



Cape Environmental Assessment Practitioners (Pty) Ltd

Reg. No. 2008/004627/07

Telephone: (044) 874 0365
Facsimile: (044) 874 0432

Web: www.cape-eaprac.co.za

17 Progress Street, George
PO Box 2070, George 6530

ENVIRONMENTAL MANAGEMENT PROGRAMME

For

ZANDHOOGTE ESTATE

Portion of Remainder of the Farm Zandhoogte NO. 139, Mossel Bay (Tergniet)



Prepared for Applicant: Ideal Trading 301 CC

By: Cape EAPrac

Report Reference: MOS600/03.

Department Reference:

Case Officer: Shireen Pullen

Date: 8 December 2020

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:

Cape EAPrac Environmental Assessment Practitioners

PO Box 2070

George

6530

Tel: 044-874 0365

Fax: 044-874 0432

Report written & compiled by: **Onke Nandipha** (Bsc Environmental Studies & Bsc Honours in Geography)

Registrations: **Louise-Mari van Zyl** (MA Geography & Environmental Science [US]; Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA). Ms van Zyl has over twelve years' experience as an environmental practitioner.

PURPOSE OF THIS REPORT:

Environmental Management Plan for Basic Assessment Process

APPLICANT:

Ideal Trading 301 CC

CAPE EAPRAC REFERENCE NO:

MOS600/02

SUBMISSION DATE

08 December 2020

ENVIRONMENTAL MANAGEMENT PROGRAMME

Zandhoogte Estate

Portion of Remainder of the Farm Zandhoogte NO. 139, Mossel Bay (Tergniet)

- This report is the property of the Author/Company, who may publish it, in whole, provided that:
- Written approval is obtained from the Author and that *Cape EAPrac* is acknowledged in the publication;
- *Cape EAPrac* is indemnified against any claim for damages that may result from any publication of specifications, recommendations or statements that is not administered or controlled by *Cape EAPrac*;
- The contents of this report, including specialist/consultant reports, may not be used for purposes of sale or publicity or advertisement without the prior written approval of *Cape EAPrac*;
- *Cape EAPrac* accepts no responsibility by the Applicant/Client for failure to follow or comply with the recommended programme, specifications or recommendations contained in this report;
- *Cape EAPrac* accepts no responsibility for deviation or non-compliance of any specifications or recommendations made by specialists or consultants whose input/reports are used to inform this report; and
- All figures, plates and diagrams are copyrighted and may not be reproduced by any means, in any form, in part or whole without prior written approved from *Cape EAPrac*.

Report Issued by:
Cape Environmental Assessment Practitioners

Tel: 044 874 0365
Fax: 044 874 0432
Web: www.cape-eaprac.co.za

PO Box 2070
17 Progress Street
George 6530

ORDER OF REPORT

Environmental Management Plan

Appendix 1	:	Location Plans and Site Layout
Appendix 2	:	Architectural Guidelines
Appendix 3	:	Figure 1: Silt Fences Figure 2: Temporary Stormwater Management Figure 3: Management of Haul Roads Figure 4: Demarcation of no-go areas during construction
Appendix 4	:	Environmental Guidelines on Site
Appendix 5	:	Alien Invaders List and Categories, Working for Water Guide to Control Method and Herbicide Selection
Appendix 6	:	Recycling
Appendix 7	:	EAP Curriculum Vitae

TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	Purpose of the EMPr.....	3
1.2	Status of the EMPr.....	3
2	EMPR PHASING	4
2.1	Pre Construction Phase.....	4
2.2	Construction Phase.....	4
2.3	Operational Phase.....	4
2.4	Closure and Decommissioning Phase.....	4
3	LEGISLATIVE REQUIREMENTS	5
3.1	National Environmental Management Act (NEMA, Act 107 of 1998).....	5
3.2	Environment Conservation Act, 1989 (ECA).....	6
3.3	National Environmental Management: Biodiversity Act (NEM:BA) (Act 10 of 2004).....	6
3.3.1	The National Spatial Biodiversity Assessment (NBA) (2011).....	6
3.4	National Waste Management Strategy.....	7
3.5	Conservation of Agricultural Resources Act (CARA).....	7
3.6	National Forest Act (Act 84 of 1998).....	7
3.7	National Water Act (NWA, Act 36 of 1998).....	8
3.8	National Veld and Forest Fire Act (Act 101 of 1998).....	8
3.9	National Heritage Resources Act (Act 25 of 1999).....	9
3.10	Nature Conservation Ordinance (No. 19 of 1974).....	10
4	DEVELOPMENT PROPOSAL	10
5	ENVIRONMENTAL IMPACTS & MITIGATIONS	11
5.1	Impacts.....	11
5.2	Mitigations.....	12
6	RESPONSIBILITIES	13
6.1	Property Owners or Project Proponent.....	14
6.2	Engineers and Contractors.....	14
6.3	Ecological Control Officer (ECO).....	15

6.4	Environmental Induction and Training	16
7	PRE CONSTRUCTION DESIGN CONSIDERATIONS.....	16
7.1	Stormwater Management	17
7.2	Water Conservation.....	17
7.2.1	Rain Water Harvesting.....	17
7.2.2	Dual Flush Toilets.....	18
7.2.3	Low flow shower heads	18
7.2.4	Low flow Taps.....	18
7.2.5	Geyser and pipe insulation	18
7.2.6	Grey Water	19
7.3	Energy Conservation.....	19
7.3.1	Solar heating water systems.....	19
7.3.2	Energy Efficient Lighting.....	20
7.3.3	Energy Efficient Appliances	20
7.3.4	Solar Cooling Systems	20
7.3.5	Evaporative Cooling Systems.....	20
7.3.6	Geyser and pipe insulation	21
8	CONSTRUCTION PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS	21
8.1	Establishment of Contractors Site Camp	21
8.2	Sanitation	22
8.3	Demarcation of Work Areas	22
8.4	Erosion Control	23
8.5	Stormwater Management	23
8.6	Fire Management and Protection	24
8.7	Noise and Emission Control	24
8.8	Waste Management	25
8.8.1	Solid Waste	25
8.8.2	Construction Rubble and Waste	26
8.8.3	Scrap Metal	26

8.8.4	Hazardous Waste	26
8.9	Concrete Batching.....	26
8.10	Fuel Storage.....	27
8.11	Dust Management.....	28
8.12	Water Management.....	28
8.13	Rehabilitation and Botanical Concerns	33
8.14	Social Requirements	33
8.14.1	Use of local labour	33
8.14.2	Targets	33
8.14.3	Record Keeping.....	33
8.14.4	Site Security	34
8.15	Heritage Requirements	34
8.16	Method Statements	34
8.16.1	Method Statements Required:	35
9	OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS	37
9.1	Botanical Rehabilitation.....	37
9.2	Alien Vegetation Management	38
9.2.1	Herbicide Application	42
9.3	Wildlife Management.....	43
9.3.1	Destruction of Natural Habitats and Populations.....	43
9.3.2	Road mortality	44
9.3.3	Light pollution	44
9.3.4	Poaching of local wildlife.....	44
9.3.5	Domestic Animals.....	45
9.4	Waste Management	45
9.4.1	Recycling.....	45
9.4.2	Garden Refuse	45
9.4.3	Biodegradable Refuse	45

10	MONITORING	46
	10.1 Monitoring	46
	10.2 Audits.....	46
11	DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS	48
12	IMPLEMENTATION	48
13	NON-COMPLIANCE	53
	13.1 Procedures.....	53
14	REFERENCES	54

FIGURES

Figure 1: Site location (Google Earth Pro 2016)	1
Figure 2: Preferred layout with environmental constraints	2
Figure 3: Preferred Layout Alternative 1	Error! Bookmark not defined.
Figure 4: Responsibilities	14

ENVIRONMENTAL MANAGEMENT PROGRAMME REQUIREMENTS

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

Requirement	Description
<p>Details of the EAP who prepared the EMPr; and</p> <p>The expertise of the EAP to prepare an EMPr, including a curriculum vitae.</p>	<p>Onke Nandipha of Cape Environmental Assessment Practitioners. See cover page.</p> <p>Appendix 10.</p>
<p>A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.</p>	<p>Section 1</p>
<p>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</p>	<p>Appendix 1</p>
<p>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 –</p> <ul style="list-style-type: none"> (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. 	<p>Section 5</p>
<p>A description and identification of impact management outcomes required for the aspects contemplated above.</p>	<p>Section 5</p>
<p>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 –</p>	<p>Section 5</p>

Requirement	Description
(i) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
The method of monitoring the implementation of the impact management actions contemplated above.	Section 10
The frequency of monitoring the implementation of the impact management actions contemplated above.	Section 10
An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 6
The time periods within which the impact management actions must be implemented.	Section 11
The mechanism for monitoring compliance with the impact management actions.	Section 10.2
A program for reporting on compliance, taking into account the requirements as prescribed in the Regulations.	Section 10
An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Section 6.4 Section 7 Section 8 Section 9
Any specific information that may be required by the competent authority.	

ABBREVIATIONS AND ACRONYMS

EA	Environmental Authorisation – Authorisation obtained on completion of an Environmental Impact Assessment in terms of the National Environmental Management Act.
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.
DAFF	Department of Agriculture, Forestry and Fisheries – the national authority responsible for the agricultural, forestry and fishery sector and its management.
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.
DWA	Department of Water Affairs – the provincial authority mandated to enforce the Forestry Act. Permits for the removal or pruning of protected tree species eg Milkwoods must be obtained from this entity.
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.
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 by a proponent to observe and enforce environmental policies and principles on a development site.
HWC	Heritage Western Cape – Provincial body responsible for enforcing the National Heritage Resources Act in the Western Cape.

- 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.
- OSCA** Outeniqua Sensitive Coastal Areas – Regulations enacted in terms of ECA that requires an application to the local municipality for a permit for activities on identified properties.
- SANParks** South African National Parks – National authority that manages protected areas.

1 INTRODUCTION

Cape Environmental Assessment Practitioners (Cape EAPrac) was appointed by the applicant, **Ideal Trading 301 CC** to develop an Environmental Management Programme (EMPr) which will be used to promote and ensure environmental monitoring, control and management associated with any authorisation of the proposed Tergniet Retirement Village on Remainder of the Farm Zandhoogte No. 139, Stilbaai. This process is undertaken in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended)¹.

The applicant proposes to develop on Portions of **Remainder of the Farm Zandhoogte No. 139** which is situated in Tergniet, Mossel Bay Municipality. The subject property is currently zoned 'Agricultural Zone I' in terms of the Mossel Bay Municipality: Integrated Zoning Scheme By-Law and is approximately 38,2309 ha in total.

The proposal entails the development of a residential development on the portions directly north and south of Impala Avenue.



Figure 1: Site location of the entire property.

Remainder of the Farm Zandhoogte No. 139 is located within the suburb of Tergniet, Mossel Bay Municipality. The farm is one of the few 'vacant / undeveloped' properties in the suburb (Tergniet). The subject property sits basically in the middle of Tergniet, and currently

¹ The National Environmental Management Act (Act 107 of 1998) was amended in 2006 and August 2010.

split the existing developed areas, which is situated directly east and west of the subject property. Mossel Bay Municipality approved the rezoning and subdivision of Remainder of the Farm Zandhoogte No 139, during November 2009. Mossel Bay Municipality granted approval for the extension of the validity of the approval during 2015, and this approval lapsed on 21 May 2017. The Environmental Authorisation lapsed in 2015..

Since the subject property is within the urban edge, it was (and still is) envisaged by the Municipality to allow urban development on it. Thus, even though the immediate character of the area is vacant the greater area is characterised as urban development and in particular a residential character.

The character of Tergniet is residential of nature, with a few 'vacant / undeveloped' parcels in between, one of them being the subject property (Remainder of the Farm Zandhoogte No. 139).

The figure below illustrates the boundaries of Tergniet; it is clear that the area is characterised with a residential land use and that the subject property is one of few left undeveloped. The subject property is earmarked for urban development; and when the property is developed in future, it will connect the two existing developed areas of Tergniet.



Figure 2: boundaries of Tergniet

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. Should the future environmental authorisation contain requirements (conditions) that contradict any points in this EMPr, the requirements (conditions) in the authorisation supersede this EMPr. This EMPr should be updated to

include any additional recommendations that arise from the Basic Assessment process, as well as any conditions of authorisation should the project be authorised.

This EMPr has been compiled with due consideration of Section 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 township development on the receiving environment are managed, mitigated and kept to a minimum. These phases include removal of existing structures, construction of new dwellings, management of open space areas and overall sustainability. The EMPr must provide easily understood and 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 (Ideal Trading 103 CC), all future homeowners, 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.

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 permit or municipal certification. Should the environmental authorisation (EA) contain requirements (conditions) that contradict any points in this EMPr, the requirements (conditions) in the authorisation supersede this EMPr. 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.

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 mechanism are built into the planning phase to be developed in the construction and operational phase.

2.2 CONSTRUCTION PHASE

The construction phase refers to the actual construction of any type of development on the property, and includes all earthworks and bulk services construction (road, pipelines, slipways etc.). Any construction activities must have the relevant approvals in place before they may commence. This EMPr may be incorporated into any relevant applications (municipal building plans, DAFF or Environmental Authorisation), but where site specific management actions are required, these must be developed.

2.3 OPERATIONAL PHASE

The operational phase refers to all existing dwellings and activities, and commences once the construction activities on new developments are completed and handed over to the proponent. This EMPr includes several recommendations regarding the Operational Phase of the development, but should not be seen as exhaustive. The Proponent should ensure that the Operational Phase of the area maintains the underpinning principles and ideals of sustainable development.

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 a residential and care hub inside the urban area, it is highly unlikely that it will be decommissioned in the near future. It is more likely that on occasions dwellings may be demolished to make way for new or renovated buildings. As such, specific management recommendations for demolishing are not included with this EMPr. In the event that decommissioning is required, all relevant legal processes must be complied with.

It must be noted that the demolition of units will be addressed under this phase. A Demolition Certificate must be obtained from the Mossel Bay Municipality prior to any such activities being undertaken.

3 LEGISLATIVE REQUIREMENTS

All owners 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 proponent to show how the proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

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 The National Spatial Biodiversity Assessment (NBA) (2011)

The NBA 2011 assesses the state of South Africa's biodiversity, across terrestrial, freshwater, estuarine and marine environments, emphasising spatial (mapped) information for both ecosystems and species. The NBA is central to fulfilling the South African National Biodiversity Institute's (SANBI) mandate in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) to monitor and report regularly on the state of biodiversity, and includes two headline indicators that are assessed across all environments: **ecosystem threat status** and **ecosystem protection level**. Information from the NBA can thus be used to streamline environmental decision-making, strengthen land-use planning, strengthen strategic planning about optimal development futures for South Africa, and identify priorities for management and restoration of ecosystems with related opportunities for ecosystem-based job creation.

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.

3.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The Conservation of Agricultural Resources Act 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.

In the case of the proposed development, the provisions regarding erosion control and control of invasive species must be considered.

3.6 NATIONAL FOREST ACT (ACT 84 OF 1998)

In terms of regulation 15 of the aforesaid Act,

No person may:

- (a) cut, disturb, damage, destroy or remove any protected tree; or
- (b) collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a License granted by the Minister.

The Department of Agriculture, Forestry and Fisheries (DAFF) have declared the following species as protected trees:

Acacia erioloba (Camel thorn), *Acacia haematoxylon* (Gray camel thorn), *Adansonia digitata* (Baobab), *Azelia 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 pseudebenus* (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), *Mimusops 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)

Any trimming and / or removal of the Milkwood trees (*Sideroxylon inerme*) or other protected trees on the properties will be subject to a license in terms of the aforementioned Act. The list is a national list, however if any species are planted as part of landscaping, the Act will apply.

3.7 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. A Catchment Agency may enforce these obligations and recover costs from those responsible or from those who benefited from the measures.

No licenses or permits are required for this application, but stormwater management on site must be in line with efforts to prevent pollution of other water resources.

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.

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.

Heritage Western Cape has confirmed that the proposal does not require any further heritage studies. In terms of the proposed development any evidence of archaeological remains must be communicated to the Heritage Western Cape immediately.

3.10 NATURE CONSERVATION ORDINANCE (NO. 19 OF 1974)

The Nature Conservation Ordinance provides for the protection of endangered and threatened animal and plant species in the Western Cape and requires that certain permits are obtained from the relevant authority for activities that affect these species.

Permits are required for the following activities relating to wild animals and game in the Western Cape Province:

- **Export, Import and Transport of Wild Animals and Game** - In terms of section 44 (1)(a) of the Ordinance one needs a permit to import into, export from or transport in or through the Western Cape Province any wild animal. For birds this provision only applies to birds that are listed as protected or endangered in terms of the Ordinance. It is also important to draw a distinction between this Transport Permit and a CITES permit that is mentioned below.
- **Permit to Possess the Carcase of an Endangered Wild Animal(s)** - In terms of section 26 of the Ordinance not only does one need a permit to possess any live endangered wild animal but one also needs a permit to possess the carcase or any part of the carcase of any such animal.
- **Wild Animal Captivity Permit** - In terms of section 31 of the Ordinance no person may keep any wild animal(s) in captivity without a permit. For birds, a captivity permit is only required for bird species classified as protected or endangered in terms of the Ordinance.

In the event that any wild animals are found during the required search & rescue prior to construction, the relevant permit must be obtained from CapeNature.

4 DEVELOPMENT PROPOSAL

The following development alternatives were investigated for the application area:

The proposal entails the following:

- Rezoning of **Portion A** (10.2ha) to Subdivisional Area to enable the subdivision of the property in various residential uses, namely:
 - 160x General Residential Zone I erven (group housing) = 49.18% of site (5ha)
 - 3x General Residential Zone III erven (flats) = 8.53% of site (0.87ha)
 - 4x Private Open Space erven = 12.76% of site (1.3ha)
 - 1x Public Street (Transport Zone II) = 4.66% of site (1.47ha)
 - 4x Private Street (Transport Zone III) = 24.87% of site (2.53ha)
- Link services infrastructure, namely water, sewage reticulation, stormwater drainage, 11kVA overhead line, will link up with the existing municipal services.
- Upgrade of Impala Avenue by expanding with road with a dedicated right turn lane to access the southern portion of the development.

5 ENVIRONMENTAL IMPACTS & MITIGATIONS

5.1 IMPACTS

During the Environmental Impact Assessment process, the following impacts and recommended mitigations were identified:

Botanical:

The remnant natural vegetation in the immediate area, such as those along the railway line to the south of the property, confirms that the vegetation on the property did consist of Hartenbosch Dune Thicket (Groot Brak Dune Strandveld). The Dune Thicket was, however, removed from the entire proposed development area and the area was used as agricultural lands thereafter. These lands have not been ploughed for many years and some natural vegetation has established on the old lands. In the area south of Impala street the re-established vegetation has not been disturbed much in recent years and some shrubs have established, but the area north of Impala street has been brushcutted frequently (presumably to control alien vegetation and to reduce fire risk) and the vegetation now consists mostly of grasses and herbs (see Photo's 1 and 2). It is estimated that the proposed development area has a cover of about 50% of indigenous species, with an additional cover of about 20% of alien species (mostly *Acacia cyclops* and especially *Pennisetum clandestinum*).

The indigenous species found within the proposed development area are very similar to those listed by McDonald (2008), but several more herb and grass species were found in the larger proposed development area. The 59 species found in the development area are as follows:

Trees and tall shrubs: *Azima tetraantha*, *Buddleja saligna*, *Carissa bispinosa*, *Diospyros dichrophylla*, *Euclea racemosa*, *Exomis microphylla*, *Grewia occidentalis*, *Lycium cinereum*, *Pittosporum viridiflorum*, *Pterocelastrus tricuspidatus*, *Searsia crenata*, *S. glauca*, *S. pterota*, *Solanum africanum*, *S. guineense*, *Sideroxylon inerme* and *Tarchonathus littoralis*.

Shrubs and Herbs: *Abutilon sonneretianum*, *Carpobrotus edulis*, *Chironia baccifera*, *Chrysocoma tenuifolia*, *Conicosia pugioniformis*, *Crassula expansa*, *C. tetragona*, *Delosperma littorale*, *Dischisma ciliatum*, *Disperago krausii*, *Drosanthemum hispidum*, *Galenia filiformis*, *Hebenstreitia integrifolia*, *Helichrysum littorale*, *H. teretifolium*, *Hermannia velutina*, *Leonotis oxymifolia*, *Mesembryanthemum crystallinum*, *Nemesia versicolor*, *Oncosiphon suffruticosus*, *Osteospermum moniliferum*, *Passerina vulgaris*, *Pelargonium capitatum*, *Pollichia campestris*, *Rumex saggitatus*, *Senecio elegans*, *S. juniperinus*, *Silene undulata*, *Tetragonia fruticosa*, *Wahlenbergia androsacea* and *W. tenella*.

Creepers: *Cynanchum obtusifolium*, *Sarcostemma viminalis* and *Rhoicissis digitata*.

Graminoids: Cynodon dactylon, Ehrhata villosa, Eragrostis plana, E. curvula, Ficinia oligantha, Hellmuthia membranacea, Sporobolus fimbriatus and Stenotaphrum secundatum.

Geophytes: *Albuca cooperi.*

No rare or threatened species were found within the proposed development area, but a small population of *Euchaetis albertiniana* (status = Endangered) was found along the road verge of Impala street. Milkwood and Cheesewood trees are present within the building lines/servitudes and road reserve of Impala Avenue.

Heritage:

Despite recent vegetation clearing on the northern portion of the study area, no evidence of several small structures (Presumably residential cottages) visible on early 1957 areal imagery. No Historic structures, ruins and/or gravesites were noted on or within direct proximity of the study area. Similarly, no archaeological occurrences were noted. Of interest is the fact that the 1957 areal imagery shows the southern portion of the study area, much of the current area between Bosbok Street and the railway line as having been transformed through intensive cultivation.

The study area is traversed by a public road (Blesbok Street) as well as an array of servitudes relating urban related engineering services (water pipeline, electrical and sewage). Importantly, it is situated within an established urban area bound by existing low density residential properties to the east, south and west. The proposal put forward allows for a mix of higher density residential typologies and would consequently, when taken with the context of existing built form, translate to more efficient use of urban land through “infill development”.

Taken in conjunction with the above assessment it is therefore of the view that the proposal would not impact on heritage resources of cultural significance and that the development may proceed.

Noise:

Construction noise impacts may take place, but these can be mitigated to acceptable levels with management recommendations.

5.2 MITIGATIONS

The mitigation measures identified during the EIA process are listed below. The management requirements associated with these mitigations in order to ensure that the development retains the impact significant ratings predicted by the specialist are included throughout this document.

Mitigation	Management Requirement
(a) All personnel should undergo environmental induction with regards to fauna and in particular	RESPONSIBILITIES page 13 Environmental Induction and Training page

awareness about not harming or collecting species such as snakes and tortoises.	16
(b) Demarcation of protected trees prior to construction.	CONSTRUCTION PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS page 21 Establishment of Contractors Site Camp page 21 Demarcation of Work Areas page 22
(c) All geophytes as well as other species which are likely to survive translocation should be translocated from affected areas to other areas which are to remain intact at the site.	Rehabilitation and Botanical Concerns page 33
(d) There must be a search and rescue of reptiles within the site just before they are cleared for species such as snakes and tortoises, this especially pertains to the intact remnant which was observed to have a faunal abundance.	Wildlife Management page 43
(e) A permit must be obtained from DAFF obtained for any <i>Sideroxylon inerme</i> trees that would be lost due to the development.	National Forest Act (Act 84 of 1998) page 7
(f) The site Must be managed to promote biodiversity at the site, this includes restricting dogs to fenced erfs and limiting or banning cats from the development.	Only indigenous landscaping permitted.

6 RESPONSIBILITIES

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

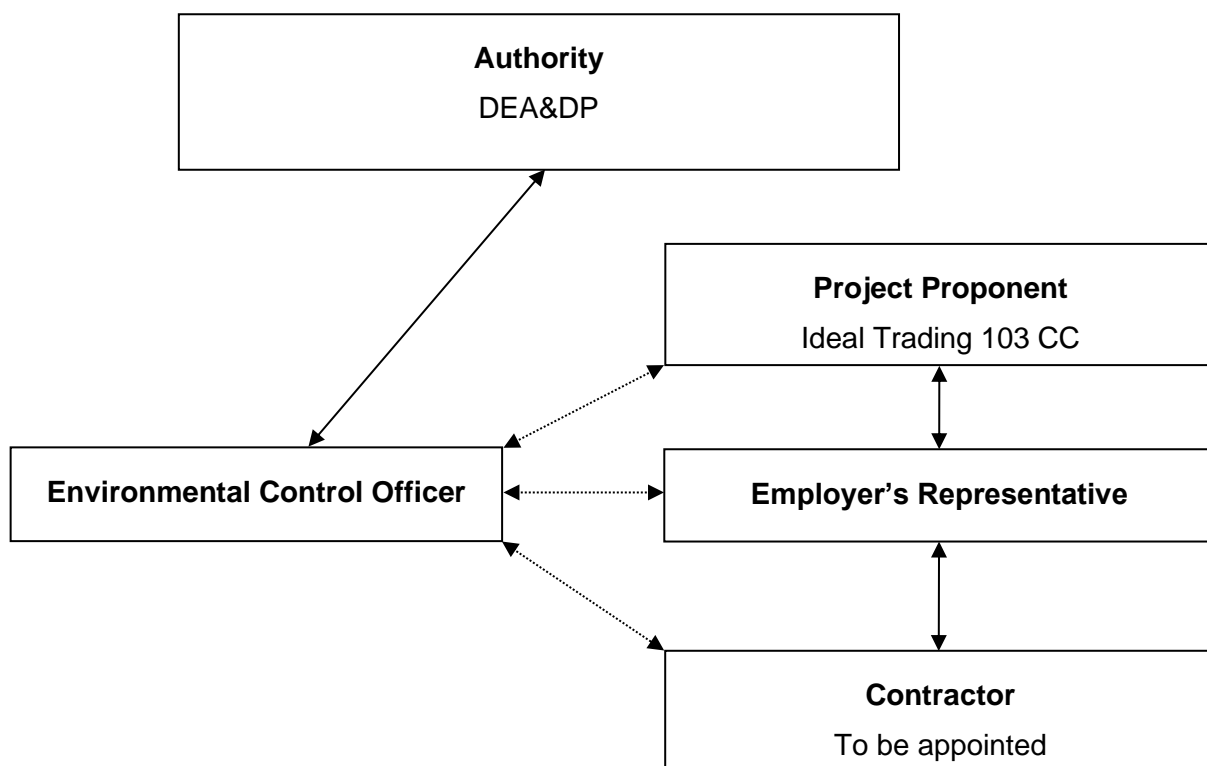


Figure 3: Responsibilities

6.1 PROPERTY OWNERS OR PROJECT PROPONENT

The Project Proponent is the person or entity who is responsible for carrying out any construction activity undertaken within the approved area. This includes activities authorised in terms of any legislation.

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

- Be conversant with the EMPr, any relevant Environmental Authorisation, Waste License, Permit or any other legally binding documentation;
- Ensure that the senior site personnel are aware of and understand the conditions and recommendations contained in the EMPr, any relevant Environmental Authorisation, Waste License, Permits or any other legally binding documentation;
- Order the removal of any person(s) and / or equipment found in contravention of any of the above mentioned authorisations.

6.2 ENGINEERS AND CONTRACTORS

The Engineers and Contractors are responsible for physically carrying out the relevant activities, and onto whom the majority of the recommendations in this EMPr are intended. The responsibilities indicated here are also relevant to Sub-Contractors.

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

- Be conversant with the EMPr, any relevant Environmental Authorisation, Waste License, Permit or any other legally binding documentation;
- 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 ECO and the Project Proponent in the event that any industry regulated standards are in contradiction with the EMPr or any other authorisations;
- Review and amend 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.

6.3 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, especially with regard to the Milkwood corridors;
- 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 Report (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 compliance with this EMPr;
- Ensuring compliance with the Environmental Authorisation or DAFF permit, if applicable;
- 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.

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

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.

7 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 is

managed. Please also refer to the Architectural Guidelines in [Appendix 2](#) for design considerations.

7.1 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. Please refer to [Appendix 3](#) for a copy of the Stormwater Layout Plan.

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

- Implement Best Management Practices in Stormwater Management as described in the Stormwater Management Plan.
- Apply the principles of Low Impact Development (LID) in the design of the drainage systems.
- The capture and storage of rainwater from roofs is mandatory, and the discharge of the overflows from rainwater tanks should be promptly returned to natural overland sheetflow.
- The stormwater modelling and drainage design should be carried out timeously in order that the Stormwater Management Plan can be implemented from the start of the construction phase of the project.

7.2 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.

7.2.1 Rain Water Harvesting

Capturing of rain water will minimise the impacts on the municipal resources. Gutters and rainwater tanks must be built into the architectural designs.

Consideration should be given to provide solar pumps at each rainwater tank in order to more effectively supply the units. The overflow from tanks should be directed into the stormwater system.

7.2.2 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.

7.2.3 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.

7.2.4 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.

7.2.5 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. Waterwise Landscaping

Waterwise landscaping principles must be incorporated into the detailed landscaping plans. 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.

7.2.6 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.

7.3 ENERGY CONSERVATION

The provision of energy has become a controversial topic, and has led to the reconsideration for many people of how they 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.

7.3.1 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 (number of people using facility, location of house, angles of roof) before making a choice.

7.3.2 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):

7.3.3 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.

7.3.4 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.

7.3.5 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.

7.3.6 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.

8 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 as well as any future dwellings, roads or infrastructure within the development area.

8.1 ESTABLISHMENT OF CONTRACTORS SITE CAMP

The Contractors Site Camp 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 and no indigenous vegetation may be removed, damaged or disturbed without prior approval. If there is no space on the erf under construction and the site camp needs to be located on other private property, permission from the relevant landowner must be obtained. 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 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;
- 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;
- 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;
- 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.

8.2 SANITATION

Chemical ablution facilities must be available for the use by construction staff for the duration of the construction period. 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);
- 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 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.

8.3 DEMARCATION OF WORK AREAS

The demarcation of no-go 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 4, 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.

8.4 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 4, Figure 2 & 3 for further details regarding erosion control on the site.

8.5 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.

8.6 FIRE MANAGEMENT AND PROTECTION

The Mossel Bay area has the potential of being a high risk fire area and the utmost care must be taken to ensure that none of the construction activities result in wild fires. Precautions must be undertaken to protect habitation, biodiversity and against loss of life and infrastructure.

The following points must be considered with regards to fire protection on site:

- **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;
- Contractors must ensure that basic firefighting equipment is available on site;
- Biomass generated from removal of invasive and indigenous vegetation should be removed from 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.

8.7 NOISE AND 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.

8.8 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).

8.8.1 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.

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.

8.8.2 Construction Rubble and 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.

8.8.3 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.

8.8.4 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.

8.9 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 is 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.

8.10 FUEL 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 any dwellings or infrastructure on the properties.

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 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.

8.11 DUST MANAGEMENT

The movement of construction vehicles and removal of existing 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 4, Figure 4](#) showing a diagrammatic representation of the management of haul roads.

8.12 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 must 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 1: 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 toolbox talks to ensure operatives	Auto shut-off taps. Ensure water supply able to be switched

	use practices		understand need to conserve water. Use buckets etc. to wash tools rather than running water. Dedicated tool washing areas.	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 (bowsers / 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.

8.13 REHABILITATION AND 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 of plant material 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 barrier against erosion.

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

8.14 SOCIAL REQUIREMENTS

8.14.1 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.

8.14.2 Targets

- The target should be to have the majority of semi-skilled labour local to the Mossel Bay Municipal area.
- An average total of 80% or higher should be maintained for the Southern Cape 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.

8.14.3 Record Keeping

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

Staff Type	Local to the Mossel Bay Municipal Area.		Southern Cape (excluding the Mossel Bay 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.

8.14.4 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.

8.15 HERITAGE REQUIREMENTS

Although no further 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.

8.16 METHOD STATEMENTS

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

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;
- 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.

8.16.1 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 clearing.
- Site layout and site camp establishment.
- Demarcation of No-Go areas

- 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.

9 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 land owners, tenants and all visitors (business or tourism) to any properties that fall under the umbrella of the development.

9.1 BOTANICAL REHABILITATION

Within urban environments, one of the greatest impacts on surrounding open spaces is the uninhibited use of exotic vegetation for gardening and landscaping. Plants do not adhere to boundaries such as fences or cadastral units, and may be blown, carried or creep outside of designated areas (gardens) and establish themselves in natural areas. This causes the so called “garden escapees”, which can affect the natural biodiversity. The most effective method of preventing this is to simply landscape with locally indigenous vegetation. The other benefits to using this approach is that locally indigenous vegetation is adapted to local conditions and uses less water and fertiliser and requires less maintenance.

Not all indigenous vegetation is easy to recreate or replant in a garden setting. In collaboration with New Plant Nursery, a list of obtainable plant species has been drafted, specific to each ecosystem type. These plants are commercially available, can be used to create landscaped effects in gardens and most importantly, naturally occur in the specified areas.

No invasive alien plant species may be used for any landscaping purposes. This will encourage the restoration and rehabilitation of the vegetation type. A suitable rehabilitation plan 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.

The Proponent should strongly promote the use of water wise landscaping, not only in the interests of water conservation, but excessive watering creates changes in the hydrological capabilities of 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 river.

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 biddem 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.

9.2 ALIEN VEGETATION MANAGEMENT

Alien invasive vegetation is identified as exotic (imported, not indigenous) plant material that is supremely adapted to local conditions. In most cases, these plant species have no natural predators and are able to out-compete indigenous vegetation.

The impact of alien vegetation on biodiversity, water resources, aesthetics and fire management is very well documented. All alien invasive vegetation should be removed from the area in order to ensure restoration of the indigenous vegetation.

Removal of alien vegetation can be undertaken using various methods. These include mechanical (cutting, chopping, pulling, ring barking), chemical (poisoning) or biological (bugs, beetles). Each species reacts differently and thus often requires specific actions or a combination of actions to effectively remove.

The important thing is to first identify the species of plant and then to implement an effective removal plan. Most species require ongoing management, i.e. initial clearing then several follow up clearings of juvenile plants.

Use of general herbicides is discouraged in any areas where contamination of the beach, river or estuary may occur. In the event that herbicides are required for the removal of alien vegetation, please refer to the ECO to obtain the details of acceptable products to use. Always read the instructions and follow the dilutions correctly.

Alien invasives on the property should consider the following:

- Although alien species are not seriously problematic within the site they are present and should be managed to reduce the likelihood of proliferation in the future;
- An alien removal program must be implemented to remove alien vegetation from within the site as a priority.
- Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated area (in consultation with the relevant botanical specialist);
- Cleared vegetation must be either removed from site or burned in-situ in temporary storage area;
- Any seed bearing material should be removed to prevent the spread of seed.

- A suitable revegetation or rehabilitation plan must be implemented after alien vegetation clearing;
- A long-term alien maintenance plan must be designed and implemented in conjunction with a suitably qualified expert to keep the open space areas weed free.;
- Indigenous and non-invasive exotic weeds can become problematic, and should also be managed to prevent strangling and displacement of naturally occurring species.

The status of the species identifies the threat and the management actions required to address the threat. The NEM:BA list of weeds and categories has been included as [Appendix 8](#), along with the Working for Water controls and herbicide selection criteria.

The NEM:BA categories currently are:

Category 1: Invader plants must be removed & destroyed immediately

Category 2: Invader plants may be grown under controlled conditions only

Category 3: Invader plants may no longer be planted

The most common species of alien invasives that occur in the area are:

- *Acacia melanoxylon* (Australian Blackwood) – currently Category 2 invader, mostly due to the economic value of the wood.



Blackwood is removed by cutting the tree as low as possible and the stump painted with a herbicide. Blackwood may also be controlled by frilling or pulling. When pulling, ensure that the root system is also removed.

A Triclopyr herbicide such as Garlon is recommended for blackwood.

- *Cestrum laevigatum* (Inkberry) - currently Category 1 invader.



Inkberry seedlings should be pulled out as soon as they are identified. Larger trees should be cut and the stump treated with a Triclopyr such as Garlon.

- *Ipomoea* spp (Morning Glory) - currently Category 3 invader.



A combination of cutting and foliar sprays (broadleaf herbicide) will control Morning Glory. Ensure that the rhizome (root) is removed if no herbicide is applied. Burning has also been used to destroy Morning Glory. A Glyphosate such as Roundup is best used on Morning Glory.

- *Lantana camara* (Lantana) - currently Category 1 invader.



Individual Lantana can be removed by cutting out the plant at the base of the stem. 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.

- *Leptospermum laevigatum* (Australian Myrtle) - currently Category 1 invader.



Australian Myrtle should be cut down at ground level. It is not necessary to apply herbicide to the stumps.

- *Cortaderia jubata* (pampas grass) – currently Category 1 invader.



Pampas grass must be removed by covering the flower heads (feathers) with a sack and cutting out the plant at the base. Then entire plant with the sack must be burnt. On no account should any root material be left in contact with the soil as it will resprout.

A Glyphosate herbicide such as Roundup can be used on the plant once all the feathers are removed.

- *Solanum mauritianum* (bugweed) – currently Category 1 invader



Bugweed is spread by Rameron pigeons. The plant must be removed by cutting it off at the stem. The plant may then be placed at a green waste site for disposal or burnt.

Seedlings should be pulled out and larger trees treated with a Triclopyr or Glyphosate foliar spray.

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.

It is suggested that when alien vegetation is identified on a site, the ECO should provide a management method statement for its removal. No dumping of invasive vegetative material is allowed. Any material must be taken to a relevant green waste site for disposal.

9.2.1 Herbicide Application

The following needs to be considered when applying herbicides:

Foliar Applications

- Foliar applications should be made with a **low pressure** (20-50 psi) backpack sprayer at rates of 4 liters or less per minute;
- All foliar treatments should be made after full leaf expansion in the spring and before Autumn (before the end of April);
- Allow herbicide treatments to **dry** for at least **three hours** at an air temperature above 18° to ensure adequate absorption and translocation. In other words, herbicide should not be sprayed on days where rain is expected;
- It may be necessary to **close off** the treatment area for access until the herbicide has completely dried;
- Use a nonionic surfactant (i.e. a wetting agent such as actipron) with all herbicide solutions used for foliar spraying. Surfactants (wetting agents) increase the effectiveness of the herbicide by:
 - o reducing surface tension and ensuring complete foliar coverage, and
 - o increasing the rate of absorption through the leaf cuticle.
- Apply herbicide with a backpack or similar hand-operated pump sprayer equipped with a **flat spray tip** or adjustable cone nozzle.
- Apply herbicide to the leaves and stems of target plants using a consistent back and forth motion.
- Herbicide should thoroughly **cover** foliage, but not to the point of run-off.
- Triclopyr herbicide requires complete foliar coverage to be effective.
- Applications made while walking backward will reduce the risk of the herbicide getting onto the applicator's clothing.

Cut Stump Applications

The main advantages to these methods, and this is the reason they have been recommended for the initial clearing options, are:

- they are very economical,
- there is minimal probability of non-target damage,
- minimal application time, and
- they can be used in the winter. Backpack sprayers or spray bottles are very effective for all of these methods.

Horizontally cut the stems at or near ground level as described above (no higher than 100mm); all cuts should be level, smooth, and free of debris. Immediately apply the herbicide to the outer 20% (cambial area) of the stump; delayed treatment may reduce the effectiveness of treatment.

9.3 WILDLIFE MANAGEMENT

Developments of any kind create several problems for the indigenous fauna of an area. This includes destruction and fragmentation of their habitat, destruction of corridors, introduction of problem animals, poaching, road mortality and disturbance of breeding sites to name a few. Individual fences around erven are thus strongly discouraged. In urban areas, dogs and cats can cause particular devastation to small mammals and birds.

This section identifies various mechanisms that can be adopted by home owners to improve their interaction with the local wildlife (Todd, 2016, Harrison, 2008 and CapeNature).

9.3.1 Destruction of Natural Habitats and Populations

Habitat destruction is the prime driver in the decimation of populations.

- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes and tortoises.
- The intact thicket remnants should be left intact as much as possible.
- There should be a search and rescue of densely vegetated areas within the site just before they are cleared for species such as snakes and tortoises, this especially pertains to the intact remnant which was observed to have a faunal abundance.
- A permit should be obtained from CapeNature for the clearing and translocation of provincially protected vertebrate species.
- Restrict development and construction activities to planned areas;
- Clear each building site individually;
- Preserve undeveloped portions of erven in their natural state;
- Rehabilitate affected areas, where possible;
- Manage functional areas appropriately;
- Compensate for loss of habitats through creating indigenous gardens;
- Leave undeveloped portions of erven unfenced;
- Make provision for, and manage, ecological corridors;
- Widen the ecological corridors where possible where allowing gardens and open space corridors to merge;
- Create continuity with neighbouring properties;
- The site should be managed to promote biodiversity at the site, this includes restricting dogs to fenced erven and limiting or banning cats from the development

- If the site is fenced, there should be no electrified strands within 20cm of the ground to prevent tortoises from being shocked and killed.
- Swimming pools must be of the beach type to allow animals that might fall into it to get out on their own;
- Wherever possible, place pipelines and cables underground, and rehabilitate;
- Restrict creation of unwanted tracks;
- Use natural materials to surface footpaths.

9.3.2 Road mortality

Road deaths of animals have led to mass deaths of animals as a direct result of human actions and can be limited by a small change in behaviour.

- Restrict speed on roads;
- Place warning signage in appropriate places;
- Use appropriate curb designs (recommend edge restraint and/or mountable instead of barrier curbs).

9.3.3 Light pollution

One of the benefits of this undertaking is that it benefits local wildlife, even within an urban environment.

- Reduce exterior lighting and avoid constant lighting;
- Use only long-wavelength or low wattage lights for exterior lighting;
- Use directional fittings for exterior lights. No direct light sources should be seen from outside the township;
- Encourage the screening of interior lighting.

9.3.4 Poaching of local wildlife

Poaching of wildlife is a constant threat and comes from surprising quarters. In light of the objectives of sustainable management, poaching is strictly prohibited within the boundaries of the property. The following points should be considered to prevent poaching:

- Educate workers to avoid poaching;
- Patrol the area to ensure that no snares are set;
- Report incidents of snaring to the management;
- Keep a record of incidents;
- Extend the network of footpaths where appropriate to increase patrol areas;
- Control materials to avoid pollution and damage to fauna;
- Control after-hours access.

9.3.5 Domestic Animals

Domestic animals such as dogs, cats, monkeys and some birds can cause problems to the natural fauna if not kept adequately enclosed. This is in line with the municipal bylaws regarding domestic animals. The following measures must be implemented and communicated very clearly to all homeowners.

- No domesticated animal may roam outside of the owners property unsupervised;
- Animals roaming the nature areas unsupervised are liable to be removed from the site at the conservation authority's discretion;
- The municipal regulations regarding the number of animals that may be kept must be adhered to.

9.4 WASTE MANAGEMENT

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.

9.4.1 Recycling

It is recommended that recycling bins are placed at a central point in the development, with access for all residents and visitors to encourage recycling of most of the general household waste that is produced. Bins need to be adequately marked for ease of reference. The Proponent should enter into an agreement with a local recycling organisation for collection of these materials.

See [Appendix 9](#) for easy to use reference documents on what can be recycled and how recycling works.

9.4.2 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. Homeowners 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.

9.4.3 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.

Compost heaps are not advisable due to the potential issues around leaving biodegradable refuse at any place accessible by baboons and monkeys. Worm farms are an acceptable method of composting as they can be kept indoors away from predators. It is however, advisable that this activity is only undertaken by more permanent residents where a constant source of material is available for the worms.

10 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 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 determine a level of scientific accuracy that can be used to measure changes.

10.1 MONITORING

Fixed point monitoring must be used during construction and operation for this development. The identified site must provide a representational angle that will capture the development progress, and must include any sensitive areas to monitor impacts.

Duration and frequency of monitoring must include:

- During construction photographs must be taken at each ECO site visit;
- During operation, the HOA should continue photographing sensitive areas as designated by the ECO to monitor for rehabilitation growth and alien invasive vegetation.

10.2 AUDITS

Audits should be undertaken 6 months after completion of construction in order to ensure that all required recommendations were implemented. Furthermore it is recommended that a further audit is undertaken at least one year after the initial audit.

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

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 EMPr, 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, EMPr, and where applicable, the closure plan.	
(f) A description of any assumptions made,	

and any uncertainties or gaps in knowledge.	
(g) A description of an consultation process that was undertaken during the course of carrying out the environmental audit report.	
(h) A summary and copies of any comments that were received during any consultation process.	
(i) Any other information requested by the competent authority.	

11 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

It is not likely that decommissioning of a residential and care development such as Bardolino Lifestyle Village will take place in the near future. The possibility does exist that individual owners may decide to demolish existing facilities to make way for new ones. In this event or if the entire area requires decommissioning for some reason, all relevant legislation and policies must be complied with for the given period.

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.

Please note that these requirements are applicable to the demolition of the existing resort units as well. In addition, the requirements for the construction phase with regards to building rubble and recycling in this EMPr must be implemented for demolition.

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

12 IMPLEMENTATION

The following table is provided to assist the developer, design team, engineer and contractor with the effective implementation of this EMPr. The table below serves as a quick reference guide to the EMPr, 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; ○ 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 threatened vegetation; ○ Disturbance of butterfly habitat; ○ Fire risk 	All areas outside of the construction / development area to be clearly demarcated. All vegetation outside development area are 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.	
Obtain Permit for removal / translocation of protected plant species.	<ul style="list-style-type: none"> ○ Removal of vegetation and listed or protected plant species during construction ○ Habitat loss for avifaunal species ○ Physical removal of the narrow strips of woody riparian zones at crossings ○ Loss of topsoil 	Permit application to be informed be list of protected plant species found by the ecological specialist within the final facility development footprint. Permit requirements & list to inform updated plant rescue plan.	Prior to plant rescue and vegetation clearing.	ECO, ESA, Ecological Specialist & Contractor	ECO & proponent to provide photographic record	
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	○ Land disturbance,	Implementation	of	Throughout	Contractor	Engineer

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
construction vehicles	<p>changing run-off characteristics and increasing erosion risks</p> <ul style="list-style-type: none"> ○ Soil erosion during construction ○ Disturbance of fauna during operation ○ Soil erosion during operation ○ Disturbance and displacement of avifaunal species ○ Dust impacts during construction 	recommendations defined in EMPr.	construction phase		
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 	As per the requirements of the EMPr i.e. brush/straw packing & re-seeding	Throughout the construction phase.	Contractor	ECO & Proponent

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
	<ul style="list-style-type: none"> Loss of vegetation 				
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 Dust impacts during construction 	As per the requirements of the EMPr. Do not strip topsoil from entire development footprint	Throughout the construction phase	Contractor	ECO & Proponent
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 Plant Rescue, 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

Item	Associated Impacts	Management Action	Timing	Responsible Party	Monitoring
On-going Environmental Education	<ul style="list-style-type: none"> o 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"> o 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"> o Removal of vegetation and listed or protected plant species during construction o Alien plant invasion during operation o Soil erosion during operation 	Gardening / landscaping activities.	Throughout operation	Proponent	Proponent
Control of alien plants	<ul style="list-style-type: none"> o Removal of vegetation and listed or protected plant species during construction o Alien plant invasion during operation o 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"> o Removal of vegetation and listed or protected plant species during construction o Alien plant invasion during operation o Soil erosion during operation 	Closure of facility in compliance with legislation and this EMPr.	Unlikely	Proponent	Proponent

13 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 Authorisation. It is the responsibility of the Holder of the Authorisation (the Proponent), and not the ECO, to report such matters of non-compliance to the relevant Authority.

13.1 PROCEDURES

The Project Proponent shall comply with the environmental specifications and requirements of this EMP, any EA 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 Project Proponent, stating the nature and magnitude of the contravention.
- The Project Proponent shall **act to correct the transgression** within the period specified in by the authority.
- The Project Proponent 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 Project Proponent 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 EMMP, disagreement regarding the implementation or method of implementation of conditions of the EMMP, 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.

14 REFERENCES

- Aquanotion, 2008. www.twoflush.com/conservbody.htm. Aquanotion Ltd, Alberta, Canada.
- Eartheasy, 2008. www.eartheasy.com - Solutions for Sustainable Living.
- eHow Home, 2011. www.eHow.com - *How to Safely Dispose of Energy Efficient Light Bulbs*.
- Harrison, J, November 2008. *Portion 51 of Farm 485, Stilbaai: Impact Assessment of Proposed Development: Vertebrate Fauna*. First Draft Report. JAH Environmental Consultancy, Plumstead, Cape Town.
- Henderson, L 2001. *Alien Weeds and Invasive Plants*. Plant Protection Research Institute, Agricultural Research Council, Department of Agriculture, South Africa.
- Lochner, P. 2005. *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053H, Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.
- Mackay, M., 2016. *Basic Assessment Report: Bardolino Lifestyle Village, Erf 3972, Hartenbos, Mossel Bay*. Cape EAPrac, George, South Africa.
- PracticalEnvironmentalists, 2008. www.practicalenvironmentalist.com. *Swimming Pools and the Environment – Is your pool eco-friendly*.
- Todd, S. 2016. *Bardolino Lifestyle Village, Mossel Bay: Specialist vegetation report for basic assessment*. Simon Todd Consulting, South Africa.
- Van Rooyen, M. 2016. *Mossel Bay: Bardolino Lifestyle development: Erf 3972, Hartenbos, Civil services supporting Information*. MVD Consulting Engineers, Mossel Bay, South Africa.
- Working for Water. 2011. www.environment.gov.za/workingforwater *Invasive Alien Plants*