

# The Environmental Management Plan for establishing Agricultural Projects within the Oranjemund Constituency

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## Document Status

<b>Proponent</b>	Oranjemund Constituency Office
<b>Title of the proposed Activity</b>	The Environmental Management Plan for establishing Agricultural Projects within the Oranjemund Constituency
<b>Activity Type</b>	Establishment of Agricultural Projects
<b>Location of the Activity</b>	<p>The Agricultural Project will be located along the Orange River and between Oranjemund and Rosh Pinah at four different areas:</p> <ul style="list-style-type: none"> <li>• Farm 212 Hohenfels GPS Coordinates: 16.81000000 and 29.20750000</li> <li>• Lucerne A and Lucerne B GPS Coordinates: 16.72416667 and 28.46027778</li> <li>• Upper portion closer to Plot B of Debaras 2 GPS Coordinates: 17.32388889 and 29.20750000</li> <li>• Rosh Pinah GPS Coordinates: 17.01055556 and 28.54805556</li> </ul>
<b>Competent Authority</b>	Environmental Commission (Ministry of Environment and Tourism)
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## **PURPOSE OF THIS DOCUMENT**

This document, Environmental Impact Assessment (EIA) Report and Environmental Management Plan (EMP) for the establishment of an Agricultural Project for Oranjemund Constituency Office presents the findings of the impact assessment with respect to issues and concerns raised during the scoping phase of the EIA. The findings are presented in the following reports:

- The Environmental Impact Assessment, with several appendices, including the Issues and Response Report (indicating to stakeholders where their issues have been captured)
- Environmental Management Plan (this Report).

### *Appreciation for participation by stakeholders*

Stakeholders were invited to partake in the consultation process. Various media platforms were used to engage the public on the proposed activities as per the Background Information Document (BID) attached on the annexes. Newspaper advertisements were placed in two local daily English newspapers and notice boards were placed around community notice board in Oranjemund and Rosh Pinah areas. In addition, radio announcements were made via the local languages (NBC Oshiwambo, National Radio and Afrikaans NBC Radio Stations) inviting community members to a Public Consultation meeting. Social Media (Facebook) was also used to engage the stakeholders. Project Background Information Documents were available from the Henties Bay Community Library. The BID was also available from the KPM Offices in Windhoek (the consultant) on request via e-mail.

## **PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL SCOPING REPORT**

A period of three weeks (from 29<sup>th</sup> of November to 21<sup>st</sup> December 2019) was dedicated to receiving comments and inputs from the public on the proposed Agricultural Project for Oranjemund Constituency Office in //Kharas Region. Copies of the BID were couriered

to all registered Interested and or Affected Parties (I&APs) especially the farming community in //Kharas Region and all other registered stakeholders. In addition, the availability of the draft EIA Report was announced in the media as well as by way of letters addressed to registered key stakeholders.

### **OPPORTUNITIES FOR PUBLIC REVIEW**

The following methods of public review of the Environmental Impact Assessment Report were available:

- Completing the comment sheet enclosed with the reports;
- Additional written submissions;
- Comment by email or telephone;
- Comment during the public participation meeting at the Rosh Pinah Community Hall (meeting held on Friday, 20<sup>th</sup> December 2019 at 10h30).

### **FINAL ENVIRONMENTAL IMPACT REPORT**

Comments received from stakeholders on the draft findings during the review period were assessed and are now included in this Final EIA Report.

## **ACRONYMS AND ABBREVIATIONS**

BID	Background Information Document
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
I&AP	Interested and Affected Party
KPM	KPM Environmental Consulting
MET	Ministry of Environment and Tourism
NGO	Non-Governmental Organization

## **GLOSSARY OF TERMS**

**Assessment** - The process of collecting, organizing, analysing, interpreting and communicating information relevant to decision making.

**Competent authority** - means a body or person empowered under the local authority's actor a delegation made under the Pollution Prevention and Waste Management Bill to enforce the rule of law.

**Cumulative Impacts** - in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Evaluation** – means the process of ascertaining the relative importance or significance of information, the light of people's values, preference and judgments in order to make a decision.

**Environment** - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

**Environmental Impact Assessment (EIA)** - the process of assessment of the effects of a development on the environment.

**Environmental Management Plan (EMP)** - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

**Interested and Affected Party (I&AP)** - any person, group of persons or organization interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

**Mitigate** - The implementation of practical measures to reduce adverse impacts.

**Proponent (Applicant)** - Any person who has submitted or intends to apply for an authorization, as legislated by the National Environmental Assessment Policy, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

**Public** - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of public, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

**Scoping Process** - the process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

**Significant effect/Impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Stakeholders** - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term, therefore, includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Stakeholder engagement** - The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can, therefore, be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term "public participation".



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## Abbreviations

Abbreviations	Meaning
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ER	Employee Representative
ECO	Environmental Control Officer
OTC	Oranjemund Town Council
I&AP	Interested and Affected Parties

# 1. INTRODUCTION

As part of its mandate, the Oranjemund Constituency Office intends to establish several agricultural projects within the Oranjemund mining areas as well as in the Rosh Pinah areas that has been already mined. The purpose of the agricultural projects for the Constituency is to sustain the two areas after the mining activities both for Namdeb in Oranjemund and for Skorpion Zinc mine in Rosh Pinah has ended. The Oranjemund Constituency Office has identified several area in Oranjemund and along the Orange River and also one in Rosh Pinah where the initial projects will commence. The identified areas are:

- Farm 212 Hohenfels
- Lucern A & Lucern B
- Upper portion closer to Plot B Daberas 2 and
- Open area of Rosh Pinah (southern part of Rosh Pinah town along the C13 national road network).

Bulk infrastructure and services to the proposed agricultural projects will be provided as follow:

- **Water:** A water reticulation system with accordance with the Sewerage and Drainage Regulations (amendments) Local authorities Act, Section 23 of 1992 and guidelines will be constructed for each project (in case if they are to be connected through the Town Council). All projects will be provided with individual water connection points.
- **Sewer:** A sewerage system will be provided either connected to the Municipal sewerage system or each project to establish their own septic tank. Extensions of the sewer network to enable individual project connections can be discussed with the Oranjemund Town Council and RoshSkor respectively.
- **Streets:** Access to the planned projects will be through existing roads networks s that will be extended into the new areas.

- **Electrical services:** An electrical network system will be constructed to accommodate individual connections to each project site. Electricity infrastructure will also be connected to the Oranjemund Town Council/Nampower grid and managed accordingly.

The development of an EMP is a requirement for any EIA project as per Namibia's Environmental Management Act (7 of 2007). Therefore, this EMP is a legal document that must accompany the EIA Report before an Environmental Clearance is issued. The main purpose of this EMP is to:

- Minimize adverse impacts on the environment;
- Protect the environmental quality of the site;
- Meet the requirements of all national and local legislations;
- Outline guidelines for construction of services and operational phase of the project.
- Provide detailed specifications (table 2) for the management and mitigation of activities that have the potential to impact negatively on the environment.

This EMP describes the mitigation and monitoring measures to be implemented during the following phases of these developments:

- **Construction Tender Preparation** – the period during which the Oranjemund Constituency, having secured the necessary legislative and administrative arrangements, prepare construction tender documents for the development of services infrastructure to service the various agricultural projects as well as any other construction process(s) within the agricultural farming plot;
- **Construction** – the period during which the services infrastructure will be constructed to service the various agricultural plots within the Oranjemund Constituency;

- **Operation and Maintenance** – the period during which the services infrastructure will be fully functional and maintained by the Oranjemund Constituency.
- **Decommissioning and rehabilitation** – the period when the agricultural activities reaches its end period. Decommissioning and rehabilitation measures have been outlined on Page 22.

## **2. RESPONSIBILITIES**

The responsibility for the implementation of the EMP ultimately lies with the Oranjemund Constituency (the Developer), who is also responsible for the eventual operation of these developments. The implementation of this EMP requires the involvement of several key individuals, each fulfilling a different but vital role to ensure sound environmental management during each phase of these developments.

The Developer should appoint an Employer’s Representative (ER) to oversee all aspects of these developments for all development phases (including all contracts for work outsourced). The Developer may decide to assign this role to one person for the full duration of these developments, or may assign an ER to each of the development phases – i.e. one for the Planning and Design Phase, one for the Construction Phase and one for the Operational and Maintenance Phase. The ER will in turn appoint an Environmental Control Officer (ECO) to oversee the implementation of the whole EMP during the Construction and Operation and Maintenance Phases. Again, the ER (and/or the Developer) may decide to assign this role to one person for both phases, or may assign a different ECO for each phase – i.e. one for the Construction Phase and another for the Operation and Maintenance Phase. The following positions and their respective responsibilities are outlined below:

- Employer’s Representative;
- Environmental Control Officer; and

- Contractor (Construction and Operations and Maintenance).

## 2.1. Employer's Representative

The ER is appointed by the Developer to manage all contracts for work/services that are outsourced during all development phases. Any official communication regarding work agreements is delivered through this person. The ER should with the commencement of the project appoint a competent ECO who will represent the Developer on-site.

During the Planning and Design and Construction Tender Preparation Phase, the ER will have the following responsibilities regarding the implementation of this EMP:

- Ensuring that the necessary legal authorizations have been obtained (see Table 1);
- Developing, managing implementation of and maintaining all Development Guidelines;
- Ensure that the management requirements included in Table 2 inform the planning and design of the relevant infrastructure developments (i.e. that these requirements are considered during the Planning and Design Phase not as an afterthought); and
- Ensure that the management requirements included in Table 2 inform the preparation of tender documents for the construction of the relevant infrastructure developments.

During the Construction and Operation and Maintenance Phases the ER shall assist the ECO where necessary and will have the following responsibilities regarding the implementation of this EMP:

- Ensuring that the necessary legal authorisations and permits (see Table 1) have been obtained by the Contractor;
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary;
- Ordering the removal of individuals and/or equipment not complying with the EMP;

- Issuing fines for transgression of site rules and penalties for contravention of the EMP; and
- Providing input into the ECO's ongoing internal review of the EMP. This review report should be submitted on a monthly basis to the Developer.

Theme	Legislation Instrument	Management Requirements
<b>Archeology</b>	National Heritage Act 27 of 2004	All protected heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
<b>Environmental</b>	Environmental Management Act (EMA) 7 of 2007 EIA Regulations (EIAR) (GN) No. 28/2007 (GG No. 4878)	The amendment, transfer or renewal of the Environmental Clearance Certificate (ECC) (EMA S39-42; EIAR S19 & 20). Amendments to this EMP will require an amendment of the ECC for these developments.
	"List of activities that may not be undertaken without ECC" GG No. 4878 GN No. 29	Any activities listed in this listing notice require an ECC and hence an Environmental Assessment.
<b>Labour</b>	Labour Act 11 of 2007 Health and Safety Regulations (HSR) GN 156/1997 (GG 1617).	Adhere to all applicable provisions of the Labour Act and the Health and Safety regulations.
<b>Roads</b>	Roads Ordinance 17	<ul style="list-style-type: none"> <li>• Width of proclaimed roads and road reserve boundaries (S3.1)</li> <li>• Control of traffic on urban trunk and main roads (S27.1)</li> <li>• Rails, tracks, bridges, wires, cables, subways or culverts across or under proclaimed roads (S36.1)</li> <li>• Infringements and obstructions on and interference with proclaimed roads. (S37.1)</li> <li>• Distance from proclaimed roads at which fences are erected (S38)</li> </ul>
<b>Water</b>	Water Act 54 of 1956	Section 21 details provisions relating to effluent discharge permits.
	Water Quality Guidelines for Drinking Water and Waste Water Treatment	Details specific quantities in terms of water quality determinants, which waste water should be treated to before being discharged into the environment

Table 1: Relevant guidelines and legislated permit requirements

## 2.2. Environmental Control Officer (ECO)

The ECO should be a competent person appointed by the ER. The ECO is the Developer's on-site representative primarily responsible for the monitoring and review of on-site environmental management and implementation of the EMP by the Contractor. If no ECO is appointed the duties of the ECO fall upon the ER.

During the Construction Phase and Operation and Maintenance Phase the ECO's duties include the following:

- Assisting the ER in ensuring that the necessary legal authorisations have been obtained;
- Maintaining open and direct lines of communication between the ER, Developer, the Construction and/or Operations and Maintenance Contractor, and Interested and Affected Parties (I&APs) with regard to this EMP and matters incidental thereto;
- Monthly site inspection of all construction and/or infrastructure maintenance areas with regard to compliance with this EMP;
- Monitor and verify adherence to the EMP (audit the implementation of the EMP) and verify that environmental impacts are kept to a minimum;
- Taking appropriate action if the specifications of the EMP are not adhered to;
- Assisting the Contractor in finding environmentally responsible solutions to problems;
- Advising on the removal of person(s) and/or equipment not complying with the specifications of the EMP in consultation with the ER;
- Recommending the issuing of fines for transgressions of site rules and penalties for contraventions of the EMP; and
- Undertaking an annual review of the EMP.



### 2.3. Contractor (Construction and Operations and Maintenance)

The Contractor is responsible for the implementation of the EMP, on-site monitoring and evaluation of the EMP. It is envisaged that various contractors might be appointed at various periods for various tasks throughout the life cycle of the agricultural development (construction through to decommissioning phase) of this project. These can be broadly grouped into Construction Contractors and Operations and Maintenance Contractors. In order to ensure sound environmental management, the relevant sections of this EMP should be included in all contracts of work outsourced thus legally binding all appointed contractors and sub-contractors. All contractors shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers and newcomers receive an induction presentation on the importance and implications of the EMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice.

The Contractor should keep records of all environmental training sessions, including names, dates and the information presented.

### 3. SUMMARY OF ENVIRONMENTAL IMPACTS & PROPOSED MITIGATION MEASURES

#### 3.1. Construction Tender Preparation

The management requirements described below should be consulted and carried out when the construction tender documents for the installations of agricultural infrastructure are prepared.

Aspect	Management Requirements
<b>EMP implementation</b>	Relevant sections of this EMP should be included in the tender documents for all development so that tenderers can make provision for the implementation of the EMP: <ul style="list-style-type: none"> <li>• Construction of services infrastructure</li> <li>• Maintenance of services infrastructure</li> </ul>
<b>Financial provision</b>	<ul style="list-style-type: none"> <li>• Financial provision for the compilation of a Waste Management Plan should be included as a cost item within tenders concerning the construction and/or maintenance of services infrastructure.</li> <li>• Financial provision for topsoil management and the rehabilitation of exhausted borrow pits should be included as a cost item within construction tender documents.</li> <li>• Financial provision for the co-opting of a health officer from the Ministry of Health and Social Services to facilitate HIV/AIDS and TB education programmes periodically on site during the construction phase should be included as a cost item within construction tender documents.</li> <li>• Financial provision for the facilitation of an induction programme for both senior, temporary construction personnel as well as subcontractors and associated personnel should be included as a cost item within tenders concerning the construction and/or maintenance of services infrastructure.</li> <li>• Financial provision for the compilation of a Tree Management Plan should be included as a cost item within construction tender documents.</li> <li>• Financial provision for the drafting of a Communication Plan should be included as a cost item within construction tender documents.</li> </ul>
<b>Recruitment</b>	<ul style="list-style-type: none"> <li>• Provisions designed to maximise the use of local labour should be included within tender documents concerning the construction and/or maintenance of services infrastructure.</li> <li>• A provision stating that all unskilled labour should be sourced from local communities should be included within tenders concerning the construction and/or maintenance of services infrastructure.</li> <li>• Specific recruitment procedures ensuring qualified local companies enjoy preference during tender adjudication should be included within tenders concerning the construction and/or maintenance of services infrastructure.</li> <li>• Provisions promoting gender equality pertaining to recruitment should be included within tender documents concerning the construction and/or maintenance of services infrastructure.</li> <li>• Women should be given preference for certain unskilled jobs (e.g. flag bearers).</li> </ul>

Table 2: Construction Tender Preparation Requirements

### 3.2. Construction Phase

Table 2 below provides mitigation measures for the various environmental aspects identified in the EIA report.

Aspect Description	Mitigation Measure	Responsibility
<b>Aesthetic (Change in landscape) / Sense of place</b>	<p>The constituency/town strategic development plan is assessed for its impact on sense of place.</p> <p>Indicators:</p> <ul style="list-style-type: none"> <li>• An expert assesses the effects of the current strategic development plan on sense of place;</li> <li>• The current development plan is amended to consider sense of place.</li> </ul>	Oranjemund Constituency
<b>Employment Creation (Influx of job seekers)</b>	<p>The Contractor should compile a formal recruitment process including the following provisions as a minimum:</p> <ul style="list-style-type: none"> <li>• Recruitment should not take place at construction sites.</li> <li>• Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labour outside the agreed upon process.</li> <li>• Contractors should give preference in terms of recruitment of sub-contractors and individual labourers to those who are qualified and from the project area and only then look to surrounding towns.</li> <li>• Clearly explain to all job-seekers the terms and conditions of their respective employment contracts (e.g. period of employment etc.) – make use of interpreters where necessary.</li> </ul>	Contractor/Agricultural investor
<b>Health &amp; Safety related impacts</b>	<ul style="list-style-type: none"> <li>• No human waste should come in contact with open soil. Every construction site should have at least one portable toilet.</li> <li>• No open fires may be made anywhere on-site during the construction period. Heating and cooking facilities (where necessary) should be provided by the Contractor.</li> </ul>	Contractor/Agricultural investor
<b>Noise and Vibration</b>	<ul style="list-style-type: none"> <li>• All workers on site must be equipped with ear plugs to be used when the noise becomes unbearable.</li> <li>• Switch off machines that are not used.</li> <li>• Construction activities which known to generate vibration should be scheduled for day periods and not at night.</li> <li>• Duration of vibration should be kept as short as possible.</li> <li>• Proper maintenance including routine servicing of equipment</li> </ul>	Safety Officer / ECO

Aspect Description	Mitigation Measure	Responsibility
<b>Dust</b>	<ul style="list-style-type: none"> <li>• Equip all the workers exposed to dust with dust masks;</li> <li>• Spray the areas that are mostly affected with water to minimize dust;</li> <li>• Minimize activities that can generate dust during windy days;</li> <li>• Limit the speed within the whole construction area to a maximum of 40 km/h;</li> <li>• Dust will significantly be reduced if excavation and land clearing is carried out after it has rained and the soil is wet.</li> </ul>	Site Manager and Environmental Control Officer
<b>Conservation and Vegetation (Soil Erosion)</b>	<ul style="list-style-type: none"> <li>• The layout and building design should incorporate existing trees (a "tree" is defined as an indigenous woody perennial plant with a trunk diameter <math>\geq 150</math> mm).</li> <li>• The Contractor/investor should compile a Tree Management Plan which should include the following as a minimum: <ul style="list-style-type: none"> <li>- Trees (as defined above) if not already accounted for in an existing GIS, should be surveyed, coordinates/location incorporated into the Contractor's GIS, marked with paint (or other means so as to be readily visible) and protected;</li> <li>- Trees, which are impossible to conserve, need to be identified and their location recorded on a map;</li> <li>- The Contractor should apply to the local authority for a permit to remove these trees.</li> <li>- A list should be compiled of all trees to be removed detailing the erf on which they are located, the species as well as which trees will be planted to replace these. The nursery where these trees will be sourced from should also be included;</li> <li>- Each tree that is removed needs to be replaced after construction;</li> </ul> </li> <li>• Only a limited width +/- 5 m on the side of roads may be partially cleared of vegetation.</li> </ul>	Contractor/agricultural investor

Table 3: Construction Phase Mitigation Measures

### 3.3. Operational Phase

Aspect Description	Mitigation Measure	Responsibility
<b>Traffic Congestion</b>	<ul style="list-style-type: none"> <li>• Introduce traffic calming measures on strategic routes.</li> <li>• Encourage heavy traffic to avoid residential areas and the CBD</li> </ul>	Oranjemund Constituency
<b>Effluent Generation</b>	<ul style="list-style-type: none"> <li>• Sewage should not be discharged directly onto open soil. All sewage must be removed regularly and disposed of at a recognised (municipal) sewage treatment facility.</li> <li>• The water collected from wash basins and showers (grey water), should not be left standing for long periods of time as this promotes parasite and bacterial proliferation.</li> <li>• Grey water should be recycled: <ul style="list-style-type: none"> <li>- Used for dust suppression;</li> </ul> </li> </ul>	Oranjemund Constituency

Aspect Description	Mitigation Measure	Responsibility
	<ul style="list-style-type: none"> <li>- Used to water a vegetable garden, or to support a small nursery;</li> <li>- Used to clean equipment.</li> <li>• Grey water that is not recycled should be removed along with sewage on a regular basis.</li> </ul>	
<b>Impact on Water resources</b>	<ul style="list-style-type: none"> <li>• All accommodation establishments provide awareness materials to their guests;</li> <li>• The municipality reinforces water awareness by including a message relating to water saving on their monthly municipal accounts.</li> <li>• The sustainable yields of the project boreholes should be determined during the acquirer test (pumping test) by a qualified and experienced hydrogeologist who will then recommend a safe abstraction yield for the project site to the proponent.</li> <li>• Groundwater should be abstracted and used efficiently by limiting it to certain activities such as ablution facilities, drinking and cooling site equipment (if required).</li> <li>• The developer/contractor should strictly adhere to the abstraction volumes given in their abstraction permit, and where possible, use less water than the allocated volume in the water permit.</li> <li>• The proponent should raise awareness to their workers on water savings measures and include the reality of climate change and its impact on groundwater recharge, and eventual effect on the water supply in the area.</li> <li>• Re-use of the water used on some of the project activities should be encouraged.</li> </ul>	Oranjemund Constituency/ Contractor
<b>Waste Generation</b>	<ul style="list-style-type: none"> <li>• The construction site should be kept tidy at all times. All domestic and general construction waste produced on a daily basis should be cleaned and contained daily.</li> <li>• No waste may be buried or burned.</li> <li>• Waste containers (bins) should be emptied regularly and removed from site to a recognised (municipal) waste disposal site. All recyclable waste needs to be taken to the nearest recycling depot.</li> <li>• A sufficient number of separate bins for hazardous and domestic/general waste must be provided on site. These should be clearly marked as such.</li> <li>• Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.</li> <li>• No waste may remain on site after the completion of the project.</li> <li>• Irrigation should be designed and managed for zero or minimum deep percolation during the growing seasons to keep fertilizer and pesticides in the root zone for a time being.</li> <li>• Conduct water resources pollution awareness for all workers involved in both project phase should be implemented.</li> <li>• Waste disposal sites should be lined so that soluble substances from the wastes do not leach into groundwater systems when it rains or get washed into the Orange River.</li> </ul>	Contractor/Agricultural investor

Aspect Description	Mitigation Measure	Responsibility
	<ul style="list-style-type: none"> <li>All run-off materials such as hydrocarbons, waste water and other potential pollutants associated with the project should be contained on site in designated containers and disposed of at nearby approved sites in accordance to the municipal waste discharge standards, so that they do not reach water bodies (systems).</li> </ul>	
<b>Flooding</b>	<p>A Stormwater Management Plan should be developed by the proponent for all planned development and should address as a minimum the following:</p> <ul style="list-style-type: none"> <li>Ensure that the stormwater system is separate from the sewerage system.</li> <li>Canalising of run-off with concrete should be avoided as far as possible and natural run-off surfaces utilised or enhanced.</li> <li>Storm water channels should be accommodated next to roads in the reserve.</li> <li>Where practical/feasible consider soft/permeable road shoulder options – minimise paved or impermeable areas.</li> <li>Run-off from areas where surface water might become contaminated should be captured, detained and treated to sewage effluent standards.</li> </ul>	Oranjemund Constituency / Developer
<b>Increase Crime</b>	Policing Neighbourhood Watches	Oranjemund Constituency / Developer
<b>Increase Poaching</b>	Education Public Awareness Policing	Oranjemund Constituency / Developer
<b>Soil Contamination</b>	<ul style="list-style-type: none"> <li>All heavy construction vehicles and equipment on site should be provided with a drip tray. <ul style="list-style-type: none"> <li>Drip trays are to be transported with vehicles wherever they go.</li> <li>Drip trays should be cleaned daily and spillage handled, stored and disposed of as hazardous waste.</li> </ul> </li> <li>All heavy construction vehicles should be maintained regularly to prevent oil leakages.</li> <li>Maintenance and washing of construction vehicles should be take place only at a designated workshop area. <ul style="list-style-type: none"> <li>The workshop area should be lined with concrete and sloped so as to collect and detain all run-off.</li> <li>The workshop should have an oil-water separator for collected run-off from washing.</li> </ul> </li> <li>Spilled cement and/or concrete (wet or dry) should be treated as hazardous waste and disposed of by the end of each day in the appropriate hazardous waste containers.</li> <li>All hazardous substances (e.g. fuel etc.) or chemicals should be stored in a specific location on an impermeable surface that is bunded.</li> <li>Spill control preventative measures should be put in place to manage soil contamination, thus minimising the</li> </ul>	Contractor/Agricultural investor

Aspect Description	Mitigation Measure	Responsibility
	contamination from reaching water bodies during irrigation or run-offs.	

Table 4: Operational Phase Mitigation Measures

### 3.4. Decommissioning Phase

The permanent closure of these developments is not envisaged. However, in the event that they are decommissioned the following mitigation measures should be adhered to.

Aspect Description	Mitigation Measure	Responsibility
<b>Construction related activities</b>	<ul style="list-style-type: none"> <li>Many of the mitigation measures prescribed for construction activity for these developments (see construction phase mitigation measures) would be applicable to some of the decommissioning activities. These should be adhered to where applicable.</li> </ul>	Oranjemund Constituency/ Contractor
<b>Rehabilitation</b>	<ul style="list-style-type: none"> <li>Upon completion of the construction phase consultations should be held with the local community/property owner(s) regarding the post-construction use of exhausted borrow pits.</li> <li>In the event that no post-construction uses are requested, all exhausted borrow pits and excavated areas need to be rehabilitated as follows: <ul style="list-style-type: none"> <li>Borrow pits and excavated areas may only be backfilled with clean or inert fill. No material of hazardous nature (e.g. sand removed with an oil spill) may be dumped as backfill.</li> <li>Rehabilitated borrow pits and excavated areas need to match the contours of the existing landscape.</li> <li>The rehabilitated area should not be higher (or lower) than nearby drainage channels. This ensures the efficiency of revegetation and reduces the chances of potential erosion.</li> <li>Topsoil is to be spread across borrow pit and excavated areas evenly.</li> <li>Deep ripping is required, not just simple scarification, so as to enable rip lines to hold water after heavy rainfall.</li> <li>Ripping should be done along slopes, not up and down a slope which could lead to enhanced erosion. Rehabilitated borrow pits need to remain fenced-off after the decommissioning of the project to prevent livestock from denuding the newly established vegetation on the area.</li> </ul> </li> </ul>	Oranjemund Constituency/ Contractor

Table 5: Decommissioning Phase Mitigation Measures

## **4. CONCLUSION AND RECOMMENDATIONS**

Various impacts of activities within the Oranjemund Constituency on the environment were identified. It is acknowledged that implementation of some measures would require substantial time and / or financial resources, while others are achievable within operational norms. The Oranjemund Constituency Office and the identified agricultural investor or chosen farmer can thus decide on the prioritization of mitigation measures according to their resource capacity within the institution.

The Environmental Management Plan is a leaving document and while care has been taken to ensure that all identified issues have been covered, there might be some issues that might arise as a results of a new agricultural technology that might be used. Therefore, it will be a responsibility of the proponent to ensure that new issues arising during implementation are properly assessed and mitigation measures are put in place.

The EMP is a legal document which the proponent should familiarise with and ensure that his/her contractors adheres to all provisions and mitigation measures proposed.