

ENVIRONMENTAL MANAGEMENT PLAN FOR THE CONTINUED OPERATION AND MANAGEMENT OF THE TSANDI DUMPSITE, OMUSATI REGION, NAMIBIA



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UPDATED: SEPTEMBER 2025

DOCUMENT INFORMATION

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Report Type	Environmental Monitoring report
Date	September 2025

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ABBREVIATIONS

ECC	Environmental Clearance Certificate
COA	Conditions of Authorisation
DWAF	Department of Water Affairs and Forestry
EC	Environmental Clearance
ECO	Environmental Control Officer
EAP	Environmental Assessment Practitioner
EMA	Environmental Management Act (No. 7 of 2007)
EMP	Environmental Management Programme
EIA	Environmental Impact Assessment
EO	Environmental Officer
I&APs	Interested and Affected Parties
MET: DEA	Ministry of Environment and Tourism: Department of Environmental Affairs
MSDS	Material Safety Data Sheets
TB	Tuberculosis
STD	Sexually Transmitted Diseases
WTW	Water Treatment Works
IFC	International Finance Corporation

1. INTRODUCTION

1.1 PURPOSE OF THIS EMP

Tsandi Village Council (TVC), hereafter referred to as the proponent was granted an Environmental Clearance Certificate (ECC) for the construction, operation, and management of the dumping site, initially referred to as Tsandi landfill site. The latest ECC was granted in 2022 and expired in July 2025.

Green Gain Consultants cc has been appointed as an independent Environmental Consultant by Tsandi Village Council to conduct environmental monitoring for the operation and management of the existing landfill site for Tsandi Village Council.

This document constitute to an updated Environmental Management Plan (EMP) addresses the management of environmental impacts related to the operation of a general landfill site in Tsandi. The document should be used as a basis for managing, mitigating, and monitoring the environmental impacts associated with the operation and management of the existing dumpsite. The EMP is thus required to protect the natural, social, and socio-economic environment during the operation phase.

This document should be flexible so as to allow the contractor and Tsandi Village Council to conform to the management commitments without being prescriptive. The management commitments prove that the anticipated risks on the environment will be minimised if they are adhered to consistently. The onus set out in the EMP rests with Tsandi Village Council, main Contractor and subcontractors, which promotes responsibility and commitment. Any parties responsible for transgression of the underlying management measures outlined in this document will be held responsible of non-compliances and will be dealt with accordingly. This EMP should only be seen as a guideline and should be updated once the exact scope of activities on site has been determined.

1.2 OBJECTIVES AND PURPOSE OF THE EMP

The primary objectives of the EMP are as follows:

- To describe action plans for achieving the mitigation measures described in the EIA.
- To indicate responsibilities, schedules and staff resources regarding the implementation of these action plans.
- To highlight a monitoring programme, that will enable review of the success of the EMP and the provision of such information to the relevant decision-makers.
- To provide specific recommendations and mitigation measures on how to minimise negative impacts and therefore protecting the environment mostly on the biophysical as well as social level.
- In general, the purpose of this EMP is to formulate mitigatory measures that should be made binding to all contractors during construction of the proposed development, as well as measures that should be implemented during the operational phase.

In terms of the Environmental Assessment Policy of 1994 and the Environmental Management Act No 7 of 2007 (EMA), certain activities have been identified, which could have a substantially detrimental effect on the environment. These listed activities require an Environmental Clearance Certificate (ECC) from the competent environmental authority, i.e. Ministry of Environment and Tourism: Department of Environmental Affairs (MET:DEA), prior to commencing. The following activities identified in the EIA Regulations (**Table 1**) apply to the proposed project:

Table 1: List of triggered activities identified in the EIA Regulations which apply to the proposed project

Activity description and No(s):	Description of relevant Activity	The portion of the development as per the project description that relates to the applicable listed activity
Activity 2.1 Waste Management, Treatment, Handling and Disposal Activities	<i>The construction of facilities for waste sites, treatment of waste and disposal of waste.</i>	<i>The project entails the establishment of a landfill site.</i>
Activity 2.2 Waste Management, Treatment, Handling and Disposal Activities	<i>Any activity entailing a scheduled process referred in the Atmospheric Pollution Prevention Ordinance, 1976.</i>	<i>The project entails the processing or burning of waste on site.</i>
Activity 2.3 Waste Management, Treatment, Handling and Disposal Activities	<i>The import, processing, use and recycling, temporary storage, transit or export of waste.</i>	<i>There is a possibility that waste will be stored on site.</i>
Activity 5.1 (d) Land Use and Development Activities	The rezoning of land from – use for nature conservation or zoned open space to any other land use.	<i>The project area will be rezoned from public open space to be used for the establishment of a landfill site.</i>
Activity 8.9 Water resource developments	Construction and other activities within a catchment area.	<i>The project area is located in close proximity of catchment areas.</i>
Activity 10.1 (b) (Infrastructure)	The construction of – Public roads.	<i>The proposed project includes the construction of roads.</i>
Activity 10.2 (a) (Infrastructure)	The route determination of roads and design of associated physical infrastructure where – it is a public road;	<i>The proposed project includes the construction of roads.</i>

2. PROJECT INFORMATION

2.1 About the town

Tsandi is a village of approximately 26,834 inhabitants situated in Omusati Region of northern Namibia and is the district capital of the Tsandi electoral constituency. The village is further located along the MR123. Tsandi is a village in the Omusati Region of northern Namibia and the district capital of the Tsandi electoral constituency. It is situated on the main road MR123 (Outapi - Tsandi - Okahao). Tsandi is the residential place of the Uukwaluudhi Royal Homestead. It is also the trade centre for the whole constituency and one of the oldest villages in the Uukwaluudhi kingdom.



Figure 1: TVC townlands

2.2 Tsandi dumpsite

TVC was granted with an ECC for the construction, operation, and management of the dumpsite in 2018. The dumpsite is located within the TVC townlands, ±5km north of the D3616 road leading to Onesi from Tsandi on the following coordinates -17.726687° S, 14.871356° E.

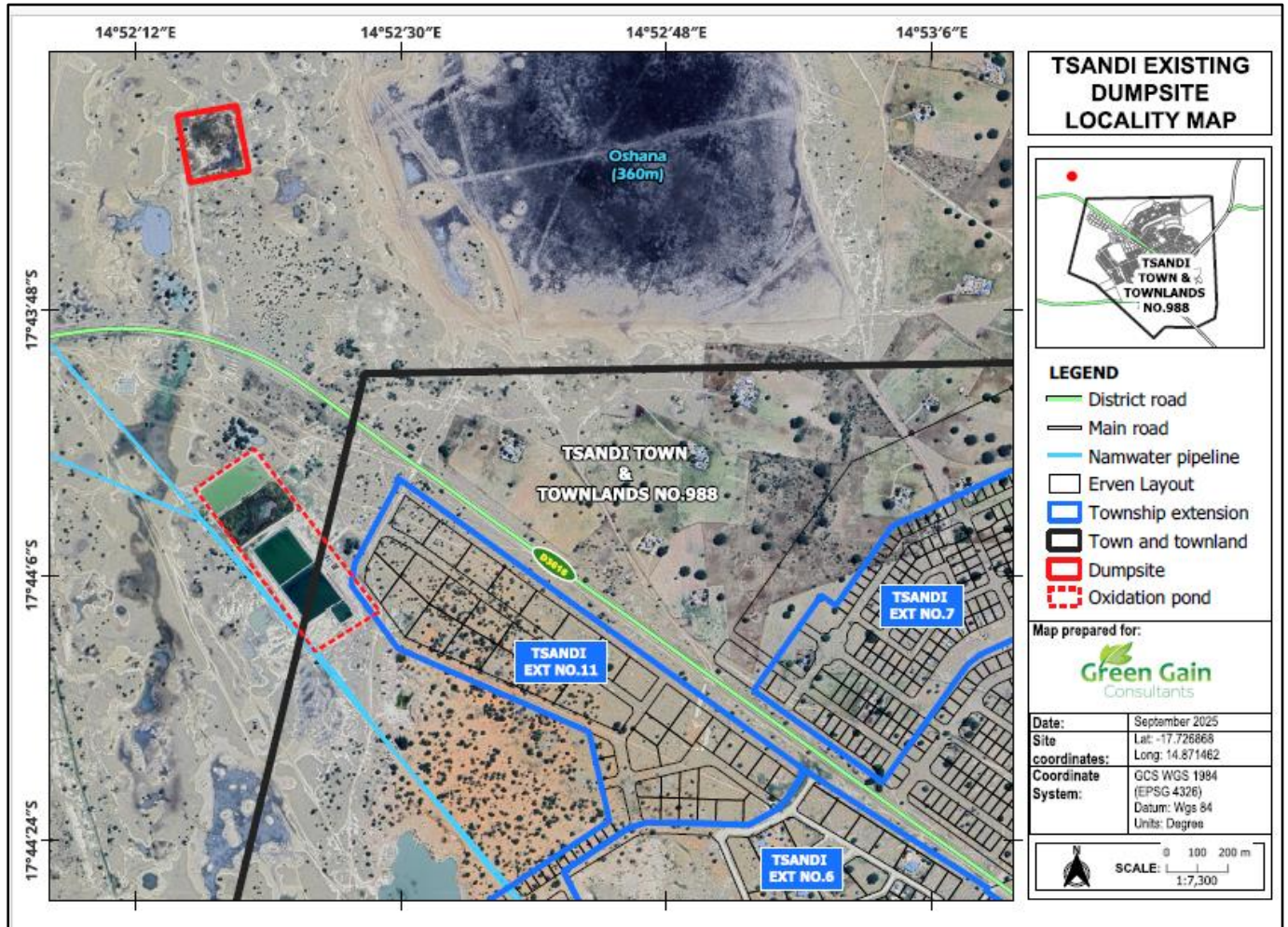


Figure 1: Locality map for the existing Tsandi dumpsite

2.3 Project overview

The area is surrounded by oshanas on its northern and western sides. There is external access roads or routes will be constructed. The site area is currently vacant with no vegetation that is worthy of conservation to be considered, however it has short camel thorn shrubs or bushes. These shrubs are likely not to be removed given that no construction will be taking place on site. The site will only be fenced off and remains as is except for the pit that will be dug for waste storage purposes. The landfill site will only consist of a pit that will be used for waste storage purposes, it does not extend to any other activities (such as, guard house, ablution facilities, recycling facilities etc) to be considered.

The perimeter fence (high jackal-proof) and lockable gates around the site are still intact and in good condition.



Figure 2: Tsandi dumpsite

3. LEGAL ENVIRONMENTAL FRAMEWORK

3.1 The constitution of the republic of namibia

There are two clauses contained in the Namibian Constitution that are of particular relevance to sound environmental management practice, viz. articles 91(c) and 95(l). In summary, these refer to:

- Guarding against over-utilisation of biological natural resources;
- Limiting over-exploitation of non-renewable resources;
- Ensuring ecosystem functionality;
- Protecting Namibia's sense of place and character;
- Maintaining biological diversity; and
- Pursuing sustainable natural resource use.

The above therefore commits the State to actively promote and sustain environmental welfare of the nation by formulating and institutionalising policies to accomplish the above mentioned sustainable development objectives.

3.2 Namibia's Environmental Management Act (EMA)

In giving effect to articles 91(c) and 95 (l) of the Constitution of Namibia, general principles for sound management of the environment and natural resources in an integrated manner have been formulated. This resulted in Namibia's Environmental Assessment Policy of 1994. To give statutory effect to this Policy, the Environmental Management Act was approved in 2007, and gazetted on 27 December 2007 as the Environmental Management Act (Act No. 7 of 2007) (EMA), Government Gazette No. 3966. Part 1 of the Environmental Management Act describes the various rights and obligations that pertain to citizens and the Government alike, including an environment that does not pose threats to human health, proper protection of the environment, broadened locus standi on the part of individuals and communities, and reasonable access to information regarding the state of the environment. Part 2 of the Act sets out 13 principles of environmental management, as follows:

- Renewable resources shall be utilised on a sustainable basis for the benefit of current and future generations of Namibians.
- Community involvement in natural resource management and sharing in the resulting benefits shall be promoted and facilitated.
- Public participation in decisions affecting the environment shall be promoted.
- Fair and equitable access to natural resources shall be promoted.
- Equitable access to sufficient water of acceptable quality and adequate sanitation shall be promoted and the water needs of ecological systems shall be fulfilled to ensure the sustainability of such systems.
- The precautionary principle and the strategy of preventative action shall be applied.
- There shall be prior environmental assessment of projects and proposals which may significantly affect the environment or use of natural resources.
- Sustainable development shall be promoted in land-use planning.

- Namibia's movable and immovable cultural and natural heritage, including its biodiversity, shall be protected and respected for the benefit of current and future generations.
- Generators of waste and polluting substances shall adopt the best practicable environmental option to reduce such generation at source.
- The polluter pays principle shall be applied.
- Reduction, reuse and recycling of waste shall be promoted.
- There shall be no importation of waste into Namibia.
- Promotion of the coordinated and integrated management of the environment;
- The Minister of Environment and Tourism was enabled to give effect to Namibia's obligations under international environmental conventions;
- Certain institutions were established to provide for a Sustainable Development Commission and Environmental Commissioner.

As the organ of state responsible for management and protection of its natural resources, the MET: DEA is committed to pursuing these principles of environmental management.

3.3 Environmental Guidelines

The EMA, under section 5, states that if a proposal is likely to affect people, the following guidelines should be considered in Scoping / EA:

- The location of the development in relation to interested and affected parties (I&APS), communities or individuals;
- The number of people likely to be involved;
- The reliance of such people on the resources likely to be affected, the resources, time and expertise available for Scoping / EA;
- The level of education and literacy of parties to be consulted;
- The socio-economic status of affected communities;
- The level of organisation of affected communities;
- The degree of homogeneity of the public involved;
- History of any previous conflict or lack of consultation;
- Social, cultural or traditional norms within the community; and
- The preferred language used within the community.

The MET also released a Draft Procedures and Guidelines for conducting EIAs and compiling EMPs in April 2008. These guidelines outline the procedures and principles that are to be followed. It will be consulted throughout the EIA process to ensure an effective process and an EMP that addresses all identified impacts.

3.4 Namibia Vision 2030

The principles that underpin Vision 2030, a policy framework for Namibia's long-term national development, comprise the following:

- Good governance;
- Partnership;
- Capacity enhancement;
- Comparative advantage;
- Sustainable development;
- Economic growth;

- National sovereignty and human integrity;
- Environment; and
- Peace and security.

Vision 2030 states that natural environments are disappearing quickly. Consequently, the solitude, silence and natural beauty that many areas in Namibia provide are becoming sought after commodities and must be regarded as valuable natural assets. Vision 2030 emphasises the importance of promoting Healthy Living which includes that the majority of Namibians are provided with basic services. The importance of developing Wealth, Livelihood and the Economy is also emphasised by Vision 2030. This development therefore supports the goals to be achieved in Vision 2030, because the bulk services will provide the community, currently living in non-favorable conditions, with potable water, electricity and waste removal services. Not only will this improve their health, it will also result in the further development of Tsandi.

3.5 Biodiversity Legislation and Policies

The following policies, aimed at biodiversity, may also be relevant for the proposed project:

- Convention on Biological Diversity (2000)
- Convention to Combat Desertification (1997)
- Namibian Water Corporation Act (1997)
- Pollution and Waste Management Bill (Draft)
- Soil Conservation Act (1969)
- United Nations Framework Convention on Climate Change (1992)
- Water Resources Management Act (2004)
- Climate Change Policy (Draft with Attorney General's office)

The applicability of the aforementioned policies and legislation has been explored in further detail during this EIA phase, based on the findings of the impact assessment and specialist investigations.

3.6 SOCIAL POLICIES

i). The Ministry of Environment and Tourism (MET) Policy on HIV & AIDS

The relevance of this policy for the proposed project stems from the fact that construction activities may involve the establishment of temporary construction workforce in Tsandi. Experience with other construction projects in a developing-world context has shown that, where construction workers have the opportunity to interact with local community, a significant risk is created for the development of social conditions and behaviors that contribute to the spread of HIV and AIDS.

In response to the threat the pandemic poses, MET has recently developed a policy on HIV and AIDS. This policy, which was developed with support from United States Agency for International Development (USAID), Gesellschaft für Technische Zusammenarbeit (GTZ) and the German Development Fund, provides for a non-discriminatory work environment and for workplace programs managed by a Ministry-wide committee.

ii). Atmosphere Pollution Prevention Ordinance (1976)

This Ordinance generally provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to

cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance. Town and Regional Planners Act 9 of 1996.

iii). Water Act No.54 Of 1956

This Act provides for Constitutional demands including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State and the EIA process is used as a fundamental management tool.

A water resource includes a watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam, into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse. Permits are required in terms of the Act for undertaking the following activity relevant to the proposed project:

- Disposal of waste in a manner that may detrimentally impact on a water resource in terms of Section 21 (g).

iv). Water Resources Management Act of Namibia (2004)

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia's water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit. Thus developers are required to efficiently plan for sewage disposal.

v). The Draft Wetland Policy (1993)

Requires that any wetlands and its associated hydrological functions form a part, to be managed in such a way that their biodiversity, vital ecological functions and life support systems are protected for the benefit of present and future generations.

vi). Draft Pollution Control and Waste Management Bill

Only Parts 2 and 7 of the Bill applies to the proposed development of Tsandi landfill site.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

This bill aims to promote sustainable development and to prevent and regulate the discharge of pollutants into the environment. Once this bill is enacted it will make provision for the establishment of an appropriate framework for integrated pollution prevention and control.

Public Health Act 36 Of 1919 And Subsequent Amendments

The Act, with emphasis to Section 119 prohibits the presence of nuisance on any land occupied.

This Act controls the existence nuisances such as litter that can cause a threat to the environment and public health. The term nuisance for the purpose of this EIA is specifically relevant specified, where relevant in Section 122 as follows:

- any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health; or
- Any other condition whatever which is offensive, injurious or dangerous to health.

Potential impacts associated with the development of the proposed development of Tsandi are expected to include dust, air quality impacts and smoke emissions.

3.7 National Heritage Act (No.76 Of 1969)

The Act calls for the protection and conservation of heritage resources and artefacts. Should any archaeological material, e.g. old weapons, coins, bones found during the construction, work should stop immediately and the National Heritage Council of Namibia must be informed as soon as possible. The Heritage Council will then decide to clear the area or decide to conserve the site or material.

3.8 Customary Law

A large number of Namibians live under indigenous customary law. Customary Law is recognised by the Namibian constitution under Article 66. Section 3 of the *Traditional Authorities Act No.25 of 2000*, gives certain powers to traditional authorities. One of the duties of the traditional authorities is to ensure that members of the traditional community use the environment and its resources in a sustainable manner. Thus the traditional authorities can institute measures to promote good waste management practices.

3.9 Communal Land Reform Act No. 5 Of 2002

This Act provides for the allocation and administration of all communal land and makes provision for the mitigation of impacts on the natural environment such as littering.

4. RESPONSIBLE PARTIES

There are at least three role-players participating in the environmental management of the site, including:

- Tsandi Village Council
- Environmental Control Officer (ECO)
- Contractors, Sub-Contractors or Engineers

Tsandi Village Council as the proponent will be responsible for the implementation of this EMP during the construction phase of the project. The following people are also required during construction in order to implement various Environmental management related issues. This responsibility, in some instances may be delegated to contractors in the employ of Tsandi Village Council for practical purposes, but Tsandi Village Council will retain legal responsibility. In that capacity, Tsandi Village Council should delegate suitably qualified person(s) with the responsibility to ensure implementation of the EMP, and will:

- Know the contents and implications of the EIA and monitor the implementation of EIA findings using the EMP and Project Aspect Register.
- Revise the EMP as required and inform the relevant parties of the changes.
- Protect the environment and rehabilitate the environment as prescribed in the EIA. The

responsibilities of the Developer during the operational phase are inter alia to ensure that:

- All requirements of the EIA and EMP are, communicated to, understood and followed by all persons working on the project who may have an impact on the environment.
- A procedure exists for reporting incidents and resolving any problems rapidly.
- Keep good records relating to the compliance/non-compliance with the conditions of the authorisation.

4.1 Environmental Control Officer

4.1.1 Roles and responsibilities

The role of the ECO is to oversee and monitor compliance with and implementation of the construction phase EMP. The ECO is therefore responsible for the following responsibilities:

- i) Liaison with the community, Tsandi Village Council, Engineer and Environmental Authorities;
- ii) Monitoring of all the Contractor's activities for compliance with the various environmental requirements contained in this EMP;
- iii) Reviewing of the Contractor's Environmental Method Statements as well as ensuring Tsandi Village Council's approval thereof;
- iv) Ensuring that the requisite remedial action is implemented in the event of non-compliance;

- v) Ensuring the proactive and effective implementation and management of environmental protection measures;
- vi) Ensuring that a register of public complaints is maintained by the Contractor and that any and all public comments or issues are appropriately reported and addressed;
- vii) Routine recording and reporting of environmental activities on a monthly basis;
- viii) Recording and reporting of environmental incidents;
- ix) Notifying the Environmental Authorities immediately of any events or incidents that may cause significant environmental damage or breach the requirements of the EMP; and
- x) Environmental Awareness Training courses to be conducted to the Contractor's entire team of workers.
- xi) Ensure that periodic environmental performance audits are undertaken on the project implementation.
- xii) Take appropriate action if the specifications contained in the EMP are not followed.
- xiii) Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- xiv) Ensure that activities on site comply with all relevant environmental legislation.
- xv) Compile progress reports on a regular basis, with input from the Site Manager, for submission to the Project Manager, including a final post-construction audit carried out by an independent auditor/consultant.

The role of the Contractor or Sub-Contractor is to oversee and monitor compliance with and implementation of the construction phase EMP. The ECO is therefore responsible for the following responsibilities:

- Be fully conversant with the Environmental Management Plan.
- Be fully conversant with all relevant environmental legislation.
- Have overall responsibility for the implementation of the EMP.
- Ensure that audits are conducted to ensure compliance to the EMP.
- Liaise with the Project Manager or his delegate, the Environmental Control Officer and others on matters concerning the environment.
- Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution on the site.
- Confine activities to the demarcated construction site.

4.1.2 Site Visits and Reporting:

- The ECO shall visit the site a minimum of once a month. More frequent visits may be required if the situation requires it.
- Monthly compliance reports shall be submitted to the Engineer and Tsandi Village Council and distributed as desired.
- The compliance report shall speak to the requirements of the construction EMP and the project specifications.
- It is recommended that an Environmental Audit Report be carried out six months after construction has been completed and submitted to the Environmental Authorities and Tsandi Village Council.

The Environmental Officer shall also provide information to the Site Manager or his representative, as required during external audits conducted by or on behalf of the Site Manager as part of the auditing programme. The information required will include the reports of internal audits conducted by the Environmental Officer.

5. MANAGEMENT OBJECTIVES AND PRINCIPLES

The following objectives provide the framework for the environmental principles for environmental management of the project:

- Minimise the potential for deterioration of air quality during all project phases.
- Avoid “disturbing” noise levels (an increase in the ambient noise level of 7dB (A) or more at the border of the property from which the noise emanates).
- Minimise the use of clean water and avoid water wastage.
- Prevent the contamination of surface and ground water as a result of the service station activities.
- Ensure that an appropriate Emergency Procedure is in place to safeguard the environment, local community and employees.
- Practise the reduction and recycling of waste materials.
- Enhance the creation of direct job opportunities for the surrounding community and contribution of the project to the local economy, especially during labour intensive phases (construction and decommissioning).
- Reduce the disturbance of the surrounding community from site activities to a minimum.
- Maintain transparent relations with the Interested & Affected Parties (IAPs) (including surrounding community, authorities and employees).
- Ensure that the community and employees are not subjected to increased safety hazards.

These guideline principles will form the basis for environmental management on site. Should these principles require modification or additions during the project this should be done at the discretion of the responsible person, who will ensure that any modifications are communicated, explained to and discussed with all affected parties.

The environmental operational procedures and environmental issues are identified and managed, under different phases of the project. The different phases are:

- Pre-construction (including design);
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase

5.1 The 5 R Pollution Prevention Hierarchy

The 5 R pollution prevention hierarchy (Reduce, Reuse, Recycle, Recover, Residuals Management) is a useful tool for regional districts to use when looking at opportunities to improve their solid waste management system (see Figure 3). The order of preference in the pollution prevention hierarchy is for waste management at one level to only be undertaken when all feasible opportunities for pollution prevention at a higher level have been taken. For example, opportunities for recycling should be explored only after all opportunities for reduction and reuse of materials have been exhausted. There are benefits to this approach.

- Actions taken at higher levels in the pollution prevention hierarchy can eliminate or reduce the environmental management costs of actions at lower levels. For example, waste prevention programs can reduce costs associated with handling wastes in the first place.
- The pollution prevention hierarchy can potentially reduce the environmental impacts of product manufacturing and distribution. For example, reuse, and to a lesser extent recycling, will reduce the environmental impact of extracting and processing primary resources while the use of recycled material can reduce the energy cost of manufacturing new products.
- Adherence to the highest level of performance under the pollution prevention hierarchy can encourage innovation and investment by industry to improve product design and reduce waste.



Figure 3: 5 R Pollution Prevention Hierarchy

1.3 SUMMARY OF MANAGEMENT ACTIONS DURING OPERATION PHASE

The tables below are only a summary of the management actions to be taken in order to minimise negative impacts. Please turn back to the relevant section above for more detail on the various management actions to be taken for each impact.

Table 2: Proposed mitigation measures

RISK	OBJECTIVE	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY
1. General Waste Management			
1.1 littering: wind-blown waste can easily pollute the surrounding area.	Reduce pollution	<ul style="list-style-type: none"> All wind-blown litters must be covered with other heavy waste i.e. building rubble to prevent it from being blown away. Maintain the fence to contain windblown litters Encourage recycling of papers, plastics to reduce amount going to the dumpsite Assign a team to collect all wind-blown waste on regular basis Clean-up campaigns encourage residents to take part in the collection of waste in public open spaces. 	Health inspector, Line Manager
1.2 Danger of expired food -Expired food in the dumpsite attracts residents especially scavengers such as kids. This pose serious public health risks.	Ensure Public safety	<ul style="list-style-type: none"> All expired food items must be condemned at the disposal site as soon as possible. This should be done in the presence of the Health Inspector. No expired food must be condemned in the absence of the municipal official, if such official is not available on sit, any other authorized qualified municipal official must assist. 	Health Inspector
1.3 Unauthorized dumping i.e. dumping at unauthorized sites, dumping of hazardous waste etc. can lead to serious public health.	Proper use of the dumpsite	<ul style="list-style-type: none"> Create public awareness through campaign, meetings, etc. Install an Information Notice Board at the dumpsite entrance depicting all rules and regulations to the users. Enforce penalties for illegal dumping and non-compliance. 	Line Manager
1.4 Risks of fire from burning of waste which could spread to nearby residents or vegetation.	Ensure public safety	<ul style="list-style-type: none"> Do not leave fire unattended Avoid burning on windy day Do not burn waste on an elevated site and avoid site with vegetation cover 	Health Inspector
1.4 Dust and fumes from vehicle and plants may generate noise, dust, vibration which might be a nuisance to the nearby residents	Avoid nuisance	<ul style="list-style-type: none"> Avoid operating when its windy Implement dust suppression procedures Do not operate to many heavy implements at once to reduce noise All vehicle and Plant must receive regular maintenance 	Line manager
2. Public Health and Safety Risks			

<p>dogs and cats. These pets, together with rodents, carry diseases to nearby homesteads.</p> <p>2.3 Contamination and infections</p> <p>-The dumpsite area may become children's sources of contamination due to the incubation and proliferation of flies, mosquitoes, and rodents.</p> <p>-Due to poor waste segregation, some medical waste maybe found mixed up with domestic waste and end up at the dumpsite. This pose a serious risk of infection with Hepatitis B, HIV, and other related diseases.</p> <p>-Colored plastics are harmful as their pigment contains heavy metals that are highly toxic.</p> <p>2.4 Occupational Health risks</p> <p>-Direct handling of solid waste can result in various types of infectious and chronic diseases with the waste workers and rag pickers being the most vulnerable. These include: skin or blood, eye and respiratory and intestinal infections as well as cancer resulting from exposure to dust or hazardous compounds.</p> <p>-Direct exposure to municipal waste can lead to diseases through chemical exposure as the release of chemical waste into the environment leads to chemical poisoning and radioactive hazard. Many studies have established</p>	<p>Avoid transmission of diseases associated with solid waste management</p>	<ul style="list-style-type: none"> • Ensure proper maintenance of fence • All organic waste that could attract pets must be discarded <ul style="list-style-type: none"> • No unauthorized scavengers • Ensure access control <ul style="list-style-type: none"> • Ensure waste proper segregation at hospitals • Training of Waste collection team especially those collecting waste from health centres • Hospital and other health centres employees must also be well informed about segregation of waste domestic and medical waste. <ul style="list-style-type: none"> • All coloured plastics must be burned • Discourage use and/or recycle of plastic in town through campaigns and awareness <ul style="list-style-type: none"> • All employees must receive training in line with their respective duties • Employees must be provided with Personal Protective Clothing/Equipment. 	<p>Health Inspector</p> <p>Health Inspector</p> <p>Gate guard/Health Inspector</p> <p>EHP-MoHSS, Health Inspector</p> <p>Health Inspector</p>
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<p>that there is a strong connection between exposure to waste and diseases.</p> <p>-Employees/workers can also be at risk of injuries from sharp objects at the dumpsite if they are not properly protected.</p> <p>-Employees are also at risk of accidents during waste handling, i.e. muscle disorders from lifting heavy containers, infectious wounds from contact with sharp objects or poisoning and chemical burns from chemical waste mixed with general waste.</p>	<p>Ensure safe working environment</p>		<p>Line Manager</p>
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3. Soil contamination

<p>3.1 Contamination of soil with heavy metals from tins, cans etc.</p>	<p>Prevent soil contamination</p>	<ul style="list-style-type: none"> • Encourage recycling of tins, cans • Avoid burying waste that contains lead i.e. tins, cans scrap metals 	<p>Health Inspector</p>
<p>3.2 Oil leakage from vehicle, machinery could contaminate the soil</p>	<p>Prevent soil contamination</p>	<ul style="list-style-type: none"> • Clean up the contaminated soil • Ensure proper and frequent servicing of vehicle and plant 	<p>Health Inspector</p>
<p>3.3 Soil erosion from disturbed areas during waste disposal</p>	<p>Soil conservation</p>	<ul style="list-style-type: none"> • Do not extract soil from slope areas • Provide erosion barrier to prevent soil from carrying away 	<p>Health Inspector</p>

4. Groundwater and Freshwater contamination			
4.1 Unlined dumping hole may pose serious risks of groundwater contamination by leachate.	Prevent groundwater contamination	<ul style="list-style-type: none"> No hazardous waste allowed Waste containing heavy metals may not be buried, unless a linear system is provided No burying of waste next to storm water course 	Health Inspector , Line Manager
4.2 Contamination of nearby watercourse	Prevent contamination of freshwater	<ul style="list-style-type: none"> Avoid major drainage lines when burying or disposing waste Storm water that is mixed with waste must be contained Storm water must be re-directed away from the waste heaps. 	Health Inspector
5. Operational Management and Maintenance			
5.1 Inadequate management if site operator is ill / on leave or resigns	Ensure effective and efficient management of the plant	<ul style="list-style-type: none"> At least two site operators must be fully trained in the operation of the site, so that one can stand in for the other in case of illness, leave, etc. 	Line Manager
5.2 Lack of skills on the part of the plant operator	Ensure effective and efficient management of the plant	<ul style="list-style-type: none"> The existing system requires only a moderate level of skill and technical expertise, which lowers the risk of malfunction due to lack of highly trained staff. Drivers and site Operators must be appropriate skilled and experienced for the task at hand Site operator/s must receive continuous training in all aspects of daily management of the plant (technical or administrative) Technical support must be available to the sewage plant operator 	Line Manager
5.3 Lack of proper and timely maintenance of vehicles, plant, structures may compromise the functionality of the site	Ensure smooth operation	<ul style="list-style-type: none"> The fence and other site structures must be maintained regularly by replacing key components A maintenance plan must be in place to ensure that planning, such as budget allocation or procurement of service providers, can be put into motion sufficiently ahead of time. 	Site foreman
5.4 Document control and access to information	Readily available of records and information about the site	<ul style="list-style-type: none"> Site foreman/Operator must ensure that all reports are available onsite and easily accessible 	Site foreman
6. Legislation requirement			
6.1 Lack of compliance with relevant legislations may cause transgression or conflicts with the law	Operating within the requirements of the law	<ul style="list-style-type: none"> This EMP must be updated every three years, concurrent with the renewal of the ECC Any upgrading of the Solid Waste disposal site should be of the required standard as per waste management bill 	Line Manager

Table 4: Summarized Operational Phase Management Table

Aspect	Management actions	Responsibility
General	<ul style="list-style-type: none"> • A maintenance plan for the landfill site must be developed to ensuring that good working order is achieved. 	Tsandi Village Council
Monitoring	<ul style="list-style-type: none"> • A monitoring and eradication programme should be put in place whereby the distribution and abundance of alien and invader fauna are monitored through fixed trapping points. 	Tsandi Village Council
Waste composition, inventory and inspection	<ul style="list-style-type: none"> • Landfill operator must ensure that a register is kept throughout the life of the facility of the quantities and characteristics of the deposited. • Information on waste register must include the origin of waste, type of waste, date of delivery, identification of the producer or collector. • Regular visual inspection of the waste at the point of deposit should be undertaken to ensure that waste is properly sorted/separated at the site. 	Tsandi Village Council
Management of landfill gas and odours	<ul style="list-style-type: none"> • Emission rates must be reduced by limiting the extent of uncapped areas on non operational areas of the site. • Accidental fires on landfills where burning is not permitted must be extinguished immediately. Appropriate operational procedures involving the spreading and smothering of burning waste, rather than the application of water, must be implemented. • An area or cell should be regularly covered with temporary cover material to reduce gas emissions from the area. The prompt covering of malodorous waste to reduce odour problems is a Minimum Requirement. In extreme cases, odour suppressants such as spray curtains may be required. 	Contractor, Tsandi Village Council
Requirements for Waste Management and Collection Contractors	<ul style="list-style-type: none"> • General waste shall be collected by a recognised service provider and be disposed off in registered waste site. • Recyclable waste shall be collected by a recognised recycling service provider for appropriate recycling purposes. • Scrap metals, steel, and glass must be collected in separate waste skips and each container intended for identified recyclable waste must be clearly marked, i.e. scrap metals only. 	Tsandi Village Council
Health and Safety	<ul style="list-style-type: none"> • An emergency plan (including fire management) must be developed and implemented; the relevant authority must approve this plan. • Ensure that all fire extinguishers are replaced on or before their expiry dates. • Site Safety checks should be carried out in accordance with the pertinent Occupational Health and Safety requirements prior to site closure. 	Tsandi Village Council, Contractor
Stormwater Management	<ul style="list-style-type: none"> • Storm water, wherever possible, must be allowed to soak into the land in the area on which the water has been discharged. 	Tsandi Village Council

Aspect	Management actions	Responsibility
	<ul style="list-style-type: none"> In the event that silt runoff occurs off the development site, the cause of this must be investigated and suitable mitigation measures employed. This may include the vegetation of bare areas, installing flow diversion channels in consultation with an engineer, installing velocity reducing structures etc. 	
Penalties	Penalties will be issues for certain specified transgressions.	Contractor

6. DECOMMISSIONING PHASE

Given the nature and purpose of the infrastructure, it is unlikely that this infrastructure will be decommissioned in the foreseeable future. In the unlikely event that use of the infrastructure is discontinued by Tsandi Village Council, the infrastructure should be “mothballed” or made available or sold to the surrounding land users. Removal of the infrastructure is likely to cause more environmental harm than its abandonment.

Decommissioning of the solid waste dumpsite would need to be conducted with great care and under supervision by a specialist in this field, as there numerous risks involved. The decommissioning process should be done in consultation with the Ministry of Environment and Tourism, Department of Environmental Affairs (DEA).

The Municipality must appoint an environmental consultant to advise on applicable legislation and appropriate measures for impact mitigation and management. Legislations that need to be complied with will include environmental and waste-related legislation, occupational health and safety legislation, and any other applicable legislation, by-laws and standards. If decommissioning is planned, a detailed Decommissioning and Rehabilitation Plan (DRP) must be compiled, taking into account the conditions on and around the site at that time, as well as applicable legislation.

7. ENVIRONMENTAL COMPLIANCE MONITORING

In order to ensure adherence to this EMP, it is advisable to keep monitoring of certain environmental elements. Compliance monitoring provides useful information for determining environmental performance for the duration of the project. This monitoring is ultimate responsibility of the proponent. Monitoring activities should be conducted by the qualified official at different interval/frequencies as indicated in the table below throughout the project life span. The monitoring report should be prepared and submitted to the Environmental Commissioner whenever required.

7.1 Monitoring

Table 1: Monitoring Schedule

Issue to be monitored	What need to be monitored	Monitoring frequency	By Who?	Report to Who?
<i>Leachate</i>	Generation liquid waste at the dumpsite	After rainy season	Health Inspector	Line Manager
<i>Infestation of insect and parasite</i>	Fly population, etc.	Weekly or regularly	Health Inspector	Line Manager
<i>Air quality</i>	Presence of smoke or dust particles in the air	Bi-monthly monitoring	Health Inspector	Line Manager
<i>General operation of the dumpsite</i>	Fences, gates, access, use	Daily	Site foreman	Line Manager
<i>Implementation of Mitigation measures</i>	Ensure total compliance to this EMP and adherence to the regulative measures	Annually	Line Manager	CEO

7.2 Site Environmental Monitoring Checklist

The following checklist should be used during the monitoring program. The checklist will enable the project to cope with new circumstances and/or requirements of community or the Authorities as they arise. The checklist should be filled in regularly as per monitoring schedule outlined in the table above. This is only an example, the Municipality shall prepare a detailed checklist outlining all environmental parameters which needs to be monitored as depicted in Table 4 above.

Table 2: Site Checklist (Example)

	KEPT AT STANDARD LEVEL?		<i>Comments</i>
	<i>YES</i>	<i>NO</i>	
<i>Leachate (any contamination of storm water with waste)</i>			
<i>Parasite infestation (population of fly at the dumpsite)</i>			
<i>Air quality (presence of smoke, thick particles in the air)</i>			

This information is true and correct to the best of my knowledge

Name of person inspecting site: _____

Signature: _____

Date of site inspection: _____

8. CONCLUSION

In conclusion it should be noted that this EMP should be regarded as a living document and changes should be made to the EMP as required by project evolution while retaining the underlying principles and objectives on which the document is based.

The compilation of the EMP has incorporated impacts and mitigation measures from the Environmental Assessment Report, as well as incorporating principles of best practice in terms of environmental management.

In addition, provided this project is mitigated, as per the EMP, the project will result in impacts that should not negatively affect the environment. It is the applicant's responsibility to ensure that this EMP is made binding on the contractor by including the EMP in the contract documentation. The contractor should thoroughly familiarise himself with the requirements of the EMP and appoint an environmental Control Officer (ECO) to oversee the implementation of the EMP on a day-to-day basis.

Parties responsible for the transgression of this EMP should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behavior/negligence should receive penalties.

APPENDIX A

Generic Method Statement Example

EXAMPLE OF METHOD STATEMENT

CONTRACT: DATE:

PROPOSED ACTIVITY (give title of Method Statement and reference number):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF THE WORKS FOR WHICH THE METHOD STATEMENT IS REQUIRED:

Start Date:

End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible): Note: please attach extra pages if more space is required

DECLARATIONS

1) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

(Signed)

(Print name)

(Signed)

(Print name)

Date: _____

2) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to other signatories and that the ECO will audit my compliance with the contents of this Method Statement:

(Signed)

(Print name)

Date: _____

3) ENGINEER

The works described in this Method Statement are approved:

(Signed)

(Print name)

Date: _____

4) APPROVING AUTHORITY

The works described in this Method Statement are approved:

(Signed)

(Print name)

Date: _____

APPENDIX C: AN EXAMPLE OF INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	Env. Condition	Comments	Corrective Action Taken <i>(Give details and attach documentation as far as possible)</i>	signature

APPENDIX D: EXAMPLE OF WASTE COLLECTION REGISTERS

Site	Time	Supplier Details	Waste Type	Approximate Quantities	Responsible Persons	Signature (Supplier)