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# PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION PHASE

# ENVIRONMENTAL MANAGEMENT PROGRAMME

# FOR THE

PROPOSED CONSTRUCTION OF A MIXED-USE DEVELOPMENT ON ERF 998 AND PORTION 5 OF THE FARM ZANDHOOGTE NO. 139 (PORTION OF RE/139), TERGNIET, MOSSEL BAY LOCAL MUNICIPALITY, WESTERN CAPE

APPLICANT:	3MP Sales and Education Services
ENVIRONMENTAL	Sharples Environmental Services cc
CONSULTANT:	Michael Jon Bennett
DEA & DP PROJECT	16/3/3/1/D6/35/0043/24
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Environmental Impact Assessments 
 Basic Assessments 
 Environmental Management Planning

Environmental Control & Monitoring • Water Use License Applications • Aquatic Assessments

#### CONTENTS

DC	DCUMENT DETAILS	iv
1.	Introduction	1
2.	About this EMPr	1
	2.1 Important caveat to the report	1
3.	How to use this document	1
4.	Description of the Activity	2
5.	Legal Framework	3
	5.1 The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)	3
,	5.2 Other applicable legislation	5
6.	Scope of this EMPr	6
7.	General Environmental Management	6
	7.1 Sile access and irallic management	/ o
	7.2 Site camp and associated facilities	0 0
	7.5 Sile cump and associated racinities	7 10
	7.4 Indigenous vegeration cleaning	10
	7.6 Integrated waste management approach	10
	7.7 Hazardous substances and fuels	11
	7.8 Cement and concrete batching	12
	7.9 Erosion control and stormwater management	13
	7.10 Excavations and Earthworks	13
	7.11 Heritage Resources	14
	7.12 Site closure and rehabilitation	14
8.	Environmental Impact Management: Planning and Design Phase	16
	8.1 OBJECTIVE 1: APPOINTMENT OF AN ENVIRONMENTAL CONTROL OFFICER	16
	8.2 OBJECTIVE 2: DETAILED DESIGN AND SITE LAYOUT PLAN	17
9.	Environmental Impact Management: Pre-construction Phase	19
	9.1 OBJECTIVE 1: IDENTIFY & DEMARCATE NO-GO AND WORKING AREAS	19
	9.2 OBJECTIVE 2: ESTABLISH ENVIRONMENTALLY SENSITIVE STE CAMP & STE FACILITES	20
10	9.3 OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION	21
10.		۲۲ دد
	10.1 Objective 4.1 Revent to dedition and sole	۲۲ کر
	10.2 OBJECTIVE 5: EIMIT DISTORDANCE OF TERRESTRIAL ECOSTSTEMS (FAORA AND FEORA)	20
	10.4 OBJECTIVE 7: DUST IMPACT MANAGEMENT	2/ 28
	10.5 OBJECTIVE 8: LIMIT AVOIDABLE VISUAL IMPACTS	29
11.	. Environmental Impact Management: Post Construction Rehabilitation Phase & Operation	onal
	Phase	32
	11.1 OBJECTIVE 9: SITE CLOSURE & REHABILITION	32
	11.2 OBJECTIVE 10: MAINTAIN ECOLOGICAL CORRIDOR FREE OF ALIEN VEGETATION	35
	11.3 OBJECTIVE 11: LIMIT VISUAL IMPACTS	35
12.	. Emergency Preparedness	39
	12.1 Emergency response procedures	39
	12.2 Emergency preparedness	39
13.	. Method statements	40
14.	. Roles and Responsibilities	40
	14.1 Duties and Responsibilities of the Contractor	40
	14.2 Duties and Responsibilities of the ECO	41 ۱۱
15	Four commental Awareness Plan	ו+ גע
13.	Monitoring Record Keening and Reporting	43 11
10.	16.1 Environmental Auditina	ΔΔ
	16.2 Construction phase monitoring, reporting and record keeping	45
17.	. Penalties, Claims and Damages	46

18. Conclusion	47
List of Tables Table 3: Listed Activities in terms of the NEMA	1
Table 3: Listed Activities in terms of the NLMA       Table 4:Offences that may constitute a fine.	47
<u>List of figures</u>	
Figure 1: Site Development Plan	3

# LIST OF APPENDICES:

Appendix A: Site Development Plan Appendix B: Environmental Awareness Guideline Appendix C: EAP CV Appendix D: Alien and Ecological Corridor Management Plan

# **DOCUMENT DETAILS**

Project Ref. No:	MUD/TN/MB/WC/05/24		
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**Sharples Environmental Services cc** Since 1998, SES has been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. Our consultants have over 20+ years of combined experience and we operate in the Southern, Eastern and Western Cape regions.

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# 1. Introduction

Sharples Environmental Services cc (SES) was appointed by 3MP Sales and Education Services (the proponent) to compile the Environmental Management Programme for the Proposed Mixed-Use Development on Erf 998 and a portion of Remainder of Farm 139 Zandhoogte, Tergniet, Mossel Bay Local Municipality, Western Cape.

# 2. About this EMPr

This document is intended to serve as a guideline to be used by 3MP Sales and Education Services (as the Implementing Agent) and any person/s acting on 3MP Sales and Education Services behalf, during the pre-construction, construction, post-construction rehabilitation and operational (maintenance) phases of the proposed development. This document provides measures that must be implemented to ensure that any environmental degradation that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised and mitigated appropriately.

This EMPr has been prepared in accordance with the requirements of an EMPr as specified in the Environmental Impact Assessment Regulations, 2014 (as amended), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (2005).

It is important to note that not only is the EMPr designed to manage the physical establishment of the development *per se*, but also as a tool which can be used to manage the environmental *impacts* of the development.

The rehabilitation, mitigation, management and monitoring measures prescribed in this EMPr must be seen as binding to the *3MP Sales and Education Services*, and any person acting on its behalf, including but not limited to agents, employees, associates, guests or any person rendering a service to the development site.

# 2.1 Important caveat to the report

In the past, some developments have had a devastating impact on the environment even though they have had Environmental Management Programmes in place, while other developments have had a low impact even though no management plans have been compiled.

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The ECO needs to ensure that all roleplayers are aware of the constraints that the EMPr places on the development and construction team and are prepared to be actively involved in enforcing these constraints. The end result relies on cooperation and mutual respect and understanding of all parties involved.

# 3. How to use this document

It is essential that this EMPr be carefully studied, understood, implemented and adhered to as far as reasonably possible, throughout all phases of the proposed development. *3MP Sales and Education Services* must retain a copy of this EMPr, and an additional copy must be kept on site at all times during the pre-construction, construction and post-construction rehabilitation phases of the development.

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by 3MP Sales and Education Services, as this EMPr identifies and specifies the procedures to be followed by

engineers and other contractors to ensure that the adverse impacts of construction and maintenance activities are either avoided or reduced. Appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMPr must be seen as a working document, which may be amended as and when needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the competent authority, the Department of Environmental Affairs & Development Planning (DEADP). Amendments to this EMPr must first be approved by the competent authority, in writing, before being implemented.

# 4. Description of the Activity

3MP Sales and Education Services proposes to construct a mixed-use development which will comprise of the following:

Zoning	Size (ha)
Business Zone I (BZI)	2.604
Business Zone IV (BZIV)	0.268
Community Zone III (CZIII)	0.527
Mixed Zone II (MZII)	0.902
Open Space II (OSZII)	1.225
General Residential Zone II (GRZII)	0.697
General Residential Zone III (GRZIII)	0.653
Transport Zone II (TZII)	1.360
Mixed Use Zone II (MZII)	0.902
Split zone erf consisting of a portion Business Zone I (BZI) with a size of 1.0	2.00
hectare and a portion Open Space	
Zone II (OSZII) with a size of 1.0	
hectare	



Figure 1: Site Development Plan

The proposed developed will take place on erf 998 and portion 5 of the farm zandhoogte no. 139 (portion of re/139), Tergniet, Mossel Bay, Western Cape.

# 5. Legal Framework

#### 5.1 The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended) gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent

authority (CA) before the commencement of an activity listed in Environmental Impact Assessment Regulations Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal is an activity listed in the EIA Regulations, a Basic Assessment Process is required and the respective reports must be submitted to the Department of Environmental Affairs and Development Planning (DEADP) before they issue 3MP Sales and Education Services with an Environmental Authorisation. The Environmental Authorisation has been attached as appendix 6.

Table 1: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2014), as amended, that are proposed to be triggered and therefore require an application for Environmental Authorisation to be submitted to the DEA & DP

Activity #	Listing notice 1. Description of Activity as per GN No. R 327		
24	<ul> <li>The development of a road— <ul> <li>(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or</li> <li>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;</li> <li>but excluding a road— <ul> <li>(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;</li> <li>(b) where the entire road falls within an urban area; or</li> <li>(c) which is 1 kilometre or shorter.</li> </ul> </li> </ul></li></ul>		
27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.		
28	<ul> <li>Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:</li> <li>(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or</li> <li>(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;</li> <li>excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.</li> </ul>		
Activity #	Listing notice 3. Description of Activity as per GN No. R 324		
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or iii. Inside urban areas: (aa) Areas zoned for conservation use; or		

	(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	
	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	
12	<ul> <li>i. Western Cape</li> <li>i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</li> <li>ii. Within critical biodiversity areas identified in bioregional plans;</li> <li>iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in where areas</li> </ul>	
	iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.	
Activity #	Listing notice 2. (GN No. R325): Scoping & Environmental Impact Reporting	
	N/A	

# 5.2 Other applicable legislation

3MP Sales and Education Services is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on their behalf, remain compliant with the conditions of the received authorisations, as well as the provisions of all other applicable legislation and guidelines, including inter alia:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Water Act (Act 36 of 1998)
- National Forest Act (Act No 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);
- Subdivision of Agricultural Land (Act No. 70 of 1970)
- Guideline for emp's for state-subsidised housing: Considerations to be taken into account in preparation of EMPs for state-subsidised housing (February 2019)

The above listed legislation have general applicability to most development applications, and it is the responsibility of *3MP Sales and Education Services* to ensure that all contractors and employees are aware of their obligations in terms of these Acts. This EMPr does not detract from any other legal requirements.

The proposed development activity will take place through various phases. Each phase has specific impacts or issues unique to that phase of the development activity. These phases of the development are listed below and the impacts associated with each phase as identified through the environmental impact assessment process are identified and given a brief description. Brief management statements are provided, as well as a description of the desirable impact management outcomes.

# 6. Scope of this EMPr

This EMPr describes the measures that must be implemented in order to avoid, minimise, manage and monitor the potential environmental impacts of the development, during all phases of the project life cycle, namely:

- Planning and Design Phase
- Pre-construction Phase
- Construction Phase
- Post-Construction Rehabilitation
- Operational Phase

General environmental management measures that must be applied throughout the project lifecycle (as and where applicable) are described in Chapter 9 below. Additional management measures that must be implemented to address specific impacts that may arise during each phase are provided in **Chapters 9-12** of this EMPr.

# 7. General Environmental Management

The following general management measures are intended to protect environmental resources from pollution and degradation during all phases of the project life cycle. These measures should be implemented as and where applicable, reasonable and practicable during the pre-construction, construction and post-construction rehabilitation and operational (maintenance) phases of the proposed development.

## Code of Conduct

The purpose of the Code of Conduct (CoC) is to minimise the impact of the activities associated with the construction phase on the environment. The rules and regulations prescribed in this CoC are intended to ensure that the impacts on the environment are not prejudiced by the construction activities. Failure to adhere to or any breach of this CoC will result in a fine being levied against the offending or defaulting party / individual.

Labourers during the construction phase should conserve the natural environment, endorsing the principles of sustainable use and minimum impact. They should also be sensitive to the impact of their operation on the environment within which they work and minimise any adverse impacts.

This EMPr forms an integral part of the activities during the construction phase and as such, is legally enforceable. In addition to the restrictions and controls provided for in this EMPr, the environmental controls comprise the following:

#### Engineers

- Unless otherwise stated by the holder, only a registered engineer must be appointed for the construction phase of the development.
- The engineer shall provide work or services of a quality and scope, and to a level, which are commensurate with accepted standards and practices.
- The engineer shall be impartial in decision-making, provision of advice and judgement.

#### Contractors and sub-contractors

• Unless otherwise determined, only appropriately registered contractors shall be appointed.

- It shall be the responsibility of the holder / engineer to ensure that the contractors abide by and comply with the rules and regulations of the Code of Conduct.
- Contractors shall at all times be responsible for their sub-contractors and employees whilst they are on the development property.

#### **Rules and Regulations**

It is of vital importance that engineers and contractors understand and acknowledge that they are working on an environmentally sensitive development and agree to conform to all environmental controls specified in this EMPr and any additional input by the ECO.

In addition to the EMPr, the environmental controls comprise the following:

- Building Plan Controls
  - A copy of the approved and signed building plans must be available on site during the construction phase of the development.
  - Variations of the building plans must be approved by the engineer / holder prior to being implemented.
  - Prior to commencing building, the contractor must remove all topsoil and store it in a berm of not more the 2m high, away from construction activities.
- Site tidiness
  - The contractor must keep the appearance of his building site neat and tidy at all times. Building rubble must be removed from site at regular intervals, and litter must be removed from the site on a daily basis. Refuse drums must be available on site which waste can be placed in. The drums must be emptied on a regular basis and the waste taken to a licenced local waste disposal facility.
- Safety
  - The contractor shall comply with the Health and Safety Act (Act No. 85 of 1993), as amended, together with such regulations promulgated thereunder.

#### 7.1 Site access and traffic management

Access to the development is proposed directly from Sorgfontein Road (DR 1578).

All construction vehicles need to adhere to traffic laws and regulations. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible, care should be taken to ensure that the local traffic flow pattern is not significantly disrupted and vehicle operators therefore need to be educated in terms of "best-practice" operation in order to minimise unnecessary traffic congestion or dangers. These practices include, but are not limited to, not unnecessarily obstructing the access point or traffic lanes used to access the site; considering the load carrying capacity of road surfaces and adhering to all other prescriptive regulations regarding the use of public roads by construction vehicles. Delivery trucks should be appropriately covered to deter the spilling of material along the route to the site.

Adequate signage that is both informative and cautionary to passing traffic (motorists and pedestrians) warning them of the construction activities should be implemented. Signage would need to be clearly visible and include, amongst others, the following:

- Identifying working area as a construction site;
- Cautioning against relevant construction activities;
- Prohibiting access to construction site;
- Clearly specifying possible detour routes and / or delay periods;

- Possible indications of time frames attached to the construction activities, and;
- Listings of which contractors are working on the site.

Other mitigation measures include:

- No construction to take place over or during the December holiday period without prior permission from the relevant authorities.
- ECO to do awareness training with the contractor and labourers and to highlight the traffic related risks before construction commences.
- Ensure appropriate behaviour of operators of construction vehicles.

#### 7.1.1 Operational phase management measures

The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority. Paved sidewalks should be provided in support of the development that will generate high numbers of public transport commuters.

#### 7.2 Site demarcation

The working areas should be clearly demarcated on site during the pre-construction or construction phases of the development, as appropriate.

#### 7.2.1 Construction working area

Prior to the commencement of any land-clearing or construction activities, the outer boundary of the development area must be surveyed and pegged. If practical, the demarcation boundary should typically allow a working area of no more than 2.5m around the development footprint unless otherwise agreed with the ECO. This demarcation boundary is to ensure that land clearing and construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint.

If desired or deemed necessary by the ECO, the outer boundary of the working area can be enclosed with orange barrier netting fencing, shade netting, droppers & wire/ danger tape, or similar – as feasible and practical. The fencing should be retained and maintained for the duration of the construction period and should not be moved during construction unless agreed otherwise with the ECO.

#### 7.2.2 No-go areas

The No-Go area for this proposal is Portion 11 of the Layout Plan (Figure 1). Prior to the commencement of any land-clearing or construction activities, all sensitive areas (as identified by the ECO), must be demarcated and must not be disturbed during the construction phase. No-go areas outside the approved development area must be off-limits to all construction workers, vehicles and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas, and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas.

Construction workers must be informed of the no-go areas, and if necessary appropriate signage can be used to enforce the demarcation. Any interaction with no-go areas should be consulted between the contractor and ECO prior to any actions.

#### 7.2.3 Demarcation of the site camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas must be used for the site camp, at least 100m away from any no-go areas. Site selection must be done in consultation with the ECO.

#### 7.3 Site camp and associated facilities

The following general management measures pertaining to the set-up, operation and closure of a site camp should be applied where appropriate, reasonable and practicable:

# 7.3.1 Fencing & Security

The site camp area must be secured to prevent any un-authorised individuals from entering the site camp and possibly getting injured or posing a safety and/or security risk. Adequate signage must be displayed, designating the site office / camp as a restricted area to non-personnel. If required, the site camp and associated areas may be fenced off along the demarcated boundaries of these areas, preferably with 2m high fence and shade netting or similar.

# 7.3.2 Fire Fighting Equipment

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g. welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques, and are informed of the emergency procedure to follow in the event of accidental fires. No open fires may be made on the construction site during any phase of the project. Construction workers may make small contained fires (e.g. for warming or cooking purposes), within the site camp provided the small fire is encircled by a corrugated iron structure, drum or similar, to prevent wind-blown cinders from causing fires elsewhere. Such fires may not be left unattended and must be thoroughly extinguished after use. No smoking must be allowed on the construction site. In the case of accidental fires the contractor must (if required) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

# 7.3.3 Waste Storage Area

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area. Sufficient signage and awareness should be created to ensure that these bins are properly used.

# 7.3.4 Hazardous Substances Storage Area

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness should be created to ensure that these bins are properly used.

#### 7.3.5 Potable Water

An adequate supply of potable water must be provided to construction workers at the site camp.

# 7.3.6 Ablution Facilities

Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution . As per the SANS10400 requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided.

Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over. The chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. The ablution facilities must not be linked to the river system in any way. Toilets must be serviced regularly and kept in an orderly state. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance.

# 7.3.7 Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks must be provided within the site camp. Seating and shade should be provided.

# 7.3.8 Vehicle & Equipment Maintenance Yard

Where possible, construction vehicles and equipment that require repair must be removed from site and taken to a workshop for servicing. If emergency repairs and/or basic maintenance of construction vehicles or equipment are necessary on site, such repair work must be undertaken within the designated maintenance yard area away from any watercourses. Repairs must be conducted on an impermeable surface, and/or a tarpaulin and/or drip trays must be laid down prior to emergency repairs taking place, in order to prevent any fuel, oil, lubricant or other spillages from contaminating the surrounding environment.

## 7.3.9 House-keeping

The site camp and related site camp facilities must be kept neat and orderly at all times, in order to prevent potential safety risks and to reduce the visual impact of the site during construction.

## 7.4 Indigenous vegetation clearing

Where indigenous vegetation must be cleared for the development the following measures must be implemented:

- Where feasible vegetation must simply be trimmed to facilitate access/ construction, rather than being completely cleared or removed.
- Vegetation clearing/trimming must be cleared by hand (i.e. brush cut) and stockpiled for use as mulch/ brush-packing during rehabilitation of the site. Any alien vegetation that is cleared must be disposed of in consultation with the ECO, unless the cleared alien vegetation does not contain seeds in which case it may be retained for use in site rehabilitation.
- Only the areas required to accommodate the construction and access to the construction site must be cleared/trimmed of vegetation.
- After any clearing is completed, an appropriate cover crop should be planted where any weeds or exotic species are removed from disturbed areas timeously.
- Vegetation outside of the construction footprint and within any no-go areas must not be cleared.
- Clearing should take place in a phased approach, so that cleared areas are kept small and manageable.
- The indigenous forest which is located lower down in the valley should be protected and suitably buffered from the development by means of a fire belt, with the surrounding aliens cleared.

#### 7.5 Topsoil and subsoil management

It is recommended that topsoil be removed from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and possibly within the site camp, ablution area, vehicle maintenance yard, refuelling area and temporary waste storage area. Topsoil removal and stockpiling must be undertaken only after consultation with the ECO.

- Removed topsoil and subsoil must be stockpiled for the duration of the active construction period, and utilised for the final landscaping and rehabilitation of disturbed areas on site.
- The removed topsoil must be stockpiled in a berm, in a demarcated area as agreed with the ECO.
- The topsoil berm may be a few meters wide but must ideally not be more than 2m high to allow light and air penetration.
- Removed subsoil must be stockpiled separately from topsoil.

- The topsoil & subsoil storage area must be located on a level area outside of any surface drainage channels outside the riparian zone, and at a location where it can be protected from disturbance and river flow/floods during construction and where it will not interfere with construction activities.
- Topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil.
- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date.
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- Stockpiles must not be located within 50 metres of watercourses. The furthest threshold must be adhered to.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Soil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.
- Topsoil removed from fynbos areas to be reused in rehabilitation areas, e.g. open space areas. Where possible, topsoil from fynbos areas, containing indigenous plant seeds, should be transferred immediately to rehabilitation areas rather than being stockpiled, as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles of this kind must not exceed 0.5 m in height and must not be compacted.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.

# 7.6 Integrated waste management approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Weather and animal proof waste bins for the different categories of recyclable waste (i.e. paper, plastic, metal). These bins must be emptied and the waste taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request. A Waste Management Plan is to be developed in order to formalise waste control methods and to provide a structure for waste management.

The non-recyclable and non-reusable waste (e.g. builder's rubble, etc.) generated on site must be stored in animal and weather proof bins and disposed of at a landfill site licensed in terms of the applicable legislation. The receipts from the facility must be kept on file and must be available on request.

# 7.7 Hazardous substances and fuels

If hazardous substances and fuels such as diesel, oil, lubricant, detergents etc. are to be stored on site for construction purposes, a designated area must be set aside for this within the site camp.

- All hazardous substances must be stored in the designated area within the site camp in animal and weather proof bins/ storage units.
- The area selected for storage of hazardous fuels must be located on a level area, at least 100m from any water courses, water bodies or surface drainage channels.
- The designated area must be clearly demarcated and secured by use of fencing and/or cages, to prevent access by un-authorised persons and/or animals.

- Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste.
- Access to the hazardous material storage area must be restricted to authorised personnel only and must be treated as a no-go zone to unauthorised personnel.
- Appropriate hazard signage indicating the nature of the stored materials shall be prominently displayed at the storage area.
- Spoil or waste material should not be dumped within 50 m of natural areas, it should be discarded at a licensed dump site.
- Those persons tasked with handling any hazardous substances must be equipped with the knowledge, equipment and safety gear necessary to handle the substance/s safely.
- Material Safety Data Sheets (MSDSs) must be available on site for all hazardous chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Storage vessels of hazardous substances must be situated in an impermeable bunded area large enough to accommodate at least 110% of the capacity of the vessel in question. If plastic sheeting is used to line the bunded area, care must be taken to ensure it is not punctured in any way during the course of the construction period.
- All waste, hazardous as well as general, which result from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF).
- Fuel tanks must ideally be elevated so that leaks can easily be detected.
- No smoking may be permitted at or surrounding the area where fuels and hazardous substances are stored.
- Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks.
- Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips.
- Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage.
- Firefighting equipment must be located in close proximity to the storage area.

In the event of a significant spill or leak of hazardous substances (petrol and diesel), such incident(s) must be reported to all relevant authorities, including the D: PCM, in accordance with Section 30 (5) of the National Environmental Management Act (NEMA) (Act 107 of 1998), pertaining to the control of emergency incidents.

# 7.8 Cement and concrete batching

Cement and concrete batching will be permitted on site, but may only take place on designated impermeable, bunded surfaces, as agreed with the ECO.

- Cement/ concrete may not be mixed on bare ground.
- The impermeable/ bunded area must be established in such a way that cement slurry, runoff and cement water will be contained and will not flow into the surrounding environment, the river/ riparian zone or contaminate the soil.
- Cement run-off and excess cement slurry must be collected in the designated impermeable area, allowed to dry and then disposed of at an appropriate facility. Alternately, the contaminated water can be collected in sealed tanks and transported to an appropriate disposal site.
- Unused cement bags must be stored in such a way that they will be protected from rain.
- Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.

• Empty cement bags must be disposed of in the hazardous waste bins on site.

#### 7.9 Erosion control and stormwater management

Appropriate measures must be implemented to control the flow of stormwater across the construction site, in order to prevent possible flooding, soil loss and dispersion of pollutants. All exposed earth surfaces must also be protected from wind and water erosion. Stripped areas must not remain uncovered for extended periods of time and must be provided with a suitable cover (vegetation, mulch, brush-packing) as soon as possible.

The scale and nature of the erosion and stormwater control measures implemented on site must be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, stormwater control) to the satisfaction of the ECO and consulting engineer.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. These measures must be established to reflect the natural slope of the surface and located at the natural ground level and must be located within the development footprint and not encroach into the buffer areas. Such measures may include the use of shade netting, grease traps/oil separators, geo-fabric, brush-packing or similar barriers in areas susceptible to erosion and along exposed slopes. Stormwater managed by the development is to be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development. Areas must be rehabilitated and a suitable cover crop planted once specific phases of construction is completed.

## 7.10 Excavations and Earthworks

Any major earthworks with bulldozers and heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e. only what is absolutely necessary. Areas to be excavated must be clearly demarcated. Areas, which have already been excavated and entail fairly significant earthworks, must be similarly demarcated to avoid the spreading of construction activities into more sensitive areas.

All excavated material must be stored on a flat surface away from any drainage line or area susceptible to erosion. The location must be decided upon in consultation with the ECO. Stored material must be protected from wind and water erosion and this may entail covering the material with suitable shade cloth material or similar (if and when necessary). The shade cloth may need to be weighed down in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

In the event that any heritage resources (human remains, grave stones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures etc.) are encountered during construction, the finding should be protected from further disturbance (ideally left in situ) and the ECO and relevant Heritage Authority should be notified. The finding should be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist.

# 7.11 <u>Heritage Resources</u>

Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities, all works must be stopped immediately and Heritage Western Cape must be notified without delay.

#### Heritage Western Cape:

T: 021 483 5059 E: hwc.hwc@westerncape.gov.za

## 7.12 Site closure and rehabilitation

Upon completion of the construction phase, and after each maintenance event, all disturbed areas, including the working area (disturbance corridor), temporary access road, and all areas utilised for the site camp and associated site camp facilities will require rehabilitation as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- Alien plants must be removed from the site as per NEMBA requirements.
- A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.
- Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. Any soil contaminated with hydrocarbons (oil, fuel, etc) or other hazardous substance must be collected and disposed of as hazardous waste to a licenced disposal facility.
- All construction waste is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is strictly prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO, and must adhere to all conditions/ requirements of the Environmental Authorisation.

• Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed.

# 8. Environmental Impact Management: Planning and Design Phase

No direct environmental impacts are associated with the planning and design phase. However, poor planning or inappropriate design decisions in this phase may result in environmental impacts arising during subsequent phases of the project.

Planning and design activities must therefore take into account the environmental constraints and opportunities identified during the Environmental Impact Assessment process, in order to avoid or minimise the potential future impacts of the development. Proper planning is also essential to ensure that adequate provision is made to implement the environmental requirements of this EMPr, and to ensure that the development is compliant with an additional conditions which may be included in the Environmental Authorisation.

The environmental management objectives (goals) during this phase are to:

- Appoint an Environmental Control Officer.
- Complete the detailed design site layout plan.
- Update the EMPr (if necessary).

These environmental management objectives, as well as the management actions that must be implemented in order to achieve the desired objective and avoid/minimise potential impacts are discussed in more detail below.

#### 8.1 OBJECTIVE 1: APPOINTMENT OF AN ENVIRONMENTAL CONTROL OFFICER

Impact Management Objective: To appoint a suitably qualified and experienced Environmental Control Officer.			
Potential impact to avoid	Failure to appoint an ECO will result in non-compliance with the requirements of the EMPr.		
Impact Management Outcome	The requirements of the EMPr are implemented and monitored during all phases of the development, which will promote		
Impact Management Obicome	sound environmental management on site.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
A suitably qualified and experienced Environmental Control Officer must be appointed before any 3MP Sales and Education During design provide the second secon		During design phase	
activities commence on site.		Services	
• The appointed ECO must adhere to the requirements stated in Chapter 15 and any other			
requirements specified in the E	requirements specified in the Environmental Authorisation.		
<ul> <li>The appointed ECO must be</li> </ul>	<ul> <li>The appointed ECO must be advised of the construction start date, before any activities</li> </ul>		
commence on site so that the ECO can perform a pre-commencement inspection and plan for			
environmental awareness training of construction workers.			
Porformanco Indicator	A qualified ECO is appointed prior to the commencement of any a	construction activities (includin	g pre-construction set-up
	activities) on site.		

# 8.2 OBJECTIVE 2: DETAILED DESIGN AND SITE LAYOUT PLAN

conditions which may be included	in the Environmental Authorisation.		eport ana any adamonal
Potential impact to avoid	<ul> <li>Substantial deviation from the conceptual layout plan may result in:</li> <li>Non-compliance with the Environmental Authorisation during construction.</li> <li>Triggering of additional listed activities not authorised in the Environmental Authorisation.</li> <li>An increase in the severity of the impacts identified and assessed in the EIA or may result in new impacts not previously</li> </ul>		
Impact Management Outcome	assessed and not provided for in the EMPr, resulting in environme	ental degradation.	
Mitigation measure		Responsible party	Time period
<ul> <li>The final detailed design Environmental Impact Asse</li> <li>The final detailed design Authorisation (EA).</li> <li>If the final detailed design layout must be assessed amended by the Compete</li> <li>Interested &amp; Affected Partie proposed amendment to the ecological input and be de</li> <li>All stormwater infrastructure encroach into the buffer and The following mitigation in considered during detailed</li> <li>Soft infrastructure must be be done via permeable gravel and may contribut</li> <li>Stormwater managed bo ('infiltration channels or be edge of the development (e.g. oils and hydrocarbo reach low points, and re through increased rough</li> </ul>	& layout must adhere to the conceptual layout assessed in the ssment (EIA) process. & layout must adhere to any conditions of the Environmental differs significantly from that assessed during the EIA, the revised by an Environmental Consultant and the received EA must be ent Authority before proceeding. as may need to be provided with an opportunity to comment on any the EA depending on the significance of the changes. e stormwater management plan be developed with appropriate eveloped based on Sustainable Drainage Systems (SUDS). re, must be located within the development footprint and not teas. heasures recommended by the Freshwater Specialist should be design: be considered where practical. For example, permeable surfaces can concrete block pavers (such as Amorflex), brick pavers, stone chip, and the to slowing surface flows (especially if maintained). y the development could be discharged into porous channels / swales basins') running near parallel or parallel to contours within and along the ent. This will provide for some filtration and removal of urban pollutants ons), provide some attenuation by increasing the time runoff takes to educe the energy of storm water flows within the stormwater system ness when compared with pipes and concrete V-drains.	3MP Sales and Education Services / Consulting Engineer	During design phase

•	Frequent stormwater outl protection measures (e.g the surface and located mattresses at pipe outlets into the buffer areas.	lets must be designed to prevent erosion at discharge points. All erosion g. Reno-mattresses) must be established to reflect the natural slope of at the natural ground level. All stormwater infrastructure, such as reno s, must be located within the development footprint and not encroach	
•	• Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development. Also include the placement of stormwater grates (or similar).		
•	The use of grease traps/o stormwater is mandatory Key maintenance will inc of key collection points I responsibility of the relevo	bil separators to prevent pollutants from entering the environment from v. To ensure the efficiency of these, they must be regularly maintained. clude litter and sediment clearing and the servicing and maintenance like catch pits, detention tanks etc. Such maintenance should be the cant owners/estate associations and budgeted for.	
Performar	nce Indicator	Detailed designs and site layout plans that adhere to the conditions of the EA and commencement of construction.	d EMPr are finalised prior to the

# 9. Environmental Impact Management: Pre-construction Phase

Proper set-up during the pre-construction phase can set the foundation for good environmental management during the active construction phase to follow, and can avoid potential impacts from arising at a later date.

The Impact Management Objectives for this phase of the project relate to:

- Demarcation of no-go areas and working areas.
- Establishment of site camp and associated site facilities.
- Pre-construction ECO visit.

#### 9.1 OBJECTIVE 1: IDENTIFY & DEMARCATE NO-GO AND WORKING AREAS

Impact Management Objective: Identify and demarcate no-go areas, working areas and site facilities.			
Potential impact to avoid	<ul> <li>No-Go areas include aquatic habitats and public open space to remain natural.</li> <li>Insensitive location of working areas and site facilities may result in environmental impacts during the construction phase.</li> <li>Failure to accurately demarcate working areas may result in an increased disturbance footprint.</li> <li>Failure to demarcate no-go areas may result in disturbances to these areas during construction.</li> </ul>		
Impact Management Outcome	Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure	Mitigation measure Responsible party Time period		
<ul> <li>The environmentally sensitive areas must be identified and be designated as no-go areas.</li> <li>Demarcation of working area and no-go areas must be done in accordance with Section 8.2 of this EMPr.</li> <li>Site camp facilities must be situated as far away from the No-Go areas as possible.</li> </ul>		Contractor	Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site)
Performance Indicator No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to satisfaction of the ECO, before construction activities commences on site.		iately demarcated to the	

# 9.2 OBJECTIVE 2: ESTABLISH ENVIRONMENTALLY SENSITIVE SITE CAMP & SITE FACILITES

Impact Management Objective: To	set up and equip the site camp and associated site facilities in a mann	er that will promote good envir	onmental management.
Potential impact to avoid	<ul> <li>Inappropriate siting of site camp facilities may result in impacts to sensitive resources</li> <li>Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site.</li> <li>Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management &amp; compromise ability to respond to emergencies.</li> </ul>		
Impact Management Outcome	EMPr are provided on site.	squipment required to implem	ent the provisions of the
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
<ul> <li>The site camp and site facili</li> <li>The site camp and associa the general environmental i</li> <li>The site camp must be strate promote good environmen potential emergencies (incl)</li> <li>The No-Go boundary must be any stage.</li> <li>The site camp, storage facili should be located in such residents and road users as</li> <li>Frequent stormwater outlets</li> <li>It is recommended that the ecological input and be de</li> <li>The contractor shall plan his in so far as possible, can be to possil and other top mate by the ECO. Ensure the stoce</li> </ul>	ities described in Section 8.3 of this EMPr must be provided on site. ted site facilities must be set-up and managed in accordance with management measures specified in Chapter 8 of this EMPr. egically set up, away from freshwater resources, in a manner that will tal management during construction/ demolition, and to respond to uding fires, spillage of hazardous substances etc.) that may arise. be demarcated, and no disturbance may occur past this point during ities, stockpiles, waste bins, and any other temporary structures on site a way that they will present as little visual impact to surrounding possible. s must be designed to prevent erosion at discharge points. he stormwater management plan be developed with appropriate eveloped based on Sustainable Drainage Systems (SUDS). s activities so that materials excavated from borrow pits and cuttings, transported direct to and placed at the point where it is to be used. trial such as boulders must be stored at a stockpile location agreed to ck pile does not exceed the maximum height agreed upon.	Contractor / Developer	Pre-construction phase (prior to start of construction activities)
Performance Indicator	Appropriate, well organised and properly equipped site facilities construction activities. The location and set up of the facilities does n	; are available on site prior ot impact on the natural resou	to commencement of irces.

#### 9.3 OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION

It is essential that the appointed ECO be advised of the intended construction start date before construction activities commence on site, in order for the ECO to conduct an initial site inspection to assess the pre-commencement condition of the site. The ECO can also advise on the appropriate siting and demarcation of the site facilities, and the identification and demarcation of the no-go areas. The ECO may also conduct the first round of environmental awareness training at this stage, if the construction workers are present on site.

Impact Management Objective: El	<ul> <li><u>the commencement Objective</u>: Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site.</li> <li>Failure to appoint ECO or to notify ECO of commencement prior to commencement may result in non-compliance with the EA.</li> </ul>		
Potential impact to avoid	<ul> <li>Failure to appoint ECO or to notify ECO of commencement prior to commencement may result in non-compliance with the EA.</li> <li>If a pre-commencement ECO inspection is not performed, the Construction Contractor may be held liable for environmental degradation that took place prior to the Contractor commencing work on site.</li> </ul>		
Impact Management Outcome	<ul> <li>Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases.</li> <li>Site facilities are appropriately located on site.</li> <li>Construction workers receive environmental awareness training before commencing work on site.</li> </ul>		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• The appointed ECO must be a	dvised of the construction start date, before any activities commence	Contractor	Start of construction
on site so that the ECO can pe	erform a pre-commencement inspection and plan for environmental		phase
awareness training of construc	tion workers.		
Performance Indicator	A pre-commencement site inspection is conducted by the appoint site.	ted ECO before construction of	activities commence on

# 10. Environmental Impact Management: Construction Phase

A number of potential environmental impacts may arise during the construction phase of the development. These impacts have been identified and assessed during the Environmental Impact Assessment process. Environmental Management objectives and actions that will prevent the identified potential impacts from arising – or where avoidance is not possible, that will minimise and mitigate the impacts – are provided in this section.

The environmental management actions and mitigation measures prescribed in this section must be implemented throughout the construction phase, and must be implemented in conjunction with the general management measures specified in Chapter 8 of this EMPr, as well as any other conditions which may be stated in the Environmental Authorisation. The Environmental Control Officer must monitor and enforce the implementation of the relevant environmental management measures, and may provide guidance on the implementation of these environmental management measures as and when required.

#### The environmental management objectives (goals) for the Construction phase are:

- Prevent environmental pollution and contamination of soil
- Limit disturbance of terrestrial ecosystems (fauna and flora)
- Noise impact management
- Dust impact management
- Limit avoidable visual impacts

The environmental management actions that must be implemented in order to achieve the desired objectives and avoid/minimise potential impacts are discussed in more detail in the sections below.

#### 10.1 OBJECTIVE 4: PREVENT POLLUTION AND SOIL

Impact Management Objective: To	act Management Objective: To prevent environmental pollution and contamination of soil		
Potential impact to avoid	<ul> <li>Fuel, oil, lubricant or other pollutants may leak from vehicles/ machinery and contaminate soil, surface water and/or ground water.</li> <li>Spills of hazardous substances may contaminate environment.</li> <li>Chemical toilets may leak.</li> <li>Contaminated run-off from site or site camp facilities may pollute soil.</li> <li>Waste (solid or liquid) from the construction site may be blown or washed into surrounding environment.</li> <li>Contamination of soil or water may impact surrounding and downstream land/water users, biota and livestock.</li> </ul>		
Impact Management Outcome	The environment (including soil, surface water and groundwater) is not contaminated.		
IMPACT MANAGEMENT ACTIONS	APACT MANAGEMENT ACTIONS		
Mitigation measure		Responsible party	Time period

٠	All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural	Contractor	Construction phase
	slope of the surface and located at the natural ground level.		
•	Stormwater exit points must include a best management practice approach to trap any additional		
	suspended solids and pollutants originating from the proposed development. Also include the		
	placement of stormwater grates (or similar).		
Ge	neral Pollution Management:		
٠	No pollution of surface water or ground water resources may occur due to any activity on the site.		
٠	No storm water runoff from any premises containing waste, or water containing waste emanating		
	from construction activities may be discharged into the environment. Polluted stormwater must be		
	contained on the site.		
٠	Stormwater managed by the development is to be discharged into porous channels / swales		
	('infiltration channels or basins') running near parallel or parallel to contours within and along the		
	edge of the development		
٠	Frequent stormwater outlets must be designed to prevent erosion at discharge points.		
Ge	eneral Waste Management:		
٠	Dedicated waste bins or skips must be provided on site and kept in a demarcated area on an		
	impermeable surface.		
٠	Separate waste bins/skips must be provided for recyclable waste, general waste and hazardous		
	waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site		
	camp, or in separate skips until removal.		
٠	Waste must be placed in the appropriate waste bins/skips/ stockpiles.		
٠	Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least		
	110% of the volume of the bins.		
•	Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown		
	waste or dust.		
•	Waste bins/skips must be regularly emptied and must not be allowed to overflow.		
•	Construction workers must be instructed not to litter and to place all waste in the appropriate waste		
	bins provided on site.		
٠	The Contractor must ensure that all workers on site are familiar with the correct waste disposal		
	procedures to be followed.		
•	Waste generated on site must be classified and managed in accordance with the National		
	Environmental Management: Waste Act – Waste Classification and Management Regulations (GN		
	No. R. 634 of August 2013).		

<ul> <li>Disposal of waste to landfill must be undertaken in accordance with the National Environmental Management: Waste Act – National Norms and Standard for the Assessment of Waste for Landfill</li> </ul>	
Disposal (GN No. R. 635 of August 2013).	
• All waste, hazardous as well as general, resulting from the proposed activities must be disposed of	
appropriately at a licensed Waste Disposal Facility (WDF).	
Pollution Management – hydrocarbons (oil, fuel etc.)	
• Vehicles and machinery must be in good working order and must be regularly inspected for leaks.	
• If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate	
location for repair. The ECO has the authority to request that any vehicle or piece of equipment that	
is contaminating the environment be removed from the site until it has been satisfactorily repaired.	
Repairs to vehicles/ machinery may take place on site, within a designated maintenance area at	
the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs.	
Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance	
yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips.	
<ul> <li>Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks.</li> </ul>	
• Drip trays must be placed under generators (if used on site) water pumps and any other machinery	
on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage.	
Where feasible, fuel tanks should be elevated so that leaks are easily detected.	
• A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must be educated on how to utilise the spill kit.	
<ul> <li>Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste.</li> </ul>	
• Spoil or waste material should not be dumped within 50 m of natural areas, it should be discareded at a licensed dump site.	
• The use of grease traps/oil separators to prevent pollutants from entering the environment from stormwater is recommended.	
Pollution Management – Ablution facilities	
• Chemical toilets must be kept at the site camp, on a level surface and secured from blowing over.	
• Toilets must be located well outside of any storm water drainage lines , and may not be linked to the storm water drainage system in any way.	

<ul> <li>Chemical toilets must be regu water disposal/ treatment site.</li> <li>chemical toilets.</li> </ul>	larly emptied and the waste disposed of at an appropriate waste Care must be taken to prevent spillages when moving or servicing	
Pollution Management – Hazardou	s Substances	
<ul> <li>Pollution Management - Hazardoux</li> <li>Any hazardous substances (may be stored according to the my covered, waterproof bunded hyme Material Safety Data Sheets (MS substances to be used on site information on ecological impreduring accidental releases.</li> <li>Hazardous chemicals and fuels capacity to hold at least 110%</li> <li>Cement Batching</li> <li>Cement batching must take ply cement water run-off. If nece constructed to catch the runwater/ slurry has evaporated thy disposed of at an appropriate of the cement batching should take ply bin.</li> <li>Washing of excess cement/comy by must be removed from site and construction works must preference.</li> </ul>	s Substances Iterials, fuels, other chemicals etc.) that may be required on site must anufacturers' product-storage requirements, which may include a housing structure. SDSs) shall be readily available on site for all chemicals and hazardous . Where possible and available, MSDSs should additionally include bacts and measures to minimise negative environmental impacts a should be stored on bunded, impermeable surfaces with sufficient of the capacity of the storage tanks. ace on an impermeable surface large enough to retain any slurry or essary, plastic/ bidem lined detention ponds (or similar) should be off from batching areas. Once the water content of the cement the dried cement should be scraped out of the detention pond and disposal facility authorised to deal with such waste blace on already transformed areas within the footprint of the facility. stored in such a way that they will be protected from rain. Empty ring on the ground and must be disposed of in the appropriate waste ncrete into the ground is not allowed. All excess concrete/ cement d disposed of at an appropriate location. rably take place in drier months of the year when runoff from the	
Performance Indicator	No pollution of the site or contaminated soils	

# 10.2 OBJECTIVE 5: LIMIT DISTURBANCE OF TERRESTRIAL ECOSYSTEMS (FAUNA AND FLORA)

Impact Management Objective: To	) limit disturbance of terrestrial ecosystems (fauna and flora), the entire	e site will be transformed to a	n urban environment, the
mitigation for this impact is therefor	e to maintain an ecological corridor on the norther boundary of the p	roperty	
<ul><li>Destruction of habitat</li><li>Direct mortality of fauna</li></ul>			
	Vibration and noise		
Potential impact to avoid	<ul> <li>Loss of an endangered ecosystem type</li> </ul>		
	Loss of ecosystem services		
	<ul> <li>Loss of ecosystem function, pattern and process</li> </ul>		
	<ul> <li>Loss of distinct biodiversity features</li> </ul>		
Impact Management Outcome	The terrestrial ecosystem of the ecological corridor is not significantly	impacted on as a result of th	e construction activities.
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
An awareness program is to be	run by the ECO in order to prevent the labour force from intentionally	Contractor	Construction phase
killing any faunal species			
<ul> <li>No clearing outside of develop</li> </ul>	oment and infrastructure footprint area to take place.		
An Environmental Control Officer will oversee compliance with all the prescribed environmental			
requirements and mitigation m	easures listed here and will be on site regularly.		
Construction workers must be	sensitised to the fact that fauna (including mammals, snakes, birds,		
tortoises etc.) may be encount	tered on site, and they must exercise due caution to ensure that their		
actions/movements do not imp	pact tauna.		
Any fauna encountered on site	e must be allowed to passively vacate the area. Active relocation of		
fauna like snakes must be a las	t resort, and must only be performed by a person skilled/ experienced		
enough to do so without enda	ngering him/herself or the animal/bird.		
If animals are discovered on site	e during site preparation they are to be relocated or allowed to move		
off the area that is required to	be disturbed without harm;		
Construction workers may not	teed, hunt, trap, poison or shoot fauna on site or in the immediately		
surrounding areas.			
Performance Indicator	<ul> <li>The terrestrial ecosystem of the ecological corridor is not sign activities.</li> </ul>	iticantly impacted on as a i	esult of the construction

# 10.3 OBJECTIVE 6: NOISE IMPACT MANAGEMENT

Impact Management Objective: To	control avoidable noise impacts to the surrounding areas		
Potential impact to avoid	mpact to avoid Avoidable noise generated during the undertaking of construction activities, which may present a nuisance to surrounding community.		
Impact Management Outcome	Avoidable noise impacts are managed efficiently.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
A noise complaints register sho	uld be opened.	Contractor	Construction phase
Excavations and earth-moving	g activities must be restricted to normal construction working hours		
(7:30 – 17:30) as far as possible			
• Work on site must be well-plan	ned and should proceed efficiently so as to limit the duration of the		
disturbance.			
Vehicles and equipment must	be kept in good working condition. If deemed necessary, machinery		
and equipment should be fitted	d with mufflers/ exhaust silencers. No unnecessary disturbances should		
be allowed to emanate from t	he construction site.		
Due to the location of the pro	posed development site to residents, noise levels must be kept to a		
minimum at all times. If exce	ssive noise is expected on the boundary of the residential erven		
bordering the site they must be	informed in advance of when the high noise levels will occur and for		
how long they will occur.			
Workers should be educated a	on how to control noise-generating activities that have the potential		
to become disturbances, parti	cularly over an extended period of time.		
Noise levels must comply with	the relevant health & safety regulations and SANS codes and should		
be monitored by the Health &	Safety Officer as necessary and appropriate.		
Affected parties must be inforr	ned of the excessive noise factors.		
• The noise management and m	nonitoring measures prescribed in the EMPr must be adhered to.		
• The appointed Environmental	Control Officer (ECO) must undertake a site inspection once per		
week, for the duration of the c	construction phase, and to produce a short monthly ECO monitoring		
audit report, auditing on the	compliance of the property developer with the conditions of the		
Environmental Authorisation of	and the approved EMP. The monthly Monitoring Report must be		
submitted to the Directorate ([	DEADP) each month.		
Performance Indicator	Noise levels on site remain within acceptable standards. No valid no	ise complaints are received.	

## 10.4 OBJECTIVE 7: DUST IMPACT MANAGEMENT

Impact Management Objective: To	prevent the generation of significant dust.		
	Dust and wind-blown sand may arise from site during earth-mov	ing and other construction act	ivities.
Detential impract to avaid	<ul> <li>Dust may be generated from cement batching activities.</li> </ul>		
Potential impact to avoid	<ul> <li>Dust may be generated from stockpiles of earth material.</li> </ul>		
	• Dust may smother surrounding vegetation, and may pose a nuis	ance to nearby land occupar	its or land users.
Impact Management Outcome	The surrounding environment, land users, residents do not experience	e significant dust-related impac	ets.
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
Land clearing and earthmovi	ng activities should not be undertaken during strong winds, where	Contractor	Construction phase
possible.			
Cleared areas should be provi	ded with a suitable cover as soon as possible, and not left exposed		
for extended periods of time.			
Stockpiles of topsoil, spoil mate	erial and other material that may generate dust must be protected		
from wind erosion (e.g. covere	ed with netting, tarpaulin or other appropriate measures. Note that		
topsoil should not be covered	with tarpaulin as this may kill the seedbank).		
The location of stockpiles mu	st take into account the prevailing wind direction and should be		
situated so as to have the leas	t possible dust impact to surrounding residents, road-users and other		
land-users.			
Speed limits must be enforced	in all areas, including public roads and private property to limit the		
levels of dust pollution.			
The speed limit should be set a	t 20-40km/h.		
<ul> <li>Dust must be suppressed on ac</li> </ul>	cess roads and the construction site during dry periods by the regular		
application of <u>non-potable w</u>	ater or a biodegradable soil stabilisation agent. Water used for this		
purpose must be used in quan	ities that will not result in the generation of excessive run off.		
Dust suppression measures such	n as the wetting down of sand heaps as well as exposed areas around		
the site must be implemented	especially on windy days.		
The use of straw worked into the straw	ne sandy areas may also help and the ECO must advise when this is		
necessary.			
If dust appears to be a contin	uous problem the option of using shade cloth to cover open areas		
may be necessary or the erec	cting of shade netting above the fenced off are may need to be		
explored.			

All vehicles transporting sand i windblown sand occurring off	need to have tarpaulins covering their loads which will assist in any he trucks.		
Work on site must be well-plane dust concreting material	ned and should proceed efficiently so as to minimise the handling of		
<ul> <li>Material loads should be prope</li> </ul>	erly covered during transportation.		
Dust levels specified in the Nat     be exceeded, i.e. dust fall in	ional Dust Control Regulations (GN 827 of November 2013) may not		
reference method ASTM D1739	;		
A Complaints Register must b complaints that may have bee	be available at the site office for inspection by the ECO of dust		
	Excessive dust does not arise from the site.		
Performance Indicator	• No dust complaints are received from any member of the public	С.	
	• There is no evidence that vegetation surrounding the site is being	g smothered by dust.	

## 10.5 OBJECTIVE 8: LIMIT AVOIDABLE VISUAL IMPACTS

Impact Management Objective: To prevent avoidable visual impacts .				
Pc	tential impact to avoid	The introduction of construction activities and infrastructure of temporarily alter the visual character of the landscape. The curre materials and equipment. This could evoke feelings among local resi	the proposed Tergniet Mixe ent landscape will be inters dents and visitors of a landsc	d-Use Development will persed with construction ape in transition.
Im	pact Management Outcome	The surrounding land users and residents do not experience significat	nt visual impacts.	
IN	PACT MANAGEMENT ACTIONS			
M	tigation measure		Responsible party	Time period
•	Use of Natural Colours and Mate for any temporary structures or environment, where possible.	erials: Use materials and colours that blend with the natural landscape construction materials. Mimic the texture and colours of the natural	Contractor	Construction phase
•	Vegetative Screens: At key poi perimeter may be planted to a	nts of sensitivity, indigenous vegetation around the construction site's ct as a natural screen, reducing the visual impact.		
•	Localised Construction: Focus c out across the entire site sime disturbance at any given time.	construction activities in smaller, localised areas rather than spreading ultaneously. This phased approach can reduce the overall visual		

•	Revegetation for Restoration: Post-construction, prioritise revegetation efforts, especially in areas where native grasslands were disturbed. This can help in restoring the site's original visual character.	
•	Community Engagement: Engage with the local communities, to keep them informed about construction progress and the measures being taken to reduce visual impacts.	
•	Minimise Night-time Activities: Limit construction activities during the night to reduce light pollution, especially given the proximity to residential areas like Tergniet.	
•	Visual Simulations: Before starting construction, provide visual simulations to stakeholders, showcasing the expected changes to the landscape, if feasible. Site Screening: Use natural topography, existing vegetation, or temporary screens to shield construction activities from viewers. Situate construction activities in lower-lying areas or behind hills. Use screens made of materials that blend with the natural environment.	
•	Minimise Structure Heights: Keep temporary structure heights to a minimum to reduce their visibility. Use materials and colours that blend with the surrounding landscape.	
•	Lighting Control: Minimise light pollution by directing lights downwards, using shields to prevent light spill, and turning off lights when not in use.	
•	Strategic Placement: Where possible, prioritise the placement of taller construction equipment and initial construction materials in areas less visible to the majority of residents.	
•	Vegetative Barriers: Enhance and fast-track the planting of native vegetation barriers, especially in areas facing major residential zones, to provide a natural screen.	
•	Informational Signage: Erect informational signboards around the construction site, explaining the project's benefits and duration, to keep residents informed and manage perceptions.	
•	Visual Mock-ups: Share visual mock-ups or simulations with the community, showcasing the expected landscape changes during and post-construction, if feasible. Dust Suppression: Regularly water down the construction site, especially during dry and windy conditions, to minimise dust generation.	
•	Windbreaks: Install temporary windbreaks or barriers around the construction site to reduce the spread of dust.	
•	Vehicle Speed Limits: Implement strict speed limits for construction vehicles within the site to reduce dust kick-up.	

•	Construction Scheduling: Schedule dust-generating activities for times when wind speeds are low or when wind direction is away from sensitive receptors, where possible.				
•	Use of Dust Screens: Install dust screens or barriers around the construction site, particularly in areas close to sensitive receptors, to contain dust within the site.				
•	Rehabilitation of Disturbed Areas: Promptly rehabilitate areas where construction activities have ceased. Re-vegetate with native species or suitable ground cover to stabilise the soil and reduce dust generation.				
•	Regular Monitoring: Implement a monitoring program to assess the effectiveness of dust control measures.				
•	Machinery Maintenance: Ensure construction machinery is well-maintained to minimise excessive noise and vibrations.				
•	Work Hours: Restrict the noisiest construction activities to daytime hours and avoid work during early mornings, late evenings, or weekends when residents are more likely to be at home.				
•	Community Communication: Keep the local community informed about construction schedules, especially during particularly disruptive activities. This allows residents to prepare or adjust their schedules accordingly.				
Pei	erformance Indicator The site appears well managed and organise visual, limiting the visual impact of the construction site.				

# 11. Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase

After all construction activities have ceased, the sites must be cleared of all construction related equipment, materials, facilities and waste. In addition all disturbed surfaces – including disturbed areas around the structures and all areas utilised for site facilities – must be stabilised, rehabilitated and provided with a suitable cover. All temporary access roads constructed must be rehabilitated and access must be restricted from the public.

#### The environmental management objectives (goals) for this phase are:

- Rehabilitate & stabilise disturbed areas, and ensure environmentally sensitive closure of the construction sites.
- Maintain ecological corridor free of alien vegetation.
- Limit Visual Impacts

#### 11.1 OBJECTIVE 9: SITE CLOSURE & REHABILITION

Impact Management Objective: To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.							
Potential impact to avoid		Failure to remove all construction related waste and materials may result in environmental pollution.					
		Failure to remove all construction related equipment, machinery and site facilities may pose an impact to the natural					
		environment specifically the watercourses.					
		• Failure to stabilise disturbed surfaces may result in soil erosion and increased storm water run-off, which may limit					
		successful revegetation of the site.					
Impact Management Outcome		The site is neat and tidy and all exposed surfaces are suitably covered/ stabilised.					
		There is no construction-related waste or pollution remaining on site.					
IMPACT MANAGEMENT ACTIONS							
Mitigation measure			Responsible party	Time period			
On completion of the construc	tion	operations, the site camp area must be cleared of all site camp	Contractor / 3MP Sales and	Rehabilitation phase			
facilities, ablution facilities, fancing, signage, waste and surplus material			Education Services	1			

	facilities, ablution facilities, fencing, signage, waste and surplus material.	Education Services					
٠	Surfaces are to be checked for waste products from activities such as concreting or asphalting and						
	cleared in a manner approved by the ECO.						
٠	Any contaminated soil must be collected and disposed of as hazardous waste.						
٠	All construction waste, litter and rubble are to be removed from the site and re-used elsewhere, or						
	recycled/disposed of at an appropriate facility.						
٠	Burying or burning of waste or rubble on site is prohibited.						
٠	All areas within the working area and site camp that have become devoid of vegetation or where						
	soils have been compacted due to construction activities should be scarified or ripped.						
٠	Topsoil removed during the establishment of the site camp and the working area must be spread						
---	--	--	--	--	--	--	--
	evenly over the entire site camp area and all other disturbed/ exposed areas after those areas have						
	been ripped, scarified, shaped and contoured (as required).						
٠	Where necessary seeding and planting of vegetation can take place after the replacement of the						
	topsoil. Hardy, drought tolerant, non-invasive plant species must be selected. If needed, a layer of						
	mulch can be applied to the newly shaped/ landscaped and topsoiled areas. The mulch will serve						
	to limit erosion and will promote the re-vegetation of the site by retaining moisture in the soil and						
	providing organic material (compost) for new plant growth.						
<ul> <li>Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/aullies that may have developed</li> </ul>							
<ul> <li>All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the ECO, to protect these areas from wind and water erosion. No areas are to be left exposed to</li> </ul>							
	above), the placement of geotextile, onion bags filled with wood chips, brush-packing or other similar measures.						
•	Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must						
	be removed from the site and reused elsewhere on the property or disposed of at an appropriate disposal site.						
•	<ul> <li>Disturbed soils must be revegetated with the local indigenous vegetation such as that which occurs at the site, or provided with other suitable cover.</li> </ul>						
•	<ul> <li>Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised.</li> </ul>						
•	The following mitigation measures proposed by the Freshwater Specialist should be implemented:						
	landowner's responsibility regardless of mitigation associated with this project) and the establishment of indigenous vegetation cover to filter run-off before it enters the freshwater habitat.						
	• The solid domestic waste must be removed and disposed of offsite. All post-construction building material and waste must be cleared in accordance with the EMPr.						
	<ul> <li>Removal of vegetation must only be when essential for the continuation of the project.</li> <li>Do not allow any disturbance to the adjoining natural vegetation cover or soils.</li> </ul>						

0	Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed.	
0	It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.	
0	Alien/ invasive species shall not be stockpiled, they should be removed from site and dumped at an approved site.	
0	Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota.	
0	A monitoring programme shall be in place, not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts such as increased surface runoff. The monitoring should be regular and additional visits must be taken when there is potential risk to watercourses.	
0	The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion.	
0	Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area.	
0	The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater.	
0	Appropriate waste water infrastructure must be designed to prevent any such water from entering the surrounding environment.	
0	Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented.	

<ul> <li>Engage with the homeowners to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. Encourage recreational activities within the buffer area that are not in conflict with water resource management. The community could be involved in the monitoring e.g. the packaging plant effluent.</li> </ul>					
<ul> <li>All construction-related materials, equipment, facilities, waste and contaminated soils have been removed f site.</li> <li>Compacted soils have been scarified/ripped and stabilised.</li> <li>All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised.</li> <li>No alien vegetation is evident on site.</li> </ul>					

#### 11.2 OBJECTIVE 10: MAINTAIN ECOLOGICAL CORRIDOR FREE OF ALIEN VEGETATION.

Impact Management Objective: Maintain ecological corridor free of alien vegetation.						
Potential impact to avoid  • Spread of alien vegetation within the ecological corridor.						
Impact Management Outcome	Alien vegetation is eradicated within the ecological corridor					
IMPACT MANAGEMENT ACTIONS						
Mitigation measure	Mitigation measure Responsible party Time period					
<ul> <li>An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here, and will be on site regularly.</li> <li>Alien plants must be removed from the site as per NEMBA requirements.</li> <li>A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration.</li> </ul>		Developer	Operational phase			
Performance Indicator    No alien vegetation is evident in the ecological corridor.						

#### 11.3 OBJECTIVE 11: LIMIT VISUAL IMPACTS

Impact Management Objective: To prevent avoidable visual impacts .					
	The operational phase of the Tergniet Mixed-Use Development will introduce a new visual element to the landscape. The				
Potontial impact to avoid	presence of this mixed-use infrastructure can alter the visual harmony and the intrinsic sense of place that residents and				
Foremia impact to avoid	visitors associate with the area. The facility will become a permanent feature in the landscape, potentially influencing how				
	the area is perceived and experienced				
Impact Management Outcome	The surrounding land users and residents do not experience significant visual impacts.				
IMPACT MANAGEMENT ACTIONS					

Mi	tigation measure	Responsible party	Time period
•	Vegetative Screening: Plant indigenous trees and shrubs along site boundaries, especially near major roads, to create natural visual buffers and blend the development into the surrounding landscape.	Contractor	Construction phase
•	Landscape Integration: Use materials, textures, and colours that reflect the local architectural styles to harmonise with the surrounding environment and maintain a sense of place.		
•	Lighting Control: Employ downward-facing, low-glare lighting systems with motion sensors to minimise light pollution and preserve the area's nighttime character.		
•	Seasonal Landscaping Maintenance: Implement an ongoing maintenance program to ensure that the landscaped areas remain in good condition, reflecting seasonal changes and preventing visual degradation.		
•	Vegetative Buffers: Plant indigenous vegetation along site boundaries adjacent to residential areas to reduce direct visibility of infrastructure and enhance visual screening.		
•	Architectural Integration: Utilise materials and colours that complement the local landscape, minimising visual contrast and promoting architectural harmony.		
•	Lighting Control: Employ downward-facing, low-glare lighting systems with motion sensors to minimise light pollution and preserve the area's nighttime character.		
٠	Vegetative Screening Guidelines for Mixed-Use Developments		
To fol co <sup>,</sup>	effectively integrate mixed-use developments into the surrounding landscape and minimise their visual impact, the lowing vegetative screening guidelines should be implemented. These guidelines outline appropriate vegetation heights, verage requirements, and planting arrangements based on building height.		

Building Height		Recommended Vegetation Height	Minimum Coverage (%)	Screening	
Single-storey (≤4m he	eight)	Shrubs/trees of 1m+ height	20 – 30% of length	the façade	
Double-storey (4m height)	– 8m	Trees of 1.5m+ height	25 – 35% of length	the façade	
Three-storey (8m - height)	– 12m	Trees of 3m+ height	30 – 40% of length	the façade	
Larger Developments height)	s (≥12m	Trees of 5m+ height, with layered understory shrubs	40% of the faça	le length	
Planting Arrangements	and Dens	ity			
Tree Spacing: Tr	ees shou	ld be planted at 3m – 5m intervals, depend	ling on canopy sp	read.	
Shrub Placemer	nt: Dense	shrubs should be planted at 1m – 1.5m int	ervals to provide	lower-level s	creening.
Multi-Layered B screening effect	Multi-Layered Buffering: A combination of tall trees, mid-sized shrubs, and ground cover should be used to maximise screening effectiveness.			used to maximise	
Hedge Rows fo structures.	Hedge Rows for Additional Screening: Fast-growing hedge species can provide immediate coverage for lower structures.			overage for lower	
Minimum Veget	Minimum Vegetative Buffer Width: A 5m-wide vegetated buffer should be maintained along property boundaries.			erty boundaries.	
Maintenance Considerat	tions				
Regular Pruning and Trimming: Trees and shrubs should be maintained to prevent overgrowth while ensuring effective screening.			th while ensuring		
Vegetation Replaced aging, or diseas	Vegetation Replacement Strategy: A replanting plan should be established to manage plant loss due to weather, aging, or disease.			s due to weather,	
Soil and Water healthy vegetat	Conservation grow	ation Measures: Mulching and appropriat th.	e irrigation shou	ld be implem	ented to support
These guidelines ensure that mixed-use developments are effectively integrated into the landscape while reducing their visual impact through structured vegetative screening.					

•	Downward-facing Lights: Use f preserving the night sky.	ixtures that direct light downwards to minimise upward light spill,		
•	Motion Sensors: Install motion se duration of light emissions.	ensors so that lights are only activated when necessary, reducing the		
<ul> <li>Low-intensity Lighting: Opt for low-intensity lighting that provides sufficient illumination for safety without being overly bright.</li> </ul>				
•	Shielding: Use shields on lights to unintended areas.	o direct illumination to the intended areas and prevent light spill into		
•	<ul> <li>Educate Staff: Ensure that staff are aware of the importance of minimising light pollution and are trained to use lighting efficiently.</li> </ul>			
•	Periodic Reviews: Conduct pe unnecessary light emissions.	eriodic reviews of lighting practices to identify and rectify any		
Pe	Performance Indicator The site appears well managed and organise visual, limiting the visual impact of the construction site.			

#### 12. Emergency Preparedness

#### 12.1 Emergency response procedures

The potential environmental risks that may arise as a result of construction activities, or during the maintenance of the structures must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario. Potential environmental emergencies that require an emergency response include, but are not limited to, unplanned fires, sewage spills, spills of hazardous chemicals, snake bites etc.

- The construction contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents.
- The ECO, the contractor and the Holder are responsible for ensuring that all construction workers are aware of the emergency procedures, and are properly trained on how to identify and respond to an emergency incident during construction.
- An emergency procedure must clearly indicate who will take charge during an emergency, and the roles and responsibilities of workers and authorities during an emergency.
- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (OHSA) are adhered to during the construction phase. The Holder is responsible for ensuring compliance with the OHSA during the undertaking of maintenance activities.

#### 12.2 Emergency preparedness

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and operational phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training, and advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on site during construction and maintenance activities (see section 8.3).
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. During the operational phase of the development, the Holder is responsible for notifying the relevant authorities of any pollution incidents that arise as a result of maintenance activities.
- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

#### 13. Method statements

The Competent Authority and/or the ECO may require the Holder or Construction Contractor to submit Method Statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity, if the activity is causing or may cause significant environmental damage, or pose a health and safety risk.

Method Statements need not be complex and lengthy, but must clearly state **how**, **when** and **where** the activity concerned will be undertaken, and must specify **who** will be responsible for undertaking each component of that activity. Method Statements must be prepared by the Construction Contractor and submitted to the ECO for approval before undertaking the activity concerned.

The ECO and / or Competent Authority have the authority to request method statements for activities, including but not limited to:

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Fire Control & Fire Emergency Plan.
- Emergency preparedness plan / emergency response procedure (see Chapter 14).
- Post-construction rehabilitation.

The ECO has the authority to prevent activities from being undertaken until such time as a satisfactory Method Statement has been submitted to the ECO and approved by the ECO.

#### 14. Roles and Responsibilities

This EMPr, once approved by the competent authority (DEA&DP), must be seen as binding to the Holder, and any person acting on the Holder's behalf, including but not limited to agents, employees, associates, contractors and service providers.

The Holder and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

#### Duty of Care:

"Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment"

#### 14.1 Duties and Responsibilities of the Holder

The Holder is ultimately responsible for ensuring that the environmental management measures specified in this EMPr, as well as any other conditions specified by the competent authority, are implemented and

adhered to during the construction and operational phase (maintenance activities) of the proposed development.

The Holder or delegated party is responsible for monitoring and maintenance during the operational phase. The Holder must ensure that all appointed service providers, contractors and maintenance workers are capable of complying with all statutory requirements of this EMPr and the conditions of the Environmental Authorisation. The Holder is responsible for ensuring that this EMPr and the conditions of the Environmental Authorisation are implemented and adhered to during construction.

The Holder or appointed consultant is responsible for identifying emergency situations that may arise during operational and maintenance activities, and must formulate appropriate emergency response procedures for these emergency scenarios.

#### 14.2 Duties and Responsibilities of the Contractor

The "Construction Contractor" is the entity responsible for undertaking the physical construction of the residential development. The construction contractor is responsible for ensuring that all environmental management measures specified in this EMPr and in the EA are implemented during the preconstruction, construction and post-construction rehabilitation phases, unless agreed otherwise with the Holder. The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring effective environmental management during construction. The contractor must therefore make adequate financial provision\_for the implementation of all prescribed measures.

It is strongly recommended that the Construction Contractor appoint an Environmental Site Officer (ESO), who will act as the Contractor's representative to monitor and enforce compliance with the conditions of this EMPr, throughout all phases of construction.

In addition to the above, the Construction Contractor is responsible for the following:

- Identify emergency situations that may arise as a result of construction activities, and formulate appropriate emergency response procedures.
- Ensure that all construction workers, including sub-consultants and service providers, undergo environmental awareness training prior to commencing work on site, or as soon as possible thereafter.
- Compile the required method statements, which must be to the satisfaction of the ECO, before commencing with the activity to be governed by the method statement.
- Respond to concerns or issues identified by the ECO, as relates to environmental management, and implement the appropriate management or remediation measures, at the Contractor's own expense (unless agreed otherwise)
- Should third parties be called to the site to perform clean up and rehabilitation procedures, the Construction Contractor will be responsible for all associated costs.

Note that failure to comply with the requirements and conditions of this EMPr and the Environmental Authorisation may result in fines or other penalties being levied against the Construction Contractor by the Competent Authority.

#### 14.3 Duties and Responsibilities of the ECO

The appointed Environmental Control Officer (ECO) is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction

rehabilitation phases. The ECO is not required to monitor the site during the operational (maintenance) phase of the development.

#### 14.3.1 Competency of the ECO

The ECO must be independent of the Holder, Engineer, Construction Contractor and their service providers. The appointed ECO must be suitably qualified and experienced, and must be able to demonstrate that he / she is of sufficient competency to undertake the required task. The ECO must preferably be a resident in close proximity to the development area to ensure quick response if required. The ECO must work in close co-operation with the Construction Contractor, resident engineer or ESO (where applicable) and all contractors in order to identify potential problems before they occur, and provide suitable guidance as to how the identified problems (environmental impacts) can be avoided.

#### 14.3.2 Duties of the ECO

The duties of the ECO include, but are not limited to:

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo);
- Conduct environmental awareness training;
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development;
- Evaluate the achievement of the performance indicators associated with each impact management objective specified in this EMPr;
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Provide guidance as and when required regarding the implementation of the environmental management measures contained in the EMPr and EA, so as to assist the Holder and contractor in remaining compliant with these measures;
- Assist in finding environmentally acceptable solutions to construction problems;
- Ensure that the working areas, site camp facilities, access roads and no-go areas are properly demarcated;
- Ensure that proper topsoil management practices are adhered to on site;
- Ensure that proper waste management & pollution prevention strategies are practised on site;
- Examine method statements, where required;
- Recommend additional environmental protection measures, should this be necessary;
- Furnish contractors with verbal warnings in case of contravention of the EMPr;
- Recommend that the competent authority furnish errant contractors with predetermined fines, when verbal and / or written warnings are ignored;
- Ensure satisfactory rehabilitation of disturbed areas on site, after construction is complete;
- Keep detailed records of all site activities that may pertain to the environment, and produce compliance-monitoring reports (ECO Reports) for submission to the Holder, and the Competent Authority at regular intervals during the construction phase;
- Submit a final post-construction inspection report, within 6 months of completion of the construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.
- All ECO Reports and Inspection Reports must be submitted to the Holder and Competent Authority.

#### 14.3.3 Frequency of ECO visits

The ECO must conduct one site visit every week during the initial site clearance and Civil services installations of the construction phase. Once the site footprint has been established and bulk earthworks are completed the ECO may reduce the frequency of visits to once per month.

The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

The ECO must also undertake a final inspection (audit) 6 months after completion of construction activities. The purpose of this final inspection is to ensure that the rehabilitation measures applied at the conclusion of the construction phase have been sufficient to promote the successful rehabilitation of the site, and to identify any further issues that require attention or follow-up.

#### 14.3.4 Authority of the ECO

The ECO has the authority to recommend to the authorities that they suspend all works (or part thereof) occurring on site, should any action being undertaken on site not comply with the environmental requirements, and where such actions pose a serious threat to any element of the surrounding environment.

The ECO has the authority to issue instructions to the Construction Contractor and/or Holder, regarding measures that must be implemented on site in order to ensure compliance with the EMPr and Environmental Authorisation, and/or to prevent environmental degradation or pollution from occurring.

The ECO has the authority to issue verbal and written warnings to contractors. Should verbal and written instructions and/or warnings be ignored, the ECO has the authority to request the Competent Authority to issue pre-determined fines or other penalties.

The ECO has the authority to report incidents of non-compliance to the Competent Authority at any time.

#### 15. Environmental Awareness Plan

Environmental Awareness Training must be conducted prior to the commencement of construction activities. It is the holder's responsibility to familiarise himself/herself with the content and requirements of this EMPr. The holder is also responsible to ensure that the contractor and all labourers working on site during the construction phase are familiar with the content of this EMPr.

The following actions must be taken to ensure that all relevant parties are aware of their environmental role and duties:

- 1. This EMPr must be kept on site at all times.
- 2. The provisions of this EMPr and the conditions of the Environmental Authorisation must be explained in detail to all staff during Awareness Training.
- 3. Training booklets will be handed out to all labourers and must be explained to them.
- 4. Weekly checks to be done by the Holder's environmental representative who must be on site at all times.
- 5. The ECO to conduct frequent site visits.

6. Monthly monitoring reports to be compiled by the ECO. These reports will be circulated to all parties involved (including the holder, contractor and the competent authority).

The Construction Contractor must make allowance for all construction site staff, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing any work on site. During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. Other items relating to sound environmental management which must be discussed and explained during the environmental awareness training sessions include:

- The demarcated "No-Go" areas;
- General do's and don'ts of the site;
- Making of fires;
- Waste management, use of waste receptacles and littering;
- Use of the toilets provided;
- Use and control of construction materials and equipment etc.;
- Control, maintenance and refuelling of vehicles;
- Methods for cleaning up any spillage;
- Access and road safety;
- Emergency procedures (e.g. in case of fire, spillage etc.)
- General "best practice" principles, with regards to the protection of environmental resources.

Environmental awareness training and education must be ongoing throughout the construction phase, and must be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators must be utilised where needed.

#### 16. Monitoring, Record Keeping and Reporting

#### 16.1 Environmental Auditing

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), the holder of the Environmental Authorisation must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The holder is responsible for appointing, managing and remunerating the appointed auditor. The auditor may not be the appointed Environmental Control Officer (ECO), or the EAP.

The appointed auditor must undertake regular environmental audits, at a recommended frequency of every 12 months. Following each audit the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP).

- Environmental auditing and environmental audit reports must adhere to the requirements of the amended 2014 Environmental Impact Assessment Regulations, in particular Section 34 (Auditing of Compliance with Environmental Authorisation, Environmental Management Programme) and (Objective and Content of Environmental Audit Report)
- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr, and must also comment on the

ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.

• Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

#### 16.2 Construction phase monitoring, reporting and record keeping

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals during the construction phase, in order to ensure that the provisions of this EMPr and the Environmental Authorisation are adhered to and that sound environmental management is ensuing on site.

The ECO must compile a monthly ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Holder and to the Competent Authority is so requested by that authority. The ECO inspection reports must include both photographic and written records.

#### 16.2.1 ECO Inspections - Photographic Records

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs must be taken at these sites during each ECO inspection. Where necessary, the entire working area must be well documented and photographed.

#### 16.2.2 ECO Inspections - Written Records

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO must complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Holder, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month, and must highlight the key concerns/ issues on site, instances of non- compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority must request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations must be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents must also be recorded.

- A complaints register must be kept on site in which complaints by any member of the public must be logged.
- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.
- 16.2.3 Construction Phase Record Keeping

A copy of the approved EMPr, the Environmental Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities. The ECO Reports must be retained by the Holder for a period of at least 5 years, and must be provided to the Competent Authority upon request. Attached as Appendix 6 find the Environmental Authorisation.

#### 17. Penalties, Claims and Damages

The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring that all procedures required to rehabilitate the site are implemented. If third parties are called to the site to perform clean up and rehabilitation procedures, the contractor will be responsible for all costs. The competent authority may impose penalties on the Holder or any of the contractors if conditions contained in this EMPr are contravened. This would be based on an agreement or contract between the Holder and the contractor.

Penalties could be imposed In terms of Chapter 11 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, and would be applicable for any action which leads to damage to the natural environment. Please note that the payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In cases where severe environmental damage occurs, the competent authority law enforcement division may take legal action against the responsible parties. The reasons for this could include, among others:

- Not implementing the conditions of the EMPr;
- Spillage that result in environmental damage;
- Incorrect handling and storage of construction materials and chemicals;
- Sensitive areas that are not clearly demarcated;
- Performing ablutions in areas other than facilities provided for such actions; and
- Occurrence of unattended and out of control fire.

With specific regard to the excavations through the forested area the following will apply. The contractor will be responsible to pay the following penalties should indigenous trees or vegetation which are in no go areas or being protected by barrier or danger tape be damaged by anyone under his/her employ.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO to issue the contractor with penalty / fine as described in the following section.

The following fine structure shall apply:

Any vehicles, plant, or thing related to the Contractors operations within	R 1,000.00
the designated boundaries of a "no-go" area	
Any vehicle being driven, and items of plant or materials being parked or	R 1,000.00
store outside the demarcated boundaries of the site	
Persons walking outside the demarcated boundaries of the site	R 100.00
Persistent and un-repaired oil leaks from machinery. The use of	R 1,000.00
inappropriate methods of refuelling such as the use of a funnel rather	
than a pump	
Littering of site by individuals	R 250.00
Deliberate lighting of illegal fires on site	R 1,000.00
The eating of meals on site outside the defined eating area. Individual	R 250.00
not making use of the site ablution facilities	
No on-site implementation of waste management system.	R 1000.00
Waste not collected and contained immediately.	R 1000.00
No recycling of waste.	R 1000.00
Burning, burying or disposing of waste other than as prescribed.	R 1000.00
Waste not disposed of at an approved landfill.	R 1000.00
Chemicals and / or waste spilled on ground.	R 250.00
Use of other areas for toilet purposes and / or disposal of chemicals /	R 250.00
waste.	
Stockpiling of soil in an unspecified area.	R 2500.00
Stockpiles not located and aligned so as to minimise impacts.	R 2500.00
Spilling of soil or construction material into water body or stream.	R 1000.00

#### Table 2:Offences that may constitute a fine.

The above does not absolve the transgressor from being prosecuted in terms of the **National Environmental Management Act (Act 107 of 1998)** which may result in further penalties and other actions by State Departments.

#### 18. Conclusion

The recommendations and mitigation measures prescribed in this EMPr have been formulated with the intention of addressing potential pre-construction, construction and operational phase impacts on the environment. It is likely that if the conditions, requirements and recommendations of the above EMPr are implemented as described and the relevant stakeholders adhere to the various mitigation measures, then the project will be completed without unforeseen negative environmental impacts.

Familiarity with the contents of this EMPr by the contractors and other individuals involved in the development project will assist in achieving "environmental best-practice", which ultimately ensures that the project arrives at a sustainable outcome.



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# ENVIRONMENTAL AWARENESS TRAINING BOOKLET

Environmental Impact Assessments
Basic Assessments
Environmental Management Planning
Environmental Control & Monitoring
Public Participation
Broad scale Environmental Planning



## Environmental Monitor's Foreword

SES is here to ensure that everyone complies with the conditions of "Duty to Care". If these conditions are not complied with the project can be stopped and fines can be issued.

We hope that with your co-operation the project won't be stopped and fines won't be issued, and a successful project can be finished on time.

## Notes:

- Workers working on this project must undergo environmental training.
- The information contained in this document should be used during day-to-day activities.

# HOW IS THIS PROJECT IMPLEMENTING ENVIRONMENTAL MANAGEMENT?

This project is implementing Environmental Management on an ongoing basis throughout the duration of the project. The following aspects would be implemented to achieve the above stated:

- A dedicated Environmental Manager or Environmental Control Officer appointment to the project to implement and monitor Environmental Management.
- Regular environmental inspection on the site.
- Regular environmental training for workers
- Environmental audits on a regular basis.

## WASTE TREATMENT

#### Refuse:

- Refuse waste includes: waste food, food containers, packaging materials, cans, bottles, newspapers and magazines.
- Day to day household waste should always be disposed of in the containers provided on site by the company.
- No dumping of waste anywhere other than in the bins provided.
- No burning of refuse.
- If there are not enough refuse containers on site, the ECO or supervisor needs to be informed.

#### **Construction Waste:**

- Construction waste includes: concrete, steel, cement, rock, pre-coated chips, wood, plastic, empty bags and rubble.
- Construction waste must be discarded in skips located in strategic areas for removal.
- Construction waste must not be discarded in holes or burned on site.

- Small amounts of construction waste should be collected and not discarded into vegetation or down fill slopes.
- Material should only be spoiled if a rehabilitation plan has been designed for the area.

#### Liquid waste:

- Liquid waste includes: concrete, paint, thinners, diesel, hydraulic fluids, cooking oil, chemicals, other fuel and sewage.
- Use facilities provided for waste.
- The liquid waste should be recycled as far as possible.
- Use chemical toilets and ablution facilities.

## INFORM THE ENVIRONMENTAL CONTROL OFFICER (ECO) IMMEDIATELY OF ANY IMMEDIATE OR POTENTIAL ENVIRONMENTAL INCIDENT.

## SPECIFIC ENVIRONMENTAL ISSUES

## SPESIFIEKE OMGEWINGSKWESSIES IMIBA ETHILE YEZOBUME BEMEKO YENDALO

The basic Do's and Don'ts towards environmental awareness are as follows:

Die basiese Moets en Moenies van omgewingsbesinning is as volg:

Oondoqo bo mawukwenze no mawungakwenzi kwilinge lezobume be meko yendalo bume ngoluhlobo:

## Toilet Facilities: *Toilet Fasiliteite:* Izindlu Zangasese:

DO:

USE THE TOILET FACILITIES PROVIDED - REPORT FULL FACILITIES **MOET:** GEBRUIK MAAK VAN TOILET FASILITEITE WAT VOORSIEN WORD – RAPPORTEER AS FASILITEITE VOL IS **OMAWUKWENZE:** SEBENZISA IZINDLU ZANGASESE EZIBONELELWEYO- NIKA INGXELO NGAMALUNGISELELO AGCWELEYO.

#### DO NOT:

USE THE BUSH **MOENIE:** DIE BOS GEBRUIK NIE **OMAWUNGAKWENZI:** UKUSEBENZISA ITYHOLO.







## Vehicles operation and maintenance: Voertuig werking en onderhoud: Ulawulo nophatho lezithuthi:

DO:

ENSURE THAT VEHICLES AND MACHINERY DO NOT LEAK FUEL OR OILS. REFUELLING, MAINTENANCE, SERVICING OR WASHING MUST BE DONE WITHIN THE DESIGNATED AREA IN THE CONSTRUCTION CAMP AREA ONLY.

### MOET:

VERSEKER DAT VOERTUIE EN MASJINERIE NIE OLIES OF BRANDSTOF LEK NIE. VOLMAAK, ONDERHOUD, DIENS OF SKOONMAAK VAN VOERTUIE MOET SLEGS IN AANGEWYSTE AREAS IN DIE KONSTRUKSIE KAMP GESKIED.

OMAWUKWENZE: QINISEKISA IZITHUTHI NOMATSHINI ABAVUZI MAFUTHA OKANYE OYILE. UKUGALELA. UKUPHATHA. UKULUNGISA OKANYE UKUHLAMBA KUFUNEKA **KWENZIWE** OTYUNJIWEYO KWINKAMPI YOLWAKHIWO KUMMANDLA KUPHELA NGOKUKHAWULEZILEYO.

## DO:

REPORT ALL FUEL OR OIL SPILLS IMMEDIATELY & STOP THE SPILL CONTINUING.

#### MOET:

RAPPORTEER ENIGE BRANDSTOF OF OLIE STORTE & VERHOED DAT DIE STORT AANHOU.

**OMAWUKWENZE:** NIKA INGXELO NGE OLI NAMAFUTHA ACHITHEKILEYO, UZE UNQANDE UCHITHEKO LUNGAQHUBEKI.

## DO:

PREVENT CONTAMINATION OR POLLUTION OF STREAMS AND WATER CHANNELS.

## MOET:

VERHOED DIE KONTAMINASIE EN BESOEDELING VAN STROME & WATERKANALE.

**OMAWUKWENZE :** NQANDA USULELEKO OKANYE UNGCOLISEKO LWEMILAMBO NEMISELE YAMANZI.

## DO NOT:

ALLOW WASTE, LITTER, OILS OR FOREIGN MATERIALS INTO THE STREAM

## MOENIE:

TOELAAT DAT AFVALPRODUKTE, GEMORS, OLIES OF VREEMDE MATERIALE IN STROME BELAND NIE.

**OMAWUNGAKWENZI:** MUSA UKUVUMELA INCITHO, ULAHLO, IOYILE OKANYE EZINYE IZINTO EMILANJENI.









## Fire Control: *Vuur Beheer:* Ulawulo Lemililo:

## DO:

DISPOSE OF CIGARETTES AND MATCHES CAREFULLY. (Littering is an offence.)

### MOET:

GOOI SIGARETTE & VUURHOUTJIES OP GEPASTE MANIER WEG WEG (rommelstrooi is 'n oortreding)

**OMAWUKWENZE:** LAHLA ISIGARETE NOOMATSHISI NGONONOPHELO (ukulahla lityala).

## DO:

ENSURE A WORKING FIRE EXTINGUISHER IS IMMEDIATELY AT HAND IF ANY "HOT WORK" IS UNDERTAKEN e.g. welding, grinding, gas cutting etc.

### MOET:

VERSEKER DAT 'N WERKENDE BRANDBLUSSER BYDERHAND IS INDIEN "WARM WERK" GEDOEN WORD bv. Sweiswerk.

**OMAWUKWENZE:** QINISEKISA ISICIMA-MLILO ESISEBENZAYO SISESANDLENI UKUBA KUKHO UMSEBENZI "OTSHISAYO" OWENZIWAYO, umz. ukuwelda, ugubo, ukuqhawula ugesi, njl.

## DO NOT:

MAKE ANY FIRES **MOENIE:** ENIGE VURE MAAK OF ENIGEIETS VERBRAND NIE **OMAWUNGAKWENZI:** UKWENZA IMILILO OKANYE UTSHISE NOKUBA YINTONI.









## Fencing and Restricted Areas: *Omheining en Beperkte Areas:* Ubiyelo Nemimanndla Engavumelekanga:

#### DO:

CONFINE WORK AND STORAGE OF EQUIPMENT TO WITHIN THE IMMEDIATE WORK AREA.

#### MOET:

BEPERK ALLE WERK EN STOOR VAN GEREEDSKAP TOT IN DIE GEGEWE WERKAREA.

**OMAWUKWENZE:**GCINA UMSEBENZI NEZIXHOBO ZOKUSEBENZA NGAKUMMANDLA OKUSETYENZELWA KUWO.

## DO NOT:

ENTER ANY FENCED OFF OR MARKED AREA. SUCH AREAS HAVE BEEN MARKED WITH "NO-GO AREA" SIGNS AND SHOULD BE ADHERED TO.

#### **MOENIE:**

ENIGE OMHEINDE OF GEMERKTE AREAS BINNEGAAN NIE. SULKE AREAS IS MET "NO-GO AREA" TEKENS GEMERK EN MOET GEHOORSAAM WORD.

**OMAWUNGAKWENZI:** MUSA UKUNGENA KWI NDAWO EBIYIWEYO OKANYE EPHAWULWEYO. IMIMANDLA ENJALO IPHAWULWE NGAMAGAMA ATHI " **NO-GO AREA**".







## Safety: *Veiligheid:* Ukhuseleko:

DO:

USE ALL SAFETY EQUIPMENT AND COMPLY WITH ALL SAFETY PROCEDURES.

### MOET:

GEBRUIK ALLE VEILIGHEIDSGEREEDSKAP EN VOLDOEN AAN ALLE VEILIGHEIDS PROSEDURES.

**OMAWUKWENZE:** SEBENZISA ZONKE IZIXHOBO ZOKHUSELEKO, UZE UTHOBELE YONKE IMIGAQO YOKHUSELO.



## Driving and Dust: Bestuur en Stof: Uqhubo Nothuli:

## DO:

DRIVE ON DESIGNATED ROUTES ONLY. **MOET:** NET OP AANGEWYSTE ROETES BESTUUR. **OMAWUKWENZE:** QHUBA KWIMIMANDLA EPHAWULWEYO KUPHELA.

### DO NOT:

SPEED OR DRIVE RECKLESSLY **MOENIE:** JAAG OF ROEKELOOS BESTUUR NIE. **OMAWUNGAKWENZI:** SUKUQHUBA NGESANTYA ESIPHEZULU OKANYE NGOKUNGAKHATHALI.

#### DO NOT:

ALLOW CEMENT TO BLOW AROUND. **MOENIE;** TOELAAT DAT SEMENT WEGWAAI NIE. **OMAWUNGAKWENZI:** MUSUKUVUMELA ISAMENTE ISASAZWE.

DO NOT: CAUSE EXCESSIVE DUST MOENIE: OORDREWE STOF VEROORSAAK NIE.



## Vegetation protection: *Plantegroei Beskerming:* Ukhuselo Lwezityalo:

#### DO NOT:

DAMAGE OR REMOVE ANY VEGETATION WITHOUT DIRECT INSTRUCTION.

#### MOENIE:

ENIGE PLANTEGROEI SONDER DIREKTE INSTRUKSIE BESKADIG OF VERWYDER NIE.

**OMAWUNGAKWENZI:** MUSA UKUTSHABALALISA OKANYE USUSE NASIPHINA ISITYALO NGAPHANDLE KOMYALELO.



## Animals: *Diere:* Izilwanyana:

## DO NOT:

INJURE, CAPTURE/SNARE, FEED OR CHASE ANIMALS – this includes birds, frogs, snakes, lizards, tortoises, etc. **MOENIE:** 

ENIGE DIERE BESEER, VANG, VOER OF JAAG NIE – dit sluit in: voëls, paddas, slange akkedisse, skilpaaie ens.

**OMAWUNGAKWENZI:** MUSA UKWENZAKALISA, UKUBAMBA, UKONDLA OKANYE UKULEQA IZILWANYANA- okuquka iintaka, amasele, iinyoka, amacilikishe, izikolopati.

## DO:

REPORT ANY INJURY OF AN ANIMAL. **MOET:** 

DIE BESERING VAN 'N DIER RAPPORTEER.

OMAWUKWENZE: XELA NASIPHI ISENZAKALO SESILWANYANA.



#### Preventing Pollution: Voorkoming van Besoedeling: Ukhuselo Longcoliseko:

### DO:

CLEAR YOUR WORK AREAS OF LITTER AND BUILDING RUBBLE AT THE END OF EACH DAY – use the waste bins provided and ensure that litter will not blow away.

#### MOET:

RUIM NA ELKE DAG DIE WERK AREA OP EN GOOI ENIGE ROMMEL WEG IN DIE GEGEWE HOUERS – maak seker dat rommel nie kan wegwaai nie.

**OMAWUKWENZE:** COCA INDAWO OSEBENZA KUYO, IZINTO EZILAHLIWEYO NENKUNKUMA YOKWAKHA QHO EKUPHELENI KWEMINI-sebenzisa imigqomo yenkunkuma uze uqiniseke ukuba inkunkuma ayivuthuzwa ngumoya.

#### DO NOT:

ALLOW WASTE BINS TO OVERFLOW OR WASTE TO BLOW AROUND.

#### MOENIE:

TOELAAT DAT ROMMELHOUERS OORVLOEI OF DAT ROMMEL ROND WAAI NIE.

**OMAWUNGAKWENZI:** MUSA UKUVUMELA IMIGQOMO YENKUNKUMA IGCWALE KAKHULU OKANYE INKUNKUMA ISASAZEKE.

## DO NOT:

LITTER OR LEAVE FOOD LAYING AROUND *MOENIE:* 

ROMMEL OF KOS LAAT RONDLÊ NIE.

**OMAWUNGAKWENZI:** MUSA UKUNGCOLISA OKANYE USHIYE UKUTYA KULELE INDAWO YONKE.

## DO NOT:

BURY ANY LITTER OR WASTE IN THE GROUND. **MOENIE:** ENIGE ROMMEL OF GEMORS IN DIE GROND BEGRAWE NIE. **OMAWUNGAKWENZI:** MUSA UKUNGCWABA INKUNKUMA EMHLABENI.









# CURRICULUM VITAE

# MICHAEL JON BENNETT

#### PERSONAL

**Profession:** Principle Environmental Assessment Practitioner and Senior Environmental Control Officer, Sharples Environmental Services cc, George

Nationality: South African

Date of Birth: 22 October 1985

Languages: English (read, write and speak) & Afrikaans (read, write and speak)

Marital Status: Single

Drivers License: Code B

Health: Excellent

EAPASA Reg: 2021/3163

IAIASA Membership: 7334

#### WORK EXPERIENCE

**2014 – Present:** Sharples Environmental Services cc, George, WC Environmental Assessment Practitioner

I have gained extensive experience in assessments and monitoring and have worked on a variety of multidisciplinary projects and am proficient in:

- Basic Assessments Reports
- Water Use Authorisation Applications
- Environmental Monitoring and Reporting
- Environmental Management Programmes
- Environmental Control Officer Training
- Conducting Outeniqua Sensitive Coastal Area licensing applications

**2016 – 2017:** Sharples Environmental Services cc, Cape Town, WC *Intrim Office Manager, Environmental Assessment Practitioner* 

**2011 – 2014:** Peninsula Permits & NCC Group, Cape Town, WC *Environmental Control Officer* 

Environmental Monitoring

#### TERTIARY EDUCATION

2010

University of Cape Town

 I hold a Bachelor of Science Degree specialising in Environmental and Geographic Science & Ocean and Atmospheric Science 2023 George Urban Country Estate (Pty) Ltd
Basic Assessment Report for the proposed residential development on erf 19374 (remainder erf 6182, erven 6179 and 6156), George, Western Cape

2023GeorgeGeorge Municipality

 Basic Assessment Report for the Upgrading of the Eden Pumpstation, George, Western Cape

2023 Mossel Bay Paprenax Trading 6 cc
Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the proposed establishment of a filling station and associated business infrastructure on a portion of erf 13996, Kwanonqaba, Mossel Bay, Western Cape

2023 George George Municipality
Basic Assessment Report for proposed upgrade of the Schaapkop Pumpstation rising main on remainder of erf 464 and erf 13486, George, Western Cape

2023 George Garden Route Gateway Plaza
Basic Assessment Report for proposed mixed-use development on portions 278 and 282 of farm Kraaibosch no. 195, George, Western Cape

**2023** George George Municipality

 Basic Assessment Report for proposed development of a Photovoltaic Solar Plant on erf 2819, George, Western Cape

2023 George EARP Construction
Basic Assessment Report for the proposed commercial development on portion 49 of Farm Hansmoeskraal 202, George, Western Cape

2022 George Pieterkoen Trust
Basic Assessment Report for the proposed residential development on Portion 21 of the Farm Kraaibosch No. 195 (Pieter Koen), George, Western Cape

2022 Mossel Bay Dalmar
 Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the Proposed Residential Development On A Portion Of The Farm Vaale Valley 219, Mossel Bay (Hartenbos Landgoed II), Western Cape
#### 2022

Western Cape

Dalmar

Amendment of Environmental Authorisation Proposed Development of Herold's Bay Country Estate on A Portion of Portion 7 of The Farm Buffelsfontein No. 204, Herold's Bay, Western Cape

George

2022 Pieterkoen Trust George Basic Assessment Report for the proposed residential development on Portion 21 of the Farm Kraaibosch No. 195 (Pieter Koen), George,

2022 W. Nel & Irma Oosthuizen Trust IT 1596/2008 Still Bay

Basic Assessment Report for the development of 5 residential units on erven 4139, 4140, 4141, 4142, 4143, 4144, 4145 (Erf 3997), Still Bay West, Western Cape

2022 George Octo Trading 377 cc Section 24 G Retrospective Environmental Authorisation for the alleged unlawful construction of a road clearance of vegetation to establish a house on remainder of Farm Holle Kloof 91 and Portion 1 of the Farm Plattekloof 131, Waboomskraal, George, Western Cape

#### 2022 Knysna CapeNature Basic Assessment Report for the Proposed development on Portions

38 and 39 of Farm 205 and Remainder of Farm 211, Goukamma Nature Reserve, Knysna, Western Cape

#### 2021

Prince Albert Jurie Klue • Section 24 G Retrospective Environmental Authorisation for the alleged unlawful clearance of vegetation on Farm Angliers Bosch (Fernkloof), Remainder of Farm 157, Klaarstroom, Prince Albert, Western Cape

2021 Mossel Bay Mossel Bay Municipality Basic Assessment Report for the proposed Dana Bay Emergency Access Road on Remainder of Portion 7 of the Farm 225, Dana Bay, Mossel Bay, Western Cape

#### Willowmore 2021 LEZMIN 2087cc Basic Assessment Report for the proposed development of Portion 1

of the Farm Matjiesfontein No. 206, Baviaanskloof, Division Willowmore, Eastern Cape

2020 Sedgefield Knysna Municipality Basic Assessment Report for the proposed housing development on erven 3861, 3865, 3866, 3917, 3918 and 5010 in Sedgefield, Knysna, 2020 Mossel Bay Paprenax Trading 6 cc

 Basic Assessment Report for the proposed establishment of a filling station and associated business infrastructure on a portion of erf 13996, Kwanonqaba, Mossel Bay, Western Cape

2020 Ladismith Department of Transport and Public Works

 Maintenance Management Plan for the periodic maintenance of Trunk Road 31, section 4, km 30.8 to km 76.06, Barrydale to Ladismith, Western Cape

2020 Knysna Knysna Knysna Municipality
Maintenance Management Plan for the Maintenance of the potable water pipeline system on Erven 4197, RE/1352, RE/1351, RE/1146 and 1316 in Knysna, Western Cape

2020 Humansdorp Kouga Municipality
Environmental Control Officer for the Phase 1A of New municipal 66kV double circuit overhead line between the Melkhout substation at Humansdorp and the main intake substation at Jefferys Bay, Eastern Cape

2020 Humansdorp Kouga Municipality
Environmental Control Officer for the Construction of a new 22kv overhead powerline between Melkhout substation and Allison Street, Humansdorp, Eastern Cape

2020 Knysna Knysna Municipality
Environmental Control Officer for the Charlesford raw water pumping scheme: Upgrade and refurbishment of pumpstation: Mechanical and electrical, Knysna, Western Cape

**2020** Seweweekspoort, Department of Transport & Public Works

 Amendment of Environmental Authorisation (Part 2, Substantive amendment) for the flood damage repairs to road structures on MR309 in Seweweekspoort, Western Cape

2019 – 2021 Seweweekspoort, Department of Transport & Public Works

 Environmental Control Officer for the flood damage repairs to road structures on MR309 in Seweweekspoort, Western Cape

2019 George George Municpality
Environmental Control Officer for the Raising of the Garden Route Dam Spillway on Portion 3/352, Remainder of 536 of Erf 221, Erf 3055 and Erf 3056, George, Western Cape

 2019 Laingsburg Department of Agriculture
 Environmental Control Officer for the Construction Of Erosion Prevention Structures Within The One In Ten Year Flood Line Of The Buffels River, Laingsburg, Western Cape 2019 Williston Williston Municipality

• Environmental Control Officer for the Upgrading of bulk water network in Williston – Phase 3, Williston, Northern Cape

**2019** George George Municipality

 Environmental Control Officer for the construction of new 66kV overhead line between Ballots Bay and Glanwood substations, George, Western Cape

2019 Oudtshoorn Department of Transport & Public Works

 Environmental Control Officer for the Periodic maintenance of Trunk Road 31, Section 6, km 23.3 to km 47.8 Calitzdorp to Oudtshoorn, Western Cape

2019 Kleinbrak Mossel Bay Municipality
Environmental Control Officer for the Upgrading of Beyers Street, Klienbrak River, Western Cape

2019 George Outeniqua Eye Clinic Body Corporate

• Environmental Control Officer for the proposed expansion of parking area on erf 5950 and part of remainder erf 464, George, Western Cape

2019 Mossel Bay Hey Innovations
Basic Assessment Report for the proposed establishment of a residential development on Erf 2839, Great Brak River, Western Cape

2019 Oudtshoorn Oudtshoorn Municipality

 Environmental Management Programme for the Blossoms Emergency Supply Scheme, Oudtshoorn, Western Cape

2019 Humansdorp Clinkscales Maughan-Brown
 Environmental Management Programme for the proposed construction of a new 22kV overhead powerline between Melkhout Substation and Allison Street, Humansdorp, Eastern Cape

2019GeorgePN&MR Lotter Family Trust

 Addendum to the Environmetnal Management Programme for the Establishment of a Township (Rivendale) on Portions 5, 15, 16 and 31 of the Farm Hansmoeskraal 202, Western Cape

2019 Oudtshoorn Department of Transport and Public Works

 Basic Assessment Report for the Proposed Maintenance Activities of Trunk Road 33/4 between km 4.6 and km 14.4, Meiringspoort, Western Cape

2019 George Dynarc Capital
Substantive amendment of environmental authorisation for the proposed Development of Portion 130, 131 and 132 of the Farm Gwayang 208

2019 George Department of Transport & Public Works
 Basic Assessment Report for the proposed Upgrading of Bridge No. 2221 on Trunk Road 2/9 at km 15.1 over the Maalgate River.

2018 - 2019 Oudtshoorn Department of Transport and Public Works

 Maintenance Management Plan for the proposed periodic maintenance of Trunk Road 31, section 6, km 23.3 to km 47.8, Western Cape

2018 - 2019 Humansdorp Clinkscales Maughan-Brown

 Applicability of the EIA regulations Checklist for the proposed new 22kV overhead line between Melkhout Substation and Allison Street, Eastern Cape

2018 - 2019 Knysna Knysna Knysna local Municipality
Applicability of the EIA regulations Checklist for the proposed Rheenendal infill housing, subdivision and rezoning of portions of erf 42, 36 and 387 as well as erven 535, 536, 553, 54, 393, 406, 672, 673 and 68, Rheenendal, Western Cape

2018 - 2019 Knysna Knysna Iocal Municipality
Applicability of the EIA regulations Checklist for the proposed infill housing and subdivision of erven in Welsyndorp and the rezoning and subdivision of erven in Bosdorp, Karatara, Western Cape.

#### **2018** Port Elizabeth ACSA P.E.

 Applicability of the EIA regulations Checklist for the proposed ACSA Port Elizabeth Airport Photovoltaic Plant, Eastern Cape Province

2018Mossel BayTopUp Prop Inv.

 Applicability of the EIA regulations Checklist for the proposed Farm Stall Centre and filing Station on Portion 65 of the Farm Hartenbosch 217, Hartenbos

George Outeniqua Eye Clinic Body Corporate

 Basic Assessment Report for the proposed expansion of parking area on erf 5950 and part of remainder erf 464

2018

2018Beaufort WestBeaufort West Municipality

 Environmental Control Officer for the First and Second Environmental Audit for the provision of adequate water supply within the jurisdiction of the Beaufort West municipality

2018 Mossel Bay Element Consulting Engineers
 Environmental Management Programme update for the replacement of 22kV overhead powerline between Power Town and Hartenbos and between Hartenbos and the Hartenbos sewage substation and the construction of a new 22kV overhead power line between the Midbrak and Kleinbrak Substations.

2018 Mossel Bay Element Consulting Engineers

 Environmental Control Officer for the construction of a new 22kV overhead power line between the Midbrak and Kleinbrak Substations

2018 Mossel Bay Element Consulting EngineersEnvironmental Control Officer for the Upgrade of Amy Searle

Canal – Phase 5, Great Brak River

2018 Gouritsmond Hessequa Consulting Engineers

 Environmental Control Officer for the Upgrade and expansion of the Gouritsmond Water Water Treatment Works on remainder of erf 140, Gouritsmond

2018 George Biprops 14
Environmental Control Officer for the residential development on portion 5 of the farm Kraaibosch No. 195, Groenkloof Woods: Phase C & D

2018 Knynsa Knysna Municipality

 Environmental Control Officer for upgrading of Knysna bulk water supply scheme: phase 2B

**2018**Plettenberg BayBitou Municipality

 Environmental Control Officer for the upgrade of the Kranshoek Bulk Water Supply Scheme: Construction of Pipelines, reservoirs and associated infrastructure near Plettenberg Bay.

2018 Mossel Bay SMEC
Environmental Control Officer for the Upgrade of Kusweg and associated infrastructure in Rheebok

2017 George EARP Construction
Invasive Alien Management Plan for the proposed residential development on portions 21, 23, 24 & 48 of Farm Hansmoeskraal 202 near George

2017 Mossel Bay Mossel Bay Municipality
Environmental Control Officer for the development of the new Mossel Bay municipal cemetery on erf 2001/0

2017 Knynsa Knysna Municipality
Environmental Control Officer for the remedial work to prevent further settlement of the low-lift pump sump and retaining wall at Gouna River Pump Station

2017 Knynsa Knysna Municipality
Environmental Control Officer for upgrading of Knysna bulk water supply scheme: phase 1

#### 2017 George Biprops 14 (Pty) Ltd

 Environmental Control Officer for the residential development on portion 5 of the farm Kraaibosch No. 195

 2017 Still Bay Hessequa Municipality
 Environmental Control Officer for the construction of a reservoir, booster pump station and associated infrastructure in

Melkhoutfontein near Still Bay

2016 - 2017 Heidelberg Department of Transport & Public Works

• Environmental Control Officer for the flood damage repairs to structures in the Central Eden District Municipality Region, Heidelberg North

2016 - 2017 Riversdale Department of Transport & Public Works

 Environmental Control Officer for the flood damage repairs to structures in the Central Eden District Municipality Region, Riversdale East area

2016 - 2017 Still Bay Department of Transport & Public Works

 Environmental Control Officer for the upgrade of main road 332 near Still Bay

**2016 - 2017**Mossel BayThe South Cape College

 Environmental Control Officer for the extension of the South Cape College: Phase 3, Mossel Bay Campus

2016 - 2017Klein BrakMossel Bay Municipality

 Environmental Control Officer for the removal of obstructions in the lower floodplain of the Klein Brak River Estuary

2016 Prince Albert Milway Trade and Invest 1014cc

 Basic Assessment for the proposed guest lodge on remainder of Farm Rietpoort 13

2016 Plettenberg Bay Bitou Municipality
Basic Assessment for the proposed Qolweni phase 5 development near Plettenberg Bay

2016 Mossel Bay Element Consulting Engineers

 Environmental Management Programme for the replacement of 22kV overhead powerline between Power Town and Hartenbos and between Hartenbos and the Hartenbos sewage substation

#### 2016 George

Environmental Policy for the resurfacing of York Street, George

SMEC

2016 Mossel Bay Department of Transport & Public Works

 Maintenance Management Plan for proposed upgrade of Louis Fourie Road.

**2016** George Oaklands Bridge Country Estate HOA

 Maintenance Management Plan for proposed repair and maintenance of the riverbank at Oaklands Bridge Country Estate in Heather Park

2016 Gouritz Department of Transport & Public Works

 Update of the Maintenance Management Plan for proposed repair and maintenance of the Gouritz River Bridge bank protection along the R325 near Gouritzmond

#### 2016 George Ivorybell Investment (Pty) Ltd

 Outeniqua Sensitive Coastal Area Environmental Impact Report for the proposed new house on erf 379 in Heralds Bay

**2016** George George Municipality

 Environmental Assessment Report for the substantive amendment of environmental authorisation of the proposed upgrade and extension of the overhead power lines and associated substations

2016 Oudtshoorn SA Army Infantry School
 Environmental Control Officer for the construction of a fighting in built up areas (FIBUA) range on portion 10 of the farm Blaauwtjes Drift 110 in Oudtshoorn

2015 - 2016 Gouritz Department of Transport & Public Works
Environmental Control Officer for the repair and maintenance of the Gouritz River Bridge bank protection along the R325 near Gouritzmond

**2015 - 2016** Albertinia Garden Route Game Lodge (Pty) Ltd

• Environmental Control Officer for the five new units at the Garden Route Game Lodge

**2015 - 2016** Mossel Bay Element Consulting Engineers

 Environmental Control Officer for the replacement of 22kV overhead powerline between Power Town and Hartenbos and between Hartenbos and the Hartenbos sewage substation

**2014 - 2016** Plettenberg Bay Chauke Quanity Surveyers

 Environmental Control Officer for the Qolweni and Kwanokuthula High Density Units and engineering services

2016 Plettenberg Bay Bitou Municipality

 Environmental Control Officer for the civil engineering works for Kwanokuthula Phase 4 and the extension of Sishuba Street **2014 - 2016** Mossel Bay

- The South Cape College
- Environmental Control Officer for the extension of the South Cape College, Mossel Bay Campus

2016 SMEC George Environmental Control Officer for the resurfacing of York Street 2014 - 2015 Mossel bay The Muller Murray Trust Environmental Control Officer for the construction of gravity pipeline from the Nautilus take-off to the Boggomsbaai Reservoir phase 2 2015 Swellendam Casidra SOC Ltd Environmental Control Officer for the Grootvaderbos Groynes in the **Buffeljags River** 2015 George **Element Consulting Engineers** Environmental Control Officer for the upgrading and extension of overhead power lines and substations: construction of a new 66kV overhead line between Protea and Ballots Bay substation 2014 - 2015 George Department of Transport & Public Works Environmental Control Officer for the flood damage repair projects in the George and Knysna local municipal areas 2015 BDE Consulting Engineers (Pty) Ltd George Environmental Control Officer for the photovoltaic solar plant for the ACSA George Airport 2015 Heidelberg Bergstan South Africa Environmental Control Officer for the Duiwenhoks River stabilization works: Sites B31, B38 and B39 2015 Krakeel **Element Consulting Engineers** Environmental Control Officer for the construction of filling station at SSK Tuinrote Agri on portion 5 of the farm no. 320 2014 - 2015 Herbertsdale SMEC Environmental Control Officer for the flood damage repairs to structures in the Eden region: Herbertsdale area 2014 - 2015 Department of Transport & Public Works George Environmental Control Officer for the flood damage repair projects in the George and Knysna local municipal areas

# 2015 George SMEC Environmental Control Officer for the improvements to the Pacaltsdorp interchange and new pedestrian bridge

2014 - 2015 Still Bay De Villiers & Moore Consulting Engineers

 Environmental Control Officer for the Still Bay 66kV substation and overhead powerline

#### 2014 Beaufort West Worley Parsons Consulting Engineers

 Environmental Control Officer for the Nelspoort bulk water supply scheme northeast of Nelspoort

#### GEORGE



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# ALIEN AND ECOLOGICAL CORRIDOR MANAGEMENT PROGRAMME

FOR

### REMAINDER OF PORTION 5 OF THE FARM ZANDHOOGTE 139, TERGNIET WESTERN CAPE PROVINCE.

Produced as part of a Basic Assessment EIA Application for Environmental Authorisation in terms of the National Environmental Management Act (Act 107 of 1998) and the amended (April 2017) Environmental Impact Assessment Regulations, 2014

	PROJECT INFORMATION
Prepared For:	3MP Sales and Education Services
Prepared By:	Sharples Environmental Services cc (SES)
Document Date:	20 March 2025
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Environmental Impact Assessments 
 Basic Assessments 
 Environmental Management Planning

Environmental Control & Monitoring • Water Use License Applications • Aquatic Assessments

#### AERA TO BE MANAGED IN ACCORDANCE WITH THIS PLAN



Figure 1: Site to be managed

Alien species located in this area
Cestrum laevigatum (Ink Berry)
psidium guajava (Common guava)
Schinus terebinthifolia (Brazilian peppertree)

## According to the Botanical Comment compiled by Mark Berry the following management of the area is recommended:

The most important management or maintenance task for the corridor would be to keep it clear of aliens. Ideally, all exotic species should be removed from the corridor. A simple alien clearing plan should suffice. It is important to note that the aliens must be cleared on an annual basis. To improve biodiversity inside the corridor, it is recommended that topsoil containing seeds of indigenous species and salvageable plants, such as *Carpobrotus* spp and *Aloe arborescens*, be collected from the development areas and deposited or planted inside the corridor.

The corridor should also not be fenced off on the sides facing away from the development. If fencing is needed for security reasons, a permeable fence should be erected that will allow small mammals through. Pedestrian traffic should be minimised. The corridor should also be assessable for fire protection purposes.

#### Management measures for the site

All vegetation clearance must be undertaken with utmost care to ensure that only that vegetation, which needs to be removed, is removed.

Eradication of alien plants must be completed in such a manner that indigenous vegetation is not damaged.

It is important to remove both young plants (saplings) and old trees that are seed bearing. Different strategies can be employed to remove different species, but all methods will involve manual labour as mechanical means other than chain saws and brush cutters, should be used where necessary. It is important to tackle the smaller, more dispersed plants first, and then the larger stands of alien vegetation.

To ease the removal of the alien plants present on the site, it is recommended that all alien plants be removed during the initial site clearing activities at the start of the construction process rather than during the operational phase of the development.

#### 1. Clearing of small alien plants

The best method of clearing small plants is by hand pulling them. They must then be stacked for removal to a recognised waste site, or alternatively mulched on site. Mulched material can be used as a ground cover where necessary.

#### 2. Clearing of alien trees

Alien trees must be cut down with chain saws and then chopped into smaller portions. Some species of alien plants like Black Wattle trees are coppicing species and will re-grow from roots and stumps. This means that a chemical such as Roundup or Garlon will need to be used to prevent the trees from re-sprouting. These chemicals can either be sprayed onto the stump with a knapsack sprayer or painted on with a paintbrush. Another alternative to prevent re-growth is to strip the bark from the remaining part of the stump.

#### 3. Methods for controlling alien vegetation

Biological control, chemical control, mechanical clearing, and burning have all been used with varying results. Each method has been successful but nearly all require follow-up control. The most successful clearing projects have included an integrated approach to account for initial clearing and continued management.

#### 3.1 Mechanical control:

- Mature non-coppicing trees must be cut as low as possible and no herbicide treatment is needed on the cut stumps.
- Debris may be removed immediately from site to be burned in a safe area, mulched or used as firewood.
- Large branches should be used as firewood.
- Smaller branches should be mulched.
- Alien material containing seed must be removed from the site and burned.
- Should debris be left on site:
- In sparser areas, where felled debris will not hinder follow-up operations, plants can be felled and left in situ.
- In dense areas, stack debris in rows five metres apart parallel to the contours to facilitate follow-up operations.
- Low density seedling regeneration must be hand pulled.
- Hand pulling around pockets of indigenous vegetation (1m swathe around clumps) is important so as to not damage indigenous vegetation pockets.

#### 3.2 Chemical control

• Follow-up visitation no later than three months after initial operation.

- Follow-up control will be needed because soil stored seed may stay dormant in soil for up to 50 years.
- Follow-up control will involve a combination of hand pulling and foliar spraying.
- Seedlings, saplings and coppice can be foliar sprayed.
- Follow-up spray operation when sufficient regeneration has taken place.
- Blanket or foliar spray.

#### 3.3 Tools

- Loppers, bow saws and chainsaws
- 12-15 litre back pack spray units
- Flat fan nozzles or solid cone and 1 bar constant flow valves.

### 3.4 Team composition

- 6 persons, each being equipped with a lopping shear, bow saw and herbicide applicator, must first sweep through the area in individual lanes 5 metres apart. These persons target all plants less than 8 cm in basal diameter, felling, stacking and applying herbicide. Debranching should only be used to facilitate stacking of larger branches.
- 2 chainsaw operators thereafter follow through these lanes felling all plants more than 8 cm in basal diameter. Two assistants are responsible for stacking and herbicide application.
- For the denser areas, methodology must follow the illustration below. All rows are five metres wide. Swathes labelled 1 must be cut first and the debris placed back into these swathes. Thereafter debris generated in swathes labelled 2, must be placed into swathes labelled 1.



#### 3.5 Follow up

Once the source of the problem has been removed, namely the seed bearing trees, it is important to follow up on any seedlings and saplings that may have grown in the interim. If this is not done the effort of the removal of the adult trees will have been wasted, as the alien vegetation problem will intensify.

#### Author of document:

This Alien Management Programme was compiled by *Sharples Environmental Services cc* (SES). The company has over 30+ years combined experience in the field of environmental management on a variety of differing landuse applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials.

		HERBICIDES F	OR ALIEN PLANT	CONTROL									
							PPE		Medical Bio	omonitoring	Frequency	and Duration	
	Chemical group	MOA	Examples	Hazard Group	Hazard Criterion	Туре	Pictogram	Classification	Blood	Urine	Blood	Urine	Environmental monitoring
1	Imidazolinones	Group 2: ALS: AHAS inhibitors	lmazapyr ( Chopper, Hatchet, Arsenal)	2	Acute toxicity to mammals and birds GHS07 WARNING H319 (causes serious eye irritation) H335 ( Respiratory irritant) H315 (causes skin irritation)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>		EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	N/A	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	N/A	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING								Hazard criterion 7 and 8 are linked to environmental risks

2	Sulfonylureas	Group 2: ALS: AHAS inhibitors	Metsulfuron- methyl ( Brush-off, Climax, Forester, Extreme, Nikanor)	7	H412 (harmful to aquatic life with long lasting effects) Acute toxicity to aquatic organisms GHS09 WARNING H400 (Very toxic to aquatic life)							
				2	Acute toxicity to mammals and birds GHS07 WARNING H315 (causes skin irritation) H335 (Respiratory tract irritant) H319 (Causes serious eye irritation)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN 140, EN 149, EN 143:200 R95, R99, R100	N/A	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	N/A	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	

Carboxylic acids	Group 4: Synthetic auxins	Picloram (Access, Browser, Scrubber)	2	Acute toxicity to mammals and birds GHS07 WARNING W1302 (harmful if swallowed) H312 (harmful in contact with skin) H319 (Causes serious eye irritation) H332 (harmful if inhaled)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>		EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN 140, EN 149, EN 143:200 R95, R99, R100		Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every year. 3. All workers need to be tested once they leave they programme	
			3	Carcinogenicity GHS07 WARNING H335 (May cause respiratory irritation)	Same as above	Same as above	Same as above	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per		

						day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	
	6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER H370 (causes damage to organs – lungs)	<ul> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> </ul>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

					8. Long- sleeved shirts				
			7	Acute toxicity to aquatic organisms GHS09 WARNING 4400 (Very toxic to aquatic life)					
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects) H412 (harmful to aquatic life with long lasting effects)					
Phenoxy acids	Group 4: Synthetic auxins	Alkylchlorop henoxy (2,4D)	2	Acute toxicity to mammals and birds GHS07 WARNING 1302 (Harmful if swallowed) H317 (May cause an allergic reaction) H318 (causes serious eye damage)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345	5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every year.</li> <li>All workers need to be tested once they leave they programme</li> </ol>	

		5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100			
3	Carcinogenicity GHS07 WARNING H335 (May cause respiratory irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

		5	Developmental & Reproductive toxicity GHS08 DANGER H361 (Suspected of damaging fertility or the unborn child)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	
		8	soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING					

	Pyridine compounds as butoxy ethyl esters (Garlon 4, Garlon max, Nuvogon, Triclon, Viroaxe, Triclomax, Turbador)	2	H412 (Harmful to aquatic life with long lasting effects) Acute toxicity to mammals and birds GHS07 WARNING H302 (Harmful if swallowed) H317 (May cause an allergic reaction) H319 (causes serious eye irritation) H373 (May cause damage to organs – heart, liver, kidneys)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN 1SO 20345 EN 166:2001 EN 140, EN 140, EN 149, EN 143:200 R95, R99, R100		5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
		5	Developmental and Reproductive toxicity GHS08 DANGER With the second sec	<ol> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> </ol>	EN ISO 20345 EN 166:2001 EN140	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per		

					Type 5 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long- sleeved shirts	EN 149 EN 143:2000 R95, R99, R100		day for 5 days per week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme		
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)						
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds such As Triclopyr as amine salts	2	Acute toxicity to mammals and birds GHS07 WARNING	1.Chemically resistant nitrile gloves	EN 374:2016	5cc fresh urine sample refrigerate d. Tested		1.All workers need to be tested before they start working.	

		(Lumberjack, Timbrel)		H302 (Harmful if swallowed) H317 ( May cause an allergic reaction) H318 (Causes serious eye damage) H315 (Causes skin irritation) H335 (may cause respiratory irritation) H336 (may cause drowsiness or dizziness) H360 (may damage fertility or the unborn child)	<ul> <li>2.Type 3 and Type 4 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> </ul>	EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	using ELIZA dipstick test	2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds	8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects) Persistence in soil/water and soil absorption patnetial & bio					
		fluroxypyr (Tomahawk,		magnification & bioaccumulation					

		Starane, Voloxypyr)		GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)					
Quinoline carboxylic acid	Group 4: Synthetic auxins	Pyridine compounds such as Aminopyralid s (Sendero)	2	Acute toxicity to mammals and birds GHS07 WARNING H315 (Causes skin irritation H318 (causes serious eye damage) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)	<ol> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>3.Safety</li> <li>boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN 140, EN 149, EN 143:200	5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
			7	Acute toxicity to aquatic organisms GHS09 WARNING WARNING H400 (Very toxic to aquatic life)					

			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)							
Combinations	Group 4: Synthetic auxins	Quinoline carboxylic acid such as Picloram + Pyridine compound such as Fluroxypyr ( Plenum, Gladiator)	2	Acute toxicity to mammals and birds GHS07 WARNING WARNING H302 (harmful if swallowed) H312 (harmful in contact with skin) H319 (Causes serious eye irritation) H332 (harmful if inhaled)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN 140, EN 149, EN 143:200 R95, R99, R100		Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
			3	Carcinogenicity GHS07 WARNING	1.Chemically resistant nitrile gloves	EN 374:2016	20cc fresh blood sample.		1.All workers need to be		

			H335 (May cause respiratory irritation)	<ul> <li>2. Type 3 and Type 4 protective clothing</li> <li>3. Safety boots</li> <li>4. Face &amp; Eye protection</li> <li>5. Half-face respirators</li> <li>6. Particulate air filters for respirators</li> <li>7. Apron/ Knapjack</li> </ul>	EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	AChE tests done with Test-Mate model 400 device	tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	
		6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER H370 (causes damage to organs – lungs)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing Type 5 protective clothing	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done	

				<ul> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> <li>8. Long- sleeved shirts</li> </ul>	R95, R99, R100		every 2 years 3. All workers need to be tested once they leave the programme	
		7	Acute toxicity to aquatic organisms GHS09 WARNING ¥ H400 (Very toxic to aquatic life)					
		8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING WARNING H410 (Very toxic to aquatic life with long lasting effects) H412 (harmful to aquatic life with long lasting effects)					

Combinations	Group 4: Synthetic auxins	Pyridine compounds such as Fluroxypyr + Pyridine compounds such as Triclopyr as Pyridyloxy compound (Impala)	2	Acute toxicity to mammals and birds GHS07 WARNING H302 (Harmful if swallowed) H317 ( May cause an allergic reaction) H319 (causes serious eye irritation) H373 (May cause damage to organs – heart, liver, kidneys)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirt</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
			5	Developmental and Reproductive toxicity GHS08 DANGER H360 (May damage fertility or the unborn child)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing	EN ISO 20345 EN 166:2001 EN140 EN 149	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per		

					Type 5 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long- sleeved shirts	EN 143:2000 R95, R99, R100		week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme	
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)					
Combinations	Group 4: Synthetic auxins	Quinoline carboxylic acid such as Picloram + Pyridine compound	2	Acute toxicity to mammals and birds GHS07 WARNING	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4	EN 374:2016 EN 14605:2005			

such Triclopyr as trimethylami ne salt (Kaput gel)	H302 (harmful if swallowed) H312 (harmful in contact with skin) H315 (causes skin irritation) H317(May cause allergic skin reaction) H319 (Causes serious eye irritation) H332 (harmful if inhaled) H335 (May cause respiratory irritation) H336 (may cause drowsiness or dizziness)	protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		
	3 Carcinogenicity GHS07 WARNING H335 (May cause respiratory irritation)	1.Chemically resistant nitrile gloves2.Type 3 and Type 4 protective clothing3.Safety boots4.Face & Eye protection5.Half-face respirators	EN 374:2016 EN 374:2016 AChE t done v Test-M EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001	resh 1.All workers need to be tests tested with Aate start 1400 working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be	

			6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 140, EN149, EN 143:200 R95, R99, R100		tested once they leave the programme	
	5	Developmental and Reproductive toxicity GHS08 DANGER H360 (May damage fertility or the unborn child)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme	

		6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER W H370 (causes damage to organs – lungs)	<ul> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> </ul>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	
				<ul> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> <li>8. Long- sleeved shirts</li> </ul>	R95, R99, R100		workers need to be tested once they leave the programme	
		7	aquatic organisms GHS09 WARNING					

				H400 (Very toxic to aquatic life) Persistence in						
				soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects) H411 (Toxic to aquatic life with long lasting effects) H412 (harmful to						
			8	aquatic life with long lasting effects)						
Combinations	Group 4: Synthetic auxins	Pyridine compounds such Triclopyr as amine salt + Pyridine compounds	2	Acute toxicity to mammals and birds GHS07 WARNING  H302 (Harmful if swallowed) H315 (Causes skin irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing		EN 374:2016 EN 14605:2005	5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test is needed</li> </ol>	
		such as Clopyralid (Confront, Astra)		H317 ( May cause an allergic reaction) H318 (causes serious eye damage) H319 (causes serious eye irritation) H335 (May cause respiratory	3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate		EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN		every 2 years. 3. All workers need to be tested once they leave they programme	
				irritation) H373 (May cause damage to organs	air filters for respirators	Ì	143:200			

			– heart, liver, kidneys)	7.Apron/ Knapjack	0	R95, R99, R100			
		5	Developmental and Reproductive toxicity GHS08 DANGER H360 (May damage fertility or the unborn child)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>		EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme	

		8 Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)			
Combinations Grou Synth auxin	up 4: Pyridine compounds such as Triclopyr as triethyl ammonium + Aminopyralid (Confront super)	<ul> <li>Acute toxicity to mammals and birds</li> <li>GHSO7 WARNING</li> <li>H317 (May cause an allergic skin reaction)</li> <li>H318 (Causes serious eye damage)</li> <li>H319 (Causes serious eye irritation)</li> <li>H315 (Causes skin irritation)</li> <li>H335 (may cause respiratory irritation)</li> <li>H336 (may cause drowsiness or dizziness)</li> <li>L.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>J.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>J.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>J.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>J.Chemically resistant nitrile gloves</li> <li>J.Causes</li> <li>J.Causes skin irritation</li> <li>H335 (may cause respirators</li> <li>J.Apron/</li> <li>Knapjack</li> </ul>	Image: marked bit with the second	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme

		5	Developmental and Reproductive toxicity GHS08 DANGER H360 (may damage fertility or the unborn child)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme	
			aquatic organisms GHS09 WARNING					
		H400 (Very toxic to aquatic life)						
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	8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects) H11 (Toxic to aquatic life with long lasting effects)						
Combinations Group 4: Synthetic auxins	Pyridine 2 compounds such as Triclopyr as Butoxy ethyl ester + Aminopyralid (Garlon Max)	Acute toxicity to mammals and birds GHS07 WARNING H302 (Harmful if swallowed) H315 (causes skin irritation) H317 (May cause an allergic reaction) H318 (causes serious eye damage) H319 (causes serious eye irritation) H335 (may cause respiratory irritation) H336 (may cause drowsiness or dizziness) H373 (May cause	<ul> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>3.Safety</li> <li>3.Safety</li> <li>boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> </ul>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme		

– heart, liver, kidneys)	- heart, liver, R95, R9 kidneys) R100	99,	
5 Developmental and Reproductive toxicity GHS08 DANGER H360 (May damage fertility or the unborn child)	5       Developmental and Reproductive toxicity GHSB DANGER       1.Chemically resistant nitrile gloves       EN ISO         2.Type 3 and Type 4 protective clothing damage fertility or the unborn child)       Type 5 protective clothing       EN 166         3.Safety boots       3.Safety boots       Image: Shall face greep intersion of the spirators       Image: Shall face greep intersion of the spirators       Shall face greep intersion of the spirators       For the spirators         6.Particulate air filters for respirators       6.Particulate air filters for spirators       Image for the spirators       For the spirators         8. Long-sieceved shirts       8. Long-sieceved shirts       Image spirators       Image spirators	20345 20cc fresh blood sample. AChE tests done with Test-Mate model 400 device 2.If the working. 2.001 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 5 years 3. All workers need to be tested once they leave the programme	

			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)					
Uracils	Group 5: Photosyntheti c inhibitors at Photosystem II, Site A.	Bromacil (Bushwacker)	2	Acute toxicity to mammals and birds GHS07 WARNING $\widehat{}$ H302 (Harmful if swallowed) H315 (Causes skin irritation) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN 1SO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	

			7 8	Acute toxicity to aquatic organisms GHS09 WARNING H400 (Very toxic to aquatic life) Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)	1.Chemically	EN 374-2016	Scofresh	1 All workers	
Ureas	Group 7: Photosyntheti c inhibitors at Photosystem II, Site B.	Tebuthiuron (Limpopo, Molopo)	2	Acute toxicity to mammals and birds GHS07 WARNING $\underbrace{1}$ H302 (Harmful if swallowed)	resistant nitrile gloves 2. Type 3 and Type 4 protective clothing 3. Safety boots 4. Face & Eye protection 5. Half-face respirators 6. Particulate air filters for respirators 7. Apron/ Knapjack	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	

						R95, R99, R100			
			7	Acute toxicity to aquatic organisms GHS09 WARNING H400 (Very toxic to aquatic life)					
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)					
Combinations	Group 5 (Uracil) + Group 7 (urea)	Bromacil + Tebuthiuron (Bundu)	2	Acute toxicity to mammals and birds GHS07 WARNING $\widehat{}$ H302 (Harmful if swallowed) H315 (Causes skin irritation) H319 (Causes serious eye irritation) H335 (may cause respiratory irritation)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety</li> <li>Safety</li></ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	

					6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 140, EN149, EN 143:200 R95, R99, R100			
			7	Acute toxicity to aquatic organisms GHS09 WARNING H400 (Very toxic to aquatic life)					
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING CHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)					
Glycines	Group 9: Inhibitors of EPSP synthesis.	Phosphonogl ycines such as Glyphosate isopropylami ne salts (Seismic, tumpleweed) POE-T free	2	Acute toxicity to mammals and birds GHS07 WARNING H318 (Causes serious eye damage)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345	5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once	

			<ul> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/Knapjack</li> </ul>	EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		they leave they programme	
Glycines Group 9: Inhibitors of EPSP synthesis.	Phosphonogly 2 cines such as Glyphosate sodium salts (Kilo max)	Acute toxicity to mammals and birds GHS07 WARNING $\overrightarrow{1}$ H318 (Causes serious eye damage)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, P100	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	

Glycines	Group 9: Inhibitors of EPSP synthesis.	Phosphonogly cines such as glyphosate ( all GBH's containing POE-T such as Roundup etc)	2	Acute toxicity to mammals and birds GHS07 WARNING H318 (Causes serious eye damage)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years. 3. All workers need to be tested once they leave they programme	
			3	Carcinogenicity GHS07 WARNING H335 (May cause respiratory irritation) H336 (may cause drowsiness or dizziness)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> </ol>	EN 374:2016 EN 14605:2005	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per		

				H315 (Causes skin irritation) H319 (causes serious eye irritation)	3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack	EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme		
			8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING GHS09 WARNING H411 (Toxic to aquatic life with long lasting effects)						
Organoarsenicals	Group 17: Unknown	Monosodium methylarsona te (MSMA)	2	Acute toxicity to mammals and birds GHS07 WARNING H302 (Harmful if swallowed) H315 (causes skin irritation) H319 (Causes serious eye irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing	EN 374:2016 EN 14605:2005 EN 345: 1993	5cc fresh urine sample refrigerate d. Tested using ELIZA dipstick test		1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.	

H332 (Harmful if inhaled)	3.Safety bootsImage: Composite of the symplectic on the	EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100		3. ne te th pr	. All workers eed to be ested once hey leave they rogramme
3 Carcinogenicity GHS07 WARNING H335 (May cause respiratory irritation) H336 (May cause drowsiness or dizziness)	1. Chemically resistant nitrile glovesImage: Constraint of the second seco	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

					R95, R99, R100			
		6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER Ward Cause damage to organs (kidneys and liver) H372 (causes damage to organs through prolonged effect (liver and kidneys)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>Safety boots</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> <li>Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

Bipyridyliums	Group 22: Cell membrane disruptors	Diquat dibromide (Scuba, Midstream) & Paraquat (Gramoxone)	2	Acute toxicity to mammals and birds GHS06 DANGER W301( Toxic if swallowed) H311(Toxic in contact with skin) H330(Fatal if inhaled) GHS07 WARNING W315(Causes skin irritation) H319(causes serious eye irritation) H335(May cause respiratory irritation) H372(Causes damage to organs)	<ol> <li>Chemically resistant nitrile gloves</li> <li>Type 3 and Type 4 protective clothing</li> <li>Safety</li> <li>Safety</li> <li>Safety</li> <li>Safety</li> <li>Face &amp; Eye protection</li> <li>Half-face respirators</li> <li>Particulate air filters for respirators</li> <li>Apron/ Knapjack</li> </ol>	EN 374:2016 EN 14605:2005 EN 345: 1993 EN ISO 20345 EN 166:2001 EN 140, EN149, EN 143:200 R95, R99, R100	Scc fresh urine sample refrigerate d. Tested using ELIZA dipstick test	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test is needed every 2 years.</li> <li>All workers need to be tested once they leave they programme</li> </ol>	
			7	Acute toxicity to aquatic organisms H400 (Very toxic to aquatic life)					

	8	Persistence in soil/water and soil				
		absorption				
		potential & bio				
		magnification &				
		bioaccumulation				
		GHS09 WARNING				
		<b>F</b>				
		H411 (Toxic to				
		aquatic life with				
		long lasting				
		effects)				

## PESTICIDES FOR INVASIVE ANIMAL CONTROL

						PPE		Medical Biomonitoring		Frequency and Duration			
				Hazard									Environmental
	Chemical group	MOA	Examples	Group	Hazard Criterion	Туре	Pictogram	Classification	Blood	Urine	Blood	Urine	monitoring
1	Rodenticides	Inhibits vitamin K, anti- coagulant	Examples Difenacoum, Brodifacoum Coumatetralyl	2	Acute Toxicity to mammals and birds GHS06 DANGER With the second second second second H300 (Fatal if swallowed) H310 (Fatal in contact with skin) GHS07 WARNING H373 (Causes damage to organs through prolonged or repeated exposure – blood)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing Type 5 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators	Pictogram	EN ISO 20345 EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	Urine	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	Urine	monitoring

	6.Pa air fi resp 7.Ap Knar 8. Lc sleev shirt	articulate filters for pirators .pron/ apjack .ong- eved rts				
5	Developmental and Reproductive toxicity GHS08 DANGER UNBORD (May damage the unborn child) 3.Sa boot 4.Fa Eye prot 5.Ha resp 6.Pa air fi resp 7.Ap Knap	hemically istant rile ves ype 3 d Type 4 otective thing be 5 otective thing afety ots ace & be ctive rile interve otective thing afety ots ace & be ctive pirators articulate filters for pirators pron/ apjack	EN ISO 20345 EN 166:2001 EN140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years</li> <li>All workers need to be tested once they leave the programme</li> </ol>	

				8. Long- sleeved shirts				
		6	Endocrine Disrupting Chemicals (EDC) GHS08 DANGER H372 (Causes damage to organs through prolonged or repeated exposure – blood)	<ol> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> <li>8. Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years</li> <li>All workers need to be tested once they leave the programme</li> </ol>	

		7	Acute toxicity to aquatic organisms H400 (Very toxic to aquatic life)					Ensure environmental monitoring is complied with such as ESRA protocols
		8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING CHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)					Ensure environmental monitoring is complied with such as ESRA protocols
	Cholecalciferol	2	Acute Toxicity to mammals and birds GHS06 DANGER H301 (Toxic is swallowed) H311 (Toxic in contact with skin) H330 (fatal if inhaled)	<ul> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> </ul>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years</li> <li>All workers need to be tested once they leave the programme</li> </ol>	

	6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long- sleeved shirts			
6 Endocrine Disrupting Chemicals (EDC) GHS08 DANGER H372 (Causes damage to organs through prolonged or repeated exposure	6       Endocrine Disrupting Chemicals (EDC) GHS08 DANGER       1.Chemically resistant nitrile gloves         1372 (Causes damage to organs through prolonged or repeated exposure       2.Type 3 and Type 4 protective clothing         3.Safety boots       3.Safety boots         4.Face & Eye protection       3.Safety boots         5.Half-face respirators       6.Particulate air filters for respirators         7.Apron/ Knapjack       7.Apron/ Knapjack	Image: Problem state	resh e. tests with Aate 400 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

						8. Long- sleeved shirts				
2	Avicides	Sedative powder	alphachloralose	2	Acute Toxicity to mammals and birds GHS06 DANGER H301 (Toxic if swallowed) GHS07 WARNING H332 (Harmful if inhaled) H336 (may cause drowsiness or dizziness)	<ol> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> <li>6.Particulate air filters for respirators</li> <li>7.Apron/ Knapjack</li> <li>8. Long- sleeved shirts</li> </ol>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years 3. All workers need to be tested once they leave the programme	

		7	Acute toxicity to aquatic organisms 4400 (Very toxic to aquatic life)						Ensure environmental monitoring is complied with such as ESRA protocols
		8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)						Ensure environmental monitoring is complied with such as ESRA protocols
Uptake orally resulting in hepatic necrosis and eventual death	DRC 1336/ Starlicide	2	Acute Toxicity to mammals and birds GHS06 DANGER H301 (Toxic if swallowed) H311 (Toxic in contact with skin) GHS07 WARNING H315 (Causes skin irritation) H317 (May cause an allergic skin reaction) H319 (Causes serious eye irritation) H32 (Harmful if inhaled)	<ul> <li>1.Chemically resistant nitrile gloves</li> <li>2.Type 3 and Type 4 protective clothing</li> <li>Type 5 protective clothing</li> <li>3.Safety boots</li> <li>4.Face &amp; Eye protection</li> <li>5.Half-face respirators</li> </ul>	<ul> <li></li> <li></li></ul>	EN ISO 20345 EN 166:2001 EN 140 EN 149 EN 143:2000 R95, R99, R100	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	<ol> <li>All workers need to be tested before they start working.</li> <li>If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done every 2 years</li> <li>All workers need to be tested once they leave the programme</li> </ol>	

						6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long- sleeved shirts				
				7	Acute toxicity to aquatic organisms 4 H400 (Very toxic to aquatic life)					Ensure environmental monitoring is complied with such as ESRA protocols
				8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING WARNING H410 (Very toxic to aquatic life with long lasting effects)					Ensure environmental monitoring is complied with such as ESRA protocols
3	Piscicides	Mitochondrial NADH: ubiquinone reductase inhibitor and toxin	Rotenone	2	Acute Toxicity to mammals and birds GHS06 DANGER H301 (Toxic if swallowed) GHS07 WARNING (1315 (Causes skin irritation)	1.Chemically resistant nitrile gloves 2.Type 3 and Type 4 protective clothing	EN ISO 20345 EN 166:2001 EN140 EN 149	20cc fresh blood sample. AChE tests done with Test-Mate model 400 device	1.All workers need to be tested before they start working. 2.If the worker sprays 8 hours per day for 5 days per week, an additional test needs to be done	

			H319 (Causes serious eye irritation) H335 (May cause respiratory irritation)	Type 5 protective clothing 3.Safety boots 4.Face & Eye protection 5.Half-face respirators 6.Particulate air filters for respirators 7.Apron/ Knapjack 8. Long- sleeved shirts	EN 143:2000 R95, R99, R100		every 2 years 3. All workers need to be tested once they leave the programme	
		7	Acute toxicity to aquatic organisms 400 (Very toxic to aquatic life)					Ensure environmental monitoring is complied with such as ESRA protocols
		8	Persistence in soil/water and soil absorption potential & bio magnification & bioaccumulation GHS09 WARNING H410 (Very toxic to aquatic life with long lasting effects)					Ensure environmental monitoring is complied with such as ESRA protocols