must be situated within the construction area (preferably at the site camp);

- There should be no toilet facilities placed close to wetlands areas or water courses;
- One toilet for every 15 personnel is required;
- The facilities must be serviced on a regular basis to prevent any spillage;
- The servicing contractor must dispose of the waste in an approved manner;
- The toilets should be secured /toed down to ensure that they do not blow over in windy conditions;
- All toilet facilities must be removed from site on completion of the contract period;
- Should the construction period be interrupted by a builders break, the toilets should be emptied prior to the break.

7.5 EROSION CONTROL

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 necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc.

Any erosion channels developed during construction on slopes must be backfilled, compacted and restored to an acceptable condition.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. Consideration and provision shall be made for the following methods (or combination thereof): brushcut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.). Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained.

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.

See Appendix 3, Figure 2 & 3 for further details regarding erosion control on the site.

7.6 STORMWATER MANAGEMENT

During the construction phase, the risk is highest of stormwater damage to both the environment and the works. The cost of the proper planning and implementing of stormwater management systems is small compared to the cost of repairing damage or retrofitting solutions.

Therefore, it is prudent to implement sufficient stormwater management elements, before any construction activities take place, to prevent such damage.

The final design of the drainage system should therefore take place timeously, to ensure that the system serves the ultimate development, as well as the construction phases.

The following must be implemented:

- Run-off from all work areas should be filtered through silt fences, or channelled into sedimentation dams, before being allowed to flow into the natural water courses.
- Energy dissipation measures should be combined with the above measures, where necessary.
- Construction of the roads and services should be carried out in phases, so that construction activities are continuously being completed and the work areas rehabilitated.

Practical applications for stormwater management are included in Appendix 3, Figures 2 & 3.

7.7 FIRE MANAGEMENT AND PROTECTION

Erf 2103 is not currently considered to be fire prone / a fire risk given the nature of the majority of the vegetation currently on site (grazed lands). However, considering the large undeveloped

property to the north (high biomass loads, due to alien infestation & senescent vegetation) and the surrounding residential / resort land-uses (braais, fireplaces, heat sources, electrical connections etc.) the risk of fire cannot be excluded or ignored.

Fire prevention and management is thus paramount, for the health and safety of those visiting or residing on the property, the protection of infrastructure, and protect fauna and the indigenous vegetation within the open space areas. The following measures must thus be implemented:

- **NO OPEN FIRES** are allowed anywhere on the construction site,
- The total removal of all invasive alien vegetation should take place in order to decrease the fire risk associated with the site;
- Cigarette butts may not be thrown in the veld, but must be disposed of correctly in suitable receptacles. These can be glass, plastic or metal containers half filled with sand;
- In case of an emergency, the contact details of the local fire and emergency services must be readily available (see contact list on page ix above);
- Contractors must ensure that basic firefighting equipment is available on site;
- Biomass generated from removal of invasive and indigenous vegetation should be chipped on site and not burned in situ;
- Fire risk on site is a point of discussion that must take place as part of the environmental induction.

7.8 NOISE & EMISSION CONTROL

It is recommended that noise generation be kept to a minimum and that construction activities be confined to normal working hours (08:00 - 17:00 on workdays and 08:00 to 14:00 on Saturdays). Deviations to these times must be communicated with the ECO and neighbours.

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

- Provide baffle and noise screens to noisy machines as necessary;
- Provide absorptive linings to the interior of engine compartments;
- Ensure machinery is properly maintained (fasten loose panels, replace defective silencers);
- Switch off machinery immediately when not in use;
- Reduce impact noise by careful handling.

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

Emission control in vehicles will be reduced by implementing the above mentioned noise control methods. Furthermore the following should be taken into account:

- All diesel vehicles should be correctly maintained and serviced to minimise unnecessary exhaust emissions;
- Any vehicles with smoking exhausts should be tested for emissions and repaired immediately;
- Speed limits must be adhered to;
- Vehicles and other diesel driven machinery should be switched off when not in use.

7.9 WASTE MANAGEMENT

An integrated waste management approach should be adopted on site.

Only approved waste disposal methods are allowed. The Contractor shall ensure that all site personnel are instructed in the proper disposal of all waste. The Contractor shall ensure that sufficient disposal facilities are available.

Recycling must be encouraged on site and recycling bins must be provided and clearly marked. It is recommended that local community leaders are contacted to identify groups or individuals who may benefit from the disposal of recyclable material and scrap metal.

Disposal of all waste materials must be done at suitable facilities. No dumping of any waste material on or off site is permitted.

The disposal of all general waste must take place at a landfill licensed in terms of Section 20 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the National Environmental Management: Waste Act, 2008 (NEM:WA, Act No 59 of 2008).

7.9.1 Solid Waste

The Contractor shall ensure that all facilities are maintained in a neat and tidy condition and the site shall be kept free of litter. Measures must be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the Contractor shall provide litterbins, containers and refuse collection facilities for later disposal.

Solid waste may be temporarily stored on site in a designated area approved by the ECO prior to collection and disposal. Solid waste must be removed on a weekly basis to a licensed waste disposal site. Recyclable waste should be recycled if at all possible. Examples of recyclable materials is shown in [Appendix 8](#).

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

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

7.9.2 Construction Rubble & Waste

All construction waste must be disposed of at an approved site (no construction rubble may be spoiled anywhere on site). No illegal dumping of construction material may take place.

All movable parts of the derelict buildings must be removed prior to demolition i.e. window frames, light fittings, bathroom and sink fittings, cupboards etc. Where possible, recycling of these should take place.

Demolition building rubble must be disposed of at a registered disposal site.

7.9.3 Scrap Metal

Recycling of scrap metal is recommended. Scrap metal must be disposed of offsite at suitable facilities or arrangements made for community involvement in the recycling.

7.9.4 Hazardous Waste

All hazardous waste (including bitumen, etc.) shall be disposed of at an approved hazardous landfill site. Unused or rejected tar or bituminous products must be returned to the supplier's production plant. Under no circumstances may the spoiling of tar or bituminous products on the site, over embankments, or any burying, be allowed.

Used oil, lubricants, grease and cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at an approved hazardous waste site.

7.10 CONCRETE BATCHING

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

All concrete batching should take place on an area that are to be **hard surfaced** as part of the development. Concrete batching outside such areas may only take place with the necessary approval of the ECO and then **all topsoil must be stripped and stockpiled for reuse**. Concrete mixing areas must have **bund walls or a settling pond** in order to prevent cement run off. Once the settling ponds dry out, the concrete must be removed and dispatched to a suitable disposal site.

When using **Readymix concrete**, care must be taken to prevent spills from the trucks while offloading. This form of batching is preferable for large constructions as no on site batching is required and there is a lesser likelihood of accidental spills and run off. Trucks may not be washed out on site.

Batching at satellite sites must be done on a **batching plate** i.e. wood or metal sheet, to prevent soil contamination. In order to prevent cement run off, both under normal circumstances and in event of rain, batching plates must be used.

7.11 FUEL & CHEMICAL STORAGE

The above-ground storage of fuel is subject to authorization in terms of the National Environmental Management Act (NEMA as amended), if more than 30m³ is stored on site at any one time. It is not expected that the storage of fuel will be necessary for the construction of the dwelling or infrastructure on the property.

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

- Temporary fuel storage must take place within the contractors site camp in an area approved by the ECO;
- No storage of fuel may take place on any other portion of the site;
- Mobile fuel units used to refuel plant on site must make use of drip trays when refuelling;
- Where possible, double lined storage tanks should be used;
- All storage tanks must be ISO 9001 certified;
- Storage facilities should not be located within a watercourse flood plain, near a wetland area (or in this case the stormwater retention dams) or where there is a potential for any spilled fuel to enter a watercourse or groundwater;
- Fuel storage facilities should be located on flat ground. No cut and fill should take place immediately on or adjacent to fuel storage areas;
- Bund walls must be constructed to contain at least 110% of the total capacity of the storage tanks;
- Bund walls must be constructed of impermeable material or lined to ensure that petroleum products cannot escape;
- A suitable material should be placed in the base of the bund walls to soak up any accidental spillages;
- A sealable tap system may be implemented to drain water collecting in the bund walls. The tap must be at the base of the bund wall and drainage must be supervised to ensure that no pollutants are tapped out;
- The tanks should be locked and secured when not in use;
- Automatic shut-off nozzles are required on all dispensing units;
- Storage tanks should be drained within one week of completion of activities (unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction

program extends over the Christmas shutdown, the contractor must ensure that storage tanks are emptied prior to this period;

- All storage tanks, containers and related equipment should be regularly maintained to ensure the safe storage and dispensing of fuel;
- Defective hoses, valves and containment structures should be promptly repaired;
- Vehicle and equipment fuelling should be undertaken on a hard impermeable surface or over drip pans to ensure spilled fuel is captured and cleaned up;
- The area must be totally rehabilitated on completion of the contract and all contaminated material must be taken to a registered dumping site for that purpose.

Any other chemicals that may be required for construction purposes must adhere to the following requirements:

- No storage may take place within the identified 20 buffer of aquatic systems;
- Chemicals used for construction must be stored safely on site and surrounded by bunds;
- Chemical storage containers must be regularly inspected so that any leaks are detected early;
- Emergency plans must be in place in case of spillages onto road surfaces and wetlands /water courses.

7.12 DUST MANAGEMENT

The movement of construction vehicles and removal of vegetation will create dust that could impact on the surrounding vegetation and cause inconvenience to neighbouring property owners. Every effort must be made to contain this impact. Construction vehicles must adhere to speed limits and minimisation of haul roads must be implemented. During dry, dusty periods haul roads should be kept dampened to prevent excess dust. No potable water or seawater may be used for damping haul roads.

Exposed stockpile materials must be adequately **protected** against wind (covered), and should be sited taking into consideration the prevailing wind conditions. Covering could include planting of short term vegetation to prevent dust such as rye grass or even covering with grass sods which can later be used for landscaping. No invasive alien vegetation may be used as a vegetative cover on stockpiles.

Trucks bringing in materials must be **covered** to prevent dust and small particles escaping and potentially causing damage to people and property.

Please see attached Appendix 3, Figure 4 showing a diagrammatic representation of the management of haul roads.

7.13 WATER MANAGEMENT

Relatively little work has been carried out to date on water sustainability on construction sites, More cogniscance is given to water sustainability during the operational phase of a project. However, as water moves up the political and environmental agenda due to increasing pressure on water resources, it is anticipated that this will change. Taking this into consideration and applying the principles of Best Practice, it is recommended that the Contractor take a sustainable approach to the use of water during construction. The following table (Waylen et al, 2011) provides practical actions which can be implemented to minimise water use on site.

Table 4: Water using processes & actions to reduce consumption (Source: Waylen et al, 2011)

Key:			High water using processes	
Use of Water on Site (Processes/ Activities)	Procedures/ Systems	Estimated proportion of current water use on sites	Behaviours	Technologies

Design Stage Considerations (relating to water use impact of completed development)		N/A		Water efficient bathroom products and taps should be installed.
Site Camps				
Toilets, catering, washing (personnel)	Monitoring via meter readings etc. Rainwater collection and use		Site inspections for leaks, wastage / increase awareness through briefing and posters, notices. Awareness raising – toolbox talks / posters etc.	Eco-cabins (e.g. rainwater harvesting, waterless or low or sensor activated flush urinals, water saving devices [taps] and effluent management system), composting, water meter adaptors to facilitate fitment of water meter to improve quality of data. Water meter adapter / add-on
General site activities				
Tool washing Rinsing	Site inspections all to include checking for water leaks & use practices		Use toolbox talks to ensure operatives understand need to conserve water. Use buckets etc. to wash tools rather than running water. Dedicated tool washing areas.	Auto shut-off taps. Ensure water supply able to be switched off at point of use e.g. through trigger guns on hoses.
Wet Trades				
Brick/blockwork				On-site mortar silos as opposed to batch mixing
Screeding				
Concreting	Concrete mix design		Use water from settled concrete wash out area to clean equipment	On-site batching using closed-loop water recycling
Plastering				
Core Boring				Dry core
Lightweight Roofing				
Ceramic Tile				
Bentonite mixing				On-site batching using closed-loop water recycling
Rendering				
Groundworks				
Grouting				Auto shut-off taps (e.g. trigger type hoses/taps)
Drilling/Piling	Flushing water / coolant			

Dust Suppression				
General, site roads, wheel washes	Water spraying bowzers (using water diffusers to create mist as more effective at capturing dust) Rainwater collection Early hardstanding (or stone) site roads, car parks etc. (reduce requirement for damping down)	Considered to be the largest 'wasteful' use of water on sites.	Licensed water abstraction (surface water / boreholes)	Use temporary settlement lagoons and look at early construction of lagoons so that they can be utilised early. Closed-loop water recycling for drive-through wheel-washes. Admixtures for dust suppression reduces damping frequency. Source dust suppression agents that are biodegradable and binds together dust and floating parts to reduce damping.
Hydrodemolition with high pressure water		(High on sites where this is used)		Closed-loop water recycling
Cleaning				
Cleaning tools and small equipment			Use buckets as opposed to running water	
Plant & equipment				Closed loop systems
Lorry wash out				Recovery of water for re-use
Ready mixed concrete wagons	Wash out into segregated area			Wash out pit with recirculation system to reuse water in concrete mixes
Site / general cleaning				
Specialist / high pressure cleaning				
Paintbrush washing				Wash in closed containers such as Dulux EnviroWash System
Commissioning & Test				
Building plant/ services	Capture and re-use of commissioning water			

The following information should be captured on site to provide water usage data during the construction period. It is suggested that this data is included the required monthly information for the ECO.

Mandatory data includes:

- Mains water where the contractor is responsible for billing / metering;
- Licensed water abstractions;
- Water transported to sited (bowzers / tankers);
- Value of work (i.e. allocation of use) that the water data relates to.

Optional information:

- Workforce that the water data relates to (direct and subcontracted staff);
- Details of initiatives or good practice to reduce potable water consumption (e.g. rainwater recycling, other water recycling etc.);
- Estimated water saved via initiatives / good practice.

Exclusions:

- Water provided and paid for by the customer;
- Rainwater collected on site, e.g. lagoons, rainwater harvesting systems.

Refer to Appendix 5 for a water demand data sheet template.

7.14 REHABILITATION & BOTANICAL CONCERNS

Any disturbed area that is not designated for roads or buildings must be rehabilitated. No alien vegetation may be used for any rehabilitation work. A Rehabilitation Plan / Method Statement must be approved by the ECO. Ideally rehabilitation should take place prior to the rainy season in order that the plants establish sufficiently. However, in areas that may be a concern for erosion, irrigation may be justified to establish a vegetative cover against erosion.

Landscaping and acceptable plant material is dealt with in the Operational Phase section.

7.15 SOCIAL REQUIREMENTS

7.15.1 Use of local labour

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

7.15.2 Targets

- The target should be to have the majority of semi-skilled labour local to the Bitou Municipal area.
- An average total of 80% or higher should be maintained for the Southern Cape / Eden region.
- The Contractor should endeavour to source local suppliers that are BEE compliant.
- 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.

7.15.3 Record Keeping

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

Table 5: Record template for labour

Staff Type	Local to the Bitou Municipal Area.		Southern Cape (excluding the Bitou Municipal Area)		Outside the Southern Cape	
	Number	Percentage	Number	Percentage	Number	Percentage
Semi-skilled						
Operators						
Artisans						
Junior Management						
Senior Management						
Professionals						

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

7.15.4 Site Security

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

Considering this, Contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site. It is recommended that the Contractor develop a jobsite security plan prior to commencement of construction. This jobsite security plan should take into account protection of the construction site from both internal and external crime elements as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant.

7.16 HERITAGE REQUIREMENTS

Although no heritage assessments are required, there is always the possibility of unearthing artefacts and / or remains. As a general principle, the legislation governing Heritage Resources requires the following:

- Should any heritage remains of potential cultural value be exposed during excavations, these must be immediately reported to the ECO and the Provincial Heritage Resource Authority of the Western Cape, namely Heritage Western Cape in terms of the national Heritage Resources Act (Act No. 25 of 1999). Heritage remains uncovered or disturbed during earthworks may not be disturbed further until the necessary approval has been obtained from Heritage Western Cape.
- Should any archaeological remains including (but not limited to) fossil bones, fossil shells, coins, indigenous ceramics, colonial ceramics, marine shell heaps, stone artefacts, bone remains, rock art, rock engravings and any antiquity be discovered during construction, they must be immediately reported to the ECO and Heritage Western Cape and not disturbed further until the necessary approval has been obtained.
- Should any human remains be uncovered, they must immediately be reported to the ECO and the HWC archaeologist, who can be contacted on **(021) 483 9685**. Construction in the area must cease immediately and the site may not be disturbed further until the necessary approval has been obtained.

7.17 METHOD STATEMENTS

Method statements are written submissions by the Contractor to the ECO in response to the requirements of this EMP 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.

The Contractor shall not commence the activity for which a method statement is required until the ECO has approved the relevant method statement.

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

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

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

The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site;
- Start date and duration of the procedure / phase;

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

7.17.1 Method Statements Required:

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):

- Site layout and site camp establishment.
- Demarcation of No-Go areas
- Search-and Rescue Operation.
- Site clearing
- Hazardous substances and their storage.
- Cement and concrete batching.
- Traffic accommodation.
- Solid waste control system.
- Erosion remediation and stabilisation.
- Fire control and emergency procedures
- Petroleum, chemical, harmful and hazardous materials.

7.18 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:

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

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

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

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

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

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

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

- (f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;
- (g) taking all necessary measures to ensure that requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;
- (h) enforcing such measures as may be necessary in the interest of health and safety;
- (i) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and
- (j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

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

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 PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The Operational Phase of this EMPr 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 all the residents and all visitors to the property.

8.1 REMOVAL OF ALIEN INVASIVE VEGETATION

A number of alien plant species were found to occur on the property. These include:

- *Acacia longifolia* (Long-leaved wattle)
- *Acacia saligna* (Port Jackson)
- *Acacia mearnsii* (Black wattle)
- *Cortaderia selloana* (Pampas grass)
- *Eucalyptus spp*
- *Lantana camara*
- *Opuntia spp.* (Cactus spp)
- *Pennisetum clandestinum* (Kikuyu grass)
- *Pinus spp* (Pine)

Removal of alien vegetation can be undertaken using various methods. These include, mechanical (cutting, chopping, pulling, ring barking), chemical (poisoning) or biological (insects & fungi). Each species reacts differently, and thus often require specific actions, or a combination of actions, to effectively destroy the plants.

It is thus important that the abovementioned alien invasive plant species are correctly identified (see *Section 7.2.1* below), so that an effective eradication / removal plan can be implemented. Most of these species require ongoing management, i.e. several follow-up clearings of juvenile plants after the initial clearing/removal, as they resprout or seeds germinate, as well as removal of species which are introduced to the property (ignorantly planted by residents or landscapers, brought in by fauna or via wind/water dispersal of seed).

The use of herbicides, in urban areas and/or areas in proximity to water resources, must be done responsibly and in accordance with the application methods specified for each herbicide type. In the event that herbicides are required for the control of alien vegetation, it is recommended that the ECO should provide a management method statement for its removal. **Note:** Herbicides may only be applied by a suitably trained, experienced and equipped individuals, preferable registered as 'Pest Control Officers' (PCO). The Cape Town Invasive Species office can also be contacted for advice:

The Cape Town Invasive Species Unit,

Environmental Resource Management,

Westlake Conservation Office, Ou Kaapse Weg, Tokai.

Tel: (021) 712 1434/1944

Email: edrr@capetown.gov.za

The following general management requirements apply specifically to alien invasive plants on the property:

- Cleared alien vegetation may not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated open / transformed area;
- Cleared vegetation must either be chipped or removed from site and disposed of a registered garden refuse dump. Since the amount of material is not excessive, it is preferred that the material be chipped on site;
- Any seed bearing material must be removed / destroyed to prevent the spread of seed.

8.1.1 Identification of Existing Alien Plant Species

The following alien invasive plant species are known to occur on the property and must be removed / eradicated as part of the initial site clearing and rehabilitation:

Long-leaved wattle (*Acacia longifolia*)

The long-leaved wattle is an evergreen shrub or spreading tree 2-6m high, with long bright green leaves that have prominent longitudinal veins. Flowers are bright yellow and cylindrical in shape, growing up to 50mm long and 7mm wide, from July to September. Originating from Australia and Tasmania, the long-leaved was cultivated in South Africa for dune reclamation, and has spread along the coastal areas, where it competes with and replaces invasive species (*Invasive Species S.A.*: www.invasives.org.za).

This exotic *Acacia* is listed as a **Category 1b** invader.



Figure 10: *Acacia longifolia* (www.invasives.org.za, 2018)

The biological control: bud gall wasp (*Trichilogaster acaciaelongifoliae*) has proven very successful at controlling reproduction and seed set in the Long-leaved wattle. Mechanical control techniques include ringbarking, as well as cutting the plants off at ground level and then applying herbicide to prevent resprouting from the roots (a chemical control).

Port Jackson Willow (*Acacia saligna*)

An evergreen tree, growing 3-7m high, with blue-green turning bright green leaves. Bright yellow, globe-shaped flowers bloom from August to November. Brown pods with hardened, whitish margins (*Invasive Species S.A.*: www.invasives.org.za).

This exotic *Acacia* is listed as a **Category 1b** invader i.e. destroy and control future generations.



Figure 11: Images of Port Jackson Willow (www.invasives.org.za, 2018)

The biological control: gall forming rust fungus (*Uromycladium tepperianum*) has proven very successful at controlling reproduction and seed set in Port Jackson. Mechanical control techniques include ringbarking, as well as cutting the plants off at ground level and then applying herbicide to prevent resprouting from the roots (a chemical control).

Black wattle (*Acacia mearnsii*)

An evergreen tree growing 5-10m high, black wattle has dark olive-green finely hairy leaves. Pale yellow or cream spherical flowers in large fragrant sprays blooming from August to September. Fruits are dark brown, finely haired pods.

Black wattle has invaded grasslands, competing with and reducing indigenous species, and reducing grazing land for wild and domestic animals (*Invasive Species S.A.*: www.invasives.org.za).

This exotic *Acacia* is listed as a **Category 2** invader.



Figure 12: *Acacia mearnsii* (www.invasives.org.za, 2018)

The biological control: the gall midge (*Dasineura dielsi*) has proven very successful at controlling reproduction and seed set in Port Jackson. Mechanical control techniques include ringbarking, as well as cutting the plants off at ground level and then applying herbicide to prevent resprouting from the roots (a chemical control).

Pampas Grass (*Cortaderia selloana*)

Vigorous, tussock grass up to 3,5m in diameter, with flowering stalks up to 4m high. Greyish- or bluish-green leaves with rough margins. Silvery-white to pink or mauve, feathery inflorescences appear from February to April. This grass invades river banks and seasonally wet habitats (*Invasive Species S.A.*: www.invasives.org.za).

This exotic plant is listed as a **Category 1b** invader.



Figure 13: *Cortaderia selloana* (www.invasives.org.za, 2018)

Mechanical control techniques include cutting off the flowering heads, containing in a bag and burning them, the cutting the plants off at ground level and then applying herbicide to prevent resprouting from the roots (a chemical control).

Lantana (*Lantana camara*)

A spreading shrub or untidy scrambler growing up to 2m or higher. Stems usually covered with short, stiff hairs and recurved thorns. Dark green, rough, hairy leaves which are paler below and smell strongly when crushed. Pink, red, crimson, orange, yellow or white flowers in compact, flat-topped heads, often with several colours in one head, appear from September to April. Glossy green fruits which turn purplish-black. Poisonous. (reference: *Invasive Species S.A.*: www.invasives.org.za).

This exotic plant is listed as a **Category 1b** invader i.e. destroy and control future generations.

Individual Lantana can be removed by cutting out the plant at the base of the stem. As the plants are covered in stiff hairs and thorns, protective clothing must be worn during control. Make sure that all of the plant is removed. Large infestations should be sprayed with a foliar spray.



The plant should not be allowed to come into contact with soil again as it will resprout. Burning is the most effective means of destroying lantana. A Triclopyr herbicide such as Garlon or a Glyphosate such as Roundup can be used on Lantana as a foliar spray or a stump treatment.

Figure 14: Image of Lantana plant

Kikuyu Grass (*Pennisetum clandestinum*)

Popular as a lawn grass used in gardens, on sports grounds and public parks. Kikuyu grass is a rhizomatous grass with matted roots and a grass-like or herbaceous habit. It is a prostrate perennial, which may form a loose sward up to 46cm high when ungrazed, but under grazing or mowing, it assumes a dense turf. The grass spreads vigorously from rhizomes and stolons, which root readily at the nodes and are profusely branched. (reference: *Invasive Species S.A.*: www.invasives.org).

This exotic plant is listed as a **Category 1b** invader if it occurs in wetlands or protected areas i.e. destroy and control future generations. It is **not listed elsewhere**, however as it is an aggressive invader, it is recommended that it not be allowed to be planted as a lawn, as it may invade into the aquatic areas. It is thus recommended that Kikuyu grass be actively controlled (removed) from the open space areas and that indigenous lawn grass species, such as Kweek (*Cynodon dactylon*)(in full sun) and/or Buffalo Grass (in full sun or partially shade), be planted within the individual erven, as an alternative.

Manual control of this grass is extremely difficult, as it regrows from any piece of rhizome left behind. Thus herbicide control should be applied, but only under with advice and supervision of a PCO.



Figure 15: Images of Kikuyu grass (www.invasives.org.za, 2018)

The full list of invasive alien plants and their status in terms of the National Environmental Management: Biodiversity Act (NEM:BA, Act 10 of 2004) and the Conservation of Agricultural Resources Act (CARA) is available as Appendix 8. The Working for Water Guide to Control Method and Herbicide Selection is also included.

8.2 LANDSCAPING & MANAGEMENT

Within urban environments, one of the greatest impacts on adjoining/surrounding open space areas is the spread of exotic / alien invader vegetation indiscriminately planted in gardens and landscaping. Plants do not adhere to boundaries such as fences or cadastral units, and may be blown, carried (by fauna) or creep outside of designated areas (gardens) and establish themselves in natural areas. This

results in the so called “garden escapees”, which can negatively affect the biodiversity and ecological functioning of natural areas. The most effective method of preventing this is simply to landscape with only locally occurring, indigenous plant species. The other benefits to using this approach is that local indigenous plants are adapted to local conditions and use less water and/or fertilisers i.e. require less maintenance.

The vegetation type mapped to occur in the area is **Garden Route Shale Fynbos** across the majority of the property, with **South Outeniqua Sandstone Fynbos** in the northern areas.

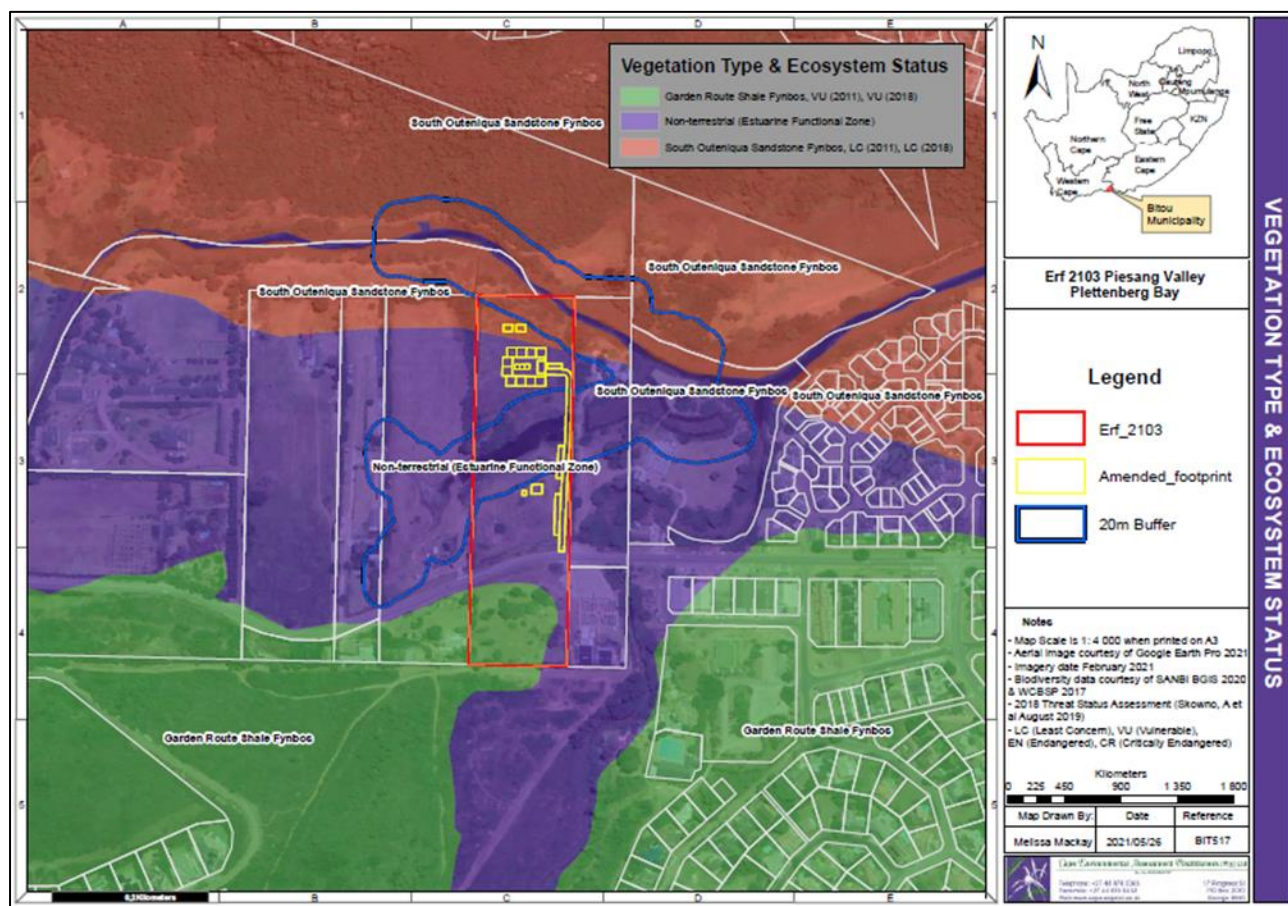


Figure 16: Ecosystem Type

As has been previously mentioned, the majority of the property has been overgrazed and there is little remnant examples of these ecosystem types. The proponent has committed to restoring this to as natural an area as is possible.

Aside from taking note of and/or identifying what plant species are currently growing naturally in the open space corridors, it is often difficult to determine what indigenous plant species are considered to be ‘local’ and are known to grow in the identified ecosystems and in the Southern Cape for that matter. It is not always an easy task to recreate or replant indigenous vegetation types in a garden setting.

Therefore, in collaboration with New Plant Nursery, a list of obtainable plant species has been drafted, specific to each vegetation/ecosystem type. These plants are commercially available, can be used to create landscaped effects in gardens and most importantly, naturally occur in the specific vegetation types. The species list available for the Southern Cape is attached as [Appendix 6](#) of this EMP.

In addition to the above, the following points must be adhered to or implemented by residents and service providers (garden services) in this regard:

- No invasive alien plant species may be used for any landscaping purposes. All listed alien plant species must be removed from the property. This will encourage the restoration and rehabilitation

of the vegetation type. A suitable rehabilitation methodology should be drawn up in consultation with the ECO. This should include a list of plant species to prevent inclusion of any exotic plant material.

- Under no circumstances may garden waste / ornamental plant species material be disposed of in the open space areas / corridors;
- The use of water-wise landscaping should be promoted, not only in the interests of water conservation, but because excessive watering can create changes in the nutrient levels and hydrological capabilities of the soil. This could potentially have an impact on the structure of the soil, as well as for the management of stormwater and its impact on the aquatic environment.
- Landscaping correctly can be used as a tool to minimise impacts of stormwater on steep slopes. Areas that have been cut need to be modified to provide pockets for vegetation to establish. Vegetation should be used that can survive in areas subject to high water content, shallow soils and shade. The following should be considered:
 - If necessary, create holes or shelves in rocky areas or in steep areas that have topsoil, place runners (strips) of hessian or bidden and attach by means of wood stakes;
 - Make holes in the material just big enough for a plant to be implanted;
 - Place plants randomly, with spacings of approximately 30cm;
 - Plants such as *Carpobrotus* spp (vygies) create good ground cover in difficult areas. Aloes must be north facing, so avoid placing in areas that are too wet and shady. Identify vegetation that occurs locally on steep slopes and rather recreate a natural environment for slope protection.

8.3 WASTE MANAGEMENT

The operational management of Erf 2103 must include a responsible and integrated waste management approach to ensure that soil and water resources on the property are protected and not contaminated with pollutants. Pollutants may take the form of solid waste (litter & household general waste) or contaminated stormwater run-off, which is likely to be directed into open space areas and the aquatic ecosystems and beyond the property boundary.

The following measures must be implemented to avoid pollution on the property and properly manage the waste generated during the operation of the estate:

8.3.1 General Household Waste & Litter

- The residential house / unit must be fitted with **inside and outside rubbish bins**, which are emptied on a weekly basis for removal and disposal of household waste via the municipal waste disposal system. The disposal of all general waste must take place at a landfill licensed in terms of Section 20 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the National Environmental Management: Waste Act, 2008 (NEM:WA, Act No 59 of 2008).
- The grounds must be **kept clean and tidy** and free of any wind-blown litter or waste.
- All outside bins and **waste storage containers must be covered**, tip-proof, weatherproof and scavenger proof.
- **No burning or dumping** of household, garden or construction waste may take place anywhere on the property and especially not in the open space areas.

8.3.2 Recycling

Recyclable waste should be recycled wherever possible. Effective management of household waste contributes to a more sustainable implementation of landfill sites and their management. Sorting of recyclable materials at the source, i.e. in each household, causes less backlog at the landfill site and decreases the availability of material so required by scavengers to the dump site. Using

biodegradable waste in a garden compost heap or an earthworm farm is far more supportive of the environment than disposing of it in the general waste.

See Appendix 8 for easy to use reference documents on what can be recycled and how recycling works.

8.3.3 Garden Refuse

Garden refuse, such as prunings and grass clippings may not be disposed of in the open space areas. Unwanted germination of seed in natural areas is to be prevented at all costs. The homeowner must take the responsibility of removing or having it removed to a suitable disposal site. Where there is sufficient space and / or mechanisms in place, garden refuse may be composted. No burning of garden waste on site is permitted.

8.3.4 Biodegradable Refuse

Households produce large amounts of biodegradable refuse that can easily be recycled to produce compost. Compost provides a rich source of nutrients for plants, both indoors and out. There are a vast array of methods and mechanisms available to homeowners, from worm farms to kitchen composters which make this process easy and not labour intensive, as well as odourless.

More information can be obtained from the Urban Sprout Green Directory on www.urbansprout.co.za.

Small compost heaps can be developed but care must be taken due to the potential issues around leaving biodegradable refuse at any place accessible by baboons and monkeys. Composting areas must not be located within the identified 20m buffer on the aquatic systems. Worm farms are an acceptable method of composting as they can be kept indoors away from predators.

Sewer lines and or conservancy tanks must be inspected on a regular basis or emptied prior to becoming full to prevent nutrification of the aquatic systems.

The landowner has expressed interest in using a small scale biogas plant for the animal faeces and other general organic waste. The facility will provide gas for lighting and cooking, whilst refining the organic material for use as organic fertiliser / compost.

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 water quality 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.

9.1 MONITORING

Fixed point photographic monitoring must be used during construction and operation for this development to monitor the health of the protected vegetation within the open spaces areas. Fixed point sites should be selected based on their potential for degradation or invasion by alien vegetation (e.g. at access points to the open space areas) and rehabilitation (where degraded areas have been replanted or managed for re-growth). These identified sites must provide a representational angle that will capture the changes in the selected / sensitive area/s.

The frequency of monitoring must include:

- During construction photographs must be taken at each ECO site visit (specified in the EMP or determined by the ECO);
- During operation, the proponent must continue photographing sensitive areas on a bi-annual basis (or as specified by the ECO or relevant authority) to monitor potential degradation and rehabilitation growth and invasion / control of alien vegetation.
- It is advised that water quality monitoring be undertaken 6 months from the date of completion of construction to determine if the changes to the culvert achieve the expected improvements.

9.2 ENVIRONMENTAL AUDITS

A final Audit Report must be submitted within 6 months of completion of construction of the development. This audit report should include the monitoring results as above.

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 6: Format / Contents of Environmental Audit Report

CONTENT OF AN ENVIRONMENTAL AUDIT REPORT	
Appendix 7 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Audit Report. The checklist below serves as a summary of how these requirements were incorporated into this Audit Report.	
Requirement	Description
(1) An Environmental audit report prepared in terms of these Regulations must contain -	
(a) Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.	
(b) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.	
(c) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.	
(d) A description of the methodology adopted in preparing the environmental audit report.	
(e) An indication of the ability of the EMP, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and (iii) Ensure compliance with the provisions of environmental authorisation, 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 a 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.	

10 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

It is not likely that decommissioning of this facility such as that planned for Erf 2103 will take place in the near future. In general, should the facility be decommissioned, the following should be undertaken:

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

A Demolition Certificate must be obtained from the Bitou Municipality prior to demolition commencing.

11 IMPLEMENTATION

The following table is provided to assist the developer, design team, engineer and contractor with the effective implementation of this EMP. The table below serves as a quick reference guide to the EMP, but must be read in conjunction with the entire document.

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
Design & Pre-Construction Phase					
Familiarisation with the contents of the EMPr & EA.	<ul style="list-style-type: none"> Loss of vegetation during construction; Protection of aquatic systems; Fire risks 	Attendance of a pre-construction environmental compliance workshop	Prior to commencement of site clearing & earthworks.	ECO, Engineers, Contractor & Project Management.	ECO to include details of this in the first environmental control Report.
Demarcation of Development Areas and No-Go Areas.	<ul style="list-style-type: none"> Loss of vegetation during construction; Protection of aquatic systems; Fire risks 	All areas outside of the construction / development area to be clearly demarcated. All vegetation outside development areas is considered no-go.	Prior to commencement of site clearing & earthworks.	Contractor with input from the Engineer, ECO and participating specialists where necessary. Contractor responsible for maintaining demarcation throughout the construction phase.	ECO to maintain photographic record of demarcation.
Environmental Induction Training	<ul style="list-style-type: none"> Creation of employment during construction (positive) Employment opportunities and skills development opportunities during the operation (positive) 	As defined in the EMPr	Prior to commencement of site clearing & earthworks.	ECO & Contractor	Contractor to provide details to ECO. ECO to provide details in monthly reports.
Construction Phase					
Minimise impact of construction vehicles	<ul style="list-style-type: none"> Land disturbance, changing run-off characteristics and increasing erosion risks Soil erosion during construction Disturbance of fauna during operation Soil erosion during operation Disturbance and displacement of avifaunal species Dust impacts during construction 	Implementation of recommendations defined in EMPr.	Throughout construction phase	Contractor	Engineer

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
Prevent concrete contamination	<ul style="list-style-type: none"> Increasing the surface run-off velocities, while reducing the potential for any run-off to infiltrate the soils at crossings Increase in sedimentation and erosion within the development footprint 	Use of delivered ready-mix concrete. Control at batching sites	Throughout construction phase	Contractor	Engineer and ECO.
Protection of Archaeological Resources	<ul style="list-style-type: none"> Unearthing of significant finds during construction 	Contact ECO and HWC.	Demarcation of sites prior to commencement of earthworks. Other mitigations throughout the construction phase.	Contractor	ECO & Proponent
Protection of all topsoil resources on site.	<ul style="list-style-type: none"> Increasing the surface run-off velocities, while reducing the potential for any run-off to infiltrate the soils at crossings Increase in sedimentation and erosion within the development footprint Loss of vegetation 	As per the requirements of the EMPr i.e. brush/straw packing & re-seeding	Throughout the construction phase.	Contractor	ECO & Proponent
Limiting Noise Impact	<ul style="list-style-type: none"> Construction noise 	As per the requirement of the EMPr.	Design, throughout the construction and operation phase	Contractor	ECO & Proponent
Reduction of dust generation as a result of construction activities.	<ul style="list-style-type: none"> Removal of vegetation and listed or protected plant species during construction Soil erosion during construction Soil erosion during operation 	As per the requirements of the EMPr. Do not strip topsoil from entire development footprint	Throughout the construction phase	Contractor	ECO & Proponent

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
	<ul style="list-style-type: none"> ○ Dust impacts during construction 				
Protection of protected plant species and on-going re-vegetation & rehabilitation.	<ul style="list-style-type: none"> ○ Land disturbance, changing run-off characteristics and increasing erosion risks ○ Loss of topsoil ○ Placement of spoil material during construction ○ Removal of vegetation and listed or protected plant species during construction ○ Soil erosion during construction ○ Soil erosion during operation ○ Dust impacts during construction ○ Unearthing of significant finds during construction 	Implementation of Re-vegetation & Rehabilitation Plan as per this EMPr.	Design phase and throughout the construction phase.	Design Team, Engineer and Contractors	ECO & Proponent
Prevention of theft and other crime.	<ul style="list-style-type: none"> ○ All construction activities 	Development of a job site security plan.	Before commencement of construction.	Contractor	Proponent
On-going Environmental Education	<ul style="list-style-type: none"> ○ All construction activities 	As defined in the EMPr.	During construction.	ECO & Contractor	Contractor to provide details to ECO.
Prevent pollution resulting from oil and fuel storage and handling.	<ul style="list-style-type: none"> ○ All construction activities 	Implement correct fuel and oil handling procedures. Implement emergency spill response plan.	Duration of the project lifespan.	ECO & Contractor	ECO & Proponent
Operational Phase					
Manage vegetation growth	<ul style="list-style-type: none"> ○ Removal of vegetation and listed or protected plant species during construction ○ Alien plant invasion during operation ○ Soil erosion during operation 	Gardening / landscaping activities.	Throughout operation	Proponent	Proponent

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
Control of alien plants	<ul style="list-style-type: none"> ○ Removal of vegetation and listed or protected plant species during construction ○ Alien plant invasion during operation ○ Soil erosion during operation 	Regular monitoring and removal of alien invasive plant species.	Throughout operation	Proponent	Proponent
Closure & Decommissioning Phase					
Items, management, responsibilities and monitoring as per construction phase, as above.					
Decommissioning of residential facility.	<ul style="list-style-type: none"> ○ Removal of vegetation and listed or protected plant species during construction ○ Alien plant invasion during operation ○ Soil erosion during operation 	Closure of facility in compliance with legislation and this EMPr.	Unlikely	Proponent	Proponent

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

12.1 PROCEDURES

The Holder of the EA shall comply with the environmental specifications and requirements of this EMP, 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**.

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

- The relevant 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 relevant 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 relevant authority may recommend halting the activity.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the relevant 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 Proponent.
- 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 EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to **specialists and / or the competent authority** for determination.
- The relevant 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.

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