

APP-002241
PROPOSED WLOTZKASBAKEN TOWNSHIP DEVELOPMENT,
ERONGO REGION, NAMIBIA

ENVIRONMENTAL MANAGEMENT PLAN



Assessed by:



Assessed for:



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Project:	PROPOSED WLOTZKASBAKEN TOWNSHIP DEVELOPMENT, ERONGO REGION, NAMIBIA, ENVIRONMENTAL MANAGEMENT PLAN	
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1 BACKGROUND AND INTRODUCTION

Geo Pollution Technologies (Pty) Ltd (GPT) was appointed by the Erongo Regional Council (the Proponent) to undertake an environmental assessment for the proposed Wlotzkasbaken Township Development Extension 1 and 2. Spatial planning required for the intended development of the township includes consideration of biophysical features, social structures and economic opportunities. The establishment of the township is an ongoing process facilitated by WinPlan Town and Regional Planning Consultants. The environmental assessment will take into consideration 1) the location and footprint of the proposed township; 2) construction activities pertaining to the provision of services such as water and electricity supply and roads; and 3) an operational phase which entails the management and periodic maintenance and repairs required on services infrastructure and the management and disposal of waste and sewage (i.e. municipal/town council services).

2 ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides management options to ensure impacts of the facility are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the descriptions below. These management measures should be adhered to during the various phases of the operations of the facility. All personnel taking part in the operations of the facility should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of construction activities (including future upgrades, maintenance, etc.) and operations of the project;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the project;
- ◆ to monitor and audit the performance of construction and operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible construction and operational personnel.

Various potential and definite impacts will emanate from the construction, operational and decommissioning phases. The majority of these impacts can be mitigated or prevented. The impacts, risk rating of impacts as well as prevention and mitigation measures are listed below.

As depicted in the tables below, impacts related to the operational phase are expected to mostly be of medium to low significance and can mostly be mitigated to have a low significance. The extent of impacts are mostly site specific to local and are not of a permanent nature. Due to the nature of the surrounding areas, cumulative impacts are possible.

2.1 PLANNING

During the phases of planning for construction, operations and decommissioning of the proposed project, it is the responsibility of the Proponent to ensure they are and remain compliant with all legal requirements. The Proponent must also ensure that all required management measures are in place prior to and during all phases, to ensure potential impacts and risks are minimised. The following actions are recommended for the planning phase and should continue during various other phases of the project:

- ◆ Ensure that all necessary permits from the various ministries, local authorities and any other bodies that governs the construction activities and operations of the project are in place and remains valid. This includes fuel permits where needed.
- ◆ Ensure that design parameters, where required, is approved by relevant authorities prior to construction.

- ◆ Ensure all appointed contractors and employees enter into an agreement which includes the EMP. Ensure that the contents of the EMP are understood by the contractors, sub-contractors, employees and all personnel present or who will be present on site.
- ◆ Make provisions to have a health, safety and environmental (HSE) coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site. Provision should be made for monthly environmental performance audits and reports.
- ◆ Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:
 - Risk management / mitigation / EMP/ emergency response plan and HSE manuals
 - Adequate protection and indemnity insurance cover for incidents;
 - Comply with the provisions of all relevant safety standards;
 - Procedures, equipment and materials required for emergencies.
- ◆ Establish and maintain a fund for future ecological restoration of the project site should project activities cease (partially or in full) and the site is decommissioned and environmental restoration or pollution remediation is required.
- ◆ Establish and / or maintain a reporting system to report on aspects of construction activities, operations and decommissioning as outlined in the EMP.
- ◆ Submit bi-annual reports to the MEFT to allow for environmental clearance certificate renewal after three years, if required. This is a requirement by MEFT.
- ◆ Appoint a specialist environmental consultant to update the EA and EMP and apply for renewal of the environmental clearance certificate prior to expiry, if required

2.1.1 National Development Goals

The proposed project pins down key development goals and challenges which were identified as part of the Namibian development goals. It may be considered as a coastal development project aiming to provide serviced housing, amenities and institutional support to communities. In addition, the project is located in line with the regional planning initiatives which identified the location as an area for coastal development. The project is unique in being one of only a handful urban developments along the coast of Namibia. The project is considered a long term project.

Desired Outcome: Continued sharing of activity plans with IAPs and governing agencies. Maintaining an open door policy with neighbours/home owners' association and employees.

Actions

Mitigation:

- ◆ Information sharing about the project's progress should be made available to governmental agencies, interested and affected parties and the home owners' association. The Proponent and affected parties should use the information generated during the environmental assessment to realistically plan for future growth and optimisation of conservation efforts. Open communication regarding future development should be maintained.
- ◆ Provision of bulk services and related environmental assessments should be conducted prior to the commencement of construction of the proposed development.
- ◆ The Proponent should consider partnering with NGO's and other governmental agencies in establishing partnerships for project component development, conservation and social upliftment.
- ◆ The Proponent must employ local Namibians where possible. Deviations from this practise should be justified appropriately.
- ◆ A community liaison officer should be appointed during the construction phase, especially to facilitate community grievances and concerns.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Progress reports on implementation kept.

2.1.2 Ideals and Aspiration

During the environmental assessment, public consultation was conducted with Wlotzkasbaken residents, neighbours and interested and or affected parties. Concern about the continued growth and operations within the Wlotzkasbaken Townlands were raised. Information about the project and surrounding environmental features was also shared with institutions which have vested interests in the new development. Aspirations for business development and growth are impacted by updated information related to possible environmental constrains and challenges. Perceived growth in the sector is associated with additional pressure which may be exerted onto governmental agencies for service delivery. The overall consideration is that a large portion of the Wlotzkasbaken landowners' concerns relates to the loss of the settlements character (sense of place), habitat and the lack of service delivery from government authorities that may further affect the proposed additional township (extensions) development.

Desired Outcome: Continued sharing of activity plans with IAPs and governing agencies. Maintaining an open door policy with neighbours and employees.

Actions

Mitigation:

- ◆ Information sharing about the project's progress should be made available to governmental agencies, interested and affected parties and the IAPs, The Proponent and affected parties should use the information generated during the environmental assessment to realistically plan for future growth and optimisation of the distribution system. Open communication regarding future development should be maintained.
- ◆ Employees / contractors to be informed about parameters and requirements for references upon employment.
- ◆ Contractor's tenders to include best practise requirements for construction safety, security and environmental management. Pollution, poaching and unauthorised habitat construction to carry contractual penalties.
- ◆ The Proponent must employ Namibians where possible. Deviations from this practise should be justified appropriately.
- ◆ A community liaison officer should be appointed during the construction phase especially to facilitate community grievances and concerns.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Records kept of all information shared with authorities, neighbours and employees,

2.1.3 Revenue Generation and Employment

The construction phase will require a large workforce which will mostly be contracted by the Proponent. Semiskilled and unskilled labour will make up the largest segment of the labour force. Such labour may easily be sourced from the nearby urban centres through contractors. Through the remuneration of professional services as well as the general labour force, revenue streams related to the construction industry will be boosted. The duration of the project will however negate economic resilience aspects. However, during the operations phase employment will be created in the form of domestic work, maintenance, etc., while businesses, retail facilities and institutional establishments will serve to diversify revenue streams and contribute to the gross domestic product (GDP).

Desired Outcome: Contribution to national treasury and provision of employment to local Namibians.

Actions

Mitigation:

- ◆ The Proponent must employ local Namibians and contractors where possible.
- ◆ If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- ◆ Deviations from this practice must be justified.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Summary report based on employee records

2.1.4 Demographic Profile and Community Health

The project is reliant on labour during the construction and operational phases. An initial and temporary change of the demographic profile during the construction phase will be replaced by a different and more permanent change to the demographic profile of the constituency during the operational phase. Increased access to services, housing and related amenities will result in an in-migration to the area. It is projected that an entire profile will be represented through the migration and not only certain aspects of the demographic profile. It is further expected that the migration will be from existing other urban centres in Namibia, as well as partially from rural communities.

An increase in foreign people in the area (foreign labourers and, potential job seekers) may potentially increase the risk of criminal and socially/culturally deviant behaviour. Differences in ethical and acceptable behaviour may foster feelings of rejection, mistrust and negatively affect the community health. Crime/security risks could have a negative impacts on the surrounding areas and township development. High rates of criminal behaviour would delay construction activities, delay the delivery of public services and community members or tourists leaving the area resulting in economic losses. However, the overall community health of the constituency will be improved through, not only the provision of services and housing, but also the related amenities.

Desired Outcome: To prevent the spread of communicable disease and prevent / discourage criminal and or socially deviant and destructive behaviour.

Actions:

Prevention:

- ◆ Construction workers should always be supervised.
- ◆ Workers' conduct should be guided by a code of conduct to be developed by the contractors.
- ◆ The construction areas should be fenced to avoid unauthorized entry.
- ◆ Employ only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Consultations with and involvement of local communities in project planning and implementation.
- ◆ Mandatory and regular training for workers on required lawful conduct and legal consequences for failure to comply with laws.
- ◆ Adopt of develop by-laws relating to environmental health.
- ◆ All provisions of the Labour Act must be adhered to.
- ◆ Construction teams and related workforce to be easily identifiable and distinguishable.
- ◆ All employees to carry company identification tags and a list of employees to be available at the site office.
- ◆ Sufficient provisions to be made available by the contractors for labourers in terms of lunch, tea and bathroom breaks.
- ◆ Educational programmes for employees on HIV/AIDS and general upliftment of employees' social status.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Project inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Summary report based on educational programmes and training conducted.
- ◆ Summary report based on any theft related incidents.
- ◆ Employment records kept on file.

2.1.5 Traffic

The construction phase will increase traffic flow to the site as well as during the operational phase. An increase in traffic to and from the site may increase the risk of incidents and accidents and road degradation (movement of construction vehicles and equipment). Construction activities may require sections of internal roads to be closed off during the maintenance of service infrastructure. In addition, the site of the proposed development is not located close to a significant a feasible labour force. It is foreseen that the largest portion of the labour force will be transported to the site daily.

The operational phase will increase the traffic on the main road to and from the project location. This will increase the probability for incidents and accidents. This will be exacerbated during the holiday season, especially during December and January which coincides with the main seasonal fishing period. Internally, the traffic risks will follow a different pattern with daily activities such as schools and businesses dictating the internal flow and peak times.

Desired Outcome: Minimum impact on traffic and no transport or traffic related incidents.

Actions

Prevention:

- ◆ Sensitive environmental features should be demarcated and no off-road driving should be allowed around these sites. No construction vehicles should be allowed to enter these sites.
- ◆ Where relevant, erect clear signage, regarding parking and access and exit points around construction sites and at the construction camps.
- ◆ Additional provision should be made and agreed upon, with the Roads Authority, should any initial construction be timed during the peak holiday seasons.
- ◆ Preparation and implementation of a traffic management plan to be approved by the supervising engineer. Traffic flow patterns and volumes should be presented while growth and future parking and expected trips should be included in a traffic impact assessment. Such assessment should be conducted to inform safety requirements such as the length of the turning lane from the existing main road. During the planning phase, all connections to national roads must be approved by the Roads Authority.
- ◆ Road safety training to be provided to all construction staff and should be implemented by any contractors used (included in tender documentation).
- ◆ During any maintenance of infrastructure which may necessitate partial or complete road closure of traffic flow disruptions, clear communication should be available to the public and should include timing of maintenance.

Mitigation:

- ◆ Construction vehicles delivering material should not be allowed to obstruct any traffic or entrances / exists of erven without prior arrangement and proper signage where such measures apply.
- ◆ If any traffic impacts are expected, traffic management should be performed to prevent these.
- ◆ Measures should be in place to prevent (or repair) damage to road surfaces during the construction phase, especially during wet conditions.
- ◆ It must be ensured that a backlog of traffic does not develop at access points during peak hours, through the implementation of an efficient and effective access control system.
- ◆ Internal speed limits should be set for the construction and operational phases.
- ◆ Tender documentation to clearly specify the requirements of road worthy vehicles to be used during the construction phase by contractors while also stipulating the requirements for the transport of employees etc.

Responsible Body:

- ◆ Proponent

Data Sources and Monitoring:

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A bi-annual report should be compiled of all incidents reported, complaints received, and action taken.

2.1.6 Health, Safety and Security

Activities associated with the construction and operational phases are reliant on human labour. As such, labourers are exposed to health and safety risks. Some activities, especially associated with the operation of heavy equipment, machines and heavy motor vehicles and or hazardous chemicals, poses the main risks to employees. In addition to these expected risks, severe climatic characteristics of the area (e.g. east wind conditions) may contribute to conditions such as sunstroke, fatigue, dehydration and related symptoms. Security breaches are another concern which relates to the development of properties, established properties within the townlands, as well as the construction camps themselves. A construction workforce presents the opportunity of ill-intending persons to pose as project team members for nefarious and criminal reasons. Constructions sites are often targeted by criminal elements and the site will therefore increase the risk of crime within the local area. Theft or damage of construction materials and properties is an important local risk. Safety risks may further be encountered should any part of the project fail. Un-rehabilitated heaps or poorly constructed road crossings present risks to traffic.

In terms of the operational phase, the Proponent has an obligation to ensure that the large infrastructure components, as well as the service infrastructure associated with the project, are constructed to best practice public safety standards. Maintenance of infrastructure components may however be required to ensure continued safe operation of structures. As an example, the Proponent will have a mandate to ensure all general waste is collected to prevent risks of contamination and health impacts. Similarly, any businesses and / or retail premises will be subject to, and will have to comply with, environmental health inspections etc. The details of such a vast aspect are beyond the scope of this assessment. However, should the Proponent fail to ensure safe and secure operational infrastructure, community safety and security may be at risk.

Desired Outcome: To prevent injury, health impacts and theft.

Actions

Prevention:

- ◆ All Health and Safety Regulations specified in the Labour Act should be complied with.
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products during the construction phase as well as during maintenance of infrastructure.
- ◆ Equipment that will be locked away on site (during the construction phase) must be placed in a way that does not encourage criminal activities (e.g. theft).
- ◆ Provide all employees with required and adequate personal protective equipment (PPE).
- ◆ Ensure that all personnel receive adequate training on operation of equipment / handling of equipment and/or hazardous substances.
- ◆ Implementation of a maintenance register for all equipment and hazardous substance storage areas.
- ◆ Implement a maintenance schedule for all infrastructure components.
- ◆ Adopt local policies and procedures for dealing with all forms of waste, including possible effluent as well as community health aspects such as noise etc.

◆ **Mitigation:**

- ◆ In terms of contracted parties, selected personnel should be trained in first aid and a first aid kit must be available on site. The contact details of all emergency services must be readily available.
- ◆ Implement and maintain an integrated health and safety management system for all businesses, to act as a monitoring and mitigating tool, which includes: operational, safe work and medical procedures, permits to work, emergency response plans, housekeeping rules, material safety data sheet (MSDS's) and signage requirements (PPE, flammable etc.).

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ A monthly report should be compiled of all incidents reported during the construction phase. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

2.1.7 Fire

Construction activities may increase the risk of the occurrence of fires. Fires outside of designated areas, especially near laydown and material storage areas, may increase the risk of the occurrence of uncontrolled fires. Chemicals and fuels stored and used for general construction activities may be flammable. Improper waste burning or discarding of cigarette butts around waste areas, or in the vicinity of hazardous chemicals, further increases fire risks. The site is located in a sparsely developed area with no fire brigade or related trained persons, which will increase the difficulty of fighting fires. Although a fire is improbable during the construction phase, the risk remains.

During the operational phase, a significantly increased fire risk will be present as related to homeowners and business. Any member of the public can accidentally, or intentionally, cause a fire. Significant increased risks are associated with the storage of large volumes of flammable chemicals or hydrocarbons, typically as present at a fuel retail facility. However, such and related activities will require a separate environmental assessment. In terms of the Proponent's responsibility, the provision and maintenance of fire hydrants throughout the development as well as the establishment of a fire brigade available to fight fires, is paramount.

Desired Outcome: To prevent property damage, possible injury and impacts caused by uncontrolled fires.

Actions:

Prevention:

- ◆ Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans from the site and signage, an emergency response plan and a firefighting plan as part of construction plans.
- ◆ Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices) should form part of all contractor's tender requirements.
- ◆ Establish or adopt by-laws related to the prevention of fires.
- ◆ Establish a maintenance schedule for all fire related infrastructure as constructed and or managed by the Proponent.
- ◆ Ensure all flammable chemicals and fuels are stored according to MSDS and SANS instructions and all spills or leaks are cleaned up immediately.
- ◆ Maintain regular site, mechanical and electrical inspections and maintenance.
- ◆ Ensure the maintenance of firefighting equipment and promote good housekeeping.
- ◆ No open and unattended fires should be allowed.
- ◆ Any LPG gas cylinders should be stored in an enclosed, secure area and serviced regularly with fire extinguishers readily available.
- ◆ The Proponent should liaise with the nearest fire brigade to ensure that all fire requirements are met and that contractors adhere to all requirements related to fuel storage and handling during the construction phase.

Mitigation:

- ◆ Implement the fire protection and firefighting plan in the event of a fire.
- ◆ Quick response time by trained staff will limit the spread and impact of fire.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of all incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.

- ◆ A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.
- ◆ Record when fire drills were conducted and when firefighting equipment were tested and training given.

2.1.8 Dust

Particulate matter is a known health concern related to air quality. Specific parameters were developed by the World Health Organisation (WHO) relating to the safe limits of particulate matter in ambient air. Construction activities will entail earth moving activities as well as possibly localised blasting which may temporarily suspend material in the air. Frequent travelling of HVM over un-surfaced areas may increase soil disturbance resulting in finer particles which are more easily suspended in the air. An increase of dust settling outside the construction area may impact on fauna and flora. However, considering existing east—wind conditions, existing biodiversity are well adapted to deal with dust.

Any construction related dust would most likely be a nuisance factor for residents and businesses, considering cumulative aspects and the windy climate of the area. Since the development is proposed in phases, construction dust may affect the initial, established community. The possible impacts, which may emanate from the project, will be on a local scale. It is not foreseen that the greenhouse gas emissions (GHG) from such activities will have a significant impact on the community health.

Desired Outcome: To prevent health impacts and minimise dust generated.

Actions

Mitigation:

- ◆ Personnel issued with appropriate masks where excessive dust are present.
- ◆ Mitigation measures should be in place, such as dust suppression where excessive dust generation is expected.
- ◆ A complaints register should be kept for any dust related issues and mitigation steps taken to address complaints where necessary.
- ◆ Notice to be given to nearby receptors prior to activities generating excessive dust which cannot be mitigated, if any.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Any complaints received regarding dust should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

2.1.9 Noise and Vibration

Construction noise, which may constitute high volume and repetitive noises, are known to impact human health. Excessive noise may result in a nuisance to nearby receptors and possible hearing loss in staff. In addition to possible impacts on human receptors, noise and vibrations will probably also have an impact to fauna and avifauna closer to construction activities. Roosting and breeding sites may be affected in such a way as to discourage further roosting and or breeding in the area. Noise and vibration may further result in a change in the ranging / foraging patterns of larger fauna species.

Noise standards have been developed by the Health and Safety Regulations of the Labour Act and WHO to protect workers and communities against the health impacts and nuisances of noise. The project will have a construction period which could cause periods of noise experienced by nearby residents (in those areas initially established). Mechanical excavations will increase the intensity of the construction noise generated.

During the operational phase, numerous and almost all aspects associated with the development will be noise emitting. Therefore, planning related to the layout of the township extensions incorporated noise related aspects with residential and institutional areas located further away from noisier areas like business areas.

Desired Outcome: To prevent any nuisance and hearing loss due to noise and vibrations generated.

Actions

Prevention:

- ◆ Follow the Health and Safety Regulations of the Labour Act for limits on noise in the workplace and World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment and not to cause a nuisance.
- ◆ Adopt or develop local regulations related to noise control.
- ◆ Allow for a community grievance mechanism.
- ◆ All machinery must be regularly serviced to ensure minimal noise production.
- ◆ Notification to nearby receptors (through a community liaison officer) of construction commencement.
- ◆ To reduce vibration levels, it is recommended that all machinery and vehicles be maintained in a good condition and that a maintenance record be kept.
- ◆ Any machinery and vehicles that cause excessive vibrations (indicative of possible malfunction) should be given defect notices and taken off site immediately. Machinery and/or vehicles may only be used again on site once they have been serviced and approval has been granted by the site supervisor.
- ◆ Unnecessary vibrations can be minimised by ensuring that no machinery or vehicles are left idling when not in use.
- ◆ The appropriate and correct placement of specific work activities can ensure the reduction of handling of machinery that cause heavy vibrations.
- ◆ Ensure personnel running the equipment are trained accordingly so that machinery is used properly.
- ◆ Pre assessment to allow for mitigation measures for any elevated levels of vibrations should take place if there is any suspicion that there may be excessive vibration levels on site during construction. These mitigation measures should then be in accordance with local regulations and standards.
- ◆ Should any blasting be conducted, a related survey of all properties will have to be conducted and an amendment to the environmental assessment and related environmental management plan will have to be submitted to MEFT.

Mitigation:

- ◆ Hearing protectors as standard PPE for workers in situations with elevated noise levels.
- ◆ An assessment of the vibrations from within premises where complaints are recorded can help determine better mitigation measures.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ Health and Safety Regulations of the Labour Act and WHO Guidelines.
- ◆ Maintain a complaints register.
- ◆ Report on complaints and actions taken to address complaints and prevent future occurrences.

2.1.10 Waste Production

Waste production during the construction and operational phases are very different and require unique waste management measures to address related impacts and prevent contamination. Construction waste may have a greater component of building rubble, discarded materials and hydrocarbon-contaminated materials, with less general and domestic waste in comparison. The latter two types of waste, along with sewage and effluent, should be managed by the contracting agent responsible for construction within a specific area. Wind may blow waste, such as old cement bags (which is a hazardous waste), plastic bags and polystyrene, from the site to beyond the site boundaries. Construction waste may present physical pollution as well as chemical contamination. Waste may include hazardous waste associated with hydrocarbon products and chemicals, as well as soil and water contaminated with such products.

Once the extensions have been developed, a greater volume of general and domestic waste will have to be managed. Any form of waste, may not only result in contamination and pollution risks, but also present health and fire risks. Uncollected domestic and general waste, not contained in suitable disposal units, may attract vermin and wild animals. Waste handling and storage, albeit temporarily, may present pollution and contamination risks.

Desired Outcome: To reduce the amount of waste produced, and prevent pollution and littering as well as safety risks associated with accumulated waste.

Actions

Prevention:

- ◆ A waste management system should be adopted and presented for the construction phase and should include measures related to construction waste handling and management.
- ◆ All construction related tender documentation should include the waste management system and should include contractual penalties for failing to adhere to the waste management requirements.
- ◆ A waste management system should be adopted for the proposed development and should include disposal to a registered landfill site.
- ◆ Ensure adequate temporary waste storage facilities are available for different types of waste during the operational phase.
- ◆ Ensure waste cannot be blown away by wind during all phases of the project.
- ◆ Prevent scavenging (human and non-human) of waste.
- ◆ Adopt or formulate regulations and by-laws relating to waste management, storage and handling.
- ◆ All construction waste produced must be removed on a weekly basis and record kept of all waste removed from site.
- ◆ Each contractor should clearly indicate their area of operations and be held accountable for all domestic and construction related waste within the area and related construction camps.
- ◆ Weekly site inspections should be conducted by a representative of the Proponent to ensure implementation of the waste management plan and compliance to the EMP.
- ◆ An independent waste and EMP management audit should be conducted on a monthly basis for the duration of construction contracts.
- ◆ Ensure all ablution facilities (chemical toilets) are properly constructed and serviced and that the contents is disposed of at the nearest, registered effluent treatment plant.

Mitigation:

- ◆ Waste should be disposed of regularly and at appropriately classified disposal facilities. This includes hazardous material disposal (empty chemical containers, contaminated rags, paper, water and soil).
- ◆ See the material safety data sheets available from suppliers for disposal of contaminated products and empty containers.
- ◆ Liaise with the regional council regarding waste and handling of hazardous waste.

- ◆ Empty chemical containers that may present a contamination/health risk must be treated as hazardous waste. Workers should not be allowed to collect such containers for purposes of storing water or food. This can be achieved by puncturing or crushing such containers prior to disposal.
- ◆ Report all fuel spills greater than 200 litres to the Ministry of Mines and Energy and enact emergency response plans for fuel spills.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/project.
- ◆ Waste management plan, weekly and monthly audit reports kept on site.
- ◆ Operational and maintenance record of all chemical toilets kept on site.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

2.1.11 Flora

Construction related activities presents the greatest risk to habitats within the area. Destruction and or disturbance of sensitive areas such as the coastal hummock belt and dolerite ridge (which lies within the proposed development), will impact the localised ecosystem, especially during the construction of properties and trenching of service infrastructure. Construction and operational activities can create habitat for flora species to establish e.g. disturbed soil is favourable for the establishment of weeds and invader species. If construction activities or waste material are allowed into these habitats, it will lead to degradation, destruction and fragmentation of highly sensitive habitats. Illegal collection of plant materials may occur. Employees should not be allowed to harvest kelp or forage for washed-up kelp from the site or from the areas adjacent to it.

Although the operational phase is not planned to have direct physically altering activities on or around sensitive habitat areas, deviant or criminal social behaviour may result in damage to protected flora resources.

Desired Outcome: To avoid pollution and negative impacts on these sensitive habitats.

Actions.

Prevention:

- ◆ Designated conservation areas (such as the dolerite ridge), as part of the project layout, should be suitably fenced prior to construction of the proposed development and no go areas must be clearly indicated. In addition the Proponent should identify protected plant species on site and where possible incorporate them into the design of the development where possible (such as in open space areas).
- ◆ All preventative aspects as identified by the vegetation specialist should be adopted and where not possible an alternative possibility considered.
- ◆ All dumping of waste material in the environment, especially bricks and contaminated materials or soils, must be prevented.
- ◆ No storage of vehicles or equipment will be allowed outside of the designated area.
- ◆ Educate all contracted and related employees on the value of biodiversity and strict conditions prohibiting harvesting of flora must be part of employment contracts. Include prohibitions or regulations on the collection of kelp, beach wood, etc.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.

Mitigation:

- ◆ For construction activities, contain construction material to a designated laydown area and prevent movement out of areas earmarked for clearing and construction.
- ◆ Take disciplinary action against any employees failing to comply with contractual conditions related to harvesting of flora.
- ◆ Implementation of an alien vegetation management plan for the site is required. This is especially in areas that have been disturbed.

Responsible Body:

- ◆ Contractor
- ◆ Proponent

Data Sources and Monitoring:

- ◆ All information and reporting to be included in a bi-annual report.
- ◆ Photographic documentation of the hummock dunes and vegetation growth of various points as identified for the integrated monitoring plan.

2.1.12 Fauna

The dolerite ridge and coastal dune hummocks were identified as the two most sensitive habitats hosting approximately 18 documented endemic species. Construction activities could lead to the displacement of faunal communities due to habitat loss and disturbance (noise, dust and vibration) and/or direct mortalities. Extreme caution must be taken when performing construction activities near these habitats since these are near impossible to restore once disturbed. Impacts may further extend to human-wildlife conflict such as chance encounters with the presences of brown hyenas and jackal foraging in the proposed township development. Poaching of animal materials may occur. Employees should not be allowed to poach animals such as roaming springboks or collect or injure any exotic species such as chameleons or scorpions.

Although the operational phase is not planned to have direct physically altering activities on or around sensitive habitat areas, deviant or criminal social behaviour may result in damage to protected fauna species.

Desired Outcome: To avoid the negative impacts on fauna and loss of biodiversity

Actions.

Prevention:

- ◆ Designated conservation areas (such as the dolerite ridge), as part of the project layout, should be suitably fenced and no-go areas clearly indicated, prior to construction of the proposed development.
- ◆ All preventative aspects as identified by the fauna specialist should be adopted and where not possible an alternative possibility considered.
- ◆ Prior to land clearing, do systematic site walkover to as best possible, locate and remove ant slow moving animals like chameleons.
- ◆ For the construction phase, instruct workers to not deliberately injure or kill any animals perceived as dangerous, like scorpions and reptiles which may be present on site. Rather encourage reporting of such animals and arrange for the relocation of the animals to safe habitats.
- ◆ Educate all contracted and related employees on the value of biodiversity and strict conditions of prohibiting the poaching of fauna must be part of employment contracts.
- ◆ Report any extraordinary animal sightings to MEFT or the Ministry of Fisheries and Marine Resources (such as beached whales etc).
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ Prevent scavenging of waste by fauna.
- ◆ Direct all lights down to working surfaces and use minimal lighting at night at the construction camps.
- ◆ No access to quad bikes or off road vehicles to the hummocks or dolerite ridge.
- ◆ As part of the town structure plan, design parameters should be set to state that all lighting, especially at businesses and institutions, should be directed downward as to prevent impacts on birds flying overhead.

Mitigation:

- ◆ For construction activities contain construction material to a designated laydown area and prevent movement in areas earmarked for conservation.
- ◆ Report any extraordinary animal sightings, conflict or incidents to the MEFT.
- ◆ Take disciplinary action against any employees failing to comply with contractual conditions related to poaching and the environment.

Responsible Body:

- ◆ Contractor
- ◆ Proponent

Data Sources and Monitoring:

- ◆ All information and reporting to be included in a bi-annual report.
- ◆ Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.

2.1.13 Groundwater, Surface Water and Soil Contamination

Contamination risks may be linked to the construction and operational phases. Sources of contamination can be spills and leaks from construction vehicles, chemicals used during construction such as paints and sewage. Shallow groundwater may lead to rapid dispersion of pollutants, and may potentially negatively impact surrounding underground utilities of infrastructure (considering the phased approach). Changes in the soil structure due to site excavation, clearance and especially ground breaking may lead to trenches along which contamination may travel.

During the operational phase, various risks of contamination may be associated with any portion of the infrastructure failing, such a leaking sewerage lines. Improper storage of hazardous materials, etc., may further pose risk to soil and groundwater contamination.

Desired Outcome: To prevent the contamination of water and soil.

Actions

Prevention:

- ◆ Leaking equipment shall be repaired immediately or be removed from site to facilitate repair.
- ◆ Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided and an emergency spill kit must always be available on site.
- ◆ Proper training of operators of construction machinery and vehicles and employees must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- ◆ Spill control measures, such as drip trays, should be in place where refuelling of construction machinery is required on the site.
- ◆ All construction machines should be maintained to be in a good working condition during operations.
- ◆ Employ drip trays and spill kits when servicing / repairs of equipment are needed.
- ◆ Where relevant, determine locations of any underground structures per erven to prevent damage to underground utilities which may lead to contamination.
- ◆ Prevent off-road driving or movement of earthmoving equipment outside of areas designated for clearing.
- ◆ No dumping of rocks and removed soil in environmentally sensitive areas. Where possible it can be used to fill erosion ditches or old quarries, if any are present.

Mitigation:

- ◆ Any spillage of more than 200 litre must be reported to the Ministry of Mines and Energy.
- ◆ Spill clean-up means must be readily available on site as per the relevant MSDS.
- ◆ Any spill must be cleaned up immediately.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A report should be compiled bi-annually of all spills or leakages reported. The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, and a copy of documentation in which spill was reported to Ministry of Mines and Energy. The latter is only for fuel spills of 200 litres or more.

2.1.14 Visual Impact and Landscape Character

Construction activities will impact the development of natural drainage patterns, caused by surface clearance and associated decrease of vegetation cover, leading to increased surface drainage. Operations will lead to changes in the landscape character during the construction phase and subsequently in the operational phase. Furthermore the site should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing.

Desired Outcome: To minimise aesthetic impacts associated with the establishment.

Actions

Mitigation:

- ◆ Construction activities must be restricted to the construction site to minimize the impacts of the construction phase.
- ◆ Storm water discharge points should be designed to minimize scouring and erosion.
- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.
- ◆ All contractors' camps to be clearly demarcated, fenced off and kept neat.
- ◆ Active construction areas to be clearly indicated, demarcated and kept neat.
- ◆ Construction to be approached in a systematic manner to ensure uniform and methodical completion of construction areas.
- ◆ Construction planning to be shared with IAPs.
- ◆ As part of the town structure plan, design parameters should be set to state that all lighting, especially at businesses and institutions, should be directed downward and alternative street light designs that is lower to the ground with softer lights be employed.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A maintenance record should be kept.
- ◆ A bi-annual report should be compiled of all complaints received and actions taken.

2.1.15 Archaeology, Heritage and Cultural Aspects

Both extension areas harbour archaeological resources, with the northern portion having a larger concentration of documented sites. However, as assessed and documented by the related specialist, these sites have a low significance rating and the majority of the sites have a low vulnerability rating. Construction activities will destroy archaeological resources located outside of the conservation areas on site. Although the site is void of heritage resources, the areas forms part of the larger cultural setting related to tourism and recreational use.

Desired Outcome: To minimise impacts on archaeological, cultural and historic resources.

Actions

Mitigation:

- ◆ All mitigation measures as proposed by the archaeologist, in the related specialist report, should be adopted.
- ◆ All construction teams should adopt chance-find procedures. Tender documentation related to construction, should make provisions for the adoption of the measures as a requirement.
- ◆ Training may be provided to the workforce in identifying possible archaeological related artefacts.

Responsible Body:

- ◆ Proponent
- ◆ Contractors

Data Sources and Monitoring:

- ◆ A maintenance record should be kept.
- ◆ A bi-annual report should be compiled of all complaints received and actions taken.

2.2 IMPACT SUMMARY

The most significant negative impacts related to the project refers to the construction phase and required activities. Disturbance and destruction of sensitive habitats rank as some of the most significant negative impacts. Of major concern is waste management and rehabilitation of construction sites.

Positive aspects permeate the operational phase through the provision of coastal residential units, services and access to public amenities. Construction phase positive aspects are of much shorter duration and related to the employment and revenue generation.

2.3 DECOMMISSIONING AND REHABILITATION

Decommissioning of the extensions is not foreseen during the validity of the environmental clearance certificate. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within WHO standards and waste should be contained and disposed of at an appropriately classified and approved waste project and not dumped in the surrounding areas. The EMP for the project will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

2.4 ENVIRONMENTAL MANAGEMENT SYSTEM

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy;
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS; and
- ◆ The EMP.

3 CONCLUSION

The EMP should be used as an on-site reference document for the operations of the facility. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. The Proponent could use an in-house Health, Safety, Security and Environment Management System in conjunction with the EMP. All operational personnel must be taught the contents of these documents.

Should the Directorate of Environmental Affairs (DEA) of the MEFT find that the impacts and related mitigation measures, which have been proposed in this report, are acceptable, an environmental clearance certificate may be granted to the Proponent. The environmental clearance certificate issued, based on this document, will render it a legally binding document which should be adhered to.