

ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED ESTABLISHMENT OF URBAN AGRICULTURAL PLOTS ON THE REMAINDER OF PORTION B OF SWAKOPMUND TOWN AND TOWNLANDS NO.41



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DOCUMENT INFORMATION

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LIST OF ACRONYMS

DEA:	Directorate of Environmental Affairs
DWA:	Directorate of Water Affairs
EAP:	Environmental Assessment Practitioner
ECC:	Environmental Clearance Certificate
ECO:	Environmental Control Officer
EHP:	Environmental Health Practitioner
EIA:	Environmental Impact Assessments
EMA:	Environmental Management Act
EMP:	Environmental Management Plan
ERP:	Emergency Response Plan
ERWF:	Erongo Water Forum
GN:	Government Notice
I&APs:	Interested and Affected Parties
ILO	International Labour Organization
MEFT:	Ministry of Environment, Forestry, and Tourism
MoHSS:	Ministry of Health and Social Services
MSDS:	Material Storage Data Sheet
PC:	Project Coordinator
PPE:	Personal Protective Equipment
G. A. P	Good Agricultural Practices
PMC:	Project Management Committee

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

The Municipality of Swakopmund has demarcated an area on the Remainder of Portion B of Swakopmund Town and Townland No.41 for urban agricultural activities. The demarcated area measures approximately 22.5ha and is located on the northeast of the town CBD and is accessible via the C34 road to Henties Bay.

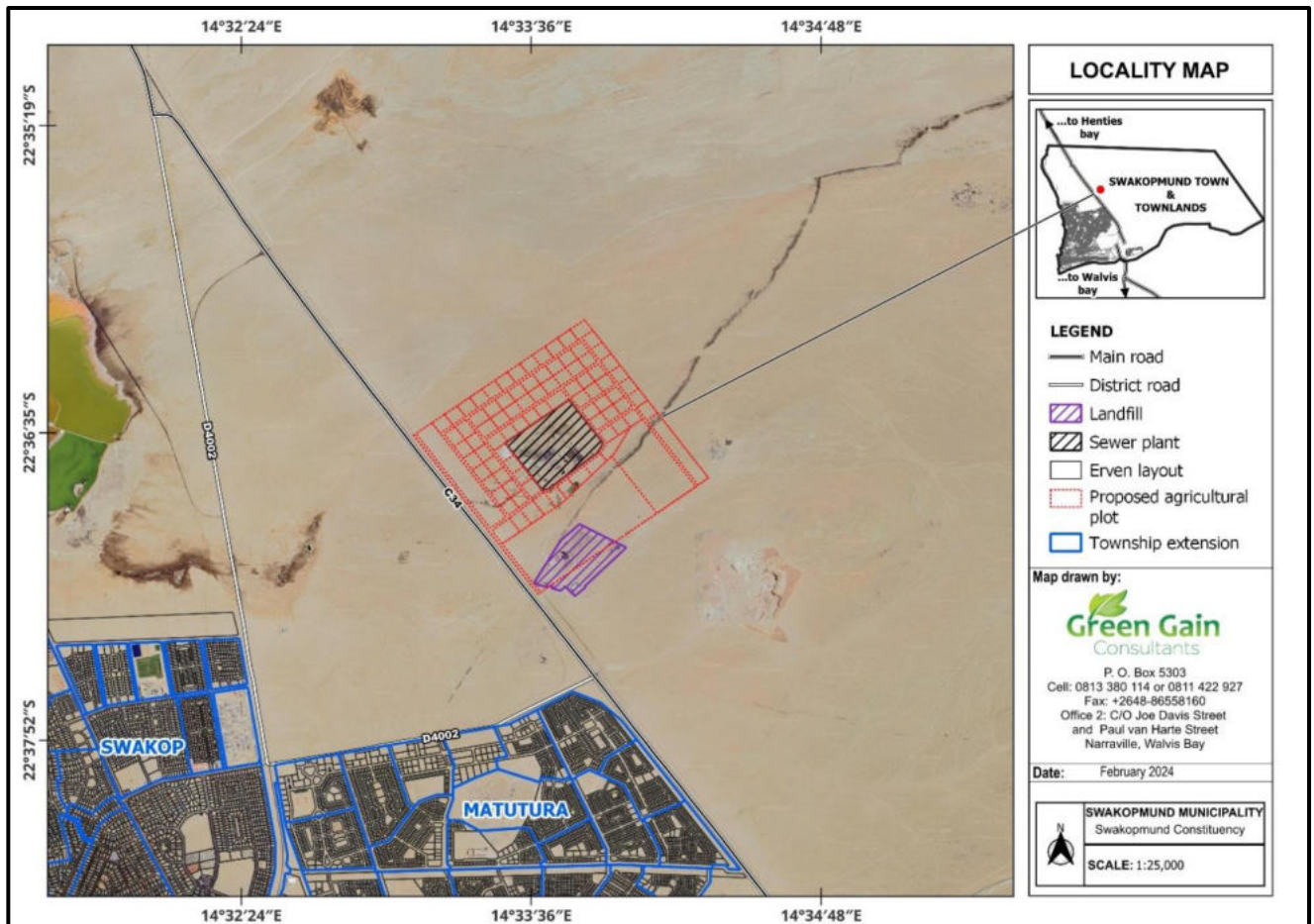


Figure 1: Locality map for the Agriculture Plots

It is in the proximity of the existing Sewage Treatment Plant (STP), the Swakopmund dumpsite and existing stone quarry. The demarcated area will be divided into 90 plots and the agricultural allotments will be leased out to interested and qualified local farmers of which preferences will be given to woman, youth, and persons with disabilities. The agricultural activities to be permitted on these plots are primarily gardening (vegetables, fruits, and ornamental etc.) and limited animal farming such as poultry and rabbits. Livestock farming such as pig, cattle, sheep, and goats will not be allowed.

1.2 About this Document

This document represents a generic Environmental Management Plan (EMP) which applies to all agricultural activities on the demarcated area. The EMP was prepared in line with Section 8 (j) of the EIA Regulations (GN 30 of February 2012), and the proponent's Terms of Reference. The EMP contains aspects of the proposed management and mitigation measures to be taken to address the identified negative environmental impacts and enhancement measures for the positive environmental impacts. It also addresses the need for compliance monitoring of identified significant environmental impacts. It is a legally binding document, thus, any deviation or transgression from this EMP is punishable by law as per the Environmental Management Act 07 of 2007. Parties responsible for transgressing may be held responsible for any rehabilitation that may need to be undertaken.

This EMP has been compiled for the management of potential environmental impacts during the planning, design, operation, and decommissioning phases of the proposed Agricultural plots. The EMP also includes best practices and good agricultural practices (G.A.P) that should be adopted by the farmers.

The specific objectives of this EMP are.

- Present measures to avoid, lessen and mitigate adverse impacts on various environmental components, and enhance the value of environmental components where possible.
- Define the roles and responsibilities for the implementation of environmental management and mitigation measures.
- Explain the need for compliance with regulatory provisions and guidelines.
- Explain procedures for compliance monitoring and reporting to the relevant competent and regulatory authorities.
- Present procedures for the possible decommissioning and required environmental rehabilitations.

The EMP is not a standalone document; however, it must be read in conjunction with the Scoping report. All personnel taking part in the planning, construction, operation, and maintenance phase should be made aware of the contents of this EMP. The EMP is also a dynamic document that allows for the evaluation of the success or failure of management actions and to carry out reorientation of the relevant actions if found necessary.

2. ROLES AND RESPONSIBILITIES

2.1 Project involvement

The implementation of the EMP requires a multitude of administration of various role players, each with specific responsibilities to ensure that the proposed activities are planned and designed, constructed, operated, and maintained in an environmentally sound manner.

Table 1: Project team

NO.	SPECIFIC PROJECT ROLE	ADDRESS AND CONTACTS
1.	Proponent	Municipality of Swakopmund Project Coordinator Mr. Robeam Ujaha rujaha@swkmun.com.na Environmental Officer Ms. Paulina Engelbrecht Email: pengelbrecht@swkmun.com.na
2.	Environmental Assessment Practitioner	Green Gain Consultants cc Mr. Joseph Amushila Cell: +264811422927 Email: info@greengain.com.na

2.2 Roles and Responsibilities

2.2.1 Proponent (Municipality of Swakopmund)

To ensure the successful implementation of this EMP, the Municipality of Swakopmund should establish a Project Management Committee (PMC) and make appointment of a Project Coordinator (PC) and an Environmental Control Officer (ECO) to perform the following responsibilities.

a). Project Management Committee (PMC)

Since the project implementation requires a multitude of administration responsibilities and collaboration among various Municipal Departments, a committee consisting of key officials shall be appointed to direct project management as follows.

- Receive applications for allotments, review and make recommendations to Council/Management for approvals.
- Establish, review, update and enforce the terms of lease agreement with the interested parties.
- Addressing concerns and offering guidance on budgeting, marketing, and other financial issues.
- Assisting in the formulation of business-related policies, processes, and guidelines.
- Identifying, monitoring, and eliminating potential operational risks.
- Analyzing and discussing changes that have occurred or will occur to guarantee the project's success.
- Where relevant, providing further insights on business or project concerns.
- Establish synergies for collaboration with relevant authorities and stakeholders

b). Project Coordinator (PC)

The PC in collaboration with the PMC and ECO shall

- Ensure that Council employees and Farmers allotted at the Agricultural plots are aware of this EMP and provide brief training (when necessary).
- Take corrective measures to address transgressions and non-compliance.
- Keep a record of emergencies and take corrective actions as per Section 8.
- Handle grievances in the prescribed manners as outlined in Section 9.
- All operation and maintenance activities are in line with Municipality environmental code of conduct.
- Receive and approve method statements from contractor/farmers.

c). Environmental Control Officer

The EC in collaboration with the PC and PMC shall ensure that.

- That all environmental impacts are managed according to the environmental principles of avoiding, minimizing, mitigating, and rehabilitation as contained in this EMP.
- Appropriate compliance monitoring is executed as outlined in Section 7 (7.1).
- Handle grievances in the prescribed manners as outlined in Section 9.
- Notify MEFT of any proposed changes to the scope of project and potential environmental impacts.
- That a copy of this EMP is always kept on site.
- Review of the on-site environmental management and implementation of the EMP by the employees.
- Compile biannual environmental reports submit to MEFT and ensure renewal of the ECC upon expiry.
- Liaise with relevant authorities and ensure that all activities follow the relevant legislations.

2.2.2 Environmental Assessment Practitioner (EAP)

The EAP in collaboration with the Municipality team is responsible for the compilation of an Environmental Scoping report and EMP and submission of such reports to the regulatory authority (MEFT). In addition, the EAP will make an application of the ECC on behalf of the proponent and make follow-ups on the application.

2.2.3 The contractor and sub-contractors

It is expected that various contractors and sub-contractors will be appointed during the construction and maintenance phases. All appointed contractors and sub-contractors involved in the project shall ensure compliance with the EMP and its conditions, thus the proponent must ensure that a copy of the EMP is given to all contractors involved. The contractor upon receiving this EMP, should ensure compliance to this EMP by:

- Undertaking their activities in an environmentally sensitive manner and within the context of this EMP.
- Undertaking good housekeeping practices during the duration of their activities.
- Ensuring that adequate environmental awareness training takes place in the language of their employees.
- Making provision for induction of the Municipality Environmental Policy
- Keeping a record of emergencies and taking appropriate corrective actions.
- Taking appropriate disciplinary actions against their employees in case of transgression.

2.2.4 Developers (Farmers/Leases)

Farmers who are allotted to the plots should be receiving this EMP as part of their contract and, should ensure compliance to this EMP by:

- Undertaking their activities in an environmentally sensitive manner and within the context of this EMP.
- Undertaking good housekeeping practices during the duration of their activities.
- Ensuring that adequate environmental awareness training takes place in the language of their employees.
- Making provision for induction of the Municipality Environmental Policy
- Keeping a record of emergencies and taking appropriate corrective actions.
- Taking appropriate disciplinary actions against their employees in case of transgression.

2.2.5 Regulatory Authorities

The proposed agricultural activities falls under the mandate of two regulatory authorities namely; the Ministry of Agriculture, Water and Land Reform (MAWLR) and Namibian Agronomic Board (NAB).

MAWLR was established and mandated to

- Create an enabling environment to develop, manage and sustainably utilise agricultural, water and forest resources for socio-economic development.
- Develop, promote, and facilitate management of the agricultural sector through the application of modern techniques, science, and appropriate technology.
- Provide extension services in the form of information, advice and training to farmers, agro-based industries, and other stakeholders and to promote technology development, adaptation, and adoption.
- Formulate regulations and policies and create awareness to ensure conformity to regulations and policies on plant and animal health quality and safety, including the use of agro chemicals.

NAB was established to promote the agronomic industry and to facilitate the production, processing, storage, and marketing of controlled products in Namibia. NAB is working on a local G.A.P (Good Agricultural Practices) industry-based food safety standard for agronomy and horticulture products that will serve as the minimum national standard. The local G.A.P (NAM G.A.P.) aims to strengthen food safety and traceability throughout the local food supply chain from farm to the table and will be a required minimum standard for adherence to local products destined for sale on the Namibian and regional markets. Namibian products destined for exports markets such as the EU should adhere to the global GAP standard which is a globally recognized food safety standard. Farms and Facilities are inspected through a risk-based approach to ensure that the agronomy and horticulture sector manages food safety risks associated with various crops.

3. ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The successful implementation of this EMP will depend on various factors such as training and awareness, enforcement, good record keeping, and reporting.

3.1 Environmental awareness training

It is important to ensure that contractors, sub-contractors, and all Municipal employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and minimization of environmental harm.

To achieve this, all parties involved in any work at the Municipality during the construction, operation, maintenance, and decommissioning phases should be briefed on their obligation towards environmental protection in terms of the EMP before work commences. The training should also cover the actions outlined in the emergency response plan as well as the Municipality SHE Policy.

3.2 Recordkeeping

There should be an up-to-date filing system whereby method statements, environmental incidents reports, training records, audit reports, and public complaints register are kept. It is advised that photographs of the incidences should be taken as a visual reference. The grievance register must be kept by the PC or ECO during the project life span.

3.3 Enforcements

This EMP upon approval by MEFT shall be a legally binding document, thus, the commitment and co-operation of the identified responsible person(s) will ensure effective implementation of the EMP. Adherence to this EMP will ensure that the environmental impacts associated with the project will be mitigated to a greater extent thus promoting sustainable development. The EMP will be enforced in accordance with the provisions of Section of the Environmental Management Act 07 of 2007 through a contract between the Municipality and the farmers.

3.3.1 Method statements

A method statement is a document that explains the correct procedures, safety precautions and work requirements of a project. Method statements are required especially during the construction and site establishment phase to describe the scope of the intended work by the contractor or developer/farmer. This should be provided in a step-by-step description for the PC or ECO to understand the nature of the intended activities. This will enable them to assist in devising any mitigation measures, which would minimize environmental impact during these tasks. The method statements should also clearly stipulate mitigation methods of the intended works as follows.

- Details of the construction camps
- Construction procedures
- Materials and equipment to be used.
- How and where materials will be stored
- The containment of accidental leaks or spills as prescribed by this EMP.
- Timing and location of activities; and
- Any other information deemed necessary by the ECO.

The contractor must submit the method statement two weeks before the commencement of any construction activity. Work may not commence until the method statement has been accepted by the PC/ECO and communicated to the workforce. The contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The PC/ECO may require changes to a Method Statement if the proposal does not comply with the specifications or if, the proposal may result in damage to the environment more than that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

3.3.2 Non-compliance and disciplinary actions

In cases of transgressions and non-compliance to the EMP, the following actions may be taken against the transgressor.

- Disciplinary actions or Penalties
- Termination of contract/lease agreement
- Legal actions

3.4 Environmental reports

The ECO shall prepare a completion report upon the completion of the construction phase. The completion report should indicate the environmental performance, compliance to the EMP, and matter of incidental.

Furthermore, the proponent shall ensure regular monitoring of project activities during all project phases and keep records. These records may be required by the competent authority when deemed necessary. The records will also be required when applying for renewal of the ECC and Municipality will also have to indicate how the EMP was adjusted to make provision for improved mitigation measures and action plans.

4. LEGAL REQUIREMENTS

The EMP implementation shall be guided by the legislative framework as outlined in the Scoping report and briefly presented here below.

Table 2: Applicable National Laws

LEGISLATION	PROVISION AND REQUIREMENTS
Constitution of the Republic of Namibia (1990)	<p>Articles 91 (c) commands the state to actively promote and sustain the environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include:</p> <ul style="list-style-type: none"> • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Protecting Namibia’s sense of place and character. • Maintain biological diversity. • Pursuing sustainable natural resource use. <p>Article 95(i) recites: “The State shall actively promote... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.</p>
Pollution Control and Waste Management Bill, 2003	<p>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as provide for general waste management.</p> <p>The bill provides a framework for a multitude of administrations on pollution control and waste management in the country.</p>
Environmental Management Act 07 of 2007	<p>Ensuring that the significant effects of activities on the environment are considered carefully and in time. To promote the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment.</p> <p>Of relevance to this project are the following listed activities, as provided in Section 27 of the Environmental Impact Assessment Regulations of 2012, which includes:</p> <p>No. 8.5 Construction of dams, reservoirs, levees, and weirs.</p>

	No.10.1 The Construction of oil, water, gas and petrochemical and other bulk supply pipelines.
Water Act 54 of 1956 and Water Resources Management Act 11 of 2013	<p>The Water Resources Management Act 11 of 2013 is present without regulations; therefore, the Water Act 54 is still in force. The Act provides for the management and protection of surface and groundwater resources in terms of utilization and pollution.</p> <p>This Act further provides provision for the control, conservation, and use of water for domestic, agricultural, urban, and industrial purposes. In addition, the Act gives provisions that pertain to license or permit that required abstracting and using water as well as for discharge of effluent.</p>
Soil conservation Act 76 of 1969	The objectives of the Soil Conservation Act 76, 1969 are to make provision for the combating and prevention of soil erosion, and the conservation, protection, and improvement of the soil, the vegetation, and the sources and resources of the water supplies.
Nature conservation Ordinance of 1975.	The Nature Conservation Ordinance Section 14 protects and preserves wild animal life, fisheries, wild plant life and objects of geological, archaeological, historical and other scientific interest and for the benefit and enjoyment of the inhabitants of Namibia.
Hazardous Substance Ordinance of 1974	<p>This Ordinance provides for the control of toxic substances and is thus also relevant for pollution control. It covers the manufacturing, sale, use, disposal, dumping, importing, and exporting of hazardous waste.</p> <p>Of relevance to the proposed project are the use of Chlorine in water treatment and the unearthing of asbestos cement pipes which are classified as dangerous goods.</p>
Labour Act (No 11 of 2007)	<p>The Objectives of the National Labour Act are:</p> <ul style="list-style-type: none"> • To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. • Regulate basic terms and conditions of employment. • To ensure the health, safety, and welfare of employees; to protect employees from unfair labour practices.

	<ul style="list-style-type: none"> • To regulate the registration of trade unions and employers' organizations; to regulate collective labour relations. • To provide systematic prevention and resolution of labour disputes.
Asbestos Regulations: Schedule 1 (2) of Labour Act, 2007 (No. 11 of 2007, International Labour Organization Convention No. 162)	To comply with governmental requirements and minimize employee exposure, controls are necessary wherever there is a potential for exposure to airborne fibres.
Public Health and Environmental Act, 2015	<p>The objectives of the PHE Act are to.</p> <ul style="list-style-type: none"> • Promote public health and wellbeing. • Prevent injuries, diseases, and disabilities. • Protect individuals and communities from public health risks. • Encourage community participation to create a healthy environment. <p>Provide for early detection of diseases and public health risks.</p>
Employment Service Act 8 of 2011	To provide for the establishment of the National Employment Service; to impose reporting and other obligations on certain employers and institutions; to provide for the licensure and regulation of private employment agencies, and to deal with matters incidental thereto.
Atmospheric Pollution Prevention Ordinance 11 of 1976	To provide for the prevention of the pollution of the atmosphere, and matters incidental thereto. The Ordinance deals with administrative appointments and their functions; the control of noxious or offensive gases; atmospheric pollution by smoke, dust control, motor vehicle emissions; and general provisions.
Pollution Control and Waste Management Policy, 2003	The bill provides a framework for a multitude of administrations on pollution control and waste management in the country. Each authority identified by the bill shall play its respective role.
Basel and Rotterdam Convention, Framework Convention on Climate Change	Agreed to ensure environmentally sound management of hazardous waste and other wastes through the reduction of their movements, to reduce their impacts on human health and the environment.

Stockholm Convention on Persistent Organic Pollutants	Emphasizes the restriction and elimination of persistent organic pollutants especially the disposal of industrial and medical chemicals. It also provides information for future establishments to re-use, reduce and recycle waste with environmentally friendly technologies e.g., autoclaving. It was adopted in 2001 and entered into force on May 17, 2004.
MEFT Policy on HIV & AIDS	MEFT has recently developed a policy on HIV and AIDS. In addition, it has also initiated a program aimed at mainstreaming HIV and gender issues into environmental impact assessments.
National Heritage Act No. 27 of 2004	The Act is aimed at protecting, conserving, and registering places and objects of heritage significance.
Local Authorities Act No. 23 of 1992	The Local Authorities Act prescribes how a town or municipality should be managed by the Town or Municipal Council.
Agricultural Pests Act 3 of 1973	To provide for the registration of nurseries and the control and destruction of plants, insects and plant diseases at nurseries; the control and destruction in certain proclaimed areas of exotic animals and plants infected with insects or plant diseases; the control of the importation into the Republic of plants, insects, plant diseases, honey bees, honey and exotic animals; the payment of compensation in respect of the destruction of plants, honey bees and exotic animals and the eradication of plant diseases and insects; and the eradication of locusts; to define the powers of inspectors; and to provide for incidental matters.
Swakopmund Town Planning Scheme	Identify different land use categories, zoning, uses and consent uses.

5. MANAGEMENT OF IDENTIFIED IMPACTS

This section outlines the proposed mitigation measures to avoid, prevent and mitigate and/or enhance the identified potential impacts associated with the proposed activities. It also outlines the responsibilities of each party involved in the project implementation under each phase. The project activities are grouped according to the different operational processes and stages (planning & design, construction, operational, and decommissioning phase).

5.1 Planning and Design phase

The first step in avoiding and preventing any possible negative impacts associated with the project should start with the planning and designing phase. This EMP aims to ensure that best alternative options and good practices are implemented, and environmental degradation is avoided through appropriate environmental protection and adherence to legal requirements. Table 3 below outline the issues that should be considered at the planning and design phase.

5.1.1 Proposed mitigation measures

Table 3: Proposed mitigation measures during the planning and design phase.

Environmental Issue/Impacts	Source of Impact	Mitigation Measures	Responsibility
Farm planning	<p>Sitting of farm allotments</p> <ul style="list-style-type: none"> - Given the locality of the demarcated area and its proximity to the Landfill site, Quarry and SWTP, consideration should be given to the placement of different farming activities so as avoid contamination of farm produce. 	<ul style="list-style-type: none"> - It is recommended that a Farm Plan depicting different farming zone be developed. The farming zone should be allocated as follow. <ul style="list-style-type: none"> o The plots to be allotted for Vegetable production should be those on the northern part of the STP, while the Plots on the west of the STP should be for Composting and the Southern Plots be reserved for Ornamentals and the Eastern Plots be for Animals farming. - There should be buffer zone in the form of Greenbelt between the plots and the landfill site. - Vegetable production should be under structures (Greenhouse, tunnels, shade etc, to avoid possible contamination. - There have been few incidents of overflows from the STP, hence, there should be extra protection measures, in the form of flow channels to arrest/control the overflows of sewage and PE from the STP. 	<p>PC</p> <p>-Engineering Manager</p>
Provision for Site infrastructure	<ul style="list-style-type: none"> - The smooth operation of farming activities will depend on the provision of certain supporting infrastructure. 	<ul style="list-style-type: none"> - Provision should be made for the following infrastructure. <ul style="list-style-type: none"> o Water Supply 'pipeline o PE pipeline o Power supply o Sewerage system o Access road 	<p>Project Coordinator</p>

<p>Sustainable farming practice</p>	<p>✓ The Desirable farming activities to be allowed on the Demarcated areas should be Gazetted by means of a Council Resolution.</p> <p><u>Allowable activities are such as</u></p> <ul style="list-style-type: none"> ○ irrigation activities i.e. production of vegetable, ornamentals (flowers, fruit & shade trees, lawn), mushroom. ○ Compost making (vermicomposting, aerobic and anaerobic composting. ○ Poultry farming (broiler, layers, quail, duck etc) ○ Rabbit farming <p><u>Farming Activities not allowed on this area are such as</u></p>	<p>- There shall be a Lease Agreement between Council and the farmer which should specify all legal obligations and terms and conditions of the lease i.e. lease period, size of allotment, allowed activities, lease fee, applicable tariffs etc.</p>	
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	<ul style="list-style-type: none"> ○ Farming with pig, cattle, donkey, sheep, and goats ○ Abattoirs (slaughtering of animals, including poultry) 		
Provision for Security measures.	<ul style="list-style-type: none"> - The planning and design phase should consider the security issue during operation phase 	<ul style="list-style-type: none"> - There should an outer security fence around the demarcated areas. - Otherwise, provision should be made for sewerage system for Security personnel to be stationed onsite 	Project Coordinator

5.2 Construction phase

5.2.1 Environmental specifications

The construction phase of this project, include the period from which the Municipality will appoint a contractor/s to service the demarcated area by constructing Municipal services. The construction works should meet the minimum environmental specifications and standards as outlined below. The proposed environmental specifications are not meant to replace the Municipal construction and building regulations, hence appropriate Municipal Construction and Regulations are still applicable.

i. Construction camps

The construction contractor should provide a method statement detailing the location, layout, lay-down yard, batching area, fuel storage, sanitary facilities, and other infrastructure. The construction camps and lay-down areas should be sited at area approved by the Municipal Health Department. All construction vehicles should be parked at the dedicated parking area and no vehicle should be parked outside the designated area.

ii. Cement and concrete batching

The permitted location of a batching plant (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site layout plan and approved by the PC or ECO. Concrete shall not be mixed directly on the ground. However, materials such as boards, plastic sheeting, or other protective materials shall be used for this purpose.

iii. Access route

Th existing access routes should be used as far as possible and no off-road driving should be allowed. Notices should be placed on visible locations in the vicinity of the construction site to warn the public of construction activities and indicate that heavy vehicles may be using the road. Contractor/s shall control the movement of all vehicles and plant machinery so that they remain on designated/demarcated routes. Any temporary roads required shall be decommissioned by the Contractor/s and rehabilitated using stockpiled topsoil.

iv. Earthwork and trenching

Earthworks are to be phased so that no areas are left exposed for longer than is necessary. This is especially important during the rainy season where runoff causes siltation downstream & overall erosion and loss of topsoil, etc. Trenches shall be re-filled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimize erosion.

v. Blasting

Given the nature of the underlying soil and bedrock, it is expected that blasting will be required at some portion to the required depth of the trenches and holes for service lines. To ensure the safety of the employees and

5.2.2 Proposed mitigation measures: Construction phase

It is understood that the project will be implemented in phases, thus the proposed mitigation measures below should be implemented at any given stage when construction and establishment of farm infrastructure is being undertaken.

Table 4: Potential negative impacts and proposed mitigation measures during the construction phase

Environmental Issue/Impacts	Source of Impact	Mitigation Measures	Responsibility
Disturbance to local flora and fauna	<ul style="list-style-type: none"> - Construction activities such as offroad driving at unauthorised places, poaching of wildlife, and all other activities prohibited in the park will have negative impacts. 	<ul style="list-style-type: none"> - Comply with the instructions of signposts, signboards, pamphlets or communicated in any other manner. - Obey any legal order or instruction given by a Law-Enforcement Officer. 	Contractor
Disturbance to local flora and fauna	<ul style="list-style-type: none"> - Construction activities will cause vegetation clearance and disturb natural habitats, especially for small insects and ground burrowing animals. - Disturbance to vegetation may also occur as a result of vehicle movement and off-road driving. 	<ul style="list-style-type: none"> - Existing access routes should be used as far as possible. - Avoid trapping of small animals and injury to any animal crossing or found on the construction site. - All vehicles should be driven at a maximum speed limit of 20km/hour. - Signage with speed limit should be erected along the route. - Only prepare trenches in short sections sufficient to be worked for a short period i.e., a week, and avoid leaving empty trenches for far too long. 	Contractor

		<ul style="list-style-type: none"> - Provide barricades around uncovered trenches to ensure the safety of animals and people. 	
Soil disturbances and contamination from bulk earthworks and civil works	<ul style="list-style-type: none"> - The excavation of trenches and movement of construction vehicles will disturb the organisms in the soil and expose it to wind erosion. - Soil may also be contaminated from leaks and spills from construction vehicles and improper chemical handling. 	<ul style="list-style-type: none"> - Topsoil must be carefully extracted and kept separate from construction waste for use as backfill materials. - Limit the movement of vehicles to the construction working site and make use of existing access routes. - Vehicle movement should be restricted to within the width of the “working zone” which will be within 20 meters on the one side of the trench as described and recommended above. - Vehicles should be equipped with drip trays to prevent oil and fuel spillages. - Ensure proper maintenance of the construction vehicles and machinery. - In the event of spillages, they should be reported to the ECO and RE immediately and cleaned as soon as possible, following the spillage handling procedure presented in Table 9, response action during substance spillage. 	Contractor/s

<p>Damage to geological resources.</p>	<ul style="list-style-type: none"> - The alteration of topography due to excavations and bulk earthworks may disturb the surface geological settings. 	<ul style="list-style-type: none"> - The disturbance of soil and geology associated with demolition and construction is inevitable. However, all site disturbances should be limited to the areas where structures will be constructed. - Stockpiles generated onsite must be used as backfilling materials rather than regarded as waste materials. 	<p>Contractor/s</p>
<p>Fuel and lubricants spill or leaks at construction, refuelling, and storage sites</p>	<ul style="list-style-type: none"> - The poor handling and spillage of fuel, lubricants, and chemicals i.e., oil, grease from construction vehicles could contaminate the soil, surface water, and groundwater. 	<ul style="list-style-type: none"> - -There is a need for proper handling and storage of oil and fuel to ensure environmental protection. - -The RE shall provide specifications for storage of all oils and fuels (secondary containment etc.) and procedures for refuelling vehicles, plants, and equipment. - All leakages and spillages of oil and grease should be contained, cleaned up, and disposed of at the landfill site waste disposal site. <ul style="list-style-type: none"> • In the event of a hazardous spill: <ul style="list-style-type: none"> ✓ Immediately implement actions to stop or reduce the spill. ✓ Contain the spill. ✓ Arrange implementation of the necessary clean-up procedures. ✓ Collect contaminated soil, water and other materials and dispose it at an appropriate waste dumpsite. 	<p>Resident Engineer /Contractor</p>

		<ul style="list-style-type: none"> - Drip trays should be provided for vehicles and machines with leakages. - All construction vehicles must be serviced at the maintenance workshop and no offsite maintenance should be allowed. - If refuelling is to be done onsite, a bunding wall, big enough to contain 120% of the volume of the fuel tank should be constructed at fuel storage and transfer site/s. - Fire extinguishers must be available at all refuelling sites. Staff should be trained to handle such equipment. - Above ground fuel tanks should be on an impervious floor with bunding walls 	
<p>Dust and air pollution.</p>	<ul style="list-style-type: none"> - Excavation and construction-related activities i.e., cement mixing and backfilling will generate fugitive dust that will have a negative impact on the surrounding area and beyond. However, the worst case of dust pollution would be during windy conditions. - Trucks transporting construction material and construction residues to the dumping site will cause dust 	<ul style="list-style-type: none"> - Employ dust control measures such as: <ul style="list-style-type: none"> • Sprinkler all haulage roads and construction areas with water. • Mixing of cement should be done with a concrete mixture or in an enclosed space. • Trucks transporting construction materials such as sand and stones should be covered with a tarpaulin. • Ensure proper maintenance of vehicles and equipment to minimize the release of fumes and other pollutants in the air. 	<p>Contractor/s</p>

	pollution to streets they would be passing through.		
Waste generation	<ul style="list-style-type: none"> - Construction activities will generate several types of solid wastes such as waste rocks, food refuse, trash, scrap materials, oily rags, and empty products containers. - Additionally, liquid waste from construction camps will be generated. - All these types of waste will have a negative impact on surrounding areas if not disposed of properly and regularly. - In addition, the process of transporting all construction debris may also disturb neighbouring areas and constitute a nuisance to residents around the site and may not be aesthetically acceptable. 	<ul style="list-style-type: none"> - All general waste generated at the site must be gathered and disposed to the landfill site. - Recyclable waste i.e., empty product containers, paper, plastic, etc., should be collected, sorted, and supplied to the recycling companies i.e. to Rent a Drum in Swakopmund. - Vehicles transporting waste should be sealed with a tarpaulin to avoid waste from being blown away by wind and prevent dust emissions. - Since the construction work is taking place away from the existing built-up area, provision must be made for sufficient portable ablution facilities during the construction period. - The recommended ratio is 2 toilets for every 25 people and separate water-closet for male and female) as per the general health Regulations (GN 121. 1969). - The ablution facilities should be cleaned regularly with detergents and disinfectant soap. - Once full or at least once a week, the septic tanks should be emptied at the STP treatment plant. 	Contractor/s

<p>Land-use effects</p>	<ul style="list-style-type: none"> - The anticipated land uses effects are disturbances to the existing land uses as a result of vehicle movement and other construction-related activities. - Other noticeable impacts could be in the form of a nuisance because of noise, dust, and vibration. - The process of transporting all construction materials can also constitute a nuisance to residents in the access streets. 	<ul style="list-style-type: none"> - Construction works should be limited to daylight and no work should be allowed during odd hours. - Construction materials i.e., pipes must be kept at the construction camps and only delivered when needed, rather than stacked onsite. - Only use designated access roads. - The route of delivery vehicles should be selected to avoid residential areas as far as possible. - The emissions of dust and vibration from construction activities will occur for a short time and will likely be insignificant since the site is far from residential areas. 	<p>Contractor/s</p>
<p>Disturbances from traffic movement</p>	<ul style="list-style-type: none"> - Construction activities will require a large-scale transport operation due to the delivery of materials and construction workers to and from the site. - Based on the experience of other similar projects, there will be a frequent movement of vehicles during the construction period. - Therefore, normal traffic movement, especially in the vicinity of the construction site and on the 	<ul style="list-style-type: none"> - The contractor must erect construction signage at the construction site. - Construction vehicles must be driven by authorized drivers only and stick to the authorized speed limits in urban areas. - Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximize visibility and avoid accidents. - Revolving lights should be switched on when driving. 	<p>Contractor/s</p>

	C34 road will be disrupted during the construction period.		
Safety and health hazards	<ul style="list-style-type: none"> - Occupational health hazards are expected particularly about the construction workers who will be present at the site. - Workers will be exposed to dust, vibrations, high noise levels, sun exposure (sunstroke), and dehydration during the summer months. - The safety of the public may also be compromised by certain construction activities i.e., uncovered trenches, increase in traffic volume generation of dust, noise, and vibration. 	<ul style="list-style-type: none"> - Construction workers must be provided with appropriate Personal Protective Equipment. - Employees must also be trained on the nature of their job and made aware of potential hazards at their workplace. - Ensure there is always a safety representative equipped with a First Aid kit at the construction site. All staff should know who the Safety Representative is. - The construction site must be barricaded and out of bound for the public and visitors. - All health and safety standards specified in the Health and Safety Regulations of the National Labour Act 11 of 1992 should be complied with. - Construction vehicles should be marked with appropriate signage. 	Contractor/s
Impacts of temporary construction camps and workshops	<ul style="list-style-type: none"> - The establishment of temporary construction camps will result in the generation of different types of waste. - Placing construction camps and workshops next to residential areas 	<ul style="list-style-type: none"> - Construction camps must be established on a site with impervious surfaces in line with Section 183 of the General Health Regulations (GN. 121 1969) and must be approved by the Municipality. - Construction camps must be equipped with ablution facilities, including showers and a water closet with running water. The recommended ratio for toilets is 2 	Contractor/s

	<p>could result in a nuisance to the residents.</p>	<p>toilets for every 25 adults for separate for male and female as per the General Health Regulations (GN. 121 1969).</p> <ul style="list-style-type: none"> - The floor of the maintenance workshop should be covered with industrial mats to contain oil and grease from vehicles and equipment servicing. - All operations should be limited to daylight and music played should not be at the discomfort of the neighbors. - No alcohol may be permitted in the construction camps and workshops. - Fireplaces should be properly secured and controlled 	
<p>Landscape and visual/aesthetic impacts</p>	<ul style="list-style-type: none"> - Visual impacts associated with the construction activities will occur because of the uncollected waste stockpile, unpacked construction materials, open trenches, and other facilities which makes the view of the site unappealing. 	<ul style="list-style-type: none"> - Only prepare trenches in short sections sufficient to be worked for a short period i.e. a week and avoid leaving empty trenches for far too long - The stripped topsoil must be backfilled carefully in position after the completion of the pipe laying. - Waste generated should be collected and disposed of weekly. Excess sand from trenches should be regarded as waste. - Construction materials should be properly stacked in one place. - The construction area and construction camps and workshops should be kept neat as far as possible. 	<p>Contractor/s</p>

<p>Water requirements and consumption</p>	<ul style="list-style-type: none"> - Construction activities will require a substantial amount of water. 	<ul style="list-style-type: none"> - Employ water-saving measures such as <ul style="list-style-type: none"> • Re-use water for least important activities • Use water sparingly. • Avoid wastage, spillage, contamination, etc. 	<p>Contractor/s</p>
<p>Mixing of cement</p>	<ul style="list-style-type: none"> - Pollution and contamination of the environment may occur as a result of improper handling of cement. 	<ul style="list-style-type: none"> - Concrete shall not be mixed directly on the ground. Impermeable protective materials such as boards, plastic sheeting, mixing trays, etc., shall be used for this purpose. - The concrete batching works shall be always kept neat and clean. No batching activities shall occur on an unprotected substratum of any kind. - Contaminated water from batching areas shall not be allowed to overflow but shall be collected, stored, and disposed of at a site approved by the PC and ECO. - Unused cement bags shall be stored in weatherproof containers to prevent windblown cement dust and water contamination during rainfall or runoff events. - Used cement bags shall be disposed of regularly via the solid waste management system and shall not be used for any other purpose. - Care shall be taken to collect contaminated wash water from cleaning activities and dispose of it in a manner approved by the PC and ECO. 	<p>Contractor/s</p>

		<ul style="list-style-type: none"> - In the case of bulk cement, suitable screening and containment shall be in place during storage, loading, and batching to prevent wind-blown contamination. - The contractor shall collect all contaminated water and fine material from exposed aggregate finishes and store it in sumps for disposal at an approved waste disposal site. - All visible remains of excess concrete and aggregate shall be removed on completion of the plaster or concrete pour work and disposed of. 	
Fire outbreaks	<ul style="list-style-type: none"> - Construction activities such as welding, cooking, burning, etc., have the potential to cause fire outbreaks. This can be aggravated by the presence of flammable and combustible items i.e., fuel, vegetation, etc. 	<ul style="list-style-type: none"> - Any fires that occur shall immediately be reported to the PC. - Ensure a designated smoking area far from fire hazard areas such as the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame. - Cigarette butts must be disposed of in a designated container. - There must be a competent fire safety officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. - Contractor shall be equipped with appropriate basic fire-fighting equipment (e.g., fire buckets, extinguishers, fire beaters, etc.) at all times. 	Contractor

		<ul style="list-style-type: none"> - Open fires for cooking purposes are not allowed, except within the accommodation camp under controlled conditions. Alternative energy sources should be provided. 	
Criminal activities i.e., theft	<ul style="list-style-type: none"> - Construction materials and untended equipment kept onsite may attract criminals. 	<ul style="list-style-type: none"> - Materials and equipment that will be stored in locked rooms or must be placed in a way that does not attract criminals. 	PC
Emergency response	<ul style="list-style-type: none"> - Emergency may occur may time during the construction phase and may delay the project implementation if not handled timely. 	<ul style="list-style-type: none"> - Emergencies shall be handled as per the Emergency Response Procedures (ERP) presented in Section 8. 	PC
Handling of complaints and grievances	<ul style="list-style-type: none"> - Grievance may be received from residents with regard to construction activities. 	<ul style="list-style-type: none"> - All complaints and grievances shall be reported in the Form (Annexure 3) and submitted to the RE. - The RE shall handle the grievance as per the Grievance response procedure presented 	PC
Worker's Accommodation	<p>Accommodation of workers on site in a camp could lead to:</p> <ul style="list-style-type: none"> - Creation of new access roads, especially if workers are returning late at night with poor visibility. - Unsanitary environment with production of domestic grey wastewater 	<ul style="list-style-type: none"> - Labour force should be sourced locally where possible. The local labour force already has places to stay and would not need to be accommodated on site. - Open fires are prohibited at the construction site. 	PC

5.2.3 Proposed mitigation measures: Operation phase

The overall objective of this EMP is to ensure the establishment of a more environmentally friendly urban agriculture in line with Good Agricultural Practices (GAP) adapted to the biophysical setting of the demarcated area and to the urban context of Swakopmund.

Table 5: Potential impacts and proposed mitigation measures during operation and maintenance phase

Environmental Issue/Impacts	Source of Impact	Mitigation Measures	Responsibility
Good Agriculture Practices (GA)		<ul style="list-style-type: none"> -Promote the use of organic practices and discourage the use of inorganic fertilizer -Fertilizers should be stored in separate rooms from produce -Adhere to the withdrawal periods and handle all chemicals in line with the respective Material Data Sheets (MSDS) - Liaise with MWLR on the control measures in cases of outbreak of pest and diseases 	ECO
Water resource Management	The proposed agricultural activities will increase demand for water.	<ul style="list-style-type: none"> -Install a Bulk water meter and develop Water Demand Management Plan (WDMP) for the project -Install individual water meter for each allotment and collect monthly water consumption -Encourage and promote farming practices that uses less water -Avoid wate wastage and attend to water leakages timely -Ensure regular monitor and control of water consumption. 	ECO/farmers

		<ul style="list-style-type: none"> -Encourage water conservation farming techniques i.e. hydroponic, vertical farming systems etc. -Enforce water saving techniques. -Encourage alternative water supply for ornamental production and non-essential activities 	
Biophysical	<p style="text-align: center;">Soil pollution</p> <ul style="list-style-type: none"> • Uncontrolled use of pesticides, herbicides and chemical fertilizers can lead to soil pollution. • Planting directly into the soil could expose the soil to erosion by water or wind. 	<ul style="list-style-type: none"> • Encourage use raised beds for irrigated agriculture to prevent soil erosion. • Erect erosion work and provide soil covers to prevent soil erosion by wind or water. • Encourage organic production and discourage the use of chemical fertilizers and pesticides. 	Farmers/ECO
	<p style="text-align: center;">Air pollution</p> <p>This can be caused by dust generating activities and bad odours from</p>	<ul style="list-style-type: none"> • Avoid dust generating activities during windy days. • Ensure good housekeeping to avoid smell, bad odors and avoid open fires on the area. 	ECO
	<p style="text-align: center;">Waste generation</p>	<ul style="list-style-type: none"> ✓ Make provision for sufficient refuse bins and skips ✓ General household waste should be disposed of in the municipal refuse bins for disposal. ✓ Worn-out parts can be collected and sent to the local scrap yards. ✓ All empty disinfectants containers should be sent to the local recycling companies or properly cleaned before re-used. 	Project Coordinator

		<ul style="list-style-type: none"> ✓ Hazardous waste such as used oil, paints, unused chemicals, etc., should be collected separately and sent to Walvis Bay Hazardous waste cell. 	
Socio-Economic	Land-use effects	<ul style="list-style-type: none"> ✓ Use existing maintenance roads and no off-road driving should be allowed. 	Project Coordinator
	Food safety	<ul style="list-style-type: none"> ✓ Liaise with MWLR on the control measures in cases of outbreak of pest and diseases. ✓ Monitor the quality of food produced. The low-quality produce that are not fit for human consumption should be discarded as waste and should not be consumed or sold. 	Project Coordinator/Eco/EHP
	Landscape impacts	<ul style="list-style-type: none"> ✓ Waste generated should be collected and disposed of regularly. 	Project Coordinator
Public health and safety risks	<ul style="list-style-type: none"> ○ Exposure to noxious gases emitted from the dosing system in cases of malfunctioning. ○ Presence of disease-carrying vectors i.e., flies, mosquitoes 	<ul style="list-style-type: none"> ✓ Maintenance staff must be made aware of potential occupational health hazards associated with their jobs. ✓ Employees must be equipped with appropriate PPE suitable for each task undertaken. ✓ Keep the area clean and tidy by removing waste and unwanted vegetation. 	Project Coordinator
Exposure to chemicals and	<ul style="list-style-type: none"> - The operation farming activities may expose farmers, and the public to chemicals i.e., 	<ul style="list-style-type: none"> ✓ Compile an inventory of all hazardous substances at the workplace and implement hazard control measures a follow. 	Project Coordinator

<p>hazardous substances</p>	<p><i>chlorine, flocculants, lime, carbon dioxide, etc.</i></p> <p>The risk of exposure can be aggravated by factors such as lack of awareness, lack of protection, physical fatigue, etc.</p>	<ul style="list-style-type: none"> • All chemicals and disinfectants must be handled and stored in accordance with their respective MSDS provided by the manufacturers/suppliers. • Employees must be equipped with chemical-resistant PPE when handling chemicals. • Provide training to all maintenance staff to create awareness of the danger of chemical exposure and possible response measures in case of accidents. • First aid kit must be kept at the plant and must be accessible to all staff. • Ensure regular inspection of the disinfection system and storage rooms to detect and report leakages. • Empty containers which contained chemicals can be reused for the same purpose or returned to authorized recycling companies and should not be thrown away as waste materials. <p>✓ Warning signs must be placed in chemical storage rooms and chlorination rooms.</p>	
<p>Risk of fire</p>	<p>- Sources of fire outbreaks during operations could be electrical shocks and due to the presence of flammable and combustible items i.e., fuel.</p>	<ul style="list-style-type: none"> ✓ Ensure that all firefighting devices are in good working order and are serviced. ✓ Holistic fire protection and prevention plan are needed. This plan must include an emergency response plan, firefighting plan, and spill recovery plan. 	<p>Project Coordinator</p>

		<ul style="list-style-type: none"> ✓ Maintain regular site, mechanical and electrical inspections, and maintenance. ✓ Clean-up and contain all oil spills/leaks. 	
Visual Impact	- Improper handling of waste in and around the site could deplete the aesthetic view of the place.	<ul style="list-style-type: none"> ✓ Ensure regular waste disposal, at least weekly. ✓ Ensure good housekeeping and routine maintenance of infrastructures and surroundings. 	Project Coordinator
Increase in crime-related issues.	- The maintenance of the infrastructures i.e., fences, storage dam, pumps, etc., are at risk of vandalism from the member of the public.	<ul style="list-style-type: none"> ✓ Provide security around the site and ensure regular inspections for all plant infrastructures. ✓ Ensure proper and regular maintenance of the perimeter fence around the site. ✓ Breaches in the fencing must be repaired immediately. 	PC
Handling of complaints and grievances	- Grievance may be received from residents, customers with regards to operation or maintenance.	<ul style="list-style-type: none"> ✓ All complaints and grievances shall be reported in the Form (Annexure 3) and submitted to the Project Coordinator. ✓ The Project Coordinator shall handle the grievances 	PC
Migrant farmers and farm workers and danger of HIV/AIDS	- Migrant farmers and farm workers are likely to engage in casual relationships with locals. This may result in unplanned pregnancies, especially among school children, and may contribute to the spread of HIV/AIDS.	<ul style="list-style-type: none"> - Provide health education and awareness. - Qualified local people should be given priority. - Enforce Public Health COVID-19 General Regulations: Public and Environmental Health Act 2015 as amended. - Regular health check-ups. - Non-local employees should return to their original residential areas after completion of the contract. 	PC/ECO

5.2.4 Proposed enhancement measures: Positive impacts

Table 6: Proposed enhancement measures for the envisaged positive impacts of the proposed agricultural activities

Environmental Issue/Impacts	Source of Impact	Enhancement measures	Responsibility
Job opportunities for locals	<ul style="list-style-type: none"> - The construction phase and the operation of the intended farming activities will provide employment and business opportunities. 	<ul style="list-style-type: none"> - The priority must be given to locally qualified and unqualified people given the local unemployment rate and job scarcity. - Recruitment should include both men and women. 	Project Coordinator/Farmers
Food Security	<ul style="list-style-type: none"> - One of the significant positive impacts that will result from the proposed project is the increase food production in Swakopmund 	<ul style="list-style-type: none"> - The Municipality should explore funding and partnership opportunities to ensure the sustainability of the farming activities. 	Project Coordinator
Economic contribution	<ul style="list-style-type: none"> - During operation phase, the proposed agricultural activities will be a source of income for many residents. - The proposed agricultural activities will result in local food supply, resulting in reduced costs of transporting food. - Utilization of garden wastes (Sourced from agricultural plots and landscaping in town) as compost by urban farms and gardens reduces waste volume directed towards landfills by as much as 40%. - The intended agricultural demarcated area within the Swakopmund Municipality will result into multiplier effects, i.e., attracting new businesses such as agricultural 	<ul style="list-style-type: none"> - Ensure the production of healthy and affordable food. - Farmer should be encouraged to compost garden waste generated from own farms. - Local people interested in commercial compost making business should be permitted on the agricultural area. 	Project Coordinator

	equipment industries, processing facilities, restaurants, shops, and markets.		
Environmental Benefits	<ul style="list-style-type: none"> - The proposed demarcated agricultural area will increase the town's ecological footprint in many ways. <ul style="list-style-type: none"> o Opportunities for green waste reuse (composting) o Organic agricultural and landscaping practices minimize introduction of harmful chemicals into city soil and water 	<ul style="list-style-type: none"> - Only activities listed on the Allowable category should be permitted. - Encourage organic food production and discourage the use chemical fertilizers 	Project Coordinator
Health and Social Benefits	<ul style="list-style-type: none"> - The project will increase opportunity to access healthy food for low-income people. - Heightened sense of community - Improved health from eating locally grown produce. 	<ul style="list-style-type: none"> - Create opportunities for community engagement such as community gardening, mentoring programs, shopping at farmer's markets, and harvest festivals etc. 	

6. DECOMMISSIONING AND REHABILITATION

6.1 Decommissioning of the irrigated related activities

The decommissioning of agricultural activities should entail the following.

- Payment of the outstanding water balance with Municipality and disconnection of the water meter
- Closure of water supply network and emptying and removal of wate containers
- Demolishing of structures and removal of all support structures
- Removal of plant residues and unwanted plants
- Removal of planting beds and unused composts
- Clean-up of contaminated sand and dispose it to the Municipal dumpsite.
- Levelling of uneven terrain and disturbed areas

6.2 Decommissioning the animal farming activities

The decommissioning of agricultural activities should entail the following.

- Payment of the outstanding water balance with Municipality and disconnection of the water meter
- Closure of water supply network and emptying and removal of wate containers
- Demolishing of structures and removal of all support structures
- Removal of animal waste i.e. Manure
- Farmers maybe asked to disinfect the area in case of contamination or infestation of the area with animal pests i.e. ticks.
- Clean-up of contaminated sand and dispose it to the Municipal dumpsite.
- Levelling of uneven terrain and disturbed areas

7. ENVIRONMENTAL MONITORING

To ensure continual improvement in environmental performance and reduce adversity of potential negative impacts, it is advisable to keep monitoring the identified environmental receptors.

7.1 Monitoring during the construction phase

Monitoring of all activities during the construction period will be under the responsibility of the Contractor, whose environmental performance will be controlled by the ECO.

Table 7: Monitoring plan during construction

Element	Location	Type of monitoring	Frequency of monitoring	Purpose of monitoring
Dust	At the construction sites	Visual monitoring	During periodic site visits	To ensure adherence to environmental protection requirements
Wastewater flows generated at the construction sites	At the construction sites	Visual monitoring	During monthly site visits	To ensure adherence to environmental protection requirements
Collection of solid waste	At the construction sites	Visual monitoring	During periodic site visits	To ensure adherence to environmental protection requirements
Use of dangerous materials (paints with heavy metals, lead compositions, asbestos-cement slabs, pipes, inflammable, toxic substances, etc.)	At the construction sites with the right documentation	Visual monitoring and study of documentation	Each month	To ensure adherence to environmental protection requirements
Protective measures at the construction site	At the construction sites with the right documentation	Visual monitoring	Each month	To ensure adherence to environmental protection and safety requirements
Earth restoration after excavation works	At the construction sites	Visual monitoring	After construction works	To ensure adherence to environmental protection requirements
Noise & vibrations resulting from equipment work	Project area/close to settlements	Portative noise metering device	During periodic site visits, daily	To ensure adherence to environmental protection requirements
Traffic operation /movement	At the construction sites	Visual monitoring of machinery and trucks carrying construction materials	During periodic site visits	To ensure adherence to environmental protection requirements
Vehicle and pedestrian safety when there are no construction activities	At the construction sites	Visual monitoring by supervisor	On daily basis during the construction phase	To ensure adherence to requirements

7.2 Monitoring during the operation phase

During the operation phase, the Project Coordinator must ensure that compliance monitoring is conducted at different intervals/frequencies throughout operational life span as indicated in the table below.

Table 8: Monitoring plan during the operation phase

The issue to be monitored	Monitoring Objectives	What needs to be monitored	Frequency and means of Monitoring
Resource Utilization	-Prevent water wastage and ensure water conservation. -Ensure Energy consumption	-Overflows, leakages, pipe bursts, etc.	Daily inspections and meter reading
Public Health risks	Carrying out farming activities in an environmentally friendly and socially acceptable manner.	Reeds and overgrown vegetation Presence of mosquitoes, snakes, rodents, etc.	Monthly inspections and physical observation.
Occupational health risks	Ensure health and safe working condition	Chemical exposure and presence of health hazards	Daily physical observations.
Water quality	Use of quality water for production of healthy food	Physical quality of raw, settled, and treated water (<i>Chlorine level, N.T.U, pH, Conductivity, and Temperature</i>). Microbiological/ bacteriological quality (<i>Free Chlorine, Heterotrophic Plate count, Total Chlorine, Coliforms & Faecal Coliforms</i>).	-every two hrs. sampling and testing. -Once a week sampling and laboratory testing
Water Balance	Ensure water security of the supply area.	Production figures vs. sales figures and demand management	Monthly water balance checks.
Waste management	Prevent environmental pollution and contamination.	Litter chemical storage & handling, cleanliness, Chemical composition of sludge.	-Daily inspections and physical observation. -Quarterly chemical testing
Implementation of the EMP	Ensure compliance to this EMP and adherence to the regulative measures during planning & design, construction, operation, maintenance, and decommissioning of the agricultural activities	Implementation of specified measures and compliance to the EMP and other relevant legal requirements.	Biannual environmental report to MEFT.

8. EMERGENCY RESPONSE PLAN

This section provides an emergency response plan which entails the types and effects of emergencies and actions to be taken in case of emergency during the operation of the proposed agricultural activities.

8.1 Types and effects of emergencies

Some of the emergencies which are associated with the proposed activities are as follows.

- Substance spillage i.e., oil, concrete, chemicals, etc.
- Construction accidents
- Fire outbreak.

8.2 Emergencies response procedures

Depending on the nature of the emergency, the implementation of the emergency response plan must be geared toward the following priorities in the order below.

- Safety of People (always First)
- Protection of the Environment
- Protection of Assets

8.2.1 Emergency response procedures

Table 9: Emergency response procedures during construction, operation, and maintenance

NO.	Type of Emergency	Response actions	Responsible
1.	Substance spill i.e., concrete, oil, chemicals, etc.	<ul style="list-style-type: none"> - Stop and control the spill at the source first. - Contain the spill/leakage with appropriate containers i.e., drip trays, sumps, etc., and in an approved manner to the satisfaction of the ECO - Clean the affected area with water or an approved cleaning product. - The contaminated soil should be removed and disposed of at the Swakopmund landfill site - Repair vehicle or machinery with leakage. - If it cannot be repaired, such vehicle or machinery should not be used until it is safe to do so. - Report the incident to the RE and record it in the logbook. 	- Contractor
2.	Water supply interruptions	<ul style="list-style-type: none"> - All consumers should be encouraged to always store enough water to meet their emergency needs. 	- Project Coordinator
3.	Fire outbreak	<ul style="list-style-type: none"> - Follow the holistic Fire Approach as per Municipal procedures 	- Project Coordinator
4.	Accident i.e., injury to a person	<ul style="list-style-type: none"> - The priority after a construction accident should be to get medical attention for an injured person. - Assess the injured person's situation by checking breath, pulse. - Notify the First Aid Person - Assist the First Aid Personnel - Record in the incident report form. - Report incident to the PC or ECO 	- Farmers

9. CONCLUSION

The preparation of this EMP is based on the current information provided, any changes or deviation from the proposed activities (site establishment and allowed activities) shall trigger changes to this EMP. It should be noted that the EMP is a legally binding document between the proponent and MEFT and implementation of the recommended management actions is mandatory. The EMP is therefore important in ensuring that the management actions arising from EIA processes are clearly defined and implemented through all phases of the project life cycle. Upon approval by the MEFT, this EMP should be used as an on-site reference document for the proposed agricultural project, during the planning & design, construction, operation and maintenance, and decommissioning phase,

It is concluded that, if all mitigation measures are implemented as outlined in the EMP, it is anticipated that the consequences and/or probability of the predicted negative impacts will be managed/reduced. The Municipality of Swakopmund shall also ensure to designate a Project Coordinator and Environmental Control Officer for the project to oversee the implementation of the EMP. The PC in collaboration with the designated ECO will ensure that the EMP is fully complied with by the appointed contractor and employees during the construction phase. The PC and ECO shall issue disciplinary actions based on the severity of the environmental damages and the nature and extent of the transgression / non-compliance. In addition, the proponent may also institute legal actions against the transgressor i.e., withholding of the contract retention money from the contractor until the transgression is rectified or terminate the entire contract for non-compliance, in line with the Public Procurement Act 15 of 2015.

The Municipality shall also avail necessary resources (i.e., human, financial, etc.) and training to enable the full implementation of this EMP. Monitoring of certain environmental parameters must be conducted regularly as outlined in this EMP. Environmental biannual reports must be kept available for possible submissions to the MEFT and ensure the renewal of the project's ECC.

10. ANNEXURE

10.1 Annexure 1: Environmental compliance monitoring checklist

10.2 Annexure 2: Incident / Accident report form

Annexure 1: Environmental Compliance Monitoring Checklist

The following checklist should be used during the compliance monitoring.

PART 1: ADMINISTRATIVE INFORMATION

Project Title:		Date:
Project location:	Reporting period	Individual Preparing Checklist:
Region:		Department:
Project Coordinator:		Phone No.:

PART 2: ENVIRONMENTAL ASPECTS

ENVIRONMENTAL ASPECT/IMPACT	ENVIRONMENTAL COMPLIANCE (AS PER EMP REQUIREMENT?)		Remarks (specify the location, a good practice observed, causes of non-conformity, and proposed action)
	YES	NO	
Waste management			
Water quality testing			
Water balance check			

PART 3: RECOMMENDATION

FOR EACH ITEM CHECKED IN PART 2, DESCRIBE THE CORRESPONDING CONTROLS TO BE IMPLEMENTED TO REDUCE POTENTIAL ENVIRONMENTAL IMPACTS (e.g., spill prevention, erosion controls, air emission controls including dust suppression, selection of materials, etc.). Provide details of the activities and impacts for each box and the proposed mitigations. Include attachments where appropriate. Use the same number system for your input.

ECO: Signature: _____ Date: _____

Project Coordinator: Signature: _____ Date: _____

Annexure 2: Incident / Accident Report Form

This form is to be completed in case of an environmental incident and shall be forwarded to the ECO.

Note: This form is not intended to replace other Municipality's internal reporting procedures.

Section 1. GENERAL DETAILS

Date:	Reported By:
Time: am / pm	Name:
	Position:
	Company:
	Phone:

Section 2. RESPONSIBLE PARTIES

Name:	Phone:
Company Name:	Email:
Witness Details (if applicable)	
Name:	Phone:
Witness Statement Taken? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Section 3. INCIDENT DETAILS

Type of Incident:	<input type="checkbox"/> Spill <input type="checkbox"/> Waste/rubbish <input type="checkbox"/> Wildlife disturbance <input type="checkbox"/> Vegetation disturbance/damage <input type="checkbox"/> Acid Sulphate Soils disturbance	<input type="checkbox"/> Cultural Heritage disturbance/damage <input type="checkbox"/> Chemicals/herbicide Use <input type="checkbox"/> Water pollution/contamination <input type="checkbox"/> Nuisance (noise, air quality) <input type="checkbox"/> Other:
Incident Description		
Immediate Response Actions Taken:		

Section 4. CONTRIBUTING FACTORS AND PREVENTATIVE ACTIONS

(to be completed by Manager/Supervisor)

Cause, Circumstances, and Contributing Factors:			
Measures that were in place to prevent this type of incident:			
Measures to be implemented to prevent/minimize this type of incident from occurring again			
Comments:			
Name:	Position:		
Company:	Signature:	Date:	

Section 5. MUNICIPALITY OFFICIAL ONLY

Assessed Level of Potential or Actual Harm:			
Is an Investigation Required? <input type="checkbox"/> Yes <input type="checkbox"/> No	Investigation Team:		
FOLLOW UP ACTION:			
COMMENTS			
Name:	Position:		
Signature:	Date:		