ENVIRONMENTAL IMPACT ASSESSMENT FOR THE RENEWAL OF THE ENVIRONMENTAL CLEARANCE FOR THE CONSTRUCTION AND OPERATION OF A LANDFILL SITE LOCATED ON A PORTION OF PORTION C OF FARM KEIKANACHAB OST NO. 89, MARIENTAL, HARDAP REGION

March 2025

App - 250305005482

Project Name:	***ENVIRONMENTAL IMPACT ASSESSMENT FOR THE RENEWAL OF THE ENVIRONMENTAL CLEARANCE FOR THE CONSTRUCTION AND OPERATION OF A LANDFILL SITE LOCATED ON A PORTION OF PORTION C OF FARM KEIKANACHAB OST NO. 89, MARIENTAL, HARDAP REGION***
The Proponent:	Mariental Municipality PO Box 110 Mariental
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Release Date:	March 2025
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EXECUTIVE SUMMARY

Green Earth Environmental Consultants were appointed by the proponent, Mariental Municipality, to conduct an environmental impact assessment renewal for the construction and operation of a new dumping/landfill site on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89. In accordance with the Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012) of the Environmental Management Act (No. 7 of 2007), the activities listed below, which forms part of the proposed operations, may not be undertaken without an Environmental Clearance Renewal:

> ***WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES***
> *2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.*
> *2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.*
> *2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.*

The key characteristics/environmental impacts of the proposed project are as follows:

POSITIVE IMPACTS	NEGATIVE IMPACTS
A new dumping/landfill site will be created that will be used by die Municipality and residents of Mariental.	Vegetation and plant life will be lost to clear the area for the construction and operation of the dumping/landfill site as well as the supporting infrastructure.
Since there will be an improved landfill/dumping site, less pollution might take place.	Natural surface drainage systems and channels might be affected.
Visually the site might improve due to new infrastructure and fences that will be built on the site.	There will be an increase in traffic in the construction phase due to construction vehicles.
Temporary employment will be created in the construction phase. Permanent employment will be created in the operational phase.	Dust and noise will be generated during the construction phase.
The buying power of locals might also increase due to more individuals being employed.	Transmission of diseases from people or to people involved in operations might take place.
Land will be used more efficiently.	Land and/or open space will be lost.

The environmental impacts during the operational phase of the proposed project:

IMPACTS DURING OPERATIONAL PHASE			
Aspect	**Impact Type**	**Significance of impacts Unmitigated**	**Significance of impacts Mitigated**
Ecology Impacts	-	M	L
Dust and Air Quality	-	M	L
Groundwater Contamination	-	M	L
Waste Generation	-	M	L
Failure of Reticulation Pipeline	-	L	L
Fires and Explosions	-	M	L
Safety and Security	-	L	L

IMPACT EVALUATION CRITERION (*DEAT 2006*):		
Criteria	**Rating (Severity)**	
Impact Type	+	Positive
	O	No Impact
	-	Negative
Significance of impacts	L	Low (Little or no impact)
	M	Medium (Manageable impacts)
	H	High (Adverse impact)

The type of activities that will be carried out on the site will not negatively affect the amenity of the locality and the activities will not adversely affect the environmental quality of the area. None of the potential impacts identified are regarded as having a significant impact to the extent that the proposed project should not be allowed. However, the operational activities further on need to be controlled and monitored by the assigned managers and the proponent. Mitigation measures will be provided that can control the extent, intensity, and frequency of these named impacts in order not to have substantial negative effects or results. It is believed that the overall cumulative impact on the biophysical environment will be low and there will be a positive impact on the socio-economic environment.

The Environmental Impact Assessment Renewal which follows upon this paragraph was conducted in accordance with the guidelines and stipulations of the Environmental Management Act (No 7 of 2007) meaning that all possible impacts have been considered and the details are presented in the report.

Based upon the conclusions and recommendations of the Environmental Impact Assessment Report and Environmental Management Plan, the Environmental Commissioner of the Ministry of Environment, Forestry and Tourism is herewith requested to:

1. Accept and approve the Environmental Impact Assessment Renewal.
2. Accept and approve the Environmental Management Plan Renewal.

3. Issue an Environmental Clearance Renewal for the construction and operation of a new dumping/landfill site on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89 and for the following listed activities:

WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES

2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.

2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.

2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.

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LIST OF ABBREVIATIONS

EC	Environmental Clearance
ECO	Environment Control Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
I&APs	Interested and Affected Parties
MAWLR	Ministry of Agriculture, Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism

1. INTRODUCTION

Green Earth Environmental Consultants were appointed by the proponent, Mariental Municipality, to conduct an environmental impact assessment renewal for the construction and operation of a new dumping/landfill site on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89.

The current waste disposal site of the town of Mariental does not meet the minimum solid waste management standards. The continues use of the site has serious negative impacts on the biophysical and social environment, thus the Municipality decided to decommission the existing dumpsite and establish a new landfill site.

In accordance with the Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012) of the Environmental Management Act (No. 7 of 2007), the activities listed below, which forms part of the proposed operations, may not be undertaken without an Environmental Clearance Renewal:

> ***WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES***
> *2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.*
> *2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.*
> *2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.*

The following Environmental Impact Assessment Renewal contains information on the project and the surrounding areas and activities.

2. TERMS OF REFERENCE

To be able to implement the project, an Environmental Impact Assessment Renewal and Environmental Clearance Renewal is required. For this environmental impact exercise, *Green Earth Environmental Consultants* followed the terms of reference as stipulated under the Environmental Management Act.

The aim of the environmental impact assessment is:

- To comply with Namibia's Environmental Management Act (2007) and its regulations (2012).
- To ascertain existing environmental conditions on the site to determine its environmental sensitivity.
- To inform I&APs and relevant authorities of the details of the proposed activities and to provide them with an opportunity to raise issues and concerns.
- To assess the significance of issues and concerns raised.
- To compile a report detailing all identified issues and possible impacts, stipulating the way forward and identify specialist investigations required.

- To adhere to the National Solid Waste Management Strategy of the Ministry of Environment, Forestry and Tourism
- To outline management guidelines in an Environmental Management Plan (EMP) to minimize and/or mitigate potentially negative impacts.

The tasks that will be undertaken for the Environmental Impact Assessment include the evaluation of the following: climate, water (hydrology), vegetation, geology, soils, social, cultural heritage, groundwater, sedimentation, erosion, biodiversity, sense of place, socio-economic environment, health, safety and traffic.

The EIA and EMP from the assessment will be submitted to the Environmental Commissioner for consideration. An Environmental Clearance will only be obtained (from the DEA) once the EIA and EMP has been examined and approved for the listed activities.

The public consultation process as per the guidelines of the Act has been followed. The methods that were used to assess the environmental issues and alternatives included the collection of data on the project site and area from the proponent and identified stakeholders. All other permits, licenses or certificates that are further on required for the operation of the proposed project still needs to be applied for by the proponent.

3. NEED AND DESIRABILITY

The population of Mariental increased by 26.85% over the ten-year period from 2001 to 2011, from 9,836 to 12,478 (*Namibian Population and Housing Census Main Report*). This follows the broader trends within many other urban centres within Namibia which are seeing an increase in population, as the national population grows and rapidly urbanises. Based on the historical growth figures, the current Town population is estimated ±16 000 people. Urban citizens generate 1,2kg – 3kg waste per day. Therefore, it is estimated that between 19 200kg and 48 000kg of waste is generated in the town daily. Of this waste, 90% is recyclable if the correct waste management procedures are implemented and followed.

The nearby Hardap Dam provides the town with water as well as water for irrigation, making possible to cultivate animal fodder, as well as corn, fruits, and vegetables on the irrigation scheme on the outskirts of Town. The town is surrounded by flourishing commercial farms which, due to the low annual rainfall in the area focus on game farming as well as sheep farming which along with cattle farming remain popular in the region. Sitting astride the main route into the Kalahari and Namib Deserts, Mariental also services the needs of farmers in these areas. Mariental also boasts some of the best safari and hunting experiences in Namibia at lodges like Lapa Lange and Anib Lodge. Available game include springbuck, blesbok, giraffe, ostrich, leopard, zebra, kudu, gemsbuck, hartebeest, eland, blue- and black wildebeest.

The growing population and surrounding economic activities put pressure on the Town's infrastructure and supporting facilities.

Need – Mariental needs a landfill site to dispose of household waste, land clearing debris, some industrial wastes, coal ash, sewage sludge, treated medical wastes, solidified liquid

wastes and others that cannot be reused or recycled. The increased population of the town means that more waste must be handled and processed which cannot be accommodated on the current site.

The current site does not meet the siting guidelines of the MEFT; hence, it must be decommissioned to achieve the minimum waste disposal standards as specified in the National Solid Waste Management Strategy. The site lacks important supporting infrastructures such as access control (gates, guardhouse etc.) and there is an absence of control for waste disposal. The current site poses serious environmental threats. Delaying in implementing the decommissioning of the existing Mariental dumpsite will result in further adverse environmental impacts.

Decommissioning the old site cannot happen before a new site has been commissioned. The new site must be developed in accordance with the best practices for waste management and the National Solid Waste Management Strategy. The new site is required for the recycling of waste from the old site during the decommissioning of the old site.

Desirability – Creating a new site will involve new processes and activities to guide waste management from the source to the potential end users of the recycled waste. Waste will thus be separated at source, transported to the new dumpsite, weighed and be subjected to a sorting process to be recycled. By introducing these activities, the new landfill site's lifespan will be extended, and it will also minimize the impact on the receiving environment. It will result in employment opportunities as well as income to be derived from the recyclable commodities.

There is an urgent need for the decommissioning of the current site and the commissioning of a new site, and it is also desirable as the new site will include activities and infrastructure for the management (sorting and recycling) of waste to minimise the waste that eventually goes to the dumping site.

4. APPROACH TO THE STUDY

The assessment included the following activities:

a) Desktop sensitivity assessment

Literature, legislation, and guidance documents related to the natural environment and land use activities available on the area in general were reviewed in order to determine potential environmental issues and concerns.

b) Site assessment (site visit)

The proposed project site and the immediate area and surrounding area were assessed through several site visits to investigate the environmental parameters on site to enable further understanding of the potential impacts on site.

d) Scoping

Based on the desk top study, site visit and public participation, the environmental impacts were determined in five categories: nature of project, expected duration of impact, geographical extent of the event, probability of occurring and the expected intensity. The findings of the scoping have been incorporated in the environmental impact assessment report below.

5. PUBLIC PARTICIPATION

Public notices informing the public of the proposed project and inviting Interested and Affected Parties to provide comments on the proposed activities appeared in the New Era and the Market Watch of 12 and 19 October 2020. Notices were also displayed on the Notice Board of the Municipality of Mariental and near the project site. The final date for comments/inputs/registration was on 5 November 2020. Two public meetings were held namely on 7 October 2020 and on 10 June 2021 at the Town Council of Mariental.

6. PROJECT DESCRIPTION/SITE INFORMATION

6.1. LOCALITY AND SIZE OF DUMPSITE

The dumpsite will be located on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89, ±3km to the east of the Town. See maps below for the locality of the site:

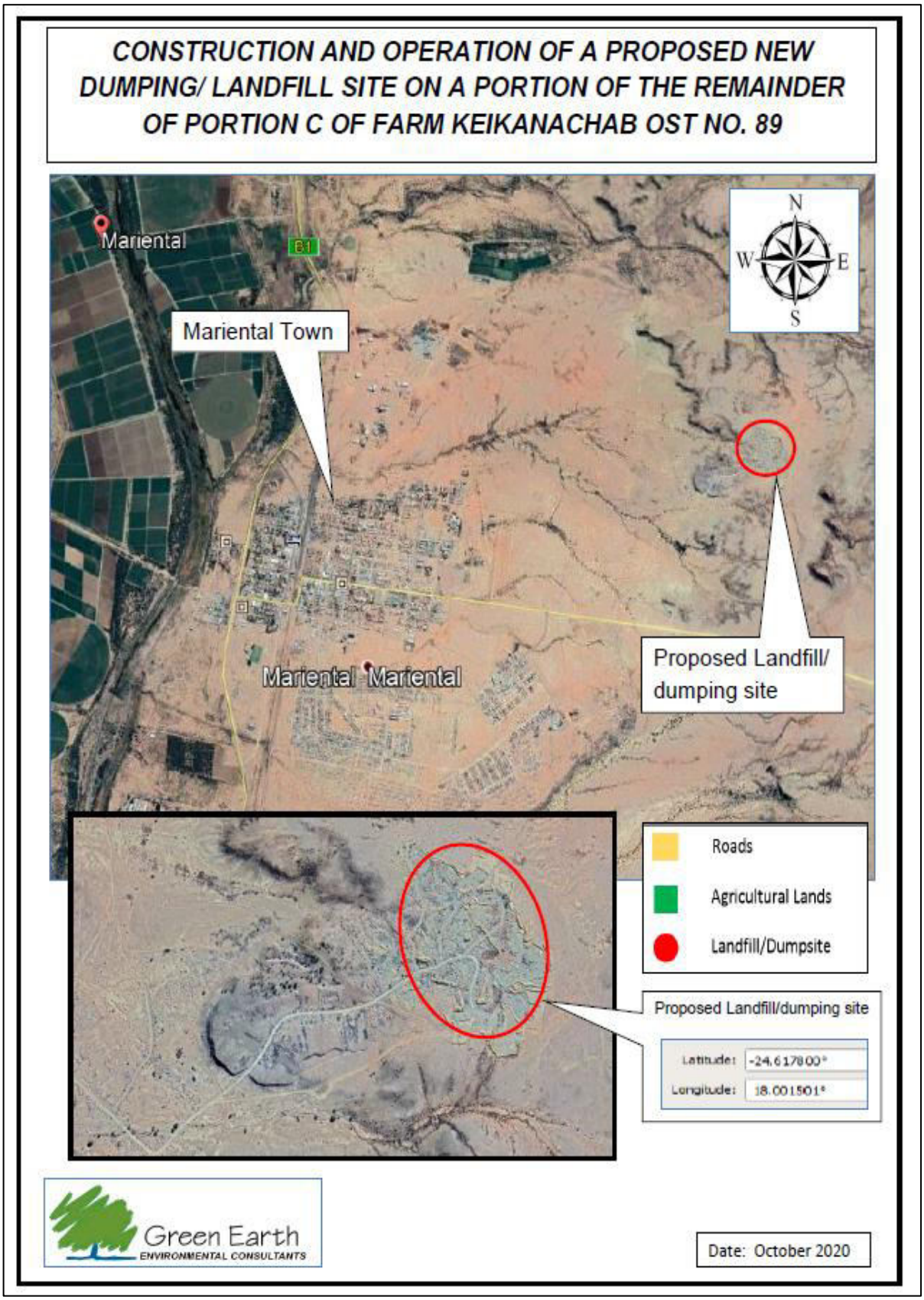

Figure 1: Locality Map of Project Site

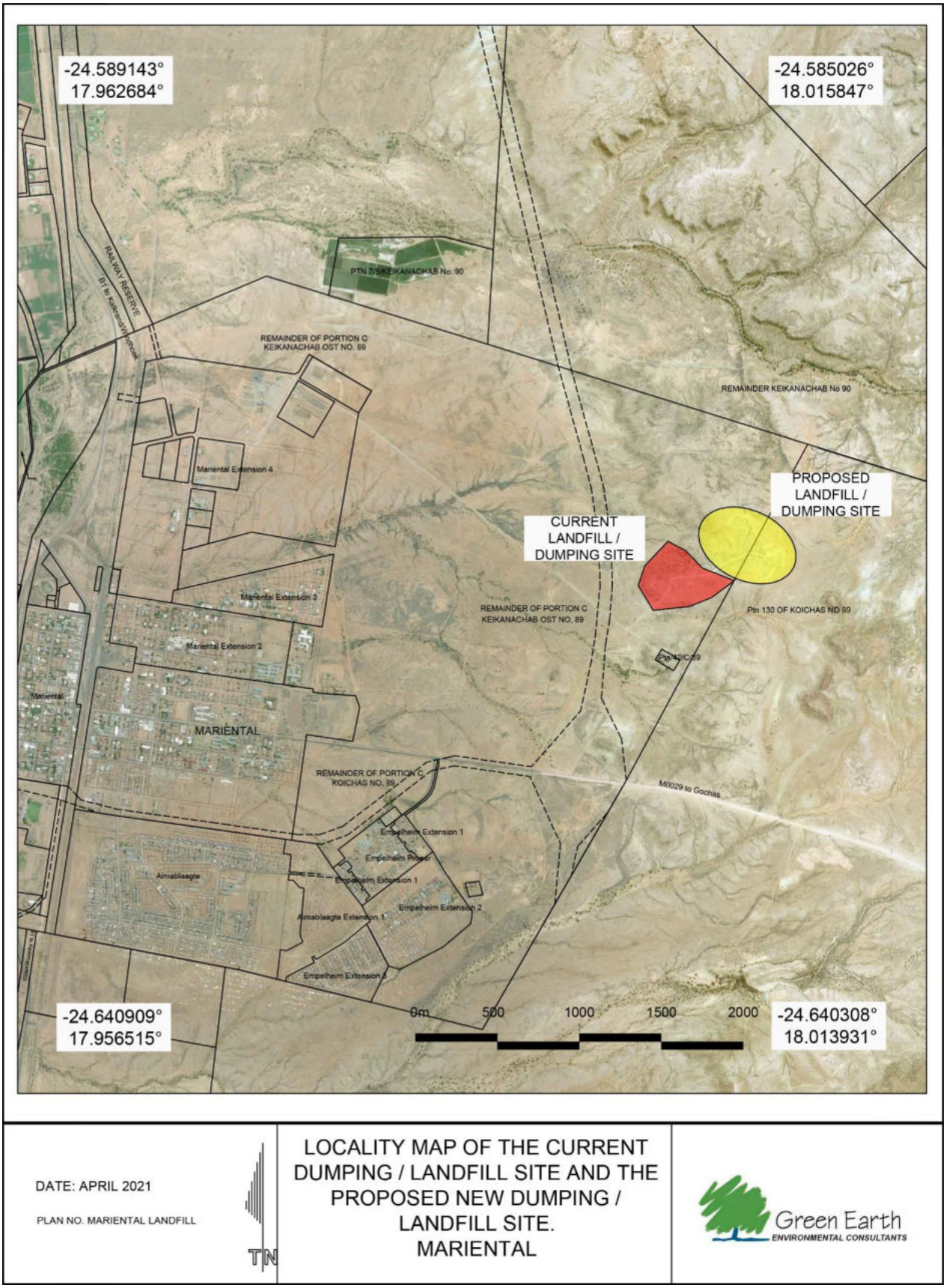

Figure 2: Locality of Project Site with Photo

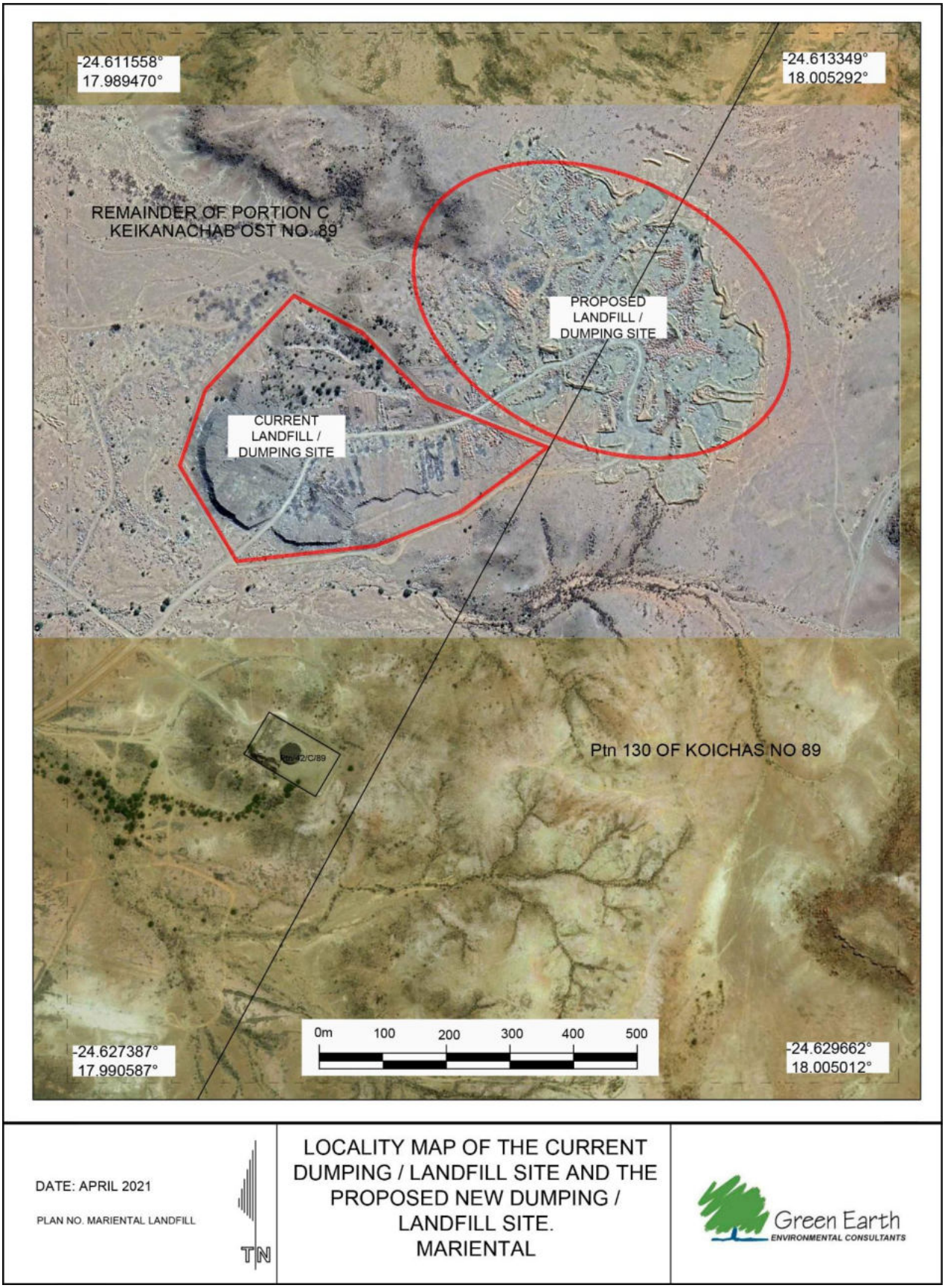

Figure 3: Locality of Project Site area

The site is easily accessible from the existing gravel road (C29) which links the town with farms to the east of the Town. The site takes up an area of ±14ha and the waste deposit is ±4m – 5m in height.

6.2. SPECIFIC INFORMATION ON NEW LANDFILL SITE

To be able to draw up the plan for the site, the area has been surveyed and literature has been studied on the socio-economic and biophysical environment. The observations are summarised in the table below:

Observations/attributes:	Description:
Area of site	14, 0514ha
Distance to nearest build-up area	2.2km
Distance to nearest public road	1.35km
Distance from nearest boreholes, river system or aquifers	4.4km
Topography of the site	Flat with low rolling hills with small surface drainage systems to lower lying surrounding area to the north (height above sea level 1090m – 1100m).
Annual Rainfall	194mm
Site Hydrogeology	Ground water Potential of Rock Bodies: Fractured, Fissured or Karstified Aquifers: SE Kalahari Karoo Basin General Description: The aquifer is dominated by sandstones and shales, overlain by unconsolidated Kalahari sediments. Dolerite sills and dykes occur, more frequently towards the central parts of the basin, and sometimes enhance the level of fracturing within the sedimentary rock. Water depth is 80m plus.
Distance to nearest water supply	2km
Prevailing wind	From west to east
Distance to critical habitats or protected zone/area or wetlands	No water protection area, wetland or other critical habitat observed in the area.

6.3. MARIENTAL WASTE MANAGEMENT PROCESS

The collection, transportation and disposal of waste is the function of the Municipality in the area under their jurisdiction. Waste collection is done from Monday to Friday by the Municipal team, as per the waste collection schedule. Waste is collected mainly from residences, institutions, businesses and public places.

The waste disposal process onsite includes offloading and tipping of waste, burning of waste, leveling, and spreading of waste and coverage and compaction of waste with soil. These activities are under the management of the Municipal Environmental Department.

Environmental issues observed on the current site include visual nuisances from windblown litter, air quality problems from the burning of waste, ingress by animals and unauthorized scavenging by people which include women and children.

It is also observed that waste is dumped outside of the fenced-in landfill area especially along the road from town to the landfill site. Poor or no segregation of the waste collected by the Municipality makes recycling difficult and thus the waste recycling observed at the site is not sufficient in reducing the waste stream to the site. Informal recycling by people scavenging on the site is taking place on a limited basis. The people are mainly collecting steel/metal products which they sell to scrap metal dealers in town.

Figure 4: Steel/metal collected by an informal recycler

The key issues identified in the waste management process of the Mariental Municipality are the following:

- Segregation of waste at source does not happen which makes it difficult to recycle waste.
- The waste taken to or collected at the site is not recorded/weighed.
- Access to the site is not controlled allowing unauthorized entrance and activities as well as dumping outside of the fenced in landfill area.

7. STRATEGY PROPOSED FOR WASTE MANAGEMENT

The Strategy proposed for the implementation of a new waste management plan by Mariental Municipality is based on guidelines obtained from the National Solid Waste

Management Strategy of the Department of Environmental Affairs of the Ministry of Environment, Forestry and Tourism.

To address waste management in Mariental is not only about decommissioning of the old site and the commissioning of a new site. The priority should be to reduce risks to the environment and public health from current waste disposal sites and illegal dumping in many areas of the town. The Municipality needs more resources (i.e. personnel) for organising solid waste management, monitoring waste generators and reducing the problems with illegal dumping. The strategies should aim to minimise waste via recycling with increasing participation of households and business owners through more awareness-raising activities. A change in culture and attitudes is needed towards solid waste, considering that awareness programs will take time to be effective. Mariental Municipality should be the driving force for this culture change and promoting recycling.

The Strategy to be followed by the Municipality should cover the following components:

1. High-level commitment from Council and senior management to maintain high standards of waste management.
2. The allocation of adequate staff resources and responsibilities for implementation of the strategy.
3. The creation of the legal framework and enforcement thereof.
4. Capacity development, training, awareness and participation.
5. Allocation of funds, budgets for implementation and financial management.
6. Monitoring and reporting.
7. Waste minimization, reuse and recycling.
8. Waste collection and transport.
9. Waste treatment and disposal.

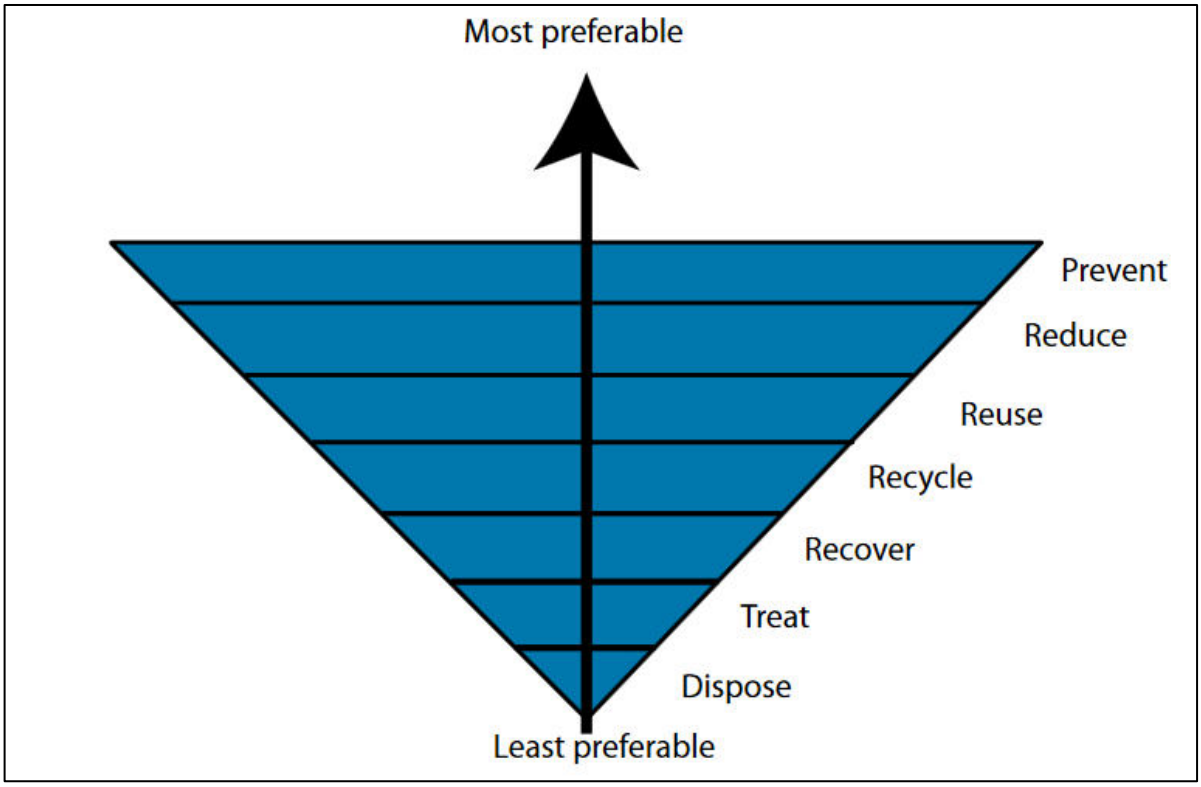

Figure 5: Waste management hierarchy (Rushborrok, 2001)

To implement the waste management strategy, Mariental Municipal Council and Management should set clear objectives to be achieved, linked to an implementation framework. The objectives to be set and framework to be followed is summarised in the table below:

Objective:	**Action:**
To create an institutional, organisational and legal framework.	To strengthen the institutional, organisational and legal framework for solid waste management, including capacity development.
To ensure that waste is minimised and promote and support recycling.	To install a culture of waste minimisation and to expand recycling systems. Create a local awareness through involving schools and the public. Create an enabling environment to promote recycling.
To create an efficient solid waste collection system.	To implement formalised solid waste collection and management systems in the municipal area with special focus on informal areas.
To create a controlled environment for municipal waste disposal.	To enforce improvements in municipal waste disposal standards.

To ensure the controlled management of hazardous waste	To plan and implement feasible options for hazardous waste management (includes healthcare waste management).

8. APPOINTMENT OF ENVIRONMENTAL CONTROL OFFICER

To ensure the efficient operation of the Town's waste management and the landfill site, a suitably qualified and experienced Environmental Control Officer (ECO) must be appointed to ensure that mitigation and rehabilitation are implemented and to ensure compliance with the provisions of the EMP.

The ECO will thus be responsible for the following:

- Liaison with the community, municipal officials, private contractors (for recycling) and Environmental Authorities.
- Ensuring that periodic environmental performance audits are undertaken on the project implementation.
- Notifying Environmental Authorities immediately of any events or incidents that may cause significant environmental damage or breach the provisions of the EMP.
- Ensuring that remedial action is taken in the event of non-compliance.
- Monitor and verify that environmental impacts are kept to the minimum.
- Take appropriate action if the provision of the EMP is not adhered to.
- Ensure that activities on the landfill site complies with the relevant environmental legislation.
- Routine recording and reporting of environmental activities on a monthly basis.
- Ensuring that a register of public complaints is maintained by the Municipality and that any comments or issues are reported and addressed in a timeous manner.
- Environmental Awareness Training to community members/leaders, municipal officials, and subcontractors of the Municipality.

9. OPTIONS/ALTERNATIVES CONSIDERED FOR NEW SITE

9.1. THE NO-GO OPTION

Under the no-go option, the existing site will remain to be used for the disposal of the waste generated in the Mariental Municipal area. This option is not the desired option as it was established that this site is as Class A (High Risk) due to the following reasons:

- The site does not meet the sitting guidelines of the MEFT; hence, it must be decommissioned to achieve the minimum waste disposal standards as specified in the Draft National Solid Waste Management Regulations.

- It serves a population of 5,000+ people (current population ±16 000).

- The site lacks important supporting infrastructure such as a guardhouse, weighbridge, bins/facility for separation of waste types (steel, plastic, paper, glass, and others) and to record the waste taken into the site or general facilities to allow proper control for waste disposal.

- Delaying in implementing the Decommissioning of the existing Mariental dumpsite will result in further adverse environmental impacts.

From the above it is clear that the no-go option is not an option.

10. IDENTIFICATION OF THE SITE

Before the current landfill site can be decommissioned, a new site must be commissioned. The Department of Environmental Affairs (Ministry of Environment, Forestry and Tourism) in their National Solid Waste Management Strategy set standards for selecting locations of new landfill sites. In accordance with these standards the proposed site must be:

- At least 500m from nearest potential sources of groundwater abstraction for drinking water (e.g. shallow aquifers).
- At least 500m from surface water sources (e.g. rivers).
- Away from any areas at risk of flooding.
- At least 500m from existing or planned housing areas, schools, hospitals, etc.
- At least 1km from national parks and other protected areas.
- At least 3km from airports.

The new site has been decided upon by applying these standards, field visits and observations, consultation with Mariental Councillors and Officials as well as I&APs. The site proposed is shown on the plan below:

Figure 6: Locality of the new site

This site is located directly east of the current landfill site. It was previously used as a borrow pit for the removal of filling material, aggregate, and soil for the purposes of road and building construction and the landscaping of building sites. The site was not rehabilitated and is ideal to be used for the new landfill site. See below photos of the site:

Figure 7: Proposed new site (1)

Figure 8: Proposed new site (2)

Figure 9: Proposed new site (3)

Before this site can be used as the new landfill site it must be prepared as follows:

- The usable landfill/building material must be removed and stored at one locality for future use for construction purposes or to cap the old site.
- The floor of the site must be compacted.
- The site must be fenced in and provided by lockable gates and guardhouse to enforce 24hour access control.
- An operator/site manager must be appointed to be present at site during day.
- Waste arriving at site must be segregated in:
    - Recyclable waste
    - Building waste
    - Garden waste
    - Noxious waste
- Waste arriving at the site must be recorded/weighed upon receiving.
- The operator/site manager must allocate a small working area of exposed waste at site. Waste arriving at the site must, once the recyclable waste is removed, be dump in this area.
- Construction waste must be stored at a separate area.
- Garden waste must be stored at separate area to allow composting.
- Recyclable waste to be kept in separate area for sorting and recycling (consider outsourcing).
- No open burning of waste must be allowed. If unavoidable, controlled burning may be allowed only at pre-set times (also dependent on wind) under the supervision of the site operator/manager.
- Cover material must be applied weekly (i.e. weekly use of bulldozer). Material recovered from the borrow pit or building rubble can be used for this purpose.
- Waste pickers organised (e.g. into groups with financial incentives).
- A dedicated area, to be fenced internally and trenched, must be set aside for receiving and storage of selected hazardous waste (if approved by MEFT).
- Ongoing implementation of specific actions identified in EMP must be attended to.

- Regular reporting on the solid waste management to be done to the Municipal Management, Councillors and the MEFT. The records to be kept by the Municipality should include at least the following but not restricted to:

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

11. BULK SERVICES AND INFRASTRUCTURE PROVISION

The new landfill site must be provided with the bulk services and infrastructure as is listed and discussed below:

11.1. Access and Internal Roads

A proper gravel access road. It is proposed that the current access to the old landfill site can be upgraded and used as access to the new site. This road links up with Road M29 from which the Town of Mariental can be accessed.

11.2. Water supply

The Project Site will be connected to the Municipality's water reticulation network.

11.3. Electricity reticulation

Electricity to the site will be obtained from the existing municipal network or from an onsite solar installation.

11.4. Sewage disposal

A sewer system needs to be installed to accommodate and treat the sewer that will be generated by the offices of the security officers, site manager and the recycling facility. It is proposed that a green sewer system be installed to allow the reuse of water. The system to be installed will be subject to the design standards of the Municipality and their approval.

11.5. Fire Protection

The new site and supporting infrastructure must be provided with proper firefighting equipment as per the requirements of the municipality.

12. ASSUMPTIONS AND LIMITATIONS

It is assumed that the information provided by the Proponent (Mariental Municipality) and the Mariental Structure Plan is accurate. The proposed site was chosen due to proximity to the town of Mariental. The assessment is based on the prevailing environmental conditions and not on future happenings on the site. However, it is assumed that there will be no significant changes to the proposed project, and the environment will not adversely be affected between the compilation of the assessment and the implementation of the proposed construction activities.

13. ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

To protect the environment and achieve sustainable development, all projects, plans, programs and policies deemed to have adverse impacts on the environment require an EIA according to Namibian legislation. The administrative, legal and policy requirements to be considered during the Environmental Assessment for the proposed project are the following:

- The Namibian Constitution
- The Environmental Management Act (No. 7 of 2007)
- Other Laws, Acts, Regulations and Policies

THE NAMIBIAN CONSTITUTION

Article 95 of Namibia's constitution provides that:

"The State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at the following:

Management of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future; in particular, the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian territory." This article recommends that a relatively high level of environmental protection is called for in respect of pollution control and waste management.

Article 144 of the Namibian Constitution deals with environmental law and it states:

"Unless otherwise provided by this Constitution or Act of Parliament, the general rules of public international agreements binding upon Namibia under this Constitution shall form part of the law of Namibia". This article incorporates international law, if it conforms to the Constitution, automatically as "law of the land". These include international agreements, conventions, protocols, covenants, charters, statutes, acts, declarations, concords, exchanges of notes, agreed minutes, memoranda of understanding, and agreements (*Ruppel & Ruppel-Schlichting, 2013*).

CONCLUSION AND IMPACT

In considering the environmental rights, Mariental Municipality should consider the following in devising an action plan in response to the articles:

- Implement a "zero-harm" policy that would guide decisions.
- Ensure that no management practice or decision result in the degradation of future natural resources.
- Take a decision on how this part of the Constitution will be implemented as part of Mariental Municipality's Environmental Control System (ECS).

ENVIRONMENTAL MANAGEMENT ACT (NO. 7 OF 2007)

The Environmental Impact Assessment Regulations (GN 30 in GG 4878 of 6 February 2012) of the Environmental Management Act (No. 7 of 2007) that came into effect in 2012 requires/recommends that an Environmental Impact Assessment and an Environmental Management Plan (EMP) be conducted for the following listed activities in order to obtain an Environmental Clearance Certificate:

> ***WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES***
> *2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.*
> *2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.*
> *2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.*

Cumulative impacts associated with the development must be included as well as public consultation. The Act further requires all major industries to prepare waste management plans and present these to the local authorities for approval.

The Act, Regulations, Procedures and Guidelines have integrated the following sustainability principles. They need to be given due consideration, particularly to achieve proper waste management and pollution control:

Cradle to Grave Responsibility

This principle provides that those who handle or manufacture potentially harmful products must be liable for their safe production, use and disposal and that those who initiate potentially polluting activities must be liable for their commissioning, operation and decommissioning.

Precautionary Principle

If there is any doubt about the effects of a potentially polluting activity, a cautious approach must be adopted.

The Polluter Pays Principle

A person who generates waste or causes pollution must, in theory, pay the full costs of its treatment or of the harm, which it causes to the environment.

Public Participation and Access to Information

In the context of environmental management, citizens must have access to information and the right to participate in decisions making.

CONCLUSION AND IMPACT

The proposed construction and operation on the project site have been assessed in terms of the Environmental Management Act (No. 7 of 2007) and the Regulations (2012). From the assessment, it can be concluded that the activities will have impacts on the prevailing environment but that the negative impacts can be sufficiently mitigated and managed by following the Environmental Management Plan which is part of this document.

Table 1: Other laws, acts, regulations and policies

Laws, Acts, Regulations & Policies consulted:		
Electricity Act (No. 4 of 2007)	In accordance with the Electricity Act (No. 4 of 2007) which provides for the establishment of the Electricity Control Board and provide for its powers and functions; to provide for the requirements and conditions for obtaining licenses for the provision of electricity; to provide for the powers and obligations of licenses; and to provide for incidental matters: the necessary permits and licenses will be obtained.	The Proponent must abide to the Electricity Act.
Pollution Control and Waste Management Bill (guideline only)	The **Pollution Control and Waste Management Bill** is currently in preparation and is therefore included as a guideline only. Of reference to the mining, Parts 2, 7 and 8 apply. Part 2 provides that no person shall discharge or cause	The Proponent must adhere to the Pollution Control and Waste Management Bill.

	to be discharged, any pollutant to the air from a process except under and in accordance with the provisions of an air pollution license issued under section 23. Part 2 also further provides for procedures to be followed in license application, fees to be paid and required terms of conditions for air pollution licenses. 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. The competent authority for the purposes of section 74 shall maintain a register of substances notified in accordance with that section and the register shall be maintained in accordance with the provisions. Part 8 provides for emergency preparedness by the person handling hazardous substances, through emergency response plans.	
Water Resources Management Act	The **Water Resources Management Act (No. 11 of 2013)** stipulates conditions that ensure effluent that is produced to be of a certain standard. There should also be controls on the disposal of sewage, the purification of effluent, measures should be taken to ensure the prevention of surface and groundwater pollution and water resources should be used in a sustainable manner.	The Act must be consulted. Fresh water abstraction and waste-water discharge permits should be obtained when required.
Solid and Hazardous Waste Management Regulations: Local	Provides for management and handling of industrial, business and domestic waste.	The Proponent must abide to the solid waste management provisions.

Authorities 1992		
Hazardous Substances Ordinance (No. 14 of 1974)	The **Ordinance** applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.	The Proponent must abide to the Ordinance's provisions.
Atmospheric Pollution Prevention Ordinance of Namibia (No. 11 of 1976)	Part 2 of the **Ordinance** governs the control of noxious or offensive gases. The Ordinance prohibits anyone from carrying on a scheduled process without a registration certificate in a controlled area. The registration certificate must be issued if it can be demonstrated that the best practical means are being adopted for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process.	The proponent should adhere to the stipulations of the Atmospheric Pollution Prevention Ordinance.
Nature Conservation Ordinance	The **Nature Conservation Ordinance (No. 4 of 1975)** covers game parks and nature reserves, the hunting and protection of wild animals, problem animals, fish and indigenous plant species. The Ministry of Environment, Forestry and Tourism (MEFT) administer it and provides for the establishment of the Nature Conservation Board.	The proposed project implementation is not located in a demarcated conservation area, national park or unique environments.
Forestry Act	The **Forestry Act (No. 12 of 2001)** specifies that there be a general protection of the receiving and surrounding environment. The protection of natural vegetation is of great importance, the Forestry Act especially stipulates that no living tree, bush, shrub or indigenous plants within 100m from any river, stream or watercourse,	No removal of protected tree species or removal of mature trees should happen. The Ministry of Environment, Forestry and Tourism should be consulted when required.

	may be removed without the necessary license.	
EU Timber Regulation: FSC (2013)	Forest Stewardship Council (FSC) came into effect in March 2013, with the aim of preventing sales of illegal timber and timber products in the EU market. Now, any actor who places timber or timber products on the market for the first time must ensure that the timber used has been legally harvested and, where applicable, exported legally from the country of harvest.	The Proponent is advised to adhere to the regulation.
Labour Act	The **Labour Act (No. 11 of 2007)** contains regulations relating to the Health, Safety and Welfare of employees at work. These regulations are prescribed for among others safety relating to hazardous substances, exposure limits and physical hazards. Regulations relating to the Health and Safety of Employees at Work are promulgated in terms of the Labour Act 6 of 1992 (GN156, GG1617 of 1 August 1997).	The proponent and contractor should adhere to the Labour Act.
Communal Land Rights	Communal land is land that belongs to the State and is held in trust for the benefit of the traditional communities living in those areas. Communal land cannot be bought or sold, but one can be given a customary land right or right of leasehold to a part of communal land in accordance with the provisions of the **Communal Land Reform Act (No. 5 of 2002)** and **Communal Land Reform Amendment Act (No. 13 of 2013)**. The Communal Land Reform Act provide for the allocation of rights in respect of communal land to establish Communal Land Boards to provide for the powers of Chiefs and Traditional Authorities and boards in relation to communal land and to make provision for incidental	Consent should be obtained from Traditional Authorities, Communal Boards, Chiefs, Kings, Queens etc. if required.

	matters. Consent and access to land for the proposed project should be requested from the relevant traditional authority through the Regional Council and Regional Communal Land Boards.	
Traditional Authorities Act (No. 17 of 1995)	The **Traditional Authorities Act (No. 17 of 1995)** provide for the establishment of traditional authorities, the designation and recognition of traditional leaders; to define their functions, duties and powers; and to provide for matters incidental thereto.	Traditional Authorities should be consulted when required.
Public and Environmental Health Act	The Public and Environmental Health Act (No. 1 of 2015) provides with respect to matters of public health in Namibia. The objects of this Act are to: (a) promote public health and wellbeing; (b) prevent injuries, diseases and disabilities; (c) protect individuals and communities from public health risks; (d) encourage community participation in order to create a healthy environment; and (e) provide for early detection of diseases and public health risks.	The proponent and contractor should adhere to the Public and Environmental Health Act.
National Heritage Act (No. 27 of 2004)	All protected heritage resources discovered need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before it may be relocated. This should be applied from the NHC.	The National Heritage Council should be consulted when required.
National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: (a) any meteorite or fossil; or (b) any drawing or painting on stone or a petroglyph known or commonly believed to have been executed by any people who inhabited or visited Namibia before the year 1900 AD; or	The proposed site for development is not within any known monument site both movable or immovable as specified in the Act, however in such an instance that any material or sites or archeologic importance are identified, it will be the responsibility of the developer to take the required route and notify the relevant commission.

	(c) any implement, ornament or structure known or commonly believed to have been used as a mace, used or erected by people referred to in paragraph; or (d) the anthropological or archaeological contents of graves, caves, rock shelters, middens, shell mounds or other sites used by such people; or (e) any other archaeological or palaeontological finds, material or object; except under the authority of and in accordance with a permit issued under this section.	
Public Health Act (No. 36 of 1919)	Under this act, in section 119: "No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The proponent will ensure that all legal requirements of the project in relation to protection of the health of their employees and surrounding residents is protected and will be included in the EMP. Relevant protective equipment shall be provided for employees in construction. The development shall follow requirements and specifications in relation to water supply and sewerage handling and solid waste management so as not to threaten public health of future residents on this piece of land.
Soil Conservation Act (No. 76 of 1969)	The objectives of this Act are to: Make provisions for the combating and prevention of soil erosion; Promote the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic;	Only the area required for the operations should be cleared from vegetation to ensure the minimum impact on the soil through clearance for construction.
Air Quality Act (N0. 39 of 2004)	The **Air Quality Act (No. 39 of 2004)** intends to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.	The proponent and contractor should adhere to the Air Quality Act.

Vision 2030 and National Development Plans	Namibia's overall development ambitions are articulated in the Nation's Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. Currently the Government has so far launched a 4th NDP which pursues three overarching goals for the Namibian nation: high and sustained economic growth; increased income equality; and employment creation.	The proposed project is an important element in employment creation.

CONCLUSION AND IMPACT

It is believed the above administrative, legal and policy requirements which specifically guide and governs development will be followed and complied with in the planning, implementation and operations of the activity.

A flowchart indicating the entire EIA process is shown in the *Figure* below:

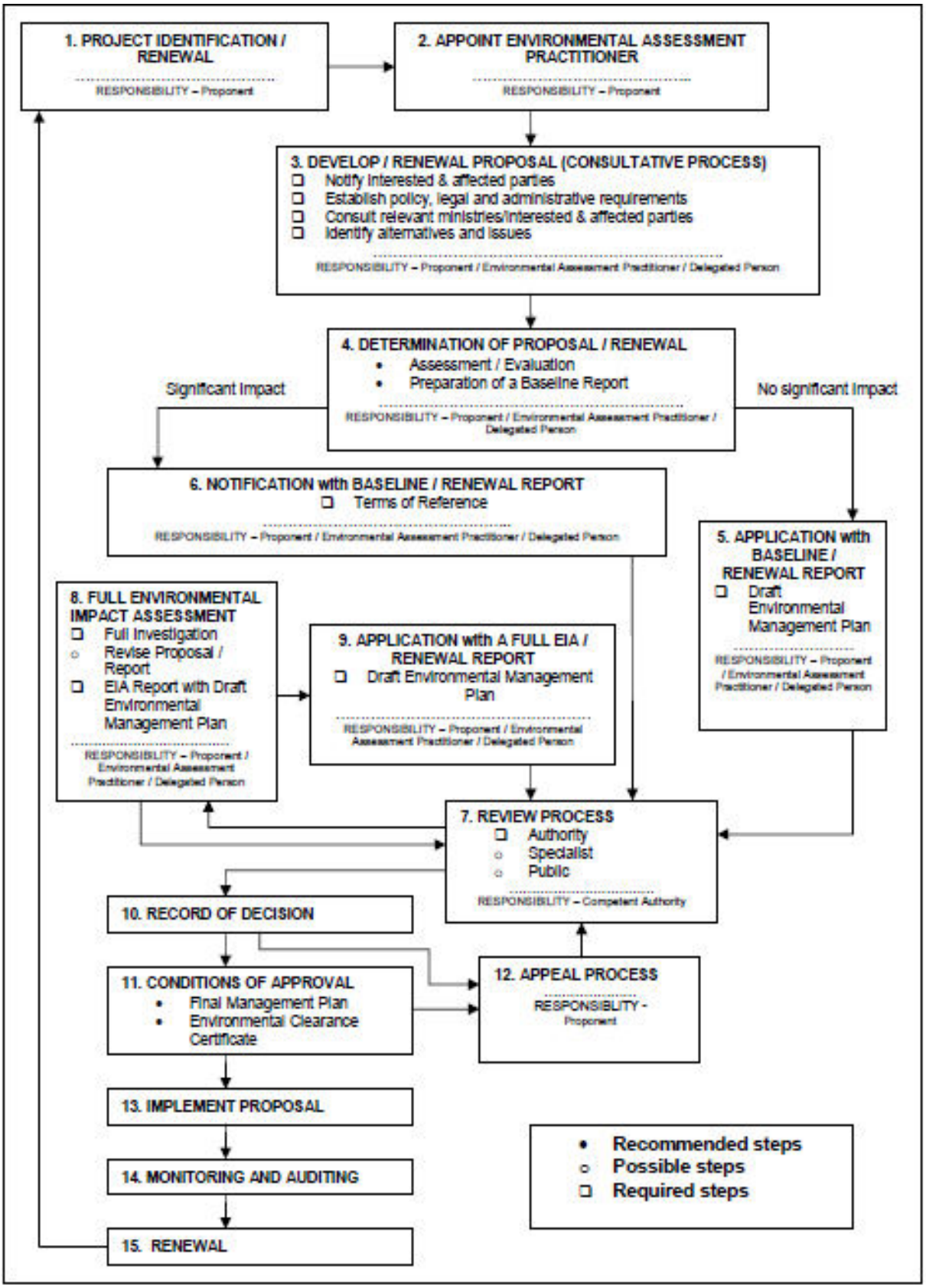

Figure 10: Flowchart of the assessment Process

14. AFFECTED NATURAL AND SOCIAL ENVIRONMENT

14.1. CLIMATE

In broad terms the climate can be described as semi-arid, with summer rainfalls and highest temperatures occurring during October and February. Maximum temperatures recorded in the area vary just under 40 degrees Celsius with an average annual temperature of more than 22 degrees Celsius (*Weather - the Climate in Namibia*, 1998 – 2012).

Rainfall in the form of thunderstorms is experienced in the area during the summer months between October and April. It is further characterised by relatively low average mean annual rainfall of 100 - 150mm in comparison to 250mm for the entire country. Over 70% of the rainfall occurs in the period between November and March with mean annual gross evaporation of 2600-2800mm (*Weather - the Climate in Namibia*, 1998 – 2012).

The prevailing wind direction is expected to prevent the spread of any nuisance namely noise and smell.

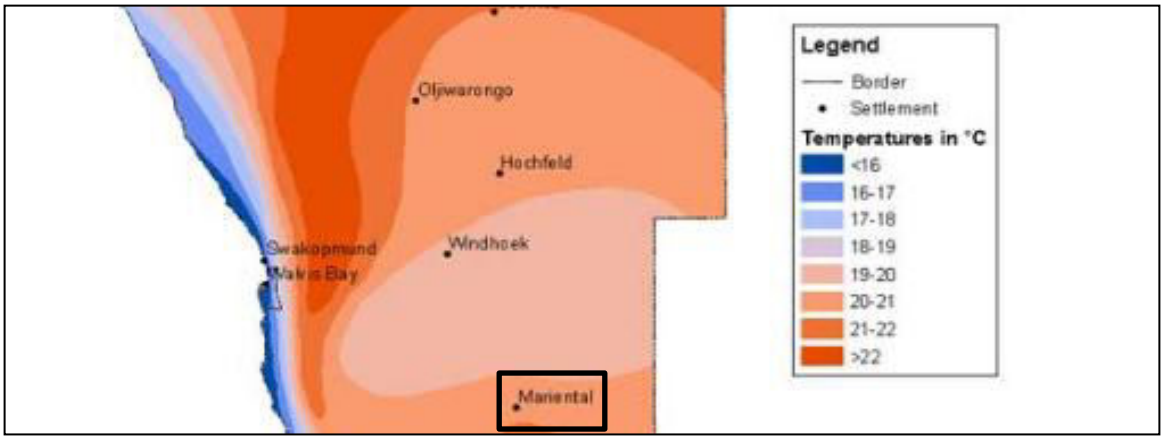

Figure 11: Average temperatures (Atlas of Namibia Project, 2002)

CONCLUSION AND IMPACT

The landfill/dumping site will not have an impact on the climate.

14.2. GEOLOGY, SOILS AND GEOHYDROLOGY

The surface geology of the area consists of formations of mainly the Kalahari Group which has a thickness of up to 30m in the study area. Within the Kalahari Group the following six lithological classifications are recognized: Duricrusts, Kalahari sand, Alluvium and lacustrine deposits, Sandstone, Marl, Basal conglomerate and gravel. The Karoo Supergroup is also present in the study area.

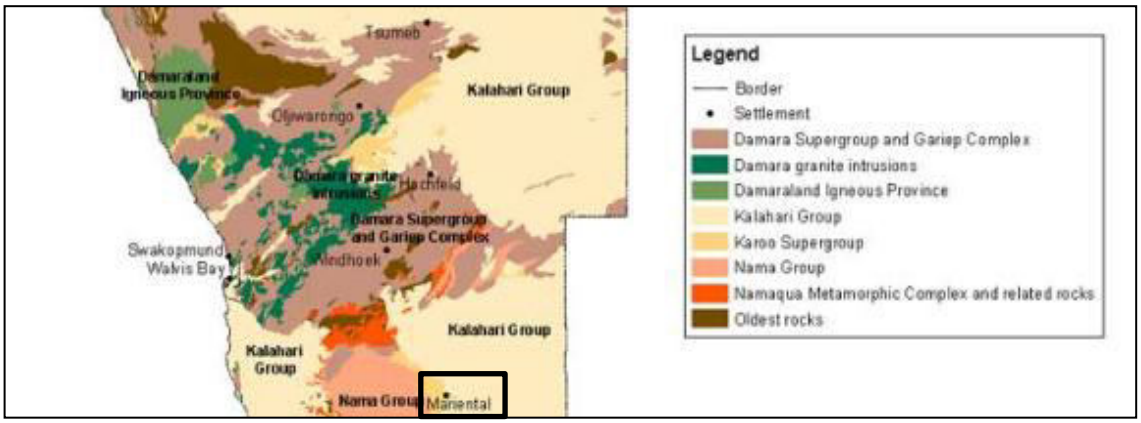

Figure 12: Geology of Namibia (Atlas of Namibia Project, 2002)

Surficial Kalahari sand covers almost the entire land surface. These lithologies comprise of fine to medium grained quartz sand, off-white in colour and typically clay-free in the upper 5m. These aeolian sands represent reworked Kalahari sediments. Though red sands occur, much of the surface sand in the study area is leached of any iron straining.

The transition from the so-called Kalahari sand to the older, underlying sandstone is often not clear but seems to be gradational. Below the surficial horizon, similar sands are found, but often with varying clay content that may reach significant (>10%) proportions.

The Kalkrand Formation of the Karoo Supergroup is expected to underlie the Kalahari Group. Groundwater flow would be mostly through primary porosity but flow along fractures, faults and other geological structure present within the formations might take place where consolidated layers are present.

CONCLUSION AND IMPACT

The landfill site will not impact on the geology, soils and geohydrology of the area. The surface drainage canals will be kept open in order that water can flow through.

14.3. BIODIVERSITY AND VEGETATION

The project site is located in the Tree and Scrub Savanna and Nama Karoo Biome. The Mariental area in general contains a large diversity of annual and perennial grass, it is estimated that there is up to 101 grass species. Four of these species are endemic namely *Eragrostis omahekensis, Eragrostis scopelophila, Pennisetum foermeranum* and *Setaria finite* (*Mannheimer & Curtis, 2009*). However, these species are not present on the specific site as it has been cleared from vegetation and has been used for the purpose of a borrow pit. Only a small amount of plants/vegetation will be removed for the construction and operational phases since the majority of vegetation has already been cleared for previous uses.

The project site is showing evidence of human inference namely informal tracks and a few gravel roads are present. There are no trees present on the site. The removal of any remaining vegetation should however still be done within a properly managed, planned and responsible manner to avoid the destruction of unnecessary ground cover or protected species. The rehabilitation of disturbed areas is important and should be done in accordance with the Environmental Management Plan (EMP). The natural characteristics of the site namely the vegetation clearance and the destruction of habitats is expected to further on have a low impact on the environment.

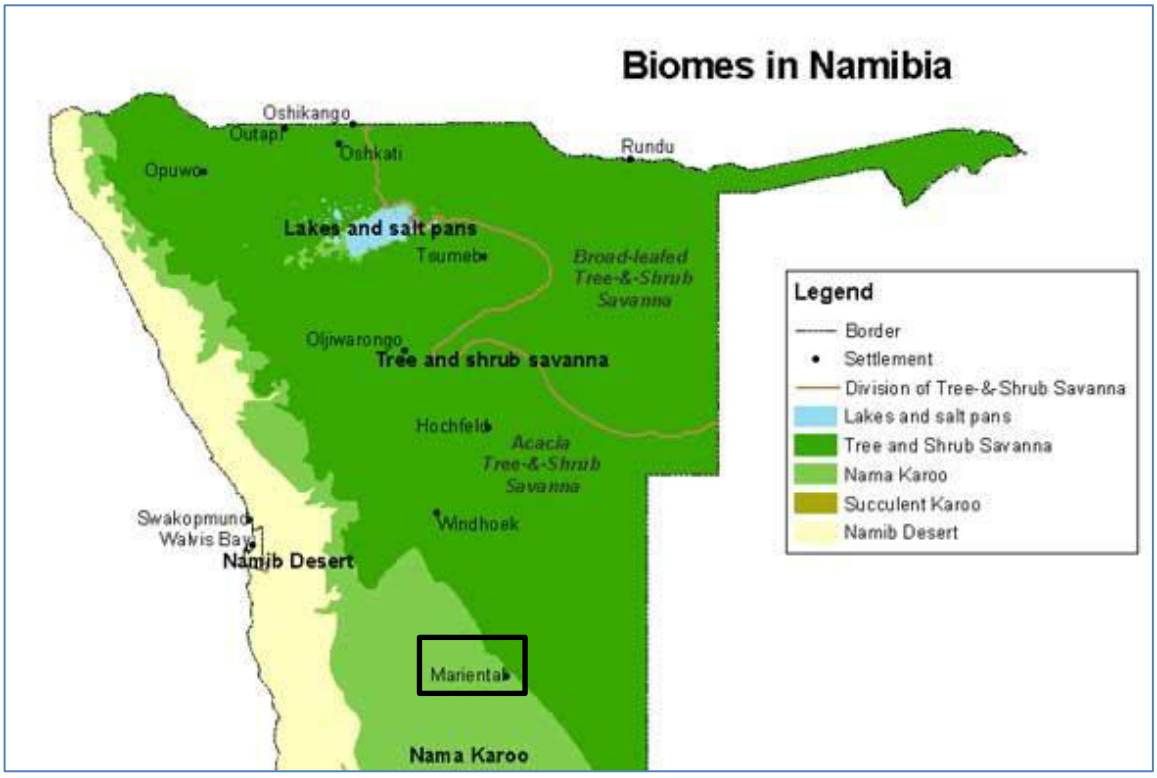

Figure 13: Biomes in Namibia (Atlas of Namibia, 2002)

CONCLUSION AND IMPACT

The landfill site will have a low impact on vegetation, shrubs and trees.

14.4. SOCIAL-ECONOMIC COMPONENT

Since the majority of land uses around Mariental are characterized by open spaces and farming activities, the landfill/dumping site will not have a negative impact on the social environment. The socio-economic characteristics of the area changed as more economic and business activities were established within the Mariental area. The majority of the surrounding land are characterized by small or medium scale business or commercial activities. Therefore, the proposed landfill/dumping site will not alter the sense of place.

The proposed landfill/dumping site will have a positive impact on the socio-economic environment and might also prevent pollution in the area. Positive impacts associated with the project will be in the form of additional job opportunities during construction as well as in operation. The community will also benefit from skills and technology transfer. The spending power of locals is likely to increase because of employment during the construction and operational phase. The construction impacts will be minimum if mitigated by the Environmental Management Plan.

CONCLUSION AND IMPACT

A landfill/dumping site will be provided which will have a positive impact on the community since employment will be created and pollution in the area might be prevented.

14.5. CULTURAL HERITAGE

The proposed project site is not known to have any historical significance prior to or after Independence in 1990. The specific area does not have any National Monuments and the specific site has no record of any cultural or historical importance or on-site resemblance of any nature. No graveyard or related article was found in the area. However, the Namibian National Heritage Act (No. 27 of 2004) provides for the protection and conservation of places and objects of heritage significance and the registration of such places and objects and to provide for incidental matters.

CONCLUSION AND IMPACT

No heritage resources or graveyards were observed on the site and in the area.

14.6. SENSE OF PLACE

The proposed landfill/dumping site will not have a large/negative impact on the sense of place in the area. An untidy or badly managed site can detract from the ecological well-being and individuality of the area. Unnecessary disturbance to the surroundings could be caused by poorly planned or poorly managed operational activities. The project site should be kept neat and clean where possible. Vegetation should not be removed or harmed if not necessary since it covers topsoil which prevents erosion. Noise and dust should be limited in the construction phase because of the neighbouring farming and business activities.

CONCLUSION AND IMPACT

The impact on the sense of place will be low.

14.7. HEALTH

The safety, security and health of the labour force, employees and neighbours are of great importance, workers should be orientated with the maintenance of safety and health procedures and they should be provided with PPE (Personal Protective Equipment). A health and safety officer should be employed to manage, coordinate and monitor risk and hazard and report all health and safety related issues in the workplace. The introduction of external workers into the area is sometimes accompanied with criminal activities posing security risks for neighbours. However, the proponent will take certain measures to prevent any activity of this sort. The welfare and quality of life of the neighbours and workforce needs to be considered for the project to be a success on its environmental performance. Conversely, the process should not affect the overall health of persons related to the project including the neighbours.

CONCLUSION AND IMPACT
The proposed landfill site will have a low impact on the health of the affected community.

15. INCOMPLETE OR UNAVAILABLE INFORMATION

The number of people that will be employed on the site in the construction and operational phases will depend on the type and scope of the construction and operational activities. Currently no exact figures are available.

16. IMPACT ASSESSMENT AND EVALUATION

The Environmental Impact Assessment sets out potential positive and negative environmental impacts associated with the project site. The following assessment methodology will be used to examine each impact identified, see *Table* below:

Table 2: Impact Evaluation Criterion (DEAT 2006)

Criteria	**Rating (Severity)**	
Impact Type	**+**	**Positive**
	O	**No Impact**
	-	**Negative**
Significance of impact being either	**L**	**Low (Little or no impact)**
	M	**Medium (Manageable impacts)**
	H	**High (Adverse impact)**

Probability:	Duration:
5 – Definite/don't know	5 - Permanent
4 – Highly probable	4 – Long-term (impact ceases)
3 – Medium probability	3 – Medium term (5 – 15 years)
2 – Low probability	2 – Short-term (0 – 5 years)
1 – Improbable	1 - Immediate
0 - None	
Scale:	**Magnitude:**
5 – International	10 – Very high/don't know
4 – National	8 - High
3 – Regional	6 - Moderate
2 – Local	4 - Low
1 – Site only	2 - Minor
	0 - None

The impacts on the receiving environment are discussed in the paragraphs below:

16.1.IMPACTS DURING CONSTRUCTION

Some of the impacts that the landfill/dumping site will have on the environment includes: water will be used for the construction and operation activities, electricity will be used, a sewer system might be constructed and wastewater will be produced on the site that will have to be handled.

16.1.1. WATER USAGE

Water is a scarce resource in Namibia and therefore water usage should be monitored and limited in order to prevent unnecessary wastage. The proposed project might make use of water in its construction and operational phase.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Water	-	2	2	4	2	L	L

16.1.2. ECOLOGICAL IMPACTS

The landfill/dumping site will be constructed in a disturbed natural area which is home to little vegetation. Therefore, the impact on fauna and flora will be minimal. Disturbance of areas outside the designated working zone is not allowed.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology	-	1	1	2	1	L	L

16.1.3. DUST POLLUTION AND AIR QUALITY

Dust generated during the transportation of building materials; construction and installation of bulk services, and problems thereof are expected to be low. Dust is expected to be worse during the winter months when strong winds occur. Release of various particulates from the site during the construction phase and exhaust fumes from vehicles and machinery related to the construction of bulk services are also expected to take place. Dust is regarded as a nuisance as it reduces visibility, affects the human health and retards plant growth. It is recommended that regular dust suppression be included in the construction activities when dust becomes an issue.

Impact evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust & Air Quality	-	2	2	4	3	M	L

16.1.4. NOISE IMPACT

An increase of ambient noise levels at the proposed site is expected due to the construction and operation activities. Noise pollution due to heavy-duty equipment and machinery might be generated.

Ensure all mufflers on vehicles are in full operational order; and any audio equipment should not be played at levels considered intrusive by others. The construction staff should be equipped with ear protection equipment.

Impact evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Noise	-	2	2	4	2	M	L

16.1.5. HEALTH, SAFETY AND SECURITY

The safety, security and health of the labour force, employees and general public are of great importance. Workers should be orientated with the maintenance of safety and health procedures and they should be provided with PPE (Personal Protective Equipment). A health and safety officer should be employed to manage, coordinate and monitor risk and hazard and report all health and safety related issues in the workplace.

Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. The presence of equipment lying around on site may also encourage criminal activities (theft).

Sensitize operators of earthmoving equipment and tools to switch off engines of vehicles or machinery not being used. The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times. Workers should be equipped with adequate personal protective gear and properly trained in first aid and safety awareness.

No open flames, smoking or any potential sources of ignition should be allowed at the project location. Signs such as 'NO SMOKING' must be prominently displayed in parts where inflammable materials are stored on the premises. Proper barricading and/or fencing around the site especially trenches for pipes and drains should be erected to avoid entrance of animals and/or unauthorized persons. Safety regulatory signs should be placed at strategic locations to ensure awareness. Adequate lighting within and around the construction locations should be erected, when visibility becomes an issue.

Impact evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety & Security	-	1	2	4	2	M	L

16.1.6. CONTAMINATION OF GROUNDWATER

Care must be taken to avoid contamination of soil and groundwater. Use drip trays when doing maintenance on machinery. Maintenance should be done on dedicated areas with

linings or concrete flooring. The risk can be lowered further through proper training of staff. All spills must be cleaned up immediately. Excavations should be backfilled and sealed with appropriate material, if it is not to be used further.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater	-	2	2	4	2	M	L

16.1.7. SEDIMENTATION AND EROSION

The area/project site is sparsely covered by vegetation. The proposed construction and operational activities will not increase the number of impermeable surfaces. The amount of storm water during rainfall events could increase erosion. Proper storm water management measures should be implemented.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Erosion and Sedimentation	-	1	1	2	1	M	L

16.1.8. GENERATION OF WASTE

This can be in the form of rubble, cement bags, pipe and electrical wire cuttings. The waste should be gathered and stored in enclosed containers to prevent it from being blown away by the wind. Contaminated soil due to oil leakages, lubricants and grease from the construction equipment and machinery may also be generated during the construction phase.

The oil leakages, lubricants and grease must be addressed. Contaminated soil must be removed and disposed of at a hazardous waste landfill. The contractor must provide containers on-site, to store any hazardous waste produced. Regular inspection and housekeeping procedure monitoring should be maintained by the contractor.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste	-	2	2	4	2	M	L

16.1.9. CONTAMINATION OF SURFACE WATER

Contamination of surface water might occur through oil leakages, lubricants and grease from the equipment and machinery during the installation, construction and maintenance of bulk services at the site.

Machinery should not be serviced at the construction site to avoid spills. All spills should be cleaned up as soon as possible. Hydrocarbon contaminated clothing or equipment should not be washed within 25m of any surface water body.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Surface water	-	2	2	4	2	M	L

16.1.10. TRAFFIC AND ROAD SAFETY

All drivers of delivery vehicles and construction machinery should have the necessary driver's licenses and documents to operate these machines. Speed limit warning signs must be erected to minimise accidents. Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximize visibility and avoid accidents.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-	2	2	4	2	M	L

16.1.11. FIRES AND EXPLOSIONS

There should be sufficient water available for firefighting purposes. Ensure that all fire-fighting devices are in good working order and are serviced. All personnel have to be trained about responsible fire protection measures and good housekeeping such as the removal of flammable materials on site. Regular inspections should be carried out to inspect and test firefighting equipment by the contractor.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Fires and Explosions	-	2	2	4	2	M	L

16.1.12. SENSE OF PLACE

The placement, design and construction of the proposed infrastructure should be as such as to have the least possible impact on the natural environment. The proposed activities will not have a large/negative impact on the sense of place in the area since it will be constructed in a manner that will not affect the neighbouring land and it will not be visually unpleasing.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Nuisance Pollution	-	1	2	2	2	M	L

16.2.IMPACTS DURING THE OPERATIONAL PHASE

16.2.1. ECOLOGICAL IMPACTS

Staff and visitors should only make use of walkways and existing roads to minimise the impact on vegetation. Minimise the area of disturbance by restricting movement to the designated working areas during maintenance.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology Impacts	-	2	2	4	2	M	L

16.2.2. DUST POLLUTION AND AIR QUALITY

Vehicles transporting goods and staff will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. Possible release of sewer odour, due to sewer system failure of maintenance might also occur. All maintenance of bulk services and infrastructure at the project site has to be designed to enable environmental protection.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust & Air Quality	-	2	2	4	3	M	L

16.2.3. CONTAMINATION OF GROUNDWATER

Spillages might also occur during maintenance. This could have impacts on groundwater especially in cases of large sewer spills. Proper containment should be used in cases of sewerage system maintenance. Oil and chemical spillages may have a health impact on groundwater users. Potential impact on the natural environment from possible polluted groundwater also exits.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater contamination	-	2	2	4	2	M	L

16.2.4. GENERATION OF WASTE

Household waste from the activities at the site and from the staff working at the site will be generated. The waste will be collected, sorted to be recycled and stored in on site for transportation and disposal at an approved landfill site.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste Generation	-	1	2	2	2	M	L

16.2.5. FAILURE IN RETICULATION PIPELINES

There may be a potential release of sewage, stormwater or water into the environment due to pipeline/system failure. As a result, the spillage could be released into the environment and could potentially be a health hazard to surface and groundwater. Proper reticulation pipelines and drainage systems should be installed. Regular bulk services infrastructure and system inspection should be conducted.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Failure of Reticulation Pipeline	-	2	2	4	2	L	L

16.2.6. FIRES AND EXPLOSIONS

Food will be prepared on gas fired stoves. There should be sufficient water available for firefighting purposes. Ensure that all fire-fighting devices are in good working order and are serviced. All personnel have to be trained about responsible fire protection measures and good housekeeping such as the removal of flammable materials on site. Regular inspections should be carried out to inspect and test firefighting equipment by the contractor.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Fires and Explosions	-	2	2	4	2	M	L

16.2.7. HEALTH, SAFETY AND SECURITY

The safety, security and health of the labour force, employees and neighbours are of great importance, workers should be orientated with the maintenance of safety and health procedures and they should be provided with PPE (Personal Protective Equipment). No open flames, smoking or any potential sources of ignition should be allowed at the project location. Signs such as 'NO SMOKING' must be prominently displayed in parts where inflammable materials are stored on the premises.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety & Security	-	1	2	4	2	L	L

16.3.CUMULATIVE IMPACTS

These are impacts on the environment, which results from the incremental impacts of the construction and operation of the development when added to other past, present, and reasonably foreseeable future actions regardless of which person undertakes such other

actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in it may not become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.

Possible cumulative impacts associated with the proposed construction include: sewer damages/maintenance, uncontrolled traffic and destruction of the vegetation or the environment. These impacts could become significant especially if it is not properly supervised and controlled. This could collectively impact on the environmental conditions in the area. Cumulative impacts could occur in both the operational and the construction phase.

Impact Evaluation

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Cumulative Impacts	-	2	3	4	2	L	L

17. CONCLUSION

In line with the Environmental Management Act (No 7 of 2007), *Green Earth Environmental Consultants* have been appointed to conduct an Environmental Impact Assessment Renewal for the construction and operation of a dumping/landfill site on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89. It is believed that the proposed landfill/dumping site can largely benefit the waste disposal and economic needs of the area.

Negative impacts that can be associated with construction in the area are most likely to include: production of solid and liquid waste, dust emissions, atmospheric emissions, noise pollution, movement of soils, increased wastewater generation and the disruption of groundwater from the foundation or other structures. The negative environmental impacts that may be visible in the operational phase of the project include: increases in solid waste generation for example food and plastics, etc., increased stress on waste disposal facilities, increase in water consumption and waste water generation, can result in an increase in traffic on the nearby roads and there can be an impact on the occupational health and safety of workers. However, this project is believed to be an asset to this area. Facilities, employment and products will be made available for which there is a need.

After assessing all information available on this project, *Green Earth Environmental Consultants* believe that the new landfill/dumping site is required.

18. RECOMMENDATION

It is therefore recommended that the Ministry of Environment, Forestry and Tourism through the Environmental Commissioner support and approve the Environmental

Clearance Renewal for the construction and operation of a new dumping/landfill site on a Portion of the Remainder of Portion C of Farm Keikanachab Ost No. 89 and for the following listed activities:

WASTE MANAGEMENT, TREATMENT, HANDLING AND DISPOSAL ACTIVITIES

2.1 The construction of facilities for waste sites, treatment of waste and disposal of waste.

2.2 Any activity entailing a scheduled process referred to in the Atmospheric Pollution Prevention Ordinance, 1976.

2.3 The import, processing, use and recycling, temporary storage, transit or export of waste.

LIST OF REFERENCES

Commencement of the Environmental Management Act, 2012. *Ministry of Environment, Forestry and Tourism*. Windhoek. Namibia, pp. 3 – 22.

Constitution of the Republic of Namibia, 1990. National Legislative Bodies. Namibia, pp. 6 – 63.

Environmental Management Act, 2007. *Ministry of Environment, Forestry and Tourism*. Windhoek. Namibia, pp. 4 - 32.

Forestry Act, 2001. *Office of the Prime Minister*. Windhoek. Namibia, pp. 9 – 31.

Mannheimer, C. & Curtis, B. 2009. *Le Roux and Muller's Guide to the Trees & Shrubs of Namibia.* Windhoek: Macmillan Education Namibia, pp. 249 – 439.

Namibian Environmental Assessment Policy, 1995. *Ministry of Environment, Forestry and Tourism*. Windhoek. Namibia, pp. 3 – 7.

Nature Conservation Ordinance, 1975. Windhoek. Namibia, pp. 4 – 47.

Rushborrok, P. 2001. Guidance on minimum approaches for improvements to existing Municipal Waste Dumpsites, *WHO Regional Office for Europe*, Copenhagen, Denmark.

Soil Conservation Act, 1969. *Office of the Prime Minister*. Windhoek. Namibia, pp. 1 – 14.

Water Resource Management Act, 2004. *Office of the Prime Minister*. Windhoek. Namibia, pp. 6 – 67.

APPENDIX A: CURRICULUM VITAE OF CHARLIE DU TOIT

1. Position:	Environmental Practitioner	
2. Name/Surname:	Charl du Toit	
3. Date of Birth:	29 October 1960	
4. Nationality:	Namibian	

5. Education:	Name of Institution	University of Stellenbosch, South Africa
	Degree/Qualification	Hons B (B + A) in Business Administration and Management
	Date Obtained	1985-1987
	Name of Institution	University of Stellenbosch, South Africa
	Degree/Qualification	BSc Agric Hons (Chemistry, Agronomy and Soil Science)
	Date Obtained	1979-1982
	Name of Institution	Boland Agricultural High School, Paarl, South Africa
	Degree/Qualification	Grade 12
	Date Obtained	1974-1978

6. Membership of Professional Association:	EAPAN Member (Membership Number: 112)	

7. Languages:		Speaking	Reading	Writing
	English	Good	Good	Good
	Afrikaans	Good	Good	Good

8. Employment Record:	From	To	Employer	Position(s) held
	2009	Present	Green Earth Environmental Consultants	Environmental Practitioner
	2005	2008	Elmarie Du Toit Town Planning Consultants	Manager
	2003	2005	Pupkewitz Megabuild	General Manager
	1995	2003	Agra Cooperative Limited	Manager Trade
	1989	1995		Chief Agricultural Consultant

1985	1988	Namibia Development Corporation Ministry of Agriculture	Agricultural Researcher

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.

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Charl du Toit

APPENDIX B: CURRICULUM VITAE OF CARIEN VAN DER WALT

1. **Position:** Environmental Consultant
2. **Name/Surname:** Carien van der Walt
3. **Date of Birth:** 6 August 1990
4. **Nationality:** Namibian
5. **Education:**

Institution	Degree/Diploma	Years
University of Stellenbosch	B.A. (Degree) Environment and Development	2009 to 2011
University of South Africa	B.A. (Honours) Environmental Management	2012 to 2013

6. **Membership of Professional Associations:**

EAPAN Member (Membership Number: 113)

7. **Languages:**

Language	Speaking	Reading	Writing
English	Good	Good	Good
Afrikaans	Good	Good	Good

8. **Employment Record:**

From	To	Employer	Positions Held
07/2013	Present	Green Earth Environmental Consultants	Environmental Consultant
06/2012	03/2013	Enviro Management Consultants Namibia	Environmental Consultant
12/2011	05/2012	Green Earth Environmental Consultants	Environmental Consultant

9. **Detailed Tasks Assigned:**

Conducting the Environmental Impact Assessment, Environmental Management Plan, Public Participation, Environmental Compliance and Environmental Control Officer

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engage.

_____

Carien van der Walt

APPENDIX C: ENVIRONMENTAL MANAGEMENT PLAN