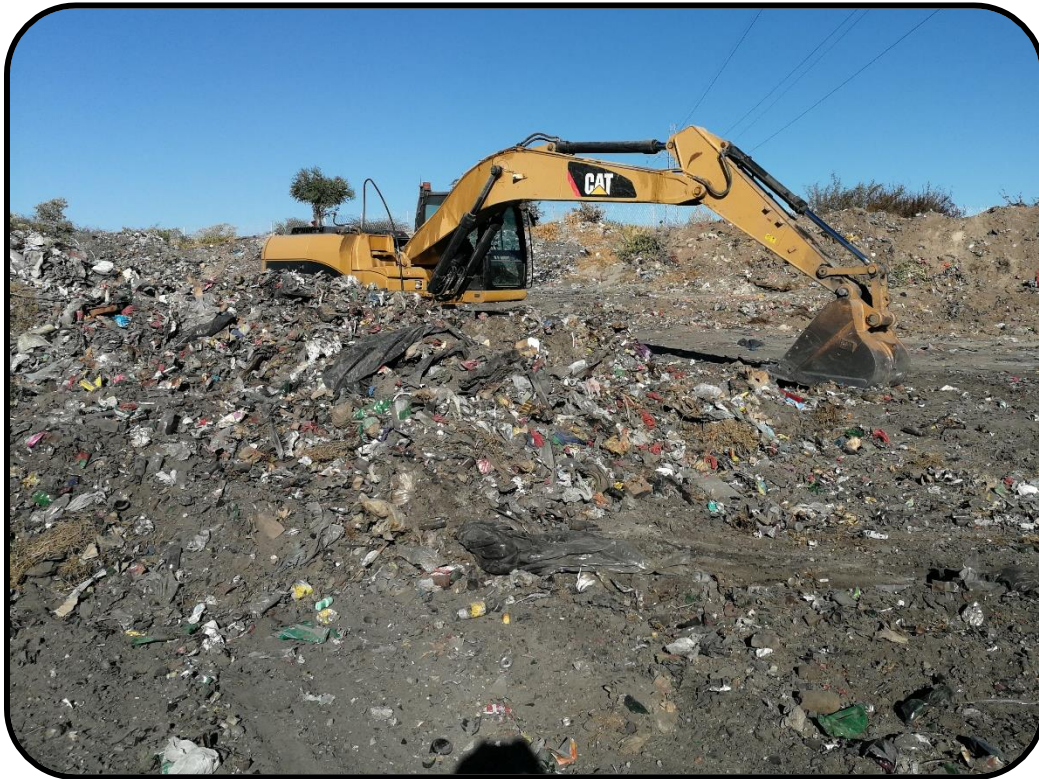


ENVIRONMENTAL MANAGEMENT PLAN (EMP)

FOR THE OPERATIONS AND MANAGEMENT OF THE EXISTING OMUTHIYA WASTE DISPOSAL SITE, OSHIKOTO REGION



Prepared For:

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Table of contents

List of Tables	5
LIST OF FIGURES	5
LIST OF ACRONYMS.....	6
1. INTRODUCTION AND BACKGROUND	7
1.1 Introduction.....	7
1.2 Objectives of the EMP	8
1.3 EMP Methodology.....	8
2. PROJECT DESCRIPTION	10
2.1 Locality	10
2.2 Site context.....	11
2.3 Nature of waste and disposal method	12
2.4 Waste stream composition.....	13
2.5 Site administration and management.....	13
3. DESCRIPTION OF THE AFFECTED ENVIRONMENT	14
3.1 Socio-economic of the area	14
3.1.1 Location, History and Demographic.....	14
3.1.2 Social and Economic Development	15
3.2 Description of the surrounding biophysical environment	16
3.2.1 Climate.....	16
3.2.2 Topography and drainage	16
3.2.3 Geology and soil.....	17
3.2.4 Vegetation	17
3.2.5 Groundwater potential	17
3.3 Solid waste management: Current practices	19
3.3.1 Waste generation and handling	19
3.3.2 Waste collection and disposal	21
3.4 Concerns and challenges toward solid waste management.....	25
3.4.1 Current waste collection system	25
3.4.2 Limited capacity and resources	25
3.4.3 Waste disposal site	25
3.4.4 Lack of waste segregation and limited recycling initiatives	25

3.4.5	Residents living in proximity to the disposal site	26
3.4.6	Facility and equipment.....	26
3.5	The way forward	26
4.	RESPONSIBILITIES.....	27
4.1	Waste generator (Institution, households, organization, etc.)	27
4.2	The Developer: Omuthiya Town Council.....	27
4.3	Line Ministries (MoHSS, MEFT, MAWLR etc.)	28
5.	LEGAL FRAMEWORK	29
6.	INTEGRATED WASTE MANAGEMENT STRATEGIES	33
6.1	Waste Management Education	33
6.2	Waste Inventory Management	33
6.3	Waste Management Hierarchy.....	34
6.3.1	Waste avoidance and reduction	34
6.3.2	Re-use and recycle	35
6.4	Improve waste collection and transportation systems	37
6.5	Control littering and illegal dumping	37
6.6	Improve waste disposal and treatment.....	38
6.7	General operation and maintenance of the disposal site	39
7.	PROPOSED MITIGATION MEASURES DURING OPERATIONAL PHASE	40
8.	ENVIRONMENTAL COMPLIANCE MONITORING	48
8.1	Monitoring.....	48
8.2	Site Environmental Monitoring Checklist	49
9.	CONCLUSION AND RECOMMENDATIONS	50
10.	REFERENCES.....	51
11.	APPENDICES	52
	Appendix 1: List of I&APs and Stakeholders	52

List of Tables

Table 1: Mixture of waste stream onsite	13
Table 2: Waste removal calendar as supplied by OTC	22
Table 3: Applicable international and national legislations	29
Table 4: Potential Recycling companies	36
Table 5: Proposed mitigation measures during the operational phase	40
Table 6: Monitoring Schedule	48
Table 7: Site inspection Checklist (Example).....	49

LIST OF FIGURES

Figure 1: Site locality.....	10
Figure 2: Site overview.....	11
Figure 3: Waste handling methods	12
Figure 4: Omuthiya Town (Google Maps, 2020).....	14
Figure 5: Hydrogeological map of Namibia (Christelis & Struckmeier 2001 (2011)	18
Figure 6: Household waste collection facilities	19
Figure 7: Institutional waste collection facilities	20

LIST OF ACRONYMS

CBD:	Central Business District
DEA:	Department of Environmental Affairs
EAP:	Environmental Assessment Practitioner
ECC:	Environmental Clearance Certificate
EIA:	Environmental Impact Assessment
EHP:	Environmental Health Practitioner
EMA:	Environmental Management Act
EMP:	Environmental Management Plan
FIFA:	Fédération Internationale de Football Association
GPS:	Global Positioning System
ISWMS:	Integrated Solid Waste Management Strategies
MAWLR:	Ministry of Agriculture, Water and Land Reform
MEFT:	Ministry of Environment, Forestry and Tourism
MoHSS:	Ministry of Health and Social Services
MURD:	Ministry of Urban and Rural Development
NFA:	Namibia Football Association
NSWMS:	National Solid Waste Management Strategy
OTC:	Omuthiya Town Council
PCWMP:	Pollution Control and Waste Management Policy
SWMU:	Solid Waste Management Unit

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

The town of Omuthiya is centrally located in the Oshikoto region and serves as a capital town of the region. Omuthiya town is one of the fastest growing town in the northern part of the country. The strategic position of the town within the region has generated a high concentration of commercial and business activities, mostly along the main road (B1 Road). This has led to the generation of large quantities of solid waste and consequential environmental degradation.

These wastes are disposed in open dumps creating considerable nuisance and environmental problems. Hence, solid waste management has become one of the most important municipal services for any town, to address waste problems and ensure hygienic conditions for its residents. The most important advantage of operating a formal waste disposal site is that the town has a specific location for disposal that can be monitored, and waste can also be processed to remove all recyclable materials. The waste management activities can provide employment opportunities for the local community. However, if not properly managed the disposal site has the potential to cause several issues such as public health risks and environmental hazards.

The Environmental Management Act (EMA), Act No.07 of 2007 requires that all activities of Waste Management, Treatment, Handling and Disposal may not be carried out without an Environmental Clearance Certificate being obtained. The existing disposal site does not have an Environmental Clearance Certificate (ECC). Hence, the Omuthiya Town Council (OTC) has appointed Green Gain Environmental Consultants cc to prepare an Environmental Management Plan (EMP) and apply for the Environmental Clearance Certificate (ECC) for their existing disposal site. Furthermore, OTC has an Integrated Solid Waste Management Plan (ISWMP) for the town that was compiled in 2018.

1.2 Objectives of the EMP

The EMP has the following objectives:

- To provide information on the potential negative impacts associated with the activities of the disposal site.
- Present mitigation measures for the identified negative impacts and enhancement measures for the positive impacts.
- To provide guidelines for the management and monitoring of the identified environmental issues.
- To provide guidelines to the responsible persons to follow appropriate contingency plans in the case of various possible impacts.

1.3 EMP Methodology

Since the project already exists and has been operating for many years, even before the enactment of the EMA, an Environmental Management Plan was considered sufficient. The preparation of the EMP is to ensure the waste disposal site is operated in line with the Namibian legal requirements in order to achieve regulatory compliance. The following approach was used during the completion of the Assessment Process:

1.3.1 Baseline assessment

The development of the EMP commenced with the collection of baseline information on the receiving environment in terms of the biophysical settings i.e., the surrounding flora and fauna and adjacent land uses. The baseline information also included the existing solid waste management practices from the sources to the final resort (disposal site). In addition to site visits, the EAP also made use of GIS and Google earth mapping to conduct spatial analysis of the area in terms of the elevation and topography, hydrology, soils, geology, distance to adjacent land uses etc. This information is also contained in Section 2. Description of the site.

1.3.2 Review of existing documents

The consultant also made use of existing information to establish the baseline which form the basis of the EMP preparation. The Integrated Solid Waste Management Plan (ISWMP) for the Omuthiya town which of 2018 also provided a wealth background on solid waste management in Omuthiya. Other documents that we reviewed include, Atlas of Namibia, Regional Geography of Oshikoto region, Groundwater in Namibia: an explanation to the Hydrogeological Map as well as relevant national and international legislations as described in Section 3 of this report.

1.3.3 Public Participation Process

Green Gain Consultants cc is the same consultant that prepared the ISWMP for the Omuthiya town, as stated above, hence, the inputs and concerns that were raised during the initial consultations, were also incorporated in this report. It is noted that, most of issues identified in the first consultation, have not yet been addressed and there has not been any significant changes from the previous situations. However, follow-up consultations with the two adjacent households and some stakeholders were done during the preparation of this EMP. The preparation of the ISWMP which culminated to the preparation of this EMP has benefited from inputs from the following stakeholders.

- Omuthiya Town Council
- Government Ministries (MET, MAW, MoHSS and MWT)
- Oshikoto Regional Council
- Residents and Businesses
- Neighbouring community (residents living next to the waste disposal site)

2. PROJECT DESCRIPTION

2.1 Locality

The town is currently served with one solid waste disposal site located about 3km north-west of town. The site is about 2.5 hectares in size and it has been in operation for more than 11 years.

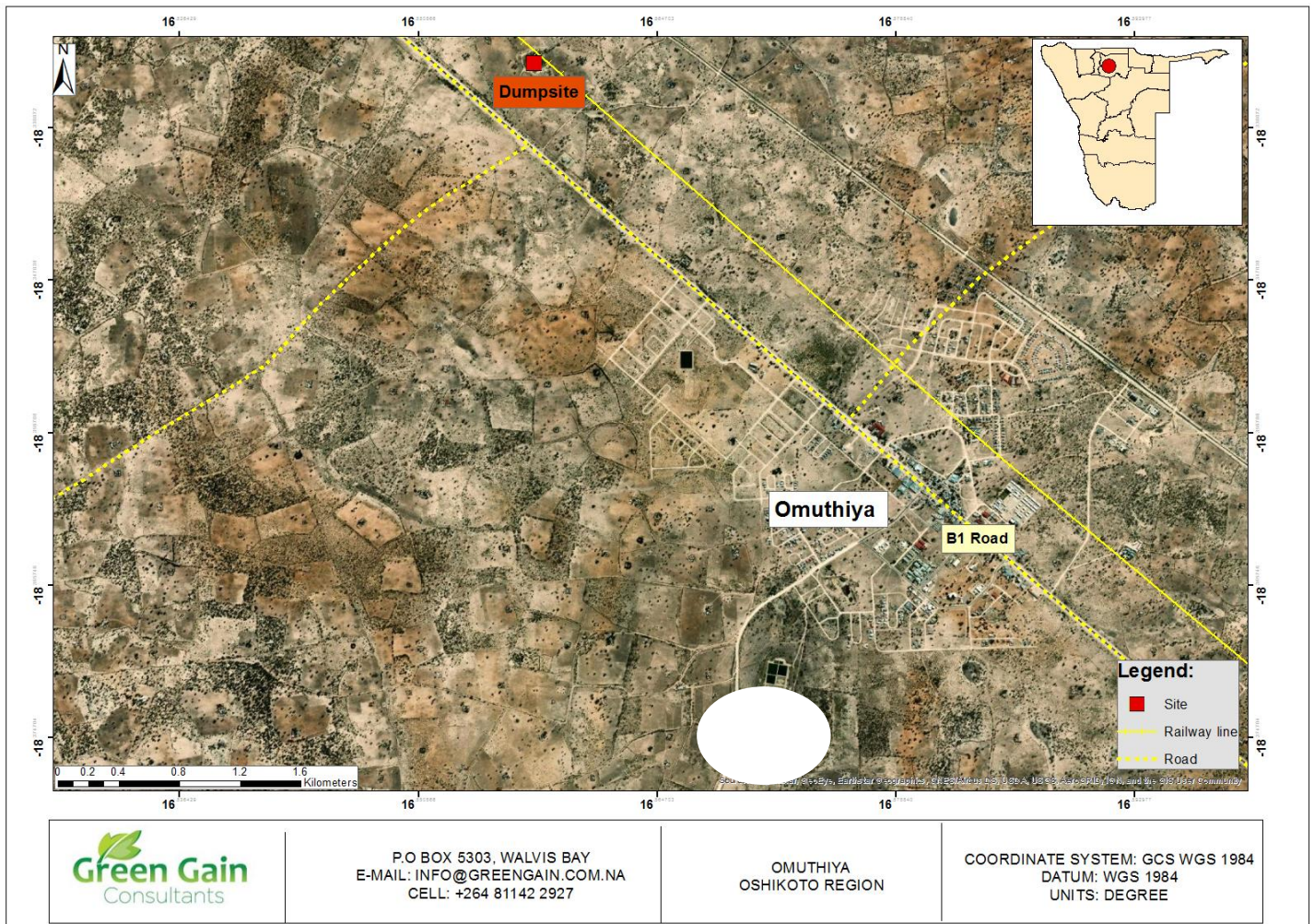


Figure 1: Site locality

2.2 Site context

The site is an old sand mining pit with an excavation of more than 3m deep. The site is properly fenced off with 1.2 m mesh and lockable gates. There is security guards at the site to control access to the site.



Figure 2: Site overview

2.3 Nature of waste and disposal method

The site is used for disposal of all municipal solid waste originating from the various sources in and around town as well as nearby villages. As depicted in the figure below, the waste stream at the dumpsite is made up of a mixture of different types of waste. The stream consists of biodegradable waste such as paper and food items as well as non-biodegradable waste such as plastics, cans, glass, e-waste and batteries. Furthermore, some of these wastes are combustible (plastic, food, paper, textile, yard debris, disposable nappies), while glass and batteries are non-combustible and remains visible even after burning.



Figure 3: Waste handling methods

Currently, an open burning system is used to reduce waste volumes at the disposal site. After burning the residual is moved further to form a heap and make space for new waste disposal. There is a designated cell for disposal by burning of expired food items and hazardous waste ashes from the hospital and veterinary incinerator.

2.4 Waste stream composition

Based on observation, a typical heap of a waste stream at the disposal site (before recycling and burning) is made of the following mixture.

Table 1: Mixture of waste stream onsite

Material	Composition by percentage (estimated)
Organic (food waste)	4%
Paper, boxes, cartons	12%
Construction material	40%
Wood debris	5%
Plastics	10%
Cans and tins	10%
Metals	4%
Electronics	1%
Glass	11%
Electronics	2%
Residues (in a separate cell)	1%

2.5 Site administration and management

- Solid waste management is rendered by the Health Section under the Department of Technical Services.
- The town council's Environmental Health Practitioner together with a team of three staff member are responsible for the solid waste management in town.
- There are currently no by-laws/regulations relating to solid waste management in Omuthiya, making it difficult to issue penalties relating to illegal dumping or cleanliness of the town.
- The town council allocates appropriate funds toward the solid waste management activities which is mostly outsourced to contractors.

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Socio-economic of the area

3.1.1 Location, History and Demographic

Omuthiya, traditionally known as Omuthiya Gwiipundi is the capital town of Oshikoto Region in northern Namibia and is situated approximately 10 kilometres from the northern border of the Etosha National Park. The town was proclaimed in October 2007 and the Omuthiya Town Council was established in September 2008. The estimated current town population is 3 800 of which 2800 are female and about 1000 male, according to the 2011 census. The council, however, predicts the current town population to be about 5 500.00 people. It is uniquely situated on the world famous Etosha Pan, between the main towns of Ondangwa in the north and Tsumeb in the south.



Figure 4: Omuthiya Town (Google Maps, 2020)

The town is servicing a surrounding community of approximately 80 000 people. A sharp increase in the community of the Town is expected with the development that is taking place, the business opportunities that are being created and the regional and municipal government jobs. The surface area of Omuthiya townlands covers 12,497 hectares (incl. part of the Etosha National Park).

3.1.2 Social and Economic Development

Having been declared the capital town of Oshikoto region, several government and public institutions as well as Namibian Police (NAMPOL) have opened their regional office headquarters in town. There are two primary schools, two combined schools, one secondary school and a school circuit inspectorate office. The town is also served with a district hospital, a clinic, NIP laboratory, a pharmacy and General Practitioner (Private Doctors). Additionally, the town has a modern State Veterinary office and National Food Reserves (NFR).

Agriculture serves as the main economic activity with tourism becoming increasingly important with direct access from the Etosha National Park via the King Nehale Gate. The town is well served with all kind of businesses from small-scale dealers to large scale retailers. The Town is also served by most known retail brands operating within town, such as Shoprite U-Save, Style, Choppies etc. There are also many other local brands operating, offering a good shopping ambiance, especially craft, baskets unique to the town and surrounding villages.

The town of Omuthiya is located about 10 kilometers from the King Nehale Gate of the Etosha National Park. The town serves as a gateway to and from the northern part of the country and thus tourists and passersby contribute to the business prosperity in town. There is a main road and railway line crosses the town, resulting in ribbon type urban settlement along the road. The town is also home to a few fountains which currently have no activities for the residents or visitors. Additionally, the water from the fountains is currently not used for much except as a water resource for livestock and wildlife. These present numerous opportunities for the town related to the Tourism industry such as hosting/accommodating tourist for day trips into the park, offer cultural experiences to tourists staying within the park or fun and recreational activities at or around the fountains. Activities such as these would lead to employment and income generating opportunities for the residents. Another potential for income and employment opportunities is the agricultural sector. The Omuthiya town is known to be an agricultural hub for the surrounding villages and neighboring towns like Ondangwa. The town currently hosts AMTA silos for the Mahangu crop, a staple in most northern Namibia regions. The town has an opportunity to supply Mahangu on a large scale to a wider market to the rest of Namibia.

Apart from the tourism and recreational potential it also holds possibilities for agricultural development, such as irrigation crops. It has also been established that the area is conducive to producing citrus crops. This can be realized through smart partnerships and cooperation with

public enterprises such as Agribusdev (Agricultural Business Development), AMTA (Agricultural Marketing and Trading Agency), NAB (Namibia Agricultural Board), Ministry of Agriculture, Water and Land Reform and educational institution.

The Town Council was also sponsored an artificial soccer pitch by the Fédération Internationale de Football Association (FIFA) through the Namibia Football Association (NFA) development programme, that will bring much-needed football development to the region.

3.2 Description of the surrounding biophysical environment

3.2.1 Climate

The Oshikoto Region is described as a semi-arid savannah with a rainfall average ranging from 400-500 mm per year. The climate is classified as a local steppe clima with a subtropical thorn woodland bio zone. The summer season of the region is described as hot with a maximum temperature between 32 °C and 38 °C during the hottest months and coldest winter temperatures are around 10 °C to 16 °C (Mendelsohn, 2003). In this region, December is known as the hottest month of the year, while July is known as the coldest month of the year in the region. The mean evaporation figure for the region lies from 3000 mm to 3200 mm per annum.

Omuthiya is mostly cloudy but generally clear and hot all year around. The average temperature for the year in Omuthiya is ± 20 °C. The warmest month, on average, is November with an average temperature of ± 26.4 °C. The coolest month on average is July, with an average temperature of ± 17.2 °C. The wind experienced at any given location is highly dependent on local topography and other factors. The average hourly wind speed in Omuthiya experiences mild seasonal variation over the course of the year. Omuthiya experience the highest winds speed in the months of May to October, with average wind speeds of more than ± 8.2 km per hour while October to May experience the lowest winds. The calmest day of the year is February, with an average hourly wind speed of ± 6.8 km per hour.

3.2.2 Topography and drainage

Oshikoto Region is mostly flat with pockets of higher ground at the Otavi Mountain Range and the mountain at Halali. The elevation is between 1 090 and 1 150 meters above sea level.

3.2.3 Geology and soil

Namibia has a unique and ancient geological history with great rock formation. The region lies on old continental base of graphite, gniesses, and volcanic rock however most of this rock lies thousands of meters below the current land scape (Mendelsohn, Obeid, & Roberts, 2000). The predominant rock types in Oshikoto region are Damara sandstone, Otavi dolomites and Nosib quartzite. The Otavi Mountains have rich ore bearing deposits, costly to exploit, while copper is mined. Saltpans occur in northern parts as well as in the Etosha Pan.

Northern Kalahari Sandveld covers the eastern part, Aeolian Sands cover the northern area with parches of Soloneze Soils which are medium textured, bleached or even white. It covers all plains and drainage depressions and has a very low clay content. Areas bordering Etosha have non-soloneeze soils that are fertile. These medium-textured soils are often considered ideal for agriculture as they are easily cultivated by farmers and can be highly productive for crop growth.

3.2.4 Vegetation

The vegetation in the Oshikoto Region varies greatly from the north to the south and from the east to the west. According to (Strohbach, 2014) the north and north-east, this *Colophospermum mopane* shrubveld is gradually replaced by broad-leafed savannas, whilst to the south-west, the vegetation is replaced by the *Terminalia pruinoides* woodlands. This transition is very patchy in nature. To the south, some *Odyssea paucinervis* occurs, whilst to the east *Terminalia pruinoides* and *Albizia anthelmintica* become prominent.

3.2.5 Groundwater potential

Numerous underground caverns, with high-quality groundwater, are found in limestone. The drainage system is defined by three river systems flowing from east to west and two systems originating in Central Angola draining into the Etosha Pan. Oshanas, local flood areas, are found in the northern area and become flooded during rainy seasons. After rain, fresh surface water in pans and oshanas is available until June-July.

The quality of the groundwater within the region is variable since some boreholes provide a good yield at the depths of 10m and 50m. The water quality in the region is varying from drinkable to highly saline water. With ephemeral river in the region, the water source in the ephemeral can be accessed even by hand-dug pit. The interconnected ephemeral pans and shallow river courses known as oshanas are the reminders of the proto-Kunene and Cuvelai systems which are emptied into the inland massive lake known as the Etosha lake. Mostly, part of the north/eastbound

groundwater flow is shallow, and discharges through numerous springs along the southern margin of the Etosha Pan, where it rapidly evaporates. The potable water in the region is supplied in piped system from the Calueque Dam in Angola, on the Kunene River, to the major urban settlements within the region. This dam does not only provide water to the Oshikoto Region, it also provides water to the Oshana, Omusati and Ohangwena Regions.

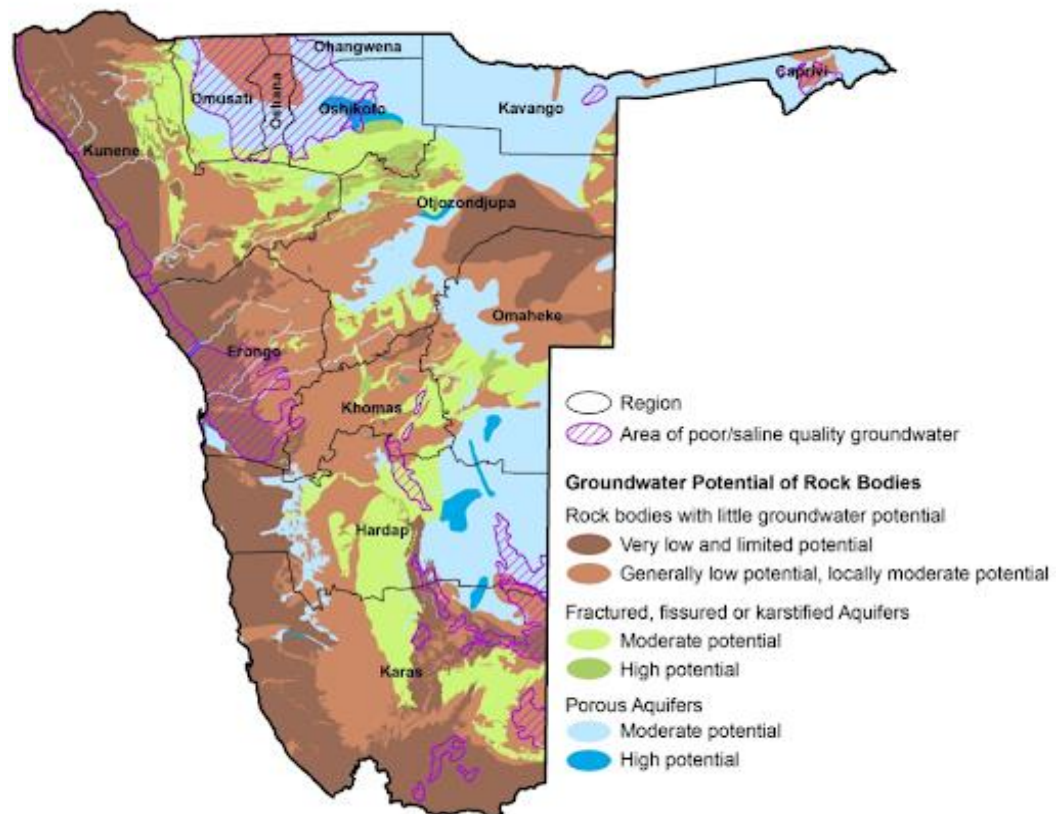


Figure 5: Hydrogeological map of Namibia (Christelis & Struckmeier 2001 (2011))

3.3 Solid waste management: Current practices

3.3.1 Waste generation and handling

Solid waste in Omuthiya originates primarily from household (domestic), business area/commercial/trade premises (such as restaurants, hotels, shops and markets), institutions (schools, offices and hospital), streets, parks, gardens, construction activities and as well as municipal services such as street cleaning, repairs and maintenance etc.

a) Waste from residential (informal & formal) areas

Each household in formal townships is issued with an oil drum bin for general domestic waste collection. Some households also make use of plastic bags for additional waste collection while a few of the residents drive their waste, especially garden refuse and building rubble, to either communal skips at the CBD or to the waste disposal site. Informal areas are also issued with communal oil drums that are used by several households. Some informal residents living next to the informal market make use of communal skips to dispose off general domestic waste.



Figure 6: Household waste collection facilities

b) Waste from business premises and institutions

Business premises and institutions are provided with communal skips and wheelie bins for waste collection. Most of the institutions have waste collection bins in their offices and buildings for general domestic and office waste. Streets and public open spaces such as parks are served with pole bins for collection of litter i.e. food items etc.



Figure 7: Institutional waste collection facilities

c) Waste from healthcare and veterinary services

Healthcare wastes consist of both Health Care General Waste and Health Care Risk Waste. These are originating from the district hospital, clinic, and general practitioners' rooms (Private Doctors), NIP Laboratory and Pharmacies. Other Healthcare Risk Waste such as needles, syringes, veterinary medicines from animal health care services also originate from the State Veterinary office.



Figure 8: Healthcare waste

d) Organic waste

Abattoir waste such as animal offal, carcasses etc. originate from animal slaughtering at the informal slaughter site as well as from dead animal in the street and/or animal impoundments. Plans are underway to construct a formal animal abattoir where all the slaughtering will take place under the control of the Town Council.



Figure 9: Informal slaughter site

3.3.2 Waste collection and disposal

a) General domestic waste

Collection and transportation of general domestic waste is outsourced to cleaning contractors appointed by OTC. Currently waste is collected from formal and informal residential twice a week whilst business premises and institutions are serviced three times a week. The collection is done per suburb using a curbside garbage collection method. Waste from business premises is collected in communal skips and ultimately disposed of at the disposal site. Modes of transport is mainly open trucks without tipping mechanisms, tractor with a trailer and pick-up vehicles. Waste collection is done using the collection calendar.

Table 2: Waste removal calendar as supplied by OTC

Day	Area
Monday	Waste removal at all ervens (residential, businesses, hospitals, offices, schools etc.)
Tuesday	Litter picking from streets, sidewalks & other public open spaces.
Wednesday	Waste removal critical ervens (businesses, hospitals, and schools)
Thursday	Litter picking from streets, sidewalks & other public open spaces.
Friday	Waste removal at all ervens (residential, businesses, hospitals, offices, schools etc.)

b) Special waste

Garden waste, building rubble and obsolete items i.e. old fridges, machines from households are types of special waste produced in smaller quantity. These wastes are disposed of in communal skips which is later collected by the waste collection contractors and disposed off at the disposal site. Garden waste and building rubble from municipal services i.e. street sweeping, gardening, road constructions etc. are normally collected by the responsible contractor or by the town council and disposed off at the disposal site.

Other types of special waste found in the town are used tyres and car wrecks. There is currently a challenge in dealing with these types of especially the vehicle wrecks, thus these are seen everywhere in and around town.

c) Hazardous waste

Hazardous waste found in Omuthiya mainly originates from healthcare and veterinary services. At the hospital, health care wastes are normally isolated in red-coloured refuse bags and stored separately from other types of waste. This waste is incinerated daily under the supervision of an Environmental Health Practitioner. Liquid medical waste such medicines or other chemicals are deposited at the town's sewage treatment plant (oxidation ponds).



Figure 10: Waste incineration (Diesel tank, Incinerator & Ashes)

The State veterinary office of the MAWLR is also equipped with a diesel-powered incinerator where all veterinary care wastes such as expired drugs, needles, syringes animal carcasses etc. are incinerated. The incineration is done under the supervision of the State Veterinarian. After incineration, the ashes from the state veterinary and hospital incinerators are disposed off at a designated spot/trench at the disposal site.

d) Littering and Illegal dumping

Illegal dumping has not reached an alarming rate yet however, this occasionally occur especially in front of some business premises, along the road and some open spaces. Occasionally, a bag of waste or a pile of carcass will be found in open spaces. In some cases, waste is found dumped in front or next to the waste disposal site. This is normally cleaned up by town council officials. There is currently no standardise penalty for illegal dumping.

e) Recycling and Reuse initiatives

About 60% of the waste found at the disposal site is recyclables while 20% of the waste is reusable (food waste and construction materials). Due to poor waste segregation, only about 20% of this waste is removed for recycling and reuse purposes. This means, 60% of the recyclable and reusable waste remains part of residual at the disposal site leaving the Town Council with a huge burden of waste to deal with.



Figure 11: Recyclables

Recycling is done by members of the community in collaboration with WILCO Recycling initiative. They sort recyclables such as glass, bottles, cardboard boxes, cans and clear polythene plastics and sell them to WILCO. These items are transported out of Omuthiya for recycling purposes.

3.4 Concerns and challenges toward solid waste management

3.4.1 Current waste collection system

With the collection and transportation of waste being outsourced, it has proved difficult to manage different contractors. This system meets basic waste management needs but does not take full advantage of local recycling opportunities and it does not address waste stream reduction. Waste composting opportunities is not incorporated while hazardous waste disposal opportunities are limited and inconvenient.

3.4.2 Limited capacity and resources

It is observed that OTC has limited capacity in terms of human and financial resources, equipment which hampers effective service delivery. Limited human resources also hamper the ability of the town council to develop and conduct awareness and outreach programmes to disseminate relevant information and induce attitudes changes among the resident on solid waste management.

3.4.3 Waste disposal site

The existing waste disposal site and the disposal method is not at the required standard. There is a need to formalize the solid waste disposal site in accordance with the Environmental Management Act, No. 07 of 2007 and achieve waste disposal standards as prescribed in the National Solid Waste Management Strategy of 2018. Furthermore, there is also reported cases of continuous vandalism of the waste disposal site' fence and ineffective control of waste disposal at the site. There are also complaints from the neighbouring community regarding the public health risks associated with the disposal site. Hence, prompting a change in the current disposal technique and establish an effective communication with the affected community.

3.4.4 Lack of waste segregation and limited recycling initiatives

Waste segregation both at sources and at the disposal site is very poor. Different types of waste are normally found mixed making it difficult for recycling and reuse options. As such a huge pile of waste is clearly observed at the disposal site leaving the town council with a huge burden to deal with. The lack of waste segregation will not only increase waste stream at the disposal site, but it also increases the operation cost and reduce the service life span of the disposal site.

3.4.5 Residents living in proximity to the disposal site

Communities living in proximity of the site may be affected by various disturbances. OTC may need to compensate the households and relocate them to available and suitable residential land in Omuthiya.

3.4.6 Facility and equipment

The town council has a limited capacity in terms of resources for solid waste management. Facilities for solid waste management provided by the town council includes skips and refuse bins. There is not a designated or special vehicle for solid waste collection, transportation, and disposal. The bulldozer used and dump truck that are needed to move waste heap at the disposal site are also contracted from external contractors.

3.5 The way forward

This EMP was prepared for the operations and management of the existing disposal site to reduce or lessen environmental impacts associated with the disposal site as well as to comply with the Environmental Management Act (EMA, No. 07 of 2007), hence an Environmental Clearance Certificate will be obtained for this site.

4. RESPONSIBILITIES

It is the core responsibility of the Omuthiya Town Council to ensure the successful implementation of this EMP and any conditions to be imposed by the Ministry of Environment, Forestry and Tourism (MEFT). However, the implementation of this EMP also requires the involvement of various role players, each with specific responsibilities to ensure that the project is operated in an environmentally sensible manner.

4.1 Waste generator (Institution, households, organization, etc.)

Waste generator refers to any person or organisation whose activities produce any waste and, if that person/organisation is not known the person who is in possession and/or control of the waste. It is the duty of anyone who imports, produces, carries, keeps, treats, disposes of, or are a dealer or broker that has control of, controlled waste. Any person handling waste should make sure they handle it in a way that will bring no harm to the health of any individual or the environment. All waste producers make sure their waste collection bins are placed outside during the collection day or have their waste disposed of at the registered disposal site. Failure to comply with the above, shall be liable to penalties or face legal action.

4.2 The Developer: Omuthiya Town Council

Responsibilities

- a) Implement the final EMP after approval by DEA and ensure the project comply with the EMP and conditions therein.
- b) Notify MEFT and EAP of any proposed changes to the solid waste disposal site and its surrounding.
- c) Appoint the responsible official(s) to take the responsibility of the following:
 - Daily inspections and regular monitoring and review of the on-site environmental management and implementation of the EMP by the maintenance team or contractor.
 - Overall maintenance and control of the site (i.e. fences, gates, etc.).
 - Control the disposal and burning of waste, collection of windblown litter.
 - Keep environmental records, compile and submit quarterly reports to DEA.
- d) The above responsibilities could be shared among several officials as per their respective job descriptions. However, the overall responsibilities should lie with the Environmental Health Practitioner.

- e) Provide Environmental training and awareness on the contents of the EMP to all contractors, sub-contractors and employees involved in the management of the solid waste disposal site. Environmental awareness training should take place in the language understood by the employees.
- f) Ensure the review/update of this EMP as required and renewal of the ECC.

4.3 Line Ministries (MoHSS, MEFT, MAWLR etc.)

Various government ministries should provide supervisory and monitoring roles to ensure compliance of their respective regulations and laws by enforcement of respective laws. Of relevance to this project are the Ministry of Health and Social Services, Ministry of Environment, Forestry and Tourism, Ministry of Works and Transport and Ministry of Agriculture, Water and Land Reform.

- **Ministry of Health and Social Services** should provide monitoring of public health and safety issues in town in consultation with OTC. Moreover, MoHSS is responsible for collection and disposal of medical waste or healthcare waste from the clinic in accordance with National Healthcare Waste Management Plan, as well as inspection of food outlets in and around town and nearby villages.
- **Ministry of Environment, Forestry and Tourism** should conduct an Environmental compliance monitoring should any instances of non-compliance be found, this must be brought to the attention of the Environmental Health Practitioner, along with recommended measures for rectifying the non-compliance.
- **Ministry of Agriculture, Water and Land Reform** is responsible for the control of animal healthcare (veterinary) waste i.e. expired drugs, needles, carcasses. These types of waste maybe incinerated, and the ashes must be disposed off in an acceptable manner and in consultation with OTC.

5. LEGAL FRAMEWORK

There are several international, national legislations which provide a broad range of principles related to pollution control and waste management that are applicable to ongoing operations of the disposal site. These are tabled below.

Table 3: Applicable international and national legislations

LEGISLATION	PROVISION AND REQUIREMENTS
Local Authorities Act, No. 23 of 1992 as amended	<p>Provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters.</p> <p>The collection and disposal of waste is the responsibility of local and regional authorities. The Act also gives power to the Local Authorities to establish by-laws to safeguard waste management within their jurisdictions.</p>
Pollution Control and Waste Management Policy, 2003	<p>This policy serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management procedure.</p> <p>The bill provide framework for a multitude administration on pollution control and waste management in the country. Each authority identified by the bill shall play its respective roles.</p>
Environmental Management Act, No.07 of 2007	<p>Ensuring that the significant effects of activities on the environment are considered carefully and in time. To promote the sustainable management of the environment and the use of natural resources by establishing principles for decision making on matters affecting the environment.</p> <p>Further it states that; all activities of waste management, handling storage and disposal require an Environmental Clearance Certificate. The ECC for this project should also be renewed every after three years.</p>
Public Health and Environmental Act, 2015	<p>The objectives of the PHE Act are to;</p> <ul style="list-style-type: none"> • Promote public health and wellbeing • Prevent injuries, diseases and disabilities • Protect individuals and communities from public health risks • Encourage community participation in order to create a healthy environment • Provide for early detection of diseases and public health risks

	<p>Section 2 requires that a) “Every local authority must take necessary reasonably and applicably measures to maintain its local authority area at all times in a hygienic and clean condition” b) Prevent occurrence of a health nuisance, unhygienic condition, an offensive condition or any condition which could be harmful or dangerous to the health of a person within its local authority or the local authority area of another local authority”</p>
<p>Atmospheric Pollution Prevention Ordinance, no. 11 of 1976</p>	<p>To provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto. The Ordinance deals with administrative appointments and their functions; the control of noxious or offensive gases; atmospheric pollution by smoke, dust control, motor vehicle emissions; and general provisions.</p> <p>According to the Ordinance, the Local Authority shall control and prevent atmospheric air pollution or emission of noxious or offensive gases by smoke.</p>
<p>Hazardous Substances Ordinance 14 of 1974</p>	<p>This Ordinance provides for the control of toxic substance and thus also relevant for pollution control. It covers for the manufacturing, sale, use, disposal, dumping, importing and exporting of hazardous waste.</p> <p>OTC shall control the manufacturing, used or disposal of hazardous waste as per this Ordinance</p>
<p>Labour Act (No 11 of 2007)</p>	<p>To establish a comprehensive labour law for all employers and employees; to entrench fundamental labour rights and protections. Regulate basic terms and conditions of employment; ensure the health, safety and welfare of employees; to protect employees from unfair labour practices; to regulate the registration of trade unions and employers’ organisations; to regulate collective labour relations; to provide or the systematic prevention and resolution of labour disputes;</p>
<p>The Soil Conservation Act No.76 of 1969</p>	<p>This Act provides for the prevention and combating soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of water sources,</p>
<p>Road Traffic & Transport Act, 22 of 1999</p>	<p>The Regulations are very similar to those of South Africa and incorporate various South African National Standards (SANS) standards relating to the identification and classification of dangerous goods and substances, as well as the packing and transportation of goods.</p>

Medicine and Related Substances Control Act 13 of 2003	Enforces disposal of undesirable medicines.
Atomic Energy and Radiation Protection Act, 5 of 2005	License required for the disposal of radiation source or nuclear material Amended under hazardous substances ordinance Radioactive waste is presently transported across the borders as there is no disposal facility in Namibia.
Namibia Integrated Health Care Waste Management Plan, 2010	Provide the information to allow health care facilities to establish a good healthcare waste management system consistent with the regulatory requirements of Namibia.
National Solid Waste Management Strategy, 2018	Provides coordination for funding, regulations, action plan for proper solid waste management and facilitate stakeholder collaboration.
Waste Disposal Site Siting Guidelines, 2017	Provide guidelines and specifications for Sanitary Landfills and Criteria for Site Selection.
Basel and Rotterdam Convention, Framework Convention on Climate Change	<p>Agreed to ensure environmentally sound management of hazardous waste and other wastes through the reduction of their movements, for the purpose of reducing their impacts on human health and environment.</p> <p>The Basel Convention makes specific reference to control of special HCW: sharps, pathological infectious waste, hazardous chemical waste, and pharmaceutical waste and includes the following waste categories:</p> <ul style="list-style-type: none"> • Clinical wastes from hospitals, health centers, and clinics. • Wastes from the production and preparation of pharmaceutical products. • Pharmaceutical waste. • Waste from the production, formulation and use of biocides and phyto-pharmaceuticals <p>Namibia has accepted the principal that the only legitimate transboundary shipments of hazardous waste are exported, where the country lacks the facilities or expertise to dispose of the waste categories. This is applicable to the transportation of radioactive waste from Namibia to South Africa. Because suitable facilities are not available in Namibia, provided that the radioactive waste is labelled, temporarily stored and transported according to the United Nations (UN) recommended standards.</p>

Stockholm Convention on Persistent Organic Pollutants	Emphasizes the restriction and elimination of on persistent organic pollutants (POPs), especially the disposal of industrial and medical chemicals. It also provides information for future establishments to re-use, reduce and recycle waste with environmentally friendly technologies e.g. autoclaving. It was adopted in 2001 and entered into force on May 17, 2004.
Rotterdam Convention	Prescribes the Prior Informed Consent procedures for certain hazardous chemicals and pesticides in international trade. Adopted in 1998, entered into force on February 24, 2004.
International Atomic Energy Agency (IAEA)	The IAEA is an autonomous intergovernmental organization within the UN system. The organization provides advice to member states on nuclear power development, health and safety, radioactive waste management, legal aspects of atomic energy, and prospecting for and exploiting nuclear raw materials. The agency has developed safety standards in the area of pre-disposal of hazardous waste, which includes collection, handling, treatment, conditioning, and storage of radioactive waste.

6. INTEGRATED WASTE MANAGEMENT STRATEGIES

This section provides a description of Integrated Solid Waste Management Strategies (ISWMS) that promote effective waste management systems and wise waste disposal practices. The ISWMS will allow the OTC to plan carefully and make provision in terms of facilities, personnel to manage all types of waste from generation to disposal. The ISWMS should serve as a regulatory framework to enforce, promote and support the principles of waste management from collection, transportation, disposal, storage of various kinds of municipal solid waste.

The ISWMS will include a number of strategies such as waste management education and awareness, inventory management, waste hierarchy and minimisation initiatives i.e. recycling and resource recovery, improve standards on waste collection, transportation and disposal as well as general maintenance of the disposal site as explained in detail below.

6.1 Waste Management Education

Awareness raising campaigns are a key component to ensure effective solid waste management, disseminate information and educate the community and raise awareness on what types of wastes should be recycled and how they should be presented (i.e. loose and plastic-bag free apart from the flexible plastic program). These education programme includes the following:

- **Educational postcards and general guides** to waste services, to provide information about collection days, what type of waste can be placed in each bin and correct placement of bins on the kerbside. These materials can be produced and distributed at the public offices i.e. churches, clinics, polices, OTC office etc.
- **Community clean up campaigns-** OTC in collaboration with other public entities should organise regular clean up campaigns to cultivate a culture of cleanness in the town.
- **Others:** Existing community gatherings should also be used to raise awareness on waste management in the town.

6.2 Waste Inventory Management

It is difficult to achieve effective solid waste management without a good data base. It is recommended that the OTC develop an integrated register of all types and quantity of waste generated in the town as well as where and how they are used and how the residues or out-dated materials are stored or disposed. Furthermore, there should be an up-to-date filing system for

the disposal site, whereby method statements, environmental incidents report, training records, audit reports and public complaints register are kept.

6.3 Waste Management Hierarchy

If not properly planned, the collection, handling, storage, and transportation of waste can be a very costly exercise. The waste hierarchy remains the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste. They save costs and land as well as conserve natural resources, landfill space and energy. The hierarchy classifies waste management strategies according to their desirability in terms of waste minimization. According to the hierarchy; waste avoidance at source is to be considered as highly preferable. Followed by the 4Rs namely, Reduce, Re-use, Recycle and Recover whereas Treatment, Containing and Disposal should only be considered as last resorts. The waste hierarchy is explained in detail below.



Figure 12: Waste management hierarchy

6.3.1 Waste avoidance and reduction

The process of waste avoidance and reduction is a primary focus for most waste management strategies. It begins with an examination of what you are using? i.e. paper, plastic etc. and what it is used for? This involves reducing the amount of waste produced in society and helps to

eliminate the generation of harmful and persistent wastes, supporting the efforts to promote a more sustainable society. A key action in minimising waste is influencing community behaviour regarding waste production. This can be done in the following ways:

- Adopting a green procurement approach by buying environmentally preferred products.
- Establish a green team for the town that promotes and actively seeks opportunities to reduce waste and increase recycling in day-to-day operations e.g. re-using old recycling crates and used tyres as planting boxes for plants and fruit trees.
- Participating in local programs, festivals and working with local business groups on waste minimisation initiatives e.g. Local retail programs for alternatives to disposable plastic bags, food waste recovery etc.

6.3.2 Re-use and recycle

Recoverable materials that are organic in nature such as plant material, food scraps, and paper products can be recovered through composting and digestion processes to decompose the organic matter. This should start with identifying a designated site or cell within the disposal site for decomposing organic waste separately from other wastes. The resulting organic material can be recycled as mulch or to be used as compost for agricultural or landscaping purposes. Other types of waste such as plastic, boxes, cartons, tins, bottles, cans etc. which originate from business premises as well as papers, newspaper, boxes, electronics originating from institutions/offices are recyclables. The OTC in collaboration with institutions and residents can establish recycling projects. The ideal site for this centre is in the town's CBD. Some of the potential recycling companies are tabulated below.

Table 4: Potential Recycling companies

Company name	Town and address	Types of waste recycle
Rent-A-Drum Pty Ltd.	Ondangwa Mr. Abraham Reinhardt 0811272298 Email: facilitymanager@rent-a-drum.com.na	General domestic waste (cans, papers, plastic)
Mpact Corrugated (Pty) Ltd	44 3rd street East, Walvis Bay Tel: 064 214200 Fax: + 264 64 200 667	Paper, boxes, cardboard,
WESCO	Walvis Bay	Oil, grease
Envirofill Pty Ltd	Tsumeb 067 221 429 cvanwyk@enviro-fill.com.na	General domestic waste (cans, papers, plastic)
Transworld e-waste	Windhoek	electrical and electronic equipment
Elago Motors	Omuthiya-Ondangwa main Road, Mr. Elago Onesmus 0811278427	Wrecks
Scrap Salvage Pty Ltd.	Tel: +264 61 300 444 Fax: +264 61 221 513 P.O. Box 6837, Windhoek 27 Kallie Roodt Street, Northern Industrial Area, Windhoek	Wrecks, scrap metals
Ge-co Glass	P. O. Box 86243, Eros Windhoek 0813275372	Glass

The Town Council or waste generator can make arrangements with any of these companies for supply of recyclables.

6.4 Improve waste collection and transportation systems

The waste collection and transportation systems should be standardized and improved to ensure effective solid waste management while minimizing the cost involved. Standards would involve the following:

- Team or staff members responsible for solid waste should receive training on effective solid waste management.
- Standard refuse bins (wheelie bins) and skips at collection point.
- Develop a waste collection schedule and work accordingly.
- Develop a service plan for all vehicles and equipment used in waste collection.
- Procure a vehicle for waste collection and transportation.
- All vehicle used for transportation of waste must have a canopy cover to contain windblown waste (i.e. net, tonner cover etc.).
- Encourage street sweeping and litter picking on a regular basis. This can be done through a volunteer (on incentive base) or by the officials on regular basis.

6.5 Control littering and illegal dumping

Litter found in streets and public open spaces often includes cigarette butts, beverage containers, paper, plastic film and wrappers. These can be reduced by installing pole bins on streetlights which can be emptied on regular basis by the waste collection team. Illegal dumping remains a significant challenge in most towns in Namibia. This often include dumping of building rubble, garden waste and some household waste i.e. scraps, redundant items, batteries etc.

Controlling illegal dumping has proven difficult, hence there seems to be misconceptions among the urban residents that they are only responsible for keeping their home clean, but their immediate environment and public places, like streets and drains, are the responsibility of the town council. Such behavior is regarded as a major barrier to the successful implementation of SWM in urban areas. This requires concerted efforts and educational programmes to sensitize people towards attitude changes to decrease the incidence of illegal dumping. This approach would graduate to enforcement actions and fines in accordance with council approved tariffs.

6.6 Improve waste disposal and treatment

The waste disposal site must be properly arranged to achieve the following:

- Prevent risks to human health and the environment.
- Reduce littering.
- Vector control i.e. flies, rodents, stray animals etc.
- Control dust, noise, and odor.
- Reduce cost of disposal.
- Extend service life span of the disposal.

There are several types of waste management techniques. Some of the environmentally friendly waste management techniques are; sanitary landfill and controlled dumping. Sanitary landfill is an acceptable waste management method, with controlled emissions and limited health and environmental impacts. There are two types of sanitary landfill namely: Area method and Trenching method.

a) Area Landfill

The solid waste is placed on the land without any excavation. A bulldozer or similar equipment spreads and compacts the waste; then the waste is covered with a layer of earth; and finally the earth cover is compacted. The area method is best suited for flat areas or gently sloping land, and is also used in quarries, ravines, pits, or where other suitable land depressions exist. Normally the earth cover material is hauled in or obtained from adjacent areas.

b) Trench Landfill

A trench is cut in the ground and the solid waste placed in it. The waste collection truck deposits the load into the trench. The waste is then spread in thin layers, compacted, and covered with earth excavated from the trench. At the end of the day the dragline excavates soil from the future trench; this soil is used as the daily cover material. Trenches can also be excavated with a front-end loader, bulldozer, or scraper. This method can be very expensive and time consuming thus only suitable for large cities.

6.7 General operation and maintenance of the disposal site

The following issues need to be addressed to ensure proper control and management of the disposal site to reduce negative impacts and optimize the benefits.

- **Gates and Access control**

The disposal site is already fenced off and served with a lockable gate. To ensure maximum control, a temporary guardhouse at the entrance should be established to facilitate access control of vehicles and the public. There must be at least a guard on daily basis to control access and provide direction to vehicles to the appropriate disposal units. The gate guard should also inspect the loads inside certain vehicles if deemed necessary.

- **Signage, Rules and Restrictions**

Information notice board which displays information to the users regarding the various operations and hours, details of operators, contact numbers, etc. should be placed at the entrance of the site. Only general municipal waste such as *household, garden refuse, building rubble, some industrial i.e. tires, scraps, wrecks must be allowed*. Infectious waste and hazardous i.e. used oil, asbestos, healthcare etc. must NOT be allowed at the disposal site. Open burning, scavenging, smoking and hazardous activities should be prohibited on-site.

- **Monitoring and Environmental Reports**

The EHP should be responsible for conducting regular monitoring in respect of the general operation of the disposal site. The monitoring should be done for certain environmental elements and frequency using a monitoring checklist. This monitoring report should then be compiled into quarterly reports as per given format, which is to be submitted to the competent authority (MEFT) throughout the operation life span of the site. This requirement is in accordance with the National Solid Waste Management Strategy, 2018.

7. PROPOSED MITIGATION MEASURES DURING OPERATIONAL PHASE

The following mitigation measures must be enforced to prevent, avoid and lessened negative environmental and public health risks that are associated with the operation of the disposal site.

Table 5: Proposed mitigation measures during the operational phase

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 litter must be covered with other heavy waste i.e. building rubble to prevent it from being blown away. Maintain the fence to contain windblown litter. Encourage recycling of papers, plastics to reduce amount going to the disposal site. Assign a team to collect all wind-blown waste around the disposal site on regular basis Organise clean-up campaigns and encourage residents to take part. 	EHP
1.2 Danger of expired food Expired food attracts residents especially scavengers such as street kids. This poses 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 council official, if such official is not available on site, any other authorized qualified council official must assist. 	EHP
1.3 Unauthorized dumping i.e. dumping at unauthorized sites,	Proper use of the dumpsite	<ul style="list-style-type: none"> Create public awareness through campaign, meetings, etc. 	EHP

dumping of hazardous waste etc. can lead to serious public health.		<ul style="list-style-type: none"> • Install an Information Notice Board at the disposal site entrance depicting all rules and regulations to the users. • Enforce penalties for illegal dumping and non-compliance. 	
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 active fires unattended • Avoid burning when its windy • Waste should be burned in the trench/excavation • Provide fire cuts around the disposal site 	EHP
1.5 Dust and fumes from vehicle 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 • Provide dust suppression when it's necessary 	EHP
2 Public Health and Safety Risks			
2.1 Smoke Burning of waste could generate smoke which is dangerous to human. The smoke from the disposal site is associated with several public health risk such as: a) Respiratory abnormalities b) Abdominal problems c) Ear infection	Ensure Public safety	<ul style="list-style-type: none"> • Avoid open dumping of waste. • No burning of waste should be done on windy days. • Only burn a certain amount of waste at a time. • All employees must be provided with PPE. • No development should be allowed with 500m from the disposal site. The community in proximity should be moved to other locations. 	EHP

<p>d) Central nervous system e) Blood disorder</p> <p>These can occur because of inhalation of smoke, ingestion of contaminated items or absorption through skin cells.</p> <p>Smoke can also cause health problems to animals and other living organisms in the area</p> <p>-Smoke in the surrounding may obstruct traffic flow within the surrounding area.</p> <p>2.2 Smell/odours;</p> <p>Biodegradable organic material emit obnoxious odors that cause illness to people living in and around them. Since they ferment, they could create favorable conditions for survival and growth of microbial pathogen.</p> <p>2.3 Diseases transmission</p>		<ul style="list-style-type: none"> • Large volume of organic waste should be buried or covered with sand. • Dead animals must be burned or buried. • Apply chemicals to avoid infestation of flies and rodents (when required). 	EHP
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<p>Unattended wastes lying around attract flies, rats, and other animals that in return spread diseases.</p> <p>Disposal sites closer to residential areas are always feeding places for dogs and cats. These pets, together with rodents, carry diseases to nearby homesteads.</p> <p>2.4 Contamination and infections</p> <p>The disposal site may become the children's source 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 site. This poses a serious risk of infection with Hepatitis B, HIV, and other related diseases.</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 wastes that could attract pets must be discarded • No unauthorized scavengers • Ensure access control 	<p>EHP</p> <p>EHP</p>
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<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>		<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. 	
3 Soil contamination			
3.1 Contamination of soil with heavy metals from tins, cans etc.	Prevent soil contamination	<ul style="list-style-type: none"> • Encourage recycling of tins, cans • Avoid burying waste that contains lead i.e. tins, cans scrap metals. These can be sent to scrap yards for recycling. 	EHP
3.2 Oil leakage from vehicle, machinery could contaminate the soil	Prevent soil contamination	<ul style="list-style-type: none"> • Clean up the contaminated soil and dispose off in an environmentally friendly manner. • Ensure proper and frequent servicing of vehicle and equipment used at the site 	EHP
3.3 Soil erosion from disturbed areas during waste disposal	Soil conservation	<ul style="list-style-type: none"> • No excavation should be done; hence an area landfill method is recommended. • Do not extract soil from slope areas. • Provide erosion barrier to prevent soil from carrying away. 	EHP

4 Groundwater and freshwater contamination			
4.1 Unlined dumping trench 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 	EHP
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 (leachate) must be contained or redirected/disposed at the oxidation ponds. 	EHP
5 Operational management and maintenance			
5.1 Inadequate management if site operator is ill/on leave/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. 	EHP
5.2 Lack of skills on the part of the site operator	Ensure effective and efficient management of the site.	<ul style="list-style-type: none"> The existing system requires only a moderate level of skill and technical expertise. Drivers and site operators must have appropriate skilled and experienced for the task at hand Site operators must receive continuous training in all aspects of daily management of the site (technical or administrative) Technical support must be available to the site operator 	EHP
5.3 Lack of proper and timely maintenance of vehicles, plant, structures may	Ensure smooth operation	<ul style="list-style-type: none"> The fence and other site structures must be maintained regularly by replacing key components, when required. 	EHP

compromise the functionality of the site		<ul style="list-style-type: none"> 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. 	
5.4 Document control and access to information	Readily available of records and information about the site	<ul style="list-style-type: none"> Ensure that all reports are available and easily accessible 	EHP
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 reviewed every three years, concurrent with the renewal of the ECC Any upgrading of the disposal site should be done in accordance with relevant legislations as outlined in this document. 	EHP

8. ENVIRONMENTAL COMPLIANCE MONITORING

To ensure adherence to this EMP, it is advisable to monitor 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 as indicated in the table below throughout the project life span. The monitoring report should be prepared and submitted to the Environmental Commissioner on a quarterly basis. Reporting will be based on the key performance indicators (KPI) such as:

- Quantity of waste collected.
- Quantity of waste disposed.
- Quantity of waste recycled.
- Total number of households that exists in the local authority.
- Number of households receiving waste collection services.
- Number of households paying waste management fees.
- Total number of commercial enterprises receiving waste collection services.
- Number of commercial enterprises paying waste management fees.
- Costs of waste management services.

8.1 Monitoring

Table 6: Monitoring Schedule

Issues to be monitored	What needs to be monitored	Monitoring frequency	By who?	Report to who?
General cleanliness of town	Presence of litter in and around town	Monthly	EHP	Line Manager
Waste generation	Quantity of waste collected and disposed off at disposal site.	Monthly	EHP	Line Manager
Waste minimization	Quantity of recyclables collected	Monthly	EHP	Line Manager
Cost of SWM	Cost involved in SWM activities	Quarterly	EHP	Line Manager
General operation of the disposal site	Condition of fences, gates of the disposal site. Complaints registered	Monthly	Foreman/Team leader	EHP
Quarterly Report	Key activities/actions implemented as EMP	Quarterly	EHP	MEFT

8.2 Site Environmental Monitoring Checklist

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

Table 7: Site inspection Checklist (Example)

<i>Issue to be monitored</i>	<i>KEPT AT STANDARD LEVEL?</i>		<i>Comments</i>
	<i>YES</i>	<i>NO</i>	
<i>i.e. Littering, Dust, Fire etc.</i>			

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

Name of person inspecting site: _____

Signature: _____

Date of site inspection: _____

9. CONCLUSION AND RECOMMENDATIONS

If all mitigation measures are implemented according to the recommendations given in the Environmental Management Plan, it is anticipated that the consequences and/or probability of the predicted negative impacts will be managed/reduced. The EMP should be used as an on-site reference document for the operations and management of the disposal site. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may need to be undertaken. Monitoring reports must be kept available for possible submissions to the Ministry of Environment, Forestry and Tourism for future ECC renewal application.

The consultant concludes that the project, as described in this EMP Report, is environmentally acceptable and recommends that the operations of the disposal site could proceed subject to strict adherence to Safety, Health, Environmental and Quality (SHEQ) requirements. Strict adherence to the EMP recommendations as well as compliance to all relevant national and local legislation should be the daily management and operation norms during the operations of the disposal site. To ensure strict adherence to this EMP the EHP will bear the ultimate responsibility of implementation and to ensure compliance to legislation and that the required environmental controls are in place and are working effectively.

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- Omuthiya Town Council, 2018, Strategic Plan 2018 to 2023.

11. APPENDICES

Appendix 1: List of I&APs and Stakeholders

Organisation	Contact Person	
Proponent Omuthiya Town Council	Diina Ambrosius	Environmental Health Practitioner
	Mr. Simon Ngulondo	Manager: TPE
	Ms. Taimi Lungameni	Acting CEO
Ministry of Health and Social Services	Mrs. Aune Shilongo	EHP
Ministry of Agriculture, Water and land Reform	Dr. Reinhold Haimbondi,	Veterinarian (state),
Rent-A-Drum-northern region	Mr. Abraham Reinhardt,	Manager
Tropoh Guesthouse,	Ms. Pandu	Superisor
Elago Motors	Mr. Onesumus Elago	Manager,
PUMA service Station	Mr. January I	Manager
Okamukuku Tyres -Omuthiya	Mr. Martin	Foreman

The following people also contributed to the Integrated Solid Waste Management Plan (ISWMP) for the Omuthiya town which forms an integral part of this EMP.

- Mrs. Hileni Ndinoumwa, Environmental Health Practitioner, Omuthiya Town Council
- Mrs. Aune Shilongo., EHP, Ministry of Health and Social Services
- Dr. Reinhold Haimbondi, Veterinarian (state), Ministry of Agriculture, Water and Forestry
- Mrs. Nuusuku Nambahu, Supervisor, Engine Fuel Station, Omuthiya
- Mr. January limvula, Manager, Puma Service Station, Omuthiya
- Mr. Manager, Elago Motors Spares, Omuthiya
- Dr. Casper Tarumbwa, Control EHP, Ministry of Health and Social Services
- Mr. Thomas, owner, welding and car repairs, Omuthiya
- Mr. Abraham Reinhardt, Manager, rent-A-Drum-northern region
- Ms. Pandu Tropoh Guesthouse, Omuthiya
- Mr. Onesumus Elago, Manager, Elago Motors