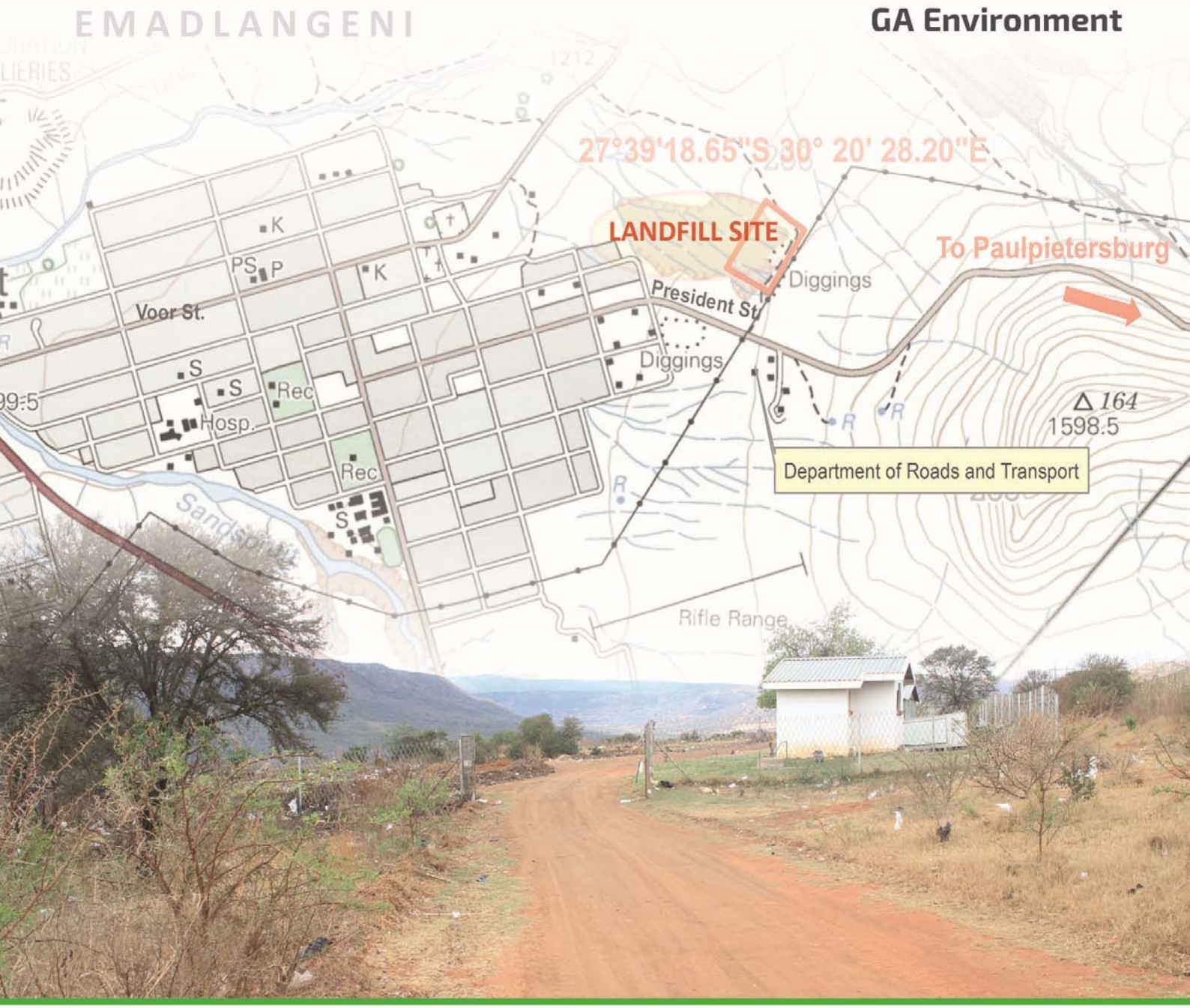
GA Environment



DRAFT BASIC ASSESSMENT FOR THE PROPOSED DECOMMISSIONING (CLOSURE) OF THE EMADLANGENI LANDFILL, EMADLANGENI LOCAL MUNICIPALITY, KWAZULU NATAL PROVINCE

EDTEA REFERENCE NUMBER: DC25/WML/0005/2017

JANUARY 2018

Environmental best practice and sustainability

DRAFT BASIC ASSESSMENT REPORT (DBAR)

For

BASIC ASSESSMENT AND A WASTE MANAGEMENT LICENCE APPLICATION PROCESS FOR THE PROPOSED DECOMMISSIONING OF EMADLANGENI LANDFILL, EMADLANGENI LOCAL MUNICIPALITY, KWAZULU NATAL PROVINCE

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22 January 2018

PROJECT INFORMATION

Title:	Basic Assessment and a Waste Management Licence Application Process for the Proposed Decommissioning of Emadlangeni Local Municipality, KwaZulu Natal Province
Competent Authority:	KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs
Reference No.:	DC25/WML/0005/2017
Applicant:	Emadlangeni Local Municipality
Environmental Consultants:	GA Environment (Pty) Ltd
Compiled by:	Nyaladzi Nleya (*Cert.Sci.Nat.)* Reviewer: Nkhensani Khandlhela
Date:	22 January 2018

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1	12 January 2018	Draft for internal review	Nyaladzi Nleya	Nkhensani Khandlhela
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Signing of the Original Document

Original	Prepared by	Reviewed by	Approved by
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EXECUTIVE SUMMARY

1 INTRODUCTION

GA Environment (Pty) Ltd has been appointed by the Department of Environmental Affairs (hereafter DEA) to undertake the Basic Assessment process for various landfill sites located within KwaZulu Natal that are currently operating without the required Waste Management Licences. The existing Emadlangeni landfill has been identified as one of the sites that will require a Waste Management Licence for decommissioning. The Emadlangeni landfill commenced operations in the year 2006 after the establishment of the Minimum Requirements for Waste Disposal by Landfill (DWAF, 1998 2nd Edition) prior to the promulgation of the National Environmental Management Waste Act (NEMWA hereafter), 2008 (Act No. 59 of 2008).

The main objective of the Waste Management Licencing Process is to ensure that the Emadlangeni landfill is decommissioned in accordance with NEMWA and other key legislation that governs the management of landfills. It is envisaged that following the licencing of the Emadlangeni landfill, the Emadlangeni Local Municipality (ELM) will formalise and decommission the landfill in line with applicable environmental legislation and conditions of the thereby reducing impacts construction will have on the Environment.

2 BASIC ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

According to the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) as amended, the licensing of the Emadlangeni landfill requires a Waste Management License (as per Government Notice 921 of November 2013). The following Waste Management listed activity is thus applicable.

- **Category A,** *Activity 14***:** The decommissioning of a facility for Waste Management Activity listed in Category A or B of this schedule;

In terms of the Environmental Impact Assessment (EIA) Regulations, a Basic Assessment is required as per Activity 19 of Listing Notice 1 (Government Notice 983 of December 2014, as amended in April 2017) and Activity 14 of Listing Notice 3 (Government Notice 985 of December 2014, as amended in April 2017). Other triggered Activities are as follows:

- Listing Notice 1: **Activity 19** -The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from [–(i)] a watercourse;
- Listing Notice 3: **Activity 14** – The development within a watercourse in (d) KwaZulu Natal (iv) A protected area identified in terms of NEMPAA, excluding conservancies
- Listing Notice 3: **Activity 14** – The development within a watercourse in (d) KwaZulu Natal

(xi) inside urban areas:

(bb) Areas designated for conservation use in Spatial Development Frameworks

In terms of the National Environmental Management Waste Act, 2008 (NEMWA) the Waste Regulations of 2014 as amended, Government Notices No R 982 and 984 of 2014, the proposed licencing of the landfill site is regarded as a listed activity and therefore requires a Basic Assessment prior to authorisation.

In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. According to the National Environmental Management Act, 1998 (NEMA) the identified listed activities (Activity 19 of Listing Notice 1 and Activity 14 of Listing Notice 3) must undergo a Basic Assessment prior to authorisation.

An EIA application form was submitted to the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs and a Basic Assessment was therefore undertaken for the proposed activities whose findings are included in the Draft Basic Assessment Report. Interested and Affected Parties (I&APs) including surrounding and affected landowners, provincial, national and local governments departments, were involved during the Public Participation Process (PPP). A summary of the PPP that commenced in October 2017 is detailed as follows:

- Publication of a media advertisement in the local newspaper, Newcastle Advertiser Newspaper of 20 October 2017;
- On-site notices notifying the public of the Basic Assessment were erected on site and at visible and accessible locations close to the site;
- Distribution of Notification letters to I&APs in October 2017;

Additional public participation process will be undertaken during the Draft Basic Assessment Report phase.

3 ENVIRONMENTAL IMPACTS

Potential risks and key issues identified during the Basic Assessment of the project were based on consultation with the I&APs, specialist investigations, desktop studies and the current state of the environment as identified during site visits. An Ecological Opinion, Geohydrological and Geotechnical Assessment were undertaken with specialist findings assessed and discussed in detail in **Chapter 5** and **9**of this report.

The potential impacts and key issues identified during the Basic Assessment include potential loss of biodiversity (flora and fauna); surface and ground water contamination; soil contamination; increased noise levels during the upgrade; atmospheric pollution and odours (Air Emissions); and safety and security issues.

4 ALTERNATIVES

Three alternatives (No go option, Closure and Rehabilitation of the landfill and Identification of potential end use planning) were identified. These alternatives were discussed in the Draft Basic Assessment Report that has been issued for your review. The closure of the Emadlangeni landfill was

therefore selected as the most appropriate alternative for the proposed landfill. These alternatives are discussed and assessed in **Chapter 6** of this report.

This BA has evaluated the potential risks and has presented the risks in terms of the human environment impacts as well as the biophysical impacts. Both impacts were identified through detailed investigations of the receiving environment as well as a rigorous analysis of the proposed activities, which are anticipated to occur during the decommissioning and monitoring phases of the project.

5 CONCLUSIONS AND RECOMMENDATIONS

The Draft BAR provides a broader description of the biophysical and socio-economic issues associated with the proposed licencing of the Emadlangeni landfill. A comprehensive public participation process was conducted and is discussed in **this report**.

The BAR has presented an assessment of the impacts of each of the proposed decommissioning activities as well as ascertain the potential cumulative impacts of the development in its entirety. Mitigation measures for each of the impacts are discussed to ensure that positive impacts can be optimised and negative impacts minimised in order for the project to be integrated into the environment in a sustainable manner.

Following the review of the Draft BAR by EDTEA and other authorities and I&APs, the comments received from all stakeholders will be incorporated into the Final BAR that will be submitted to EDTEA for review and consideration.

DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED LICENSING OF THE EMADLANGENI LANDFILL

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LIST OF ABBREVIATIONS / ACRONYMS

DEA	Department of Environmental Affairs
DWA	Department of Water Affairs
ECA	Environmental Conservation Act (Act 73 of 1989
EDTEA	KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme
G	General Waste
GCB	General Communal Landfill
GSB	General Small Landfill
GMB	General Medium Landfill
GLB	General Large Landfill
H	Hazardous Waste
HDPE	High-Density Polyethylene
I&APs	Interested and Affected Parties
IRD	Initial Rate of Deposition
IWMP	Integrated Waste Management Plan or Industry Waste Management Plan
KPI	Key Performance Indicators

GLOSSARY OF TERMS

This section provides a catalogue of terms and definitions, which may be used in this report and, or other future waste management plans and documents. Where more than one definition for a term exists in the literature, additional definitions have been provided for clarity.

Term	Definition	Reference
Audit	A site inspection at which the condition of the site on that day is appraised in terms of a number of predetermined criteria.	Minimum Requirements (1998)
Buffer Zones	Buffer Zones are separations between the boundaries of registered landfill sites and residential developments. They may vary between 500m and 1000m in width, depending on the classification of the landfill. No residential development may take place within a proclaimed buffer zone. At the discretion of the local authority and the state departments, however, developments such as industrial development may be permitted.	Minimum Requirements (1998)
Cell	This is the basic landfill unit of compacted solid waste which, when completed at the end of each day, is entirely contained by cover material. The sides may be typically formed by 1,5m or 2,0m high soil or rubble berms, or sloped covered waste. Cell width is determined by the maneuvering requirements of vehicles depositing waste at the working face.	Minimum Requirements (1998)
Co-Disposal	Co-disposal (General and Hazardous waste): The mixing and joint disposal of Hazardous (H) and General (G) waste in the same landfill. The co-disposal of general waste with hazardous waste as a means of facilitating disposal on a hazardous waste landfill is acceptable, whereas the co-disposal of any significant quantity of hazardous waste with general waste on a general waste landfill is unacceptable.	Minimum Requirements (1998)
Co-Disposal	Co-disposal: (Liquid with Dry waste): The mixing of high moisture content or liquid waste with dry waste. This affects the water balance and is an acceptable practice on a hazardous waste landfill site. This is only acceptable on a general waste landfill site when the liquid is not hazardous and the site is equipped with leachate management measures.	Minimum Requirements (1998)
Compliance Monitoring	Monitoring done in compliance with permit conditions.	Minimum Requirements (1998)
Cover	The material used to cover waste. Cover material is usually soil, but may comprise builders' rubble, ash or other suitable material. Daily cover is usually 150mm thick, intermediate cover is usually 300mm thick and final cover or capping usually 500mm thick. Final cover may form part of a special capping design and, as is the case with intermediate cover, must be able to support vegetation.	Minimum Requirements (1998)

Term	Definition	Reference
Cradle-To-Cradle	A philosophy and principle of industrial ecology involving the design of systems such that materials and waste products move in a cyclical process with zero wastage.	
Cradle-To-Grave	A policy of controlling of Hazardous Waste from its inception to its ultimate disposal.	Minimum Requirements (1998)
Development Plan	A plan indicating the phasing of the development of a landfill from the landfill preparation, through the operation (which is usually divided into areal phases), to the final closure, rehabilitation and end-use. The phasing, and hence the Development Plan, forms part of the design.	Minimum Requirements (1998)
Disposal Site	A site used for the accumulation of waste with the purpose of disposing or treatment of such waste.	ECA
Duty Of Care	This requires that any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from his control. Such a person must retain documentation describing both the waste and any related transactions. In this way, the person retains responsibility for the waste generated or handled.	Minimum Requirements
Eco-Toxicity	Eco-toxicity is the potential to harm animals, plants, ecosystems or environmental processes.	Minimum Requirements (1998)
End-Use Plan	The purpose for which the area of the rehabilitated and closed landfill is used. This may be as a park, playing fields, or other suitable land-use.	Minimum Requirements (1998)
Environment	the surroundings within which humans exist and that are made up of— (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.	NEMA
Extended Producer Responsibility	Means measures that extend a person's financial or physical responsibility for a product to the post-consumer stage of the product, and includes— (a) waste minimisation programmes; (b) financial arrangements for any fund that has been established to promote the reduction, re-use, recycling and	NEMWA (2008)

Term	Definition	Reference
	recovery of waste; (c) awareness programmes to inform the public of the impacts of waste emanating from the product on health and the environment; and (d) any other measures to reduce the potential impact of the product on health and the environment.	
Fatal Flaw	A factor or situation which prevents the development of an environmentally acceptable waste disposal facility, except as prohibitive cost.	Minimum Requirements (1998)
General Waste	Waste that does not pose an immediate threat to man or the environment, i.e. household waste, builders' rubble, garden waste, and certain dry industrial and commercial waste. It may, however with decomposition, infiltration and percolation, produce leachate with an unacceptable pollution potential.	Minimum Requirements (1998)
General Waste	All urban waste that is produced within the jurisdiction of local authorities. It comprises rubble, garden, domestic, commercial and general industrial waste. It may also contain small quantities of hazardous substances dispersed within it such as batteries, insecticides and weed-killers discarded on domestic and commercial premises. General waste may be disposed of in a permitted landfill and may be equated to what is commonly referred to as domestic, solid waste and municipal waste, i.e. that which is normally managed by a local authority.	DWAF Waste Generation Baseline Studies
General Waste	Means waste that does not pose an immediate hazard or threat to health or to the environment, and includes— (a) domestic waste; (b) building and demolition waste; (c) business waste; and (d) inert waste.	NEMWA (2008)
General Waste Landfill	A landfill designed to accept only general waste. Depending on the Site Water Balance, it may or may not have a leachate management system.	Minimum Requirements (1998)
Generator	An industry or other party whose activities result in the production of waste. The responsibility for hazardous waste remains from cradle-to-grave with the generator of the waste and the generator is held liable for any damage that the waste	Minimum Requirements (1998)

Term	Definition	Reference
	may cause to humans or to the environment.	
Guidelines	While not requirements, guidelines are recommended actions, which represent good practice. They are not enforceable, but may form the basis for site specific permit conditions in which case they become mandatory.	Minimum Requirements (1998)
Hazard	A source of or exposure to danger.	NEMA
Hazardous Waste	Waste that may, by circumstances of use, quantity, concentration or inherent physical, chemical or infectious characteristics, cause ill-health or increase mortality in humans, fauna and flora, or adversely affect the environment when improperly treated, stored, transported or disposed of.	Minimum Requirements (1998)
Hazardous Waste	Means any waste that contains organic or inorganic elements of compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.	NEMWA (2008)
Incineration	Incineration is both a form of treatment and a form of disposal. It is simply the controlled combustion of waste materials to a non-combustible residue or ash and exhaust gases, such as carbon dioxide and water.	Minimum Requirements (1998)
Infectious Waste	Any waste which is generated during the diagnosis, treatment or immunization of humans or animals; in the research pertaining to this; in the manufacturing or testing of biological agents – including blood, blood products and contaminated blood products, cultures, pathological wastes, sharps, human and animal anatomical wastes and isolation wastes that contain or may contain infectious substances.	Minimum Requirements (1998)
Interested And Affected Parties (IAPs)	Interested and Affected Parties are those people who will be affected in some way by the Hazardous Waste disposal process. Residents or farmers, a whole residential community, or the public at large may represent them.	Minimum Requirements (1998)
Landfill (V)	To dispose of waste on land, whether by use of waste to fill in excavations or by creation of a landform above grade, where the term "fill" is used in the engineering sense.	Minimum Requirements (1998)
Landfill (N)	The waste body created by land filling. This may be above or below grade, or both.	Minimum Requirements (1998)
Leachate	An aqueous solution with a high pollution potential, arising when water is permitted to percolate through decomposing waste. It contained final and intermediate products of decomposition, various solutes and waste residues. It may also contain carcinogens and/or pathogens. Sporadic/Significant.	Minimum Requirements (1998)

Term	Definition	Reference
Litter	Any object or matter discarded or left behind by the person in whose possession or control it was.	ECA
Medical Waste or Health Care Waste	Wastes emanating primarily from human and veterinary hospitals, clinics and surgeries, also from chemists and Sanitary Services. They may comprise, inter alia, sharps (used hypodermic needles and scalpel blades), malignant tissue, body parts, soiled bandages and liner, and spent or outdated medicines or drugs. They have the ability to affect and infect other living organics, and are considered hazardous.	Minimum Requirements (1998)
Minimum Requirement	A standard by means of which environmentally acceptable waste disposal practices can be distinguished from environmentally unacceptable waste disposal practices.	Minimum Requirements (1998)
Monitoring	The process of checking for changes in status or trends over time. This may be achieved by compiling successive audit or water quality analyses results.	Minimum Requirements (1998)
Operating Plan	A site-specific document which describes the way in which the landfill is operated. The Operating Plan commences at the level and detail of daily cell construction and continues through to the development and excavation sequence, access and drainage within a given phase of the Development Plan.	Minimum Requirements (1998)
Permit	The Permit issued by the Department of Water Affairs, & Forestry for the operation or closure of a landfill, in terms of Regulation 1549, promulgated under the Environment Conservation Act (Act 73 of 1989).	Minimum Requirements (1998)
Pollution	Any change in the environment caused by— (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.	NEMA
Precautionary Principle	Where a risk is unknown; the assumption of the worst-case situation and making provision for such a situation.	Minimum Requirements (1998)
Recycle	The use, re-use, or reclamation of material so that it re-enters the industrial process rather than becoming a waste.	Minimum Requirements (1998)

Term	Definition	Reference
Remediation	The rectification of problems, caused by bad practices, through the implementation of remedial measures.	Minimum Requirements (1998)
Responsible Person	The Permit Holder or his legally appointed representative who takes responsibility for ensuring that all or some of the facets of any of the following are properly directed, guided and executed, in a professionally justifiable manner: Investigatory work, design, preparation, operation, closure and monitoring.	Minimum Requirements (1998)
Standard	A criteria/measure by which the accuracy or quality of others is judged or a model for imitation, or the degree of excellence required.	Minimum Requirements (1998)
Toxic Waste	A form of hazardous waste that causes death or serious injury, such as burns, respiratory diseases, cancer or genetic mutations.	White Paper on IP&WM
Transporter	A person, organisation, industry or enterprise engaged in or offering to engage in the transportation of waste.	Minimum Requirements (1998)
Treatment	Treatment is used to remove, separate, concentrate or recover a hazardous or toxic component of a waste or to destroy or, at least, to reduce its toxicity in order to minimise its impact on the environment.	Minimum Requirements (1998)
Waste	Any matter, whether gaseous, liquid or solid or any combination thereof, which is from time to time designated by the Minister by notice in the Gazette as an undesirable or superfluous by-product, emission, residue or remainder of any process or activity (definition of 'waste' substituted by s. 1 (h) of Act 79 of 1992).	ECA
Waste	An undesirable or superfluous by-product, emission, or residue of any process or activity which has been discarded, accumulated or been stored for the purpose of discarding or processing. It may be gaseous, liquid or solid or any combination thereof and may originate from a residential, commercial or industrial area. This definition includes industrial waste water, sewage, radioactive substances, mining, metallurgical and power generation waste.	White Paper on IP&WM
Waste	Any matter, whether gaseous, liquid or solid or any combination thereof, originating from any residential, commercial or industrial area or agricultural area identified by the Minister of Environment Affairs as an undesirable or superfluous by-product, emission, residue or remainder of any process or activity.	DWAF Waste Generation Baseline Studies
Waste	Means any substance, whether or not that substance can be reduced, re-used, recycled and recovered— (a) that is surplus, unwanted, rejected, discarded, abandoned	NEMWA (2008)

Term	Definition	Reference
	or disposed of; (b) where the generator has no further use of for the purposes of production, reprocessing or consumption; (C) that must be treated or disposed of; or (d) that is identified as a waste by the Minister, but— (i) a by-product is not considered waste; and (ii) any portion of waste, once re-used, recycled and recovered, ceases to be waste.	
Waste Body	This refers to the body of waste (and cover) that is contained in the landfill. Because it is subject to decomposition, it has the potential to generate leachate and must therefore be adequately separated from the water regime.	Minimum Requirements (1998)
Waste Disposal Facility	Means any site or premise used for the accumulation of Waste with the purpose of disposing of that waste at that site or on that premise.	NEMWA (2008)
Waste Management Activity	Means any activity listed in Schedule 1 or published by notice in the Gazette under section 19 of the NEM Waste Act, and includes— (a) the importation and exportation of waste; (b) the generation of waste, including the undertaking of any activity or process that is likely to result in the generation of waste; (c) the accumulation and storage of waste; (d) the collection and handling of waste; (e) the reduction, re-use, recycling and recovery of waste; (f) the trading in waste; (g) the transportation of waste; (h) the transfer of waste; (i) the treatment of waste; and (j) the disposal of waste.	NEMWA (2008)
Waste Management License	Means a license issued in terms of section 49 of the NEM: WA (2008) for waste management activities listed under section 19	NEMWA (2008)

Term	Definition	Reference
	of the Act.	
Waste Management Facility	All wastes or products stored on a temporary or permanent basis, that could impact on surface or groundwater quality, by leaching into or coming in contact with water, are referred to a "Waste Management Facilities". See also the Waste Management Documents, "Minimum requirements for waste disposal sites" and "Minimum requirements for the handling and disposal of hazardous waste".	Minimum Requirements (1998)
Waste Management Services	Means waste collection, treatment, recycling and disposal services.	NEMWA (2008)
Waste Minimisation programme	Means a programme that is intended to promote the reduced generation and disposal of waste.	NEMWA (2008)
Waste Transfer Facility	Means a facility that is used to accumulate and temporarily store waste before it is transported to a recycling, treatment or waste disposal facility.	NEMWA (2008)
Waste Treatment Facility	Means any site that is used to accumulate waste for the Purpose of storage, recovery, treatment, reprocessing, recycling or sorting of that Waste.	NEMWA (2008)

1 INTRODUCTION

1.1 Background

The Department of Environmental Affairs (DEA) has embarked on an initiative to assist the Emadlangeni Local Municipality (ELM hereafter) to licence their existing active landfill site. The DEA has thus appointed GA Environment (Pty) Ltd, Independent Environmental Consultants, to undertake a Basic Assessment Application as part of the Waste Management Licence Application Process. The ELM also proposes to formally license the existing landfill site for decommissioning in preparation for commencement with waste management activities at a Waste Transfer Station and Buy Back Centre located in Bensdorp.

The eMadlangeni landfill occupies an area of approximately 62 000m² (±6 Ha) and is located on Erf 10000 and Erf 1006 eMadlangeni within the eMadlangeni Local Municipality which falls within the jurisdiction of Amajuba District Municipality. The site is within the boundaries of the Utrecht Balele Community Game Park and on the western foothills of the Balele Mountains. The landfill is approximately 4km north of the R34 which provides the main access into the Utrecht CBD. Direct access to the site can be gained from the surfaced President Street leading to Paulpietersburg. The site centre co-ordinates are 27°39'18.65"S; 30° 20' 28.20"E. Refer to **Figure 1** for the Locality map of the site. The location of the site is indicated in **Figure 1** and attached as **Appendix A** of this report.

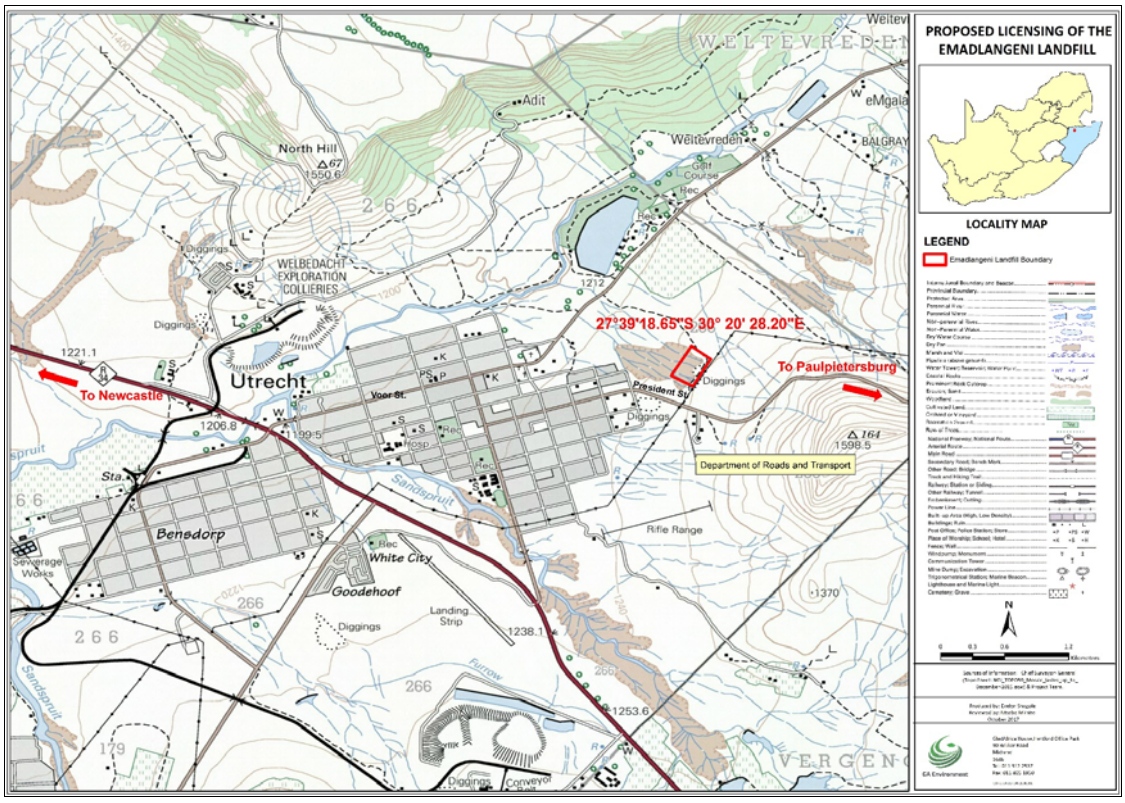

Figure 1: Locality Map indicating the Emadlangeni Landfill

1.2 Solid Waste Disposal in Emadlangeni

As a result of numerous complaints about the state of poorly operated municipal landfills and the associated impacts on the biophysical and social environment, the Department of Environmental Affairs has embarked on an initiative to assist various Municipalities in South Africa with the licensing of the existing illegal waste disposal sites. One of these is the Emadlangeni landfill that will require a Waste Management Licence for decommissioning. The initiative by DEA will assist the Emadlangeni Local Municipality with obtaining a Waste Management Licence which will also serve as a basis to seek funding opportunities and assistance from financial institutions such as DBSA and state departments such Treasury and National Ministries to ensure the closure of the landfill as per the waste legislation.

According to the Emadlangeni Local Municipality Integrated Development Plan (IDP) (2017-2017), the licencing of illegal waste dumps or the registration of unlawful landfill sites has been identified as one of the key objectives that require attention. Although the IDP is not explicit about the need to licence the existing Emadlangeni Landfill for closure, it does mention the need for alternative waste disposal facilities such as Waste Transfer Stations and Buy Back Centres within Emadlangeni as well as other areas within the municipality.

According to the Emadlangeni Local Municipality, any waste that cannot be reused or recycled will be disposed of at the regional landfill located in Newcastle. It is envisaged that the licencing of the landfill will enhance growth in the waste management industry, particularly with regards to recycling opportunities at the alternative waste transfer centres. Recycling initiatives will most likely contribute to poverty alleviation by providing sustainable employment opportunities.

Although the landfill is poorly operated, one of the key activities noted on site is the reclaiming of recyclable material by locally based reclaimers. This contributes to local revenue generated by members of the community and supports one of the goals of the National Waste Management Strategy which is a legislative requirement of the NEM:WA.

It must be highlighted that various Local Municipalities in KwaZulu Natal are faced with challenges of legally decommissioning their landfills mainly due to lack of financial resources. In some of the waste sites, including the Emadlangeni site, key landfill infrastructure (waste compacters and other machinery, security etc.) is lacking. Visual nuisances from the burning of waste, windblown litter and uncontrolled access are some of the key problems that were noted at the landfill site.

The proposed activities associated with the Decommissioning (closure) of the Emadlangeni landfill will also include the rehabilitation of landfill site as per NEM:WA, 2008 requirements. The closure and rehabilitation of the landfill will be undertaken in accordance with DWAF Minimum Requirements for rehabilitation, closure and end-use for landfill.

1.3 Status Quo

The existing landfill site is located, 4km east of Utrecht at the foot of a koppie, with topography gently sloping north eastwards (1.5km away) towards a river and dam. The landfill receives general waste from the surrounding areas where there is a security fence but no access control. No other

infrastructure (i.e. potable water, ablution facilities, signage, etc.) related to waste disposal facilities are available on site. There are no designated cells for the disposal of waste, waste was noted to have been dumped within the fenced site and also widely scattered outside the landfill site area.

Burning of waste was noted to take place but contained within the boundaries of the site. There is no evidence of either groundwater or gas monitoring noted in the vicinity of the landfill site. There are large volumes of rubble on the site. Potential for reclamation is minimal as waste is burnt as soon as it is disposed of on site. It is anticipated that upon closure of the landfill site, the local Municipality will undertake projects to reclaim waste. Please refer to **Figures 2** to **4** for the general overview and **Appendix B** for additional photographs.

Figure 2: Access road (President Street) to the site, landfill is to the left

According to the Preliminary Engineering Design report, in the absence of any accurate records, the landfill is estimated to be approximately 70 tonnes per annum receiver of waste.

Figure 3: View facing South East which shows the access gate of the landfill

Figure 4: Burnt waste located in the north western corner of the site, the Balele Mountain in the background

According to the Preliminary Engineering Report the site receives 8 tonnes of waste per day and would be classified as a Communal (C) site when using the Minimum Requirements classification system and can be classified as a Class B landfill in terms of the Norms and Standards for the disposal of Waste as promulgated in November 2013 With the observed site dimensions and waste profile it is estimated that the site currently holds in the order of 120,000m^3 of waste. It is thus possible that the facility is in the order of 30 to 40 years old. The site slopes naturally at about 4.5% from the mountain to the river.

1.4 Need and Desirability of the Project

The Emadlangeni Local municipality is applying for a Waste Management Licence in order to legally decommission the facility, and to ensure that the site adheres to the NEM:WA, 2008 requirements and other key legislation. The current landfill site is not operated and managed in accordance with the requirements of the Waste Act and thus poses various environmental problems such as threatening the health of humans and animals, visual nuisances, land pollution, groundwater contamination, threats to tourism, etc.

Once licensed, the environmental risks will be greatly reduced through the planned installation of basic infrastructure. It must be noted that as the Emadlangeni municipality has a limited budget to decommission the landfill. Obtaining a Waste Management Licence will also serve as a basis to seek funding opportunities and assistance from financial institutions such as the Development Bank of South Africa (DBSA), other State Departments such the National Treasury and other National Ministries.

In addition, the need to licence many of the unlicensed Waste Disposal in South Africa is regarded by the Minister of Environmental Affairs as one of key project towards a cleaner environment. This initiative will aid in achieving the Ministers service delivery agreement Outcome 10 (Output 1 to 4) deliverable target/indicator that serves to ensure that environmental assets and natural resources are well protected and are continually enhanced. Further delays in implementing the project will mean that the Emadlangeni Local Municipality will continue to dispose waste on an unlicensed site thereby causing adverse environmental problems.

It is for the reasons mentioned above that the licensing of the landfill must be implemented as a matter of urgency to not only address the Minister's key objectives, but also for environmental sustainability purposes.

1.5 Applicable Waste Management and NEMA EIA Listed Activities Applied For

According to the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) as amended, the licensing of the Emadlangeni landfill requires a Waste Management License as per Government Notice 921 of November 2013, as amended. The following *Category A* Waste Management listed activities are thus applicable.

- *Activity 14: The decommissioning of a facility for a waste management activity listed in Category A or B of this schedule.*

In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported to EDTEA as the competent

authority (CA hereafter) as the decision-maker. Furthermore, EDTEA is charged by Section 43(2) of NEM:WA, 2008, as the Licensing Authority for the Emadlangeni landfill.

This Basic Assessment process was conducted in accordance with Section 19-20 and Appendix 1 of the NEMA EIA regulations, 2014, as amended. NEMA requires that an EIA or Basic Assessment (BA) be undertaken in order to inform the authorisation process for a listed activity. The NEMA EIA regulations, 2014, as amended (Government Notice R. 982), published in terms of Sections 24(5) and 44 of NEMA, defines the manner in which the BA is to be undertaken. Guideline documents have been published by the Department of Environmental Affairs and these provide further guidance in implementing the EIA Regulations. The guideline documents will be used as reference documents for the purpose of this Basic Assessment.

In terms of the National Environmental Management Act (NEMA), the EIA Regulations of 2014, Government Notices No R 982 and 984 of 2014, the proposed licencing of the landfill site and is regarded as a listed activity and therefore requires a Basic Assessment prior to authorisation. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. In terms of the Environmental Impact Assessment (EIA) Regulations, a Basic Assessment is required as per Activity 19 of Listing Notice 1 (Government Notice 983 of December 2014, as amended in April 2017) and Activity 14 of Listing Notice 3 (Government Notice 985 of December 2014, as amended in April 2017). Other triggered Activities are as follows:

- **Listing Notice 1: Activity 19** -The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from [–(i)] a watercourse;

- **Listing Notice 3: Activity 14** – The development within a watercourse in (d) KwaZulu Natal (iv) A protected area identified in terms of NEMPAA, excluding conservancies

- **Listing Notice 3: Activity 14** – The development within a watercourse in (d) KwaZulu Natal

(xi) inside urban areas:

(bb) Areas designated for conservation use in Spatial Development Frameworks

This Basic Assessment Process was guided by the regulations made in terms of Chapter 5 of the National Environmental Management Act No. 107 of 1998 (NEMA), published as Government Notice No. 982 in Government Gazette No. 38282 of 04 December 2014. The purpose of these Regulations is to regulate the procedure and criteria for the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorizations.

1.6 Description of Proposed Activities

The activities required for the decommissioning of the Emadlangeni landfill are based on the DWAF Minimum Requirements for Waste Disposal by Landfill (2nd Edition, 1998). The proposed activities associated with the decommissioning of the existing facility will typically include the following:

- Shaping and landscaping of the waste body;
- The construction of stormwater and leachate management infrastructure;
- Capping of the waste body;
- Vegetative cover of the final landform;
- The construction of the required end-use infrastructure; and
- Post closure environmental monitoring where necessary.

The Preliminary Engineering report and the conceptual layout of the Emadlangeni landfill are attached as **Appendix F3.** Other requirements that have to be considered as part of the disposal facility will include drainage design, containment, leachate management, leachate detection, monitoring systems and the rehabilitation plan in line with the Minimum Requirements for Waste Disposal by Landfill (DWAF, 1998). The exact design, footprint and sizes of the associated infrastructure will be confirmed when the detailed engineering design requirements are finalised. The scope of the waste disposal site, including details of all elements of the project (for the construction, operation and decommissioning phases) is discussed in detail in this Basic Assessment Report.

Prior to the establishment of any landfill, it is required that the nature and quantities of the waste that will be deposited into the landfill be determined and the impacts that the land filling operation might have on the receiving environment be identified and assessed. The Department of Water Affairs and Forestry (DWAF) currently Department of Water Affairs (DWS) has developed a series of guidelines that serve as standards for managing waste and sets minimum requirements that an applicant wanting to permit a landfill will have to adhere to be in compliance with prevailing legislation.

1.7 The Objectives of the Basic Assessment Report

The main objectives of the Basic Assessment, in terms of the regulatory requirements stipulated in *Appendix 1* of the 2014 NEMA EIA Regulations, are to:

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
(b) identify the alternatives considered, including the activity, location, and technology alternatives;
(c) describe the need and desirability of the proposed alternatives;
(d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine—

(i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
(ii) the degree to which these impacts—
(aa) can be reversed;
(bb) may cause irreplaceable loss of resources; and
(cc) can be avoided, managed or mitigated; and

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;
(ii) identify suitable measures to avoid, manage or mitigate identified impacts; and
(iii) identify residual risks that need to be managed and monitored.

1.7.1 Structure of the Basic Assessment Report

This BAR has also incorporated the scope of assessment and content as outlined in Appendix 1 of the NEMA EIA Regulations 2014 as amended. This Basic Assessment Report (BAR hereafter) is divided into 11 Chapters, the contents of which will be presented as follows in this report:

- **Chapter 1** introduces the background to the development proposal and profiles its proponents. Furthermore, this chapter provides an indication of the BA process that will be followed as well as providing insights into the legislative requirements that have resulted in the need for this process;
- **Chapter 2** provides the legislative framework for the BA process and the context of the proposed development. The legislative framework includes national and provincial legislation as well as planning framework which will have to be considered in the BA process;
- **Chapter 3** is a detailed description of the adopted Basic Assessment Process;
- **Chapter 4** is a description of the project activities and engineering requirements;
- **Chapter 5** is a description of the receiving environment associated with the decommissioning of the landfill;
- **Chapter 6** is a description and comparative assessment of the alternatives that were considered for the project;
- **Chapter 7** details the Public Participation Process undertaken for the project. It also summarises key outcomes of the process;
- **Chapter 8** details the impact assessment methodology adopted for this Basic Assessment;
- **Chapter 9** details the environmental issues as well as the aspects and impacts potential identified for the proposed decommissioning of the landfill;
- **Chapter 10** provides a conclusion to the report as well as recommendations; and
- **Chapter 11** provides reference details for resources used to compile the Basic Assessment Report.

1.8 Application Details

The following section of the Basic Assessment Report provides the particulars, including contact details, of the key stakeholders (Applicant, Environmental Assessment Practitioner and the relevant Competent Authority) associated with the project. These details are outlined in **Table 1** below.

Table 1: Application Details

Applicant's representative	Environmental Impact Practitioner	Competent Authority Representative

Name: Zanele Sithebe **Designation**: Director: Community Services **Tel**: 082 487 9907 **e-Mail:** sithebez@emadlangeni.gov.za	**Name:** Nyaladzi Nleya **Designation**: Environmental Impact Assessment Practitioner **Tel:** 011 312 2537 **Fax:** 011 805 1950 **Email:** nyaladzin@gaenvironment.com/ environment@gaenvironment.com	**Name:** Ken Makhanya **Designation:** Environmental Officer **Mobile No**: 081 721 8812/ ken.makhanya@kznedtea.gov.za

Specific details, CV's and expertise of the team of EAPs who prepared this Report are indicated and are included as **Appendix C** of this report. This Basic Assessment Report was prepared by Mr Nyaladzi Nleya. **Mr Nyaladzi Nleya** is an Environmental Scientist and holds B.Sc. (Applied Environmental Sciences). He is an Environmental Scientist with 8 years of experience. Nyaladzi specialises in Environmental Impact Assessments (EIAs), Waste license Applications and has been a project scientist for various EIA's in Northern Cape, North West, Mpumalanga and Gauteng provinces of South Africa. Nyaladzi is currently a Project Manager and Environmental Scientist at GA Environment (Pty) Ltd.

1.9 Specialist Details

The Basic Assessment process included a number of specialist investigations indicated in Table 2 below.

Table 2: Specialist Studies and contact details

Ecological Opinion	Geotechnical and Geohydrological Study	Engineering Needs Assessment and Preliminary Closure Design Study
Company Name: Scientific Terrestrial Services **Contact Person** Emile van der Westhuizen **Contact Details**: emile@sasenvgroup.co.za	**Company Name:** North Arrow Holdings (Pty) Ltd **Contact Person** Clement Rikhotso **Contact Details**: clement.rikhotso@northarrowholdings.co.za	**Company Name:** RAPienaar Consulting (Pty) Ltd **Contact Person** Reon Pienaar **Contact Details**: reon@rapienaar.co.za

Specialist findings are assessed and discussed in detail in **Chapters 4, 5** and **9** of this report. Specialist investigation reports are attached in **Appendix F.**

2 LEGISLATIVE FRAMEWORK

This section of the Report discusses applicable legal provisions and the legal context for the Basic Assessment process. It provides a review of relevant legislation, regulations, policies and guidelines, which are applicable to (or have implications for) the proposed project. The contents of this report are based on a review of the information that was available at the time. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management of the Emadlangeni landfill site.

2.1 National Legislation

2.1.1 Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

The environmental right is mentioned in Chapter 2 of the Constitution of the Republic of South Africa (Act No. 108 of 1996). In terms of this provision: everyone has the right to an environment that is not harmful to his or her health or wellbeing. The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. Specifically as regards the environmental right, the Constitution states that:

"*...everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*".

The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate.

2.1.2 National Environmental Management Act, 1998

The National Environmental Management Act, 1998 or NEMA (Act No. 107 of 1998) was promulgated to serve as the general framework within which environmental management and implementation plans must be formulated. It provides guidelines on how any organ of state must exercise any function when taking any decision in terms of the Act or any statutory provision concerning the protection of the environment. NEMA sets out the principles by reference to which a conciliator appointed under the Act must make recommendations. These principles guide the interpretation, administration and implementation of the Act, and any other specific laws concerned with the protection or management of the environment.

2.1.2.1 NEMA and Cooperative Governance in Environmental Management

As the main environmental management legislation in the country, NEMA provides the legal framework for integrating good environmental management into all development activities. The principles laid out in Section 2 of the Act are aimed at promoting certainty with regard to decision-making by organs of state on matters affecting the environment. These NEMA principles are meant to guide the exercise of functions affecting the environment by "all organs of state that may significantly affect the environment". This implies that any statutory body, or state-owned enterprise, fulfilling a mandate having to do with the protection of the environment must carry out such a function in accordance with these principles. NEMA advocates for procedures and institutions to facilitate and promote cooperative government and intergovernmental relations.

2 Key NEMA Principles

(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.

(3) Development must be socially, environmentally and economically sustainable.

NEMA also advocates and promotes public participation in environmental governance. One of the objectives of NEMA is to provide for institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith, such as detailed regulations for Environmental Impact Assessment to predict the impacts of a plan, proposal or policy.

Since its promulgation on 29 January 1999, there have been several amendments to the original act, with a view to strengthening the environmental management function and the general framework of laws concerning the environment.

2.1.2.2 Specific Environmental Management Legislation

The term "*Specific Environmental Management Legislation"* refers to a range of specific laws that have been formulated as regulations or subordinate legislation aimed at dealing with various aspects of environmental management in terms of NEMA and its provisions (Section 1 of Act No. 46 of 2003). Some specific Environmental Management Legislation is discussed in the following sections.

a) Environmental Impact Assessment Application

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation or permission by law as these activities may significantly affect the environment. The act requires that in such cases the impacts must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The following sections discuss the regulations governing the environmental impact assessments.

b) NEMA Environmental Impact Assessment Regulations

Regulations for EIA in South Africa were first promulgated under the Environment Conservation Act, 1989 (Act No. 73 of 1989, ECA). Those regulations took effect in September 1997 and several minor amendments followed in the early 2000s. Since then, two major reviews of EIA Regulations have ushered in gradual reforms aimed at improving the efficiency of EIAs and resolving the administrative problems that soon became apparent with the implementation of the ECA regulations. The most recent of these regulations were promulgated in terms of Sections 24(5), 24M and 44 of NEMA, and are now referred to as the NEMA EIA Regulations, 2014 (Government Notice Nos. R982, R983, R984 and R985, published in Government Gazette No. 38282 of 04 December 2014).

2.1.3 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) as amended

A specific environmental management act was promulgated on 10 March 2009 to govern waste management activities. This Act aims to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

The National Environmental Management Waste Act (Act No. 59 of 2008) establishes institutional arrangements and planning matters; provides for national norms and standards for regulating the management of waste by all spheres of government; makes provision for specific waste management measures; establishes the procedures for the licensing and control of waste management activities; provides for the remediation of contaminated land; provides for the establishment of the national waste information system; and provides for compliance and enforcement of waste management activities.

The Emadlangeni landfill, being a waste disposal area, receives significant amounts of waste, in particular general waste. Section 16(1) of the Waste Act states that "A holder of waste must, within the holder's power, take all reasonable measures to—

> *"(a) avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
> *(b) reduce, re-use, recycle and recover waste;*
> *(c) where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
> *(d) manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;*
> *(e) prevent any employee or any person under his or her supervision from contravening this Act; and*
> *(f) prevent the waste from being used for an unauthorised purpose."*

Also, section 19(1) of the act gives the minister power to gazette certain activities as "listed waste management activities" for which either a Basic Assessment or an Environmental Impact Assessment

must be carried out and an Environmental Authorisation and a Waste Management License issued, before such activities may be undertaken.

2.1.3.1 Specific Waste Management Legislation

The term "*Specific waste management legislation"* refers to a range of specific laws and guidelines that have been formulated with the aim of dealing with various aspects of waste management, and should be considered in conjunction with NEMWA. Some specific Environmental Management Legislation is discussed in the following sections.

a) DWAF Minimum requirements for the handling, classification and disposal of hazardous waste (1998)

The minimum requirements for handling, classification and disposal of hazardous waste guideline sets out the waste classification system, in which waste is placed in two classes i.e. general or hazardous. The classification of the waste is based on their inherent toxicological properties. Hazardous waste, however, is further subdivided based on the risks the waste poses. The requirements for pre-treatment and disposal of hazardous waste are appropriately set in accordance with the waste classification, and are provided for within the guideline document. Hazardous waste prevention and minimisation as well as the handling, transportation and storage is also briefly addressed.

Prior to the development of the Waste Management and Classification Regulations in 2013, waste has been classified in terms of the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste (MR - HW). MR were the first guidance documents for the management of waste. Landfill classification was based in terms of Type of waste; size of waste stream and the potential for leachate generation (climate, etc). Critics have shown that the MR focused mainly on the classification of waste and had no defined waste management responsibilities on the landfill operator. In addition to this, the generator had little understanding of waste generated and made no interventions to reduce waste volumes or recycle /recover as per the National Waste Management strategy. Following the review of the Act by Government, DEA Development and implementation of (Gazette No. 36784 of 23 August 2013). These Norms and Standards are discussed in the preceding sections:

b) GNR 926: NEMWA National Norms and Standards for the Storage of Waste (29 Nov 2013)

The National Norms and Standards for the Storage of Waste was promulgated in terms of the provision stipulated in the NEMWA, and came into effect on the 29 November 2013, GN No. 926. The National Norms and Standards for the Storage of Waste aims to regulate both the storage of general and hazardous waste. The schedule provides standards for the location, construction and design as well as the operation of waste management facilities. Furthermore, the schedule provides the minimum requirements for the both above ground and underground waste storage facilities and containers.

c) GNR 634: NEMWA Classification and Management Regulations (23 August 2013)

The Waste Classification and Management Regulations were also promulgated in terms of the provision of NEMWA, and came into effect on the 23 August 2016. These regulations are aimed at regulating the classification and management of waste to give effect to provisions of the Act. According to these Regulations, Waste must be classified according to GHS – SANS 10234 "South African National Standard Globally Harmonized System of Classification and Labelling. The purpose of these Regulations is to:

- prescribes general duties of waste generators, transporter and manager;
- establish a mechanism for the listing of waste management activities that do not require a waste management licence;
- prescribes requirements for disposal of waste to landfill
- prescribe requirements and timeframes for the management of certain waste); and
- Prescribe general duties of waste generators, transporters and managers.

According to these Regulations, waste must classified within 180 days of generation wastes and any waste that has been treated must be re-classified. Any waste must be re-classified if there are modification to the process or activity that generated the waste. These Regulations further identify wastes that do not require Classification or Assessment. According to these Regulations, Generators must ensure their waste is re-used, recycled, recovered, treated and/or disposed of within 18 months of generation. All waste generators (excluding those exempted by the Waste Act) keep records of waste and safety data sheets where applicable.

d) GNR 635: NEMWA National Norms and Standards for the assessment of Waste for Landfill Disposal (23 August 2013)

The National Norms and Standards for the assessment of waste for landfill disposal was promulgated in terms of the provision stipulated in the NEMWA, and came into effect on the 23 August 2013, GNR No. 635. These Norms and Standards addresses the Assessment of waste prior to landfilling and describes New Landfill Classification in terms of barrier design and chemical characteristics of the waste. The Regulations further prescribe limits relating to chemical composition of wastes from laboratory testing such as LCT (Leachable Concentration Threshold) and Total Concentration Thresholds, etc.

e) GNR 636: NEMWA National Norms and Standards for Disposal of Waste to Landfill (23 August 2013)

These Norms and Standards aligns waste classification and character to default "simplified" basal lining systems (containment) being "Class A, B, C and D" versus "Type 0 to 4" from the DWAF Minimum Requirements. The standards further determine the class of landfill in order:

- Provide standard containment barrier requirements (engineering design requirements);
- List waste acceptance criteria for disposal of waste to landfill; and
- List waste disposal restrictions

Waste must be assessed according to the Norms and Standards for Assessment of Waste for Landfill Disposal prior to Landfilling. Disposal of waste must comply with the Norms and Standards for Disposal of Waste to Landfill.

2.1.4 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) aims to provide for management of the national water resources in order to achieve sustainable use of water for the benefit of all water users. This act requires that the quality of water resources is protected as well as the integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved and managed in ways which take into account:

- Meeting basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest; facilitation social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and drought.

In pursuit of these objectives, Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) – (k)]. Watercourses and wetlands are protected in terms of this section, as both are regarded as water resources. Should there be any wetlands located within 500m of the watercourse or with the flood line, a Water Use Licence Application will be undertaken in terms of this Act.

2.1.5 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act.

Section 38(1) of this Act states that: *"...any person who intends to undertake a development categorised as...any development or other activity which will change the character of a site-*

(i) Exceeding 5 000 m^2 in extent; or
(ii) Involving three or more existing erven or subdivisions thereof; or
(iii) Involving three or more erven or divisions which have been consolidated within the past 5 years; or
(iv) The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(v) The rezoning of a site exceeding 10 000m^2 in extent; or

(vi) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development".

Section 38(3) further states that the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a).

The Act stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the Act states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…"

2.1.6 National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) provides for a range of protected areas: protected environments, special nature reserves and natures reserves.

South Africa has much valuable biodiversity outside of protected areas, but this is disappearing at an alarming rate. It has been recognised that in order to effectively conserve South Africa's biodiversity, conservation efforts must focus outside of formerly protected reserves, considering 80% of the country's most scarce and threatened habitats are privately owned. It is clearly not possible for government to purchase all the land identified as high priority in terms of habitat or threatened ecosystems to add it to our system of state-owned protected areas. This requires a new approach to conservation extension and a shift away from reactive extension (i.e. responding to problems and enforcing regulations and permitting procedures) to proactive extension (i.e. engaging with a landowner before a problem is created) where stewardship is encouraged. For these purposes, extension officers need to be better equipped with people skills relating to relationship building, conflict resolution, land negotiation, as well as hands-on knowledge, in the form of practical guidelines for managing natural ecosystems.

2.1.7 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The objective of the National Environmental Management: Biodiversity Act, Act No. 10 of 2004 (NEM:BA) is to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. The objectives of NEM:BA are:

Within the framework of the National Environmental Management Act, to provide for:

- the management and conservation of biological diversity within the Republic and of the components of such biological diversity;
- the use of indigenous biological resources in a sustainable manner; and
- the fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;
- To give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- To provide for co-operative governance in biodiversity management and conservation; and
- To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

2.1.8 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

The aim of The National Environmental Management: Air Quality Act, 2004 (NEM:AQA) Act No. 39 of 2004 is to:

- Protect and enhance air quality in the Republic;
- Prevent air pollution and ecological degradation and
- Secure ecologically sustainable development, while promoting justifiable economic and social development.

The NEM:AQA makes provision for the establishment of ambient air quality and emission standards at a national, provincial and local level.

2.1.9 Other National Legislation Concerning the Environment

Various other laws regarding the protection of the environment that are relevant to this BA include:

- Environment Conservation Act, 1989 (Act No. 73 of 1989) (as amended);
- Hazardous Substances Act, 1973 (Act No. 15 of 1973);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Land Administration Act, 1995 (Act No. 2 of 1995);
- Water Services Act, 1997 (Act No. 108 of 1997);
- National Forests Act, 1998 (Act No. 84 of 1998); and
- Occupational Health and Safety Act, 1993 (Act 85 of 1993).

3 BASIC ASSESSMENT METHODOLOGY

The NEMA Regulations 2014 as amended identify three separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment process (Listing Notice 1) is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process (Listing Notice 2) is necessary for those activities, which are identified as having more of a possible detrimental impact on the environment, whereas Listing Notice 3 relates to identified activities that would require environmental authorisation prior to the commencement of those activities in specific identified geographical areas only.

A Basic Assessment Process is required for the decommissioning of the Emadlangeni landfill in terms of NEM:WA, 2008, which requires a licence to ensure compliance in terms of applicable legislation and to meet the DEA objective to licence all illegal landfills in South Africa.

3.1 Stakeholder Pre-consultation

In order to address the requirements of key stakeholders before the commencement of the Basic Assessment Process, GA Environment held a number of meetings. A pre-application Meeting was held with DEA, EDTEA and the Municipality Representatives on the 01st September 2017. In addition to this, an additional meeting was held with the Emadlangeni Local Municipality officials on the 16th October 2017. Site visits with representatives from both the Municipality and EDTEA were also conducted on the same day. Please refer to **Appendix E3** for the Minutes of the pre-consultation meetings.

3.2 Registration of the Application with the Competent Authorities

A Waste License Application Form (**Appendix D1)** was completed and submitted to the KZN EDTEA for review and consideration. A letter acknowledging the receipt of the Application was received on the 6th of December 2017 and is attached as **Appendix D2**. The application has been allocated the reference number **DC25/WML/0005/2017.**

3.3 Public Participation Process

A Public Participation Process (PPP) consistent with Chapter 6 of Government Notice R. 982 (Regulations 39 – 44) was undertaken for the proposed development. This included identification of Interested and Affected Parties (I&APs) and the compilation of an I&AP database (**Appendix E7**), the placement of site notices at visible and accessible locations close to the site (**Appendix E4**) and a newspaper advertisement in the local newspaper (**Appendix E5**). Notification letters (**Appendix E1**) were distributed to Emadlangeni residents after receiving approval from the Emadlangeni Local Municipality representatives. To date, the PPP undertaken has included the following:

- the identification of Interested and Affected Parties (I&APs);
- the compilation of an I&AP database;
- the placement of site notices at visible and accessible locations close to the site;
- the placement of a newspaper advertisement in a local newspaper

- the distribution of Notification Letters to adjacent land owners and other parties on an on-going basis since the notification period commenced in September 2017.

The Draft Basic Assessment Report will be issued out for public review for the legislated 30 days from **19 January 2018 to 19 February 2018** and will be placed at the Utrecht Public Library. Other parties will be provided with copies of the report in hardcopy or softcopy formats are as follows:

- Amajuba District Municipality
- The Department of Water and Sanitation (DWS)
- The South African Heritage Resources Agency (SAHRA)
- Emadlangeni Local Municipality

Comments received during the public review will be included in the Final Basic Assessment Report that will be submitted to EDTEA for review.

3.4 Draft Basic Assessment Report (DBAR)

This report serves to represent the findings of the Basic Assessment process undertaken to date for the proposed decommissioning of the Emadlangeni Landfill. The report also documents the issues identified through the site visits, consultation with the Competent Authorities and the professional input of the relevant specialists whose reports have been attached in **Appendix F.**

All I&APs registered on the Project database will be informed of the availability of the DBAR for public review. All comments that will be received during the from the identified stakeholders during the review of the DBAR will be captured and summarised in a Comments and Response Report that will be included in the report. All Comments received to date have been included in this report. Refer to **Appendix E** for all Public Participation related documents compiled for the project in line with the Public Participation Regulations.

3.5 Specialist Studies

In accordance with the requirements of *Appendix 6* of the NEMA EIA Regulations, 2014 as amended, Specialists have been appointed to undertake studies of which the findings have been assessed and discussed in detail in **Chapter 9** of this report. Specialist investigation reports are attached in **Appendix F**. To date, the following Specialist Studies have been identified as being necessary for the Basic Assessment and the terms of reference are outlined below:

3.5.1 Ecological Opinion

An Ecological Opinion to determine the impact of the surrounding ecological environment (flora, fauna and wetland) has been undertaken by Scientific Terrestrial Services. The Ecological Opinion is aimed at informing the Waste Licencing Processes regarding the potential impact of the upgrade of landfill on the surrounding ecological environment. The terms of reference for the Ecological opinion study were as follows:

- Analysis of conservation databases;

- Location of Freshwater Ecosystem Priority Areas (FEPAs) in relation to the proposed prospecting area;
- Desktop delineation of wetlands (including GN509 Delineation);
- Highlight sensitive environmental components including watercourses, conservation-worthy vegetation and fauna habitat;
- Discuss potential impacts, mitigation and management procedures relevant to the protection of the conservation-worthy aspects of the site, and also downstream areas; and
- Compile an Ecological opinion report for the Emadlangeni landfill site.

The summary of the findings extracted from the Emadlangeni landfill Ecological opinion are discussed in **Chapter 5** and **9** of this report. Refer to the report in **Appendix F1**.

3.5.2 Geotechnical and Geo-hydrological Investigations

Landfills are known to have impact on the underground water systems due to the levels of surface water leachate generated from landfill site. It is therefore essential that the potential existing and future groundwater pollution and other potential threats to the local aquifer be determined as part of the assessment phase. GA Environment has appointed North Arrow Consulting (Pty) Ltd to undertake Geotechnical Engineering and Hydrogeological Risk Assessment for the Emadlangeni landfill site. The terms of reference for the Geotechnical and Geohydrological study will cover the following:

- To evaluate geo-technical and geo-hydrological parameters of the sub base soil at the site;
- To review the geotechnical and geo-hydrological requirements for the development of cells and associated infrastructure for a landfill at the site;
- To assess the requirements, and availability and suitability of cover material for the operations of the landfill;
- To assess the requirements, and availability and suitability of capping material for the closure of the landfill;
- To assess and evaluate the requirements, and risk issues for the landfill including, slope stability, and permeability of soil;
- To assess and evaluate the requirements for the landfill containment barrier system (geomembrane lining) in accordance with the current legal framework and make key recommendations in relation to the above site investigations;
- To identify Geotechnical and Hydrogeological Risks Associated with the site; and
- To develop a suit of site-specific recommendations for consideration during the engineering design of the proposed landfill site and associated infrastructure.

The summary of the findings as extracted from the Emadlangeni landfill Geotechnical and Geohydrological study are discussed in **Chapter 5** and **9** of this report. Refer to the report in **Appendix F2**.

3.5.3 Engineering Needs Assessment and Preliminary Closure Design Report

RAPienaar Consulting (Pty) Ltd has been appointed to draft the preliminary design plans required for the proposed development. The company will be involved throughout the Basic Assessment to

advice on issues pertaining project planning and design in order to reduce the risk of unexpected costs and delays later in process. The scope of work for the design engineers will include the following:

- Assess the existing site against standard legislative requirements for landfill design and operations, and develop a suite of conceptual engineering recommendations, which must be considered as license conditions to ensure that the landfill site is designed; and operated within legal compliance;
- Assess and evaluate the requirements for the landfill containment barrier system (geomembrane lining) in accordance with the current legal framework and make key;
- Recommendations in relation to the above site investigations; and
- Develop a suite of site-specific recommendations for consideration during the engineering design of the proposed landfill site and associated infrastructure.

The Engineering Assessment and Designs Report is attached as **Appendix F** of this Basic Assessment Report and outlines the need for adequate capping, for the capping design of the eMadlangeni landfill. The summary of the findings as extracted from the Emadlangeni Engineering Needs Assessment study are discussed in **Chapter 5** and **9** of this report. Refer to the report in **Appendix F3**.

3.6 Consideration of Alternatives

The NEMA EIA Regulations (2014) require that alternatives be considered. In terms of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the BA process. The feasible alternatives identified for the proposed decommissioning of the Emadlangeni Landfill were limited to various activity alternatives.

It must be emphasized that a site selection process was not undertaken for this project as the landfill that require licencing is already in existence. It for this reason that the activity alternatives including the “no-go” alternative, was considered for the purpose of this application. Specific details on the alternatives that were considered for this project are described and assessed in **Chapter 6** of this report.

3.7 Assumptions, Gaps and Limitations

The following assumptions were made when conducting the BA:

- Weather patterns will remain relatively stable over time.
- The town (population) of Emadlangeni will not grow by leaps and bounds over the foreseeable future.
- The applicant has the necessary skill and know-how to oversee the construction activities and ensure monitoring and rehabilitation once construction has been completed.
- The most glaring gap is that very little historical information regarding the landfill was available for study and that there were no boreholes close by that could easily be assessed. Even though the residents of Emadlangeni are in favour of the licensing of the landfill, more participation would have been welcomed.
- DEA has spearheaded the funding of the licencing of a number of unlicensed landfill sites (with limited budget constraints) as the Municipality responsible for the management of the

landfill has no funds available to undertake the required environmental studies. It is understood that once the Waste Management License is issued, the Municipality can then source funds from funding organisations to undertake detailed studies that may be required by the Competent Authorities.

- Due to limited budgetary constraints, the specialist studies were undertaken on conceptual/preliminary basis and should therefore be considered as indicative. For these reasons, should the Competent Authority require detailed studies associated with the licencing, such must be included as condition of licencing and the required studies can be undertaken before the decommissioning of the landfill commences;
- An Ecological Opinion was provided by a qualified specialist instead of detailed specialist studies as the proposed licencing of the landfill site will occur on disturbed sites that are already used for disposal of waste;
- The composition of the historical waste body is not known with certainty as the Municipality was unable provide accurate waste records. Information provided on the landfill status is based on the review of information provided by the Municipality, history of the landfill and the site observation by EAP;
- Records on water and soil quality monitoring prior to operations and the operational period of the landfill are unknown. The historical impact of waste body on the soil and water quality is unknown. It is anticipated that the formal licencing of these landfills will set a basis for all monitoring requirements required by the Competent Authorities; and
- Based on information obtained from the Applicant, it is assumed that the landfill were historically used for the disposal of general waste and no hazardous waste was disposed on site.

It can be thus concluded that other than the gaps in knowledge, assumptions provided above and the information presented in various sections of this report, it is believed that the information used in this report was adequate for the purposes of the current impact assessment.

3.8 Issuing of the Waste License

Following the review of the BA Report, a Waste License is issued in terms of Section 49 of the National Environment Waste Management Act (2008) in the name of the applicant. If the activity is authorised, this authorisation will be a single Waste Licence covering all activities for which a Waste Management Licence was granted. It should be noted that a Waste Management License may provide that the licensed activity may not commence before specified conditions are complied with. The License may also include any other condition that the Competent Authority considers necessary for the protection of the environment.

3.9 Appeal Period

After a decision has been reached by EDTEA, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by the Competent Authority, the appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated organ of state to handle the case and it would then submit its recommendations to that organ of state for a final decision on the appeal to be reached. GA Environment will communicate the decision of the

Provincial Authority and the manner in which appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the EDTEA decision has been received.

4 PROJECT DESCRIPTION

The Emadlangeni landfill receives general waste from areas located within the eMadlangeni Local Municipality. **Figure 5** shows a general layout of the site. Waste disposal took place to the extent that the area in the top of the image is filled with waste and is slowly encroaching on the bottom area (towards the Dorpspruit) by means of end tipping and pushing the waste downhill. About half of the 6Ha fenced area is covered with waste. The site entrance shown to the top right of the image and the site is fenced along the shape of the shown polygon in the image.

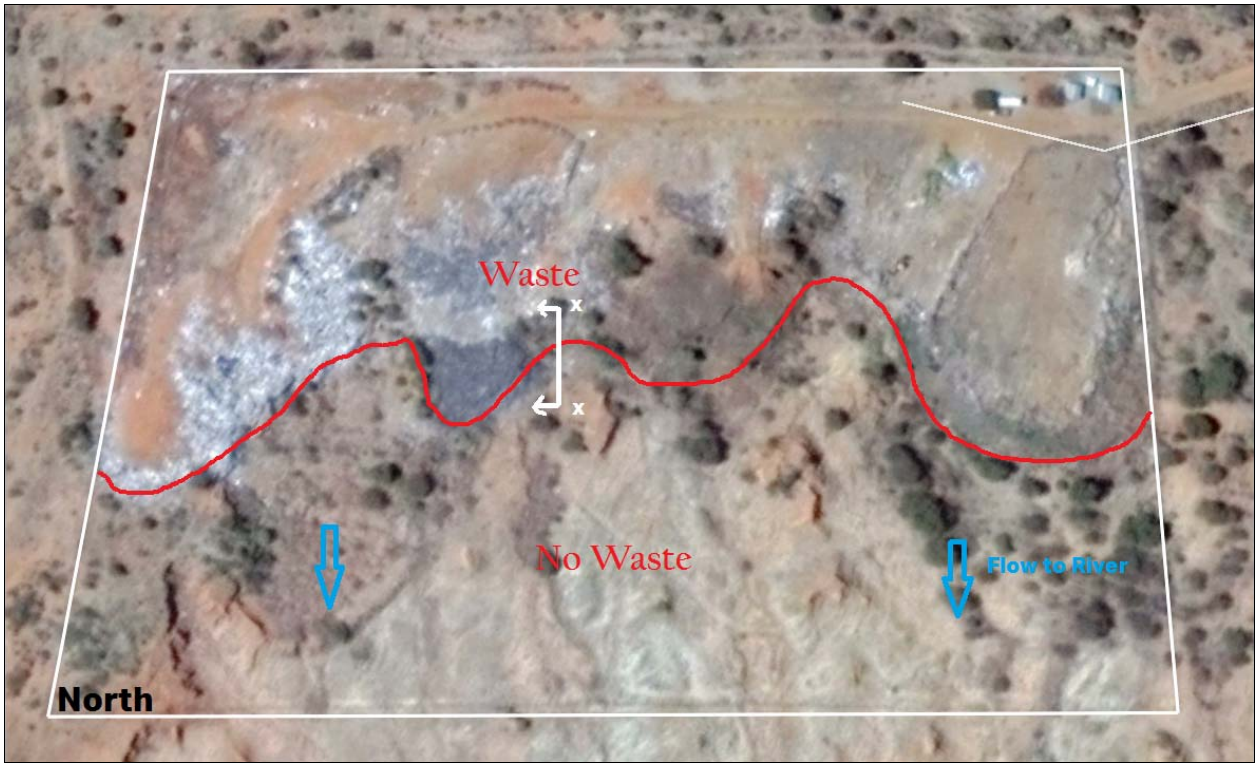

Figure 5: Emadlangeni Landfill site layout

The landfill site is transected by numerous drainage lines which have formed dongas that are notable in the north western section of the site and in the areas immediately outside the landfill boundaries. The drainage lines feed into the Dorpspruit which is located approximately 1.5km North-West of the site. Discussions on site with the driver of the municipal waste disposal vehicle, as well as the operator of the TLB, indicated that waste disposal had been taking place at the site since the 1970's. It is assumed that the natural erosion dongas forming from the Balele mountains South-East to the Dorpspruit in the North-West created an area that was deemed fit for use as a waste disposal site when the site originated.

Figure 6: Drainage lines as highlighted by the arrow

Figure 7: Erosion Dongas as indicated in the background

Adhering to the applicable legislation will ensure that both short or long term impacts and any potential degradation of the environment is avoided and effectively mitigated. Key and pertinent legislation that must be considered for the Decommissioning of the landfill must be in accordance with the following Acts, Standards and guidelines:

- National Environmental Management: Waste Act, 2008 (Act No 59 of 2008)
- GN R.634 of 2013 (Waste Classification and Management Regulations), 2013
- GN R.635 of 2013 (National Norms and Standards for Assessment of Waste for Landfill Disposal)
- GN R.636 of 2013 (National Norms and Standards for Disposal of Waste to Landfill),
- Minimum Requirements for Waste Disposal by Landfill: Second Edition 1998: Department of Water Affairs and Forestry

RAPienaar Consulting was appointed to undertake the engineering needs assessment and Conceptual Design input for the licensing of the Emadlangeni landfill. A Conceptual Plan and Conceptual Design indicating the main principles and elements of the proposed landfill design are included in this BA as **Appendix F3.**

4.1 Landfill Classification and Containment Barriers

According to the preliminary closure design report when assessing the Emadlangeni landfill for closure and capping design, the information on site specific conditions and legislative requirements discussed in the preceding chapters were taken into full consideration. Since the facility has no basal liner, the minimum requirements capping design for Small (S) or Communal (C) landfills cannot be used.

The design of the capping layers was done to maximize run off and minimize ingress of water into the waste body. Opportunity for water ingress on the top of the capped landfill is higher due to the flatter slopes. Long term ingress of water into the 1V:4H side slopes are less possible, but runoff needs to be encouraged, and thus capping designs for the top of the landfill and the side slopes differ slightly. The side slopes capping was designed without the HDPE Geomembrane contained in the top capping, but including a Geosynthetic Composite drainage layer as this was done to facilitate run-off of possible ingress on the slopes and limit ingress of water on the plateau.

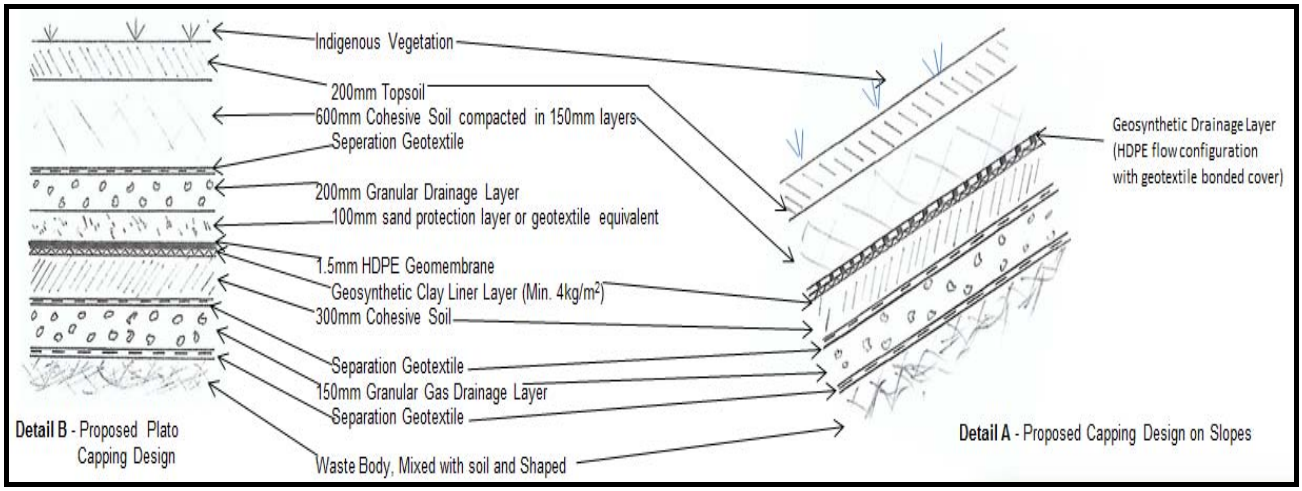

Figure 8: Proposed Capping Design

The various levels of the capping are described as follows:

- Waste Body: The final waste body is to be shaped as per the design drawings and compacted. It should be mixed with soil material and shaped to a final profile that is as smooth as practically possible.
- Separation Geotextile: The separation geotextile separates the waste body from the capping layers and should be a non-woven geotextile with a typical thickness of about 2.5mm and unit weight of at least 1.5kg/m2. This layer assists in preventing fine particles from the layer works entering the waste body.
- 150mm Granular Gas Drainage Layer: This is a landfill gas venting layer having a minimum thickness of 150mm and consisting of single sized stone or gravel of between 25mm and 50mm in size. This layer needs to be connected to a gas management system with gas vents being installed in key areas.
- Separation Geotextile: The separation geotextile separates the drainage layer from the capping layers and should be a non-woven geotextile with a typical thickness of about 2.5mm and unit weight of at least 1.5kg/m2. This layer assists in preventing fine particles from the layer works entering the drainage layer.
- Cohesive Soil Layer: This is a support layer to the below drainage system and should be 300mm thick consisting of in situ material compacted to a minimum density of 95% Standard Proctor maximum dry density at a water content of Proctor optimum to optimum +2%.
- Geosynthetic Clay Liner (GCL): A GCL is two geotextile layers with a layer of bentonite in the middle that acts as a containment barrier. The GCL should have minimum mass per unit area of 4kg/m2 and the permeability of the GCL must be such that an outflow rate of 1x10-6 cm/s will not be exceeded. These parameters are to be tested for the chosen material as per the construction Quality Assurance and Quality Control (QA/QC plan) that needs to form part of the detail design report before construction.
- Geocomposite Drainage Layer: There are a number of products on the market that could potentially be used here. The final design should replicate the specifications of a geocomposite drainage system similar to the ABG Pozidrain® product which consists of a high strength flexible polyethylene cuspated drainage core (at least 4mm thick) with a non-

woven geotextile filter fabric bonded onto one or either side. The geotextile filters a wide range of materials and is bonded to the core to ensure that it does not deform into the drainage channels under the load of the backfill material. The drainage composite allows fluids and gases to percolate into the core whilst supporting the backfill material. The collected fluids are then transported along the core to the leachate collection system at the landfill toe.

- Cohesive Soil Layer: This is a support layer to the below drainage system and should be 600mm thick consisting of in situ material compacted to a minimum density of 95% Standard Proctor maximum dry density at a water content of Proctor optimum to optimum +2%. The layers are to be placed and compacted in 150mm layers and also assist in providing the required pressure for the GCL/HDPE composite to function optimally. As indicated in the Geotechnical report the soils on site are predominantly weathered shales with a clay content and fairly low permeability. This soil will work well in conjunction with the other layers of the capping system.
- Topsoil Layer: This needs to be a minimum of 200mm topsoil layer to assist in the establishment of vegetative cover as soon as possible. The layer needs to be optimally compacted to assist plant growth and can contain a mixture of hydro seeding if required.
- Indigenous Vegetation: The vegetation layer assists with stability and run off and needs to be established as soon after construction as possible. The vegetation needs to be indigenous to the area in order to ensure optimal sustainability of the capping system.

4.2 Engineering Design requirements

As discussed, the key legislation for landfill disposal remain the “Minimum Requirements for Waste Disposal by Landfill” which is still very widely used today to provide guidelines for waste management in South Africa. Most of it has been replaced by the National Norms and Standards but in terms of landfill capping and closure, the Minimum Requirements are still used extensively. The minimum requirements document promotes environmental protection and provides guidelines for waste management best practice. In terms of capping requirements it is most important to note the following:

- The main purpose of the capping layer is to separate the waste body from the atmospheric environment. It is intended for protection and isolation of the waste from the long term effects of wind and water erosion, burrowing animals etc.
- It limits and controls the amounts of precipitation that enters the waste and should also allow water to leave the landfill by evapo-transpiration and vent landfill gas in a responsible manner.
- The cap is intended to work in conjunction with the base liner by limiting the long term generation of leachate.

4.2.1 Conceptual Design

The Conceptual Design addresses the principles of the intended design, but does not include detailed specifications. It includes all aspects of the design that will affect the successful closure of the landfill in an environmentally acceptable manner. In the case of most general waste landfills, the design submitted as part of the Waste Management Licence Management Application is the

Conceptual Design, which may then be upgraded to a detailed design, showing measurements and levels once the licence has been received. Please refer to **Appendix F3** for the Conceptual design that was undertaken for the u.

4.2.2 Detailed Design

The Detailed Design is based on the findings of the Preliminary Design. The Detailed Design includes detailed specifications of materials, measurements and procedures, as well as detailed drawings. Detailed Engineering Designs together with the associated bills of quantities, also forms the basis for contractual tendering and construction.

It should be noted that due to the budget constraints faced by the Municipality regarding the licencing of the Emadlangeni landfill, detailed engineering specifications for the landfill will be provided to the Department of Water and sanitation for review at a later stage.

4.3 Properties of Capping Material

According to the preliminary closure design report the long term performance of the capping system will depend on the quality of the design and construction process. This preliminary design needs to be confirmed through a detail design process after the issuing of the License. The detail design report should contain a full QA/QC plan to be followed during the construction process. Certain key material properties for the proposed capping layers are described here and must be confirmed during detail design.

4.3.1 In situ soil

The in situ-soil tested as part of the Geotechnical assessment is a clayey soil with very low permeability according to the results from the laboratory. This material, if well compacted, would be suited for use as capping for the facility. Due to the volume of material available however, legislative requirements and the nature of the site conditions, it is not recommended that this soil be used as a barrier layer for water ingress without combining it with geosynthetic layers as per the design.

4.3.2 Geosynthetic Clay Liner (GCL)

The stability of barriers composed of geomembranes and/or geosynthetic clay liners (GCLs) depends on the interface and/or internal shear resistances of the materials involved in the design materials. The internal resistance of stitch-bonded and needle-punched GCLs depends on the resistance of the core material (bentonite) and on the technique used to attach each geotextile layer of the GCL. When using a GCL in a slope, the evaluation of its internal shear strength is of fundamental importance for stability analysis, and for this reason it is recommended that a fully needle punched GCL with nonwoven cover and either woven or nonwoven carrier geotextile be used on the slopes of the capping. The bentonite in the GCL should contain at least 75% Montmorillonite.

Although the stability of the rehabilitated waste body and specifically the slopes rely on many factors, the most important is proper moisture control and drainage. Capping failures tend to occur under saturated conditions and layer works thus need to be quality controlled and tested to ensure design parameters of drainage and permeability are adhered to.

4.4 Stormwater Management

Based on the erodible soils found in the Emadlangeni landfill site Stormwater management is a critical component of sustainable capping and closure designs of landfills. The stormwater management infrastructure must be designed to ensure clean and dirty water separation, to facilitate non critical flow and to prevent ponding. The main objectives of the proposed stormwater design are:

- Protection of the downstream water resources described in **Chapter 5** by separating, collecting and discharging all stormwater runoff from the Emadlangeni landfill site before contamination;
- Ensuring that stormwater management infrastructure is designed to handle a storm event equal to the 1:50 year storm event;
- Preventing of ponding of water on site that could penetrate the capping layers and waste body creating leachate and possible failures of the capping layer works.
- The final shaping and capping of the landfill as described, is aimed at preventing stormwater from coming into contact with the waste and any contamination. Any stormwater on the rehabilitated site could thus be considered clean and runoff from the rehabilitated site will be discharged into the existing natural watercourse.

The proposed Emadlangeni stormwater management system shall at least include:

- Catch water banks at least 500mm high constructed of compacted in situ material at the top edge of the landfill to prevent erosion and control the runoff down the side slopes. This system needs to tie in with the existing stormwater management system;
- Downchutes to direct the runoff down the side slopes in a controlled manner. The downchutes are to be constructed of flexible material that would allow for moderate plant growth and possible future landfill deformation. The downchutes can be lined by GCL/GM to ensure permeability protection in the event of large deformations;

4.5 Gas Management

Waste materials contained in a closed landfill degrade at various rates and stages, producing a range of gases. Municipal waste found on the Emadlangeni landfill is commonly known to produce methane and carbon dioxide gases which are considered dangerous greenhouse gases that need to be controlled. These gases could potentially result in gas bubbles beneath the capping layer if not fully captured by the gas drainage layer, and then cause uplift of the capping layers. It is thus recommended to install gas vents, connected to the gas drainage layer, at key areas to release these gases. Gas monitoring probes could also be installed for use during post closure monitoring to trace gas releases. If the probes are considered too expensive or deemed a target for theft, the monitoring team could use hand held gas monitoring devices during post closure gas monitoring.

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter serves to describe the environmental setting of the area identified, whilst the environmental issues that were identified to be of significance are discussed in **Chapter 9** of this report. The chapter will also provide a description of the overall character and other sensitivities that were identified in the surrounding environment. Specialist ecological opinions compiled were also considered during the compilation of this section (**Appendix F**).

The existing landfill site it is not licensed and does not meet the minimum requirements to be classified as a landfill site as it does not have the required infrastructure such as lining, restricted access control, sanitation and dust suppression methods. This existing landfill site receives general waste from the surrounding areas and based on historical satellite imagery, it would seem it started operating in 2003.The following environmental issues relating to the licencing of the Emadlangeni landfill site have been identified as being important and were investigated in the BA Phase of the project.

5.1 Climatic Conditions

The climate in this area is mild and characterised by warm, moist summers and cool dry winters. Most rainfall occurs from October to March, with a mean annual precipitation of about 680mm. Climate determines the mode and rate of weathering. Generally, the weather patterns follow a high summer and low winter rainfall. It receives the lowest rainfall in July and the highest in January. The landfill site receives an annual rainfall ranging from 680 to 898 mm and evaporation rates of 1362 to 2224 mm/annum (http://www.saexplorer.co.za/south-africa/climate/utrecht_climate.asp)

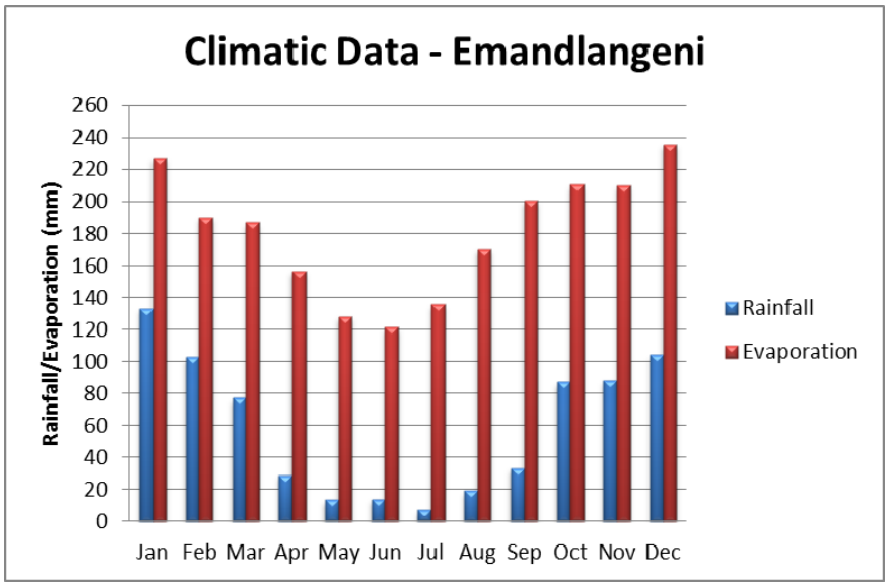

Figure 9: Climatic conditions for Emadlangeni, 2016 - 2017 (source: worldweatheronline.com)

5.2 Land Uses and Land Cover

The landfill waste body comprises two parts (cells), a garden refuse/builders' rubble section and a general waste (domestic) section (**Figure 11**). Some medical waste (bottles) were seen scattered around, worryingly suggesting that hazardous waste could have been dumped in the past. The landfill does not have a basal liner or a leachate management system other than a shallow earth stormwater channel that seems to have been dug outside the eastern boundary fence. No concrete stormwater cut-off channels are present. A small portion within the landfill remains unfilled and is still covered in pristine local vegetation where no dumping is currently undertaken. Visual problems noted on this site include windblown litter and air quality problems from the burning of waste.

Figure 10: Pristine Vegetation noted where dumping has not occurred

Waste management activities such as sorting and separating of waste identified for recycling purposes (**Figure 8**) before final disposal is located on the north eastern portion of the site. The sorting is undertaken by reclaimers who reside in the neighbouring communities. The reclaimers sort the waste and sell recyclable material to locally based recycling agents.

Figure 11: General waste mixed with garden waste noted where waste is end pushed

5.3 Soils, geology and terrain conditions

According to the information provided in the Geotechnical report, the site is underlain by sedimentary sandstone, shale (of the Ecca Group) which are overlain by post Karoo dolerite (of the Drakensburg Group). The site is located inside a valley covered on northwest and southeast sides by resistive dolerite plateaus which form the topography of the area escarpment consisting of hills and cliffs. Where dolerite has weathered it tends to form deep red residual soils. The runoff from the landfill site washes the sediments into a stream and a dam located approximately 1.5km downhill.

The sandstone and shale rocks are hard and tight and their potential as water bearing aquifers is low. Where affected by faulting and fracturing, they form secondary aquifers of limited storability but potentially high transmissivity particularly in the sandstones. Contact between dolerite intrusions and surrounding country rock often tends to act as water conduits. The landfill site is located in an area where faults and fracture zones seem not so prominent and therefore the likelihood of encountering groundwater is potentially low. This is subject to detailed follow-up ground geophysics surveys at closer spacing being done to verify this postulation.

The local topography in the vicinity of the landfill is active serious sheet erosion resulting in the formation of dongas (gulleys) where is a large bare patch of veld with a hard surface and low amounts of organic material, making plant growth virtually impossible. These dongas have formed when flowing water cuts a channel into the soil. Where ground falls away, a donga head forms that gradually works its way upstream, widening and deepening the donga. The water and soil run-off

direction are to the NW direction via non-perennial streams/rivulets or surface drainage features, downslope towards the nearby river and dam water resources.

Outcrops of sandstones are seen on the western boundary fence where waste dumping has not taken place yet. In essence, this geology has given rise to many of the in -situ characteristics of soils that are found in the area. Erosion has exposed and cut into the sandstone to reveal these outcrops. However, no significant layer of residual sandstone soils have been observed and it would seem it has all been eroded away due to its inherent low clay content and sandy loam textural class. Dolerite boulders ranging from fresh, to partly weathered and to completely weathered soils have been observed.

5.4 Ecology (flora and fauna)

From the desktop Ecological Impact Assessment, it is evident that the landfill site does not fall within a critically endangered or endangered ecosystem. The Emadlangeni landfill site is further not associated with any CBA or ESAs, nor with any protected or conservation areas, however the site is however the landfill site is situated within an informally protected area, namely the Utrecht Town Park Private Nature Reserve.

The eastern portion of the site has been cleared, and considered transformed, the western portion is considered to be secondary grassland, which might provide suitable habitat for floral and faunal SCC, and as such care should be taken during the decommissioning activities not to disturb any protected species that might utilise this area of the Emadlangeni landfill site. As waste disposal has not occurred within this area, it is unlikely that any of the decommissioning activities will directly affect such species, as activities within this area should be limited to alien invasive species control, and clearing of windblown litter.

Figure 12: Aloe species located within the landfill site

According to the ecological opinion undertaken for this site, plant species richness and density is likely to be affected by the edge effects of landfill activities that have occurred on the site for at least ten years. The impacted nature of the site, together with the expanse of untransformed vegetation to the west and north of the site lead to the suggestion that the study site is not regionally ecologically important. It is not likely to be a refuge to sensitive plant species.

With regard to the faunal species, the site is located in a game reserve hence several species including Zebra reside and browse in this area from as evidenced by droppings illustrated in **Figure 14**.

Figure 13: Droppings of wild life noted inside the landfill

Besides the small reptiles (lizards) that may be cohabiting in the area, no other faunal species including livestock were noted within the site boundaries during the site visit. It is however highly unlikely that any significant fauna would inhabit the project area.

5.5 Drainage and Hydrological Conditions

According to the Geohydrological study, there is no perennial drainage systems at or in the immediate vicinity of the site. There is no evidence of ponding water bodies on the landfill waste body as well as to the west of the fence boundary. There is also little evidence of any present monitoring (for potential pollution) of the dam and river water resources due to the landfill located up slope. Although the topographical map show a number of drainage lines running to the north western portion of the site, it was determined during the site visit that these are actually not drainage, but dongas that could have occurred as a result of the landfill activities and slope factor.

There are no monitoring boreholes present on the landfill site. No water seepage was encountered in any of the trial holes excavated, however, moist conditions of the red soil were noted in the test pits. Given the sloping ground as well as indications from the desktop geohydrological study outcomes, shallow groundwater seepage is not expected to be problematic. However, a shallow, perched water table may be encountered on the waste layers during the rainy seasons.

5.6 Heritage and Cultural Features

No cultural and heritage features were noted during the site visits undertaken for the Emadlangeni landfill. Although unlikely to exists as the landfill has been in existence for a number of years, it is expected that unknown features or artefacts of heritage value may be exposed during excavation and should thus be appropriately dealt with in environmental planning for landfill upgrading. Comments on the proposed application has been sought from KwaZulu Natal Provincial Heritage Authority (AMAFA) and it is unlikely that significant heritage resources will be impacted by the proposed activities.

5.7 Roads and Traffic Conditions

The landfill site is easily accessible and is located directly from President Street. This road is well maintained with stormwater infrastructure being installed along the road. Traffic levels on this access road is moderate to low and it is unlikely that the proposed activities will cause noise impacts even during the decommissioning phase.

5.8 Noise and Air Quality

Effective waste disposal is essential to prevent the spread of disease in communities. It is thus imperative that the Emadlangeni Local Municipality proceed with the licencing of the landfill site to be in line with the applicable legislative requirements. No significant odour problems were detected during the site visits, it must however be noted that based on conversations with residents of Utrecht the landfill site does impact on the air quality as a result of the smoke emanating from the landfill. No ambient air quality information is available for the area, although there are no major emitters of air pollution in the area. Emadlangeni is a small town which currently has no noise problems. Beside the loud noise from the vehicles using some of the main road, the site is not regarded as noisy.

5.9 Visual and Aesthetic Features

The Emadlangeni landfill is located close to residents of Utrecht town and is a visual nuisance given its location within the game reserve. Other activities such as burning of waste has severe consequences on residents of this area.

In addition, the Landfill is out of character with the natural environment of the Balelle Game Reserve resulting in a significant visual impact.

Figure 14: View of the Balele Mountain in the background

6 ALTERNATIVES

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended in 2017, feasible and reasonable alternatives must be identified and considered within the Basic Assessment process. According to GN R 982 of the EIA Regulations (2014), an alternative is defined as *"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:*

(a) property on which or location where it is proposed to undertake the activity;
(b) type of activity to be undertaken
(c) design or layout of the activity;
(d) technology to be used in the activity;
(e) operational aspects of the activity; and
Includes the option of not implementing the activity."

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the BA process. The feasible alternatives identified for the proposed decommissioning of the Emadlangeni landfill are limited to process alternatives and not an alternative location as it the intention of the Emadlangeni Local Municipality to licence the existing landfill. These alternatives are as follows:

6.1 The No-Go Option

The no-development alternative would entail continuing with the *status quo*, i.e. a situation where the Emadlangeni landfill continues to be operated despite being unlicensed. The *status quo* of the Emadlangeni landfill suggests the current operation of the landfill is neither beneficial to the ELM and the environment in which the landfill is located.

This has resulted in persistent impacts on the environment as a result of persistent fires affecting air quality and ground water pollution due to lack of leachate control mechanisms. The need to license many of the unlicensed Landfills in South Africa is regarded as one of key projects towards a cleaner environment by the Department of Environmental Affairs. Further delays in implementing the project will mean that the current adverse impacts from the activities taking place at the landfill will continue. This initiative of the licensing of the landfill will aid in achieving the Minister's service delivery agreement Outcome 10 (Output 1 to 4) deliverable target/indicator that serves to ensure that environmental assets and natural resources are well protected and are continually enhanced.

Based on the reasons provided above, there is therefore a definite need to formally license the Emadlangeni landfill site to meet all applicable legislative requirements.

6.2 Proposed and Preferred Alternative (Closure and Rehabilitation of the Emadlangeni landfill

The Emadlangeni is at present being operated illegally without a waste license. The licensing of this landfill will aid with adherence to the Minimum Requirements for Waste Disposal by Landfill, 2nd Edition (DWAF, 1998), and the National Norms and Standards for the disposal of waste to landfill

(Government Notice No. R 636 published in Government Gazette No. 36784 of 23 August 2013. The rationale behind the project serves to address the following issues:

- The need to license and operate the landfill legally
- The prevailing environmental problems caused by activities at the landfill resulting in contamination of water resources located close to the landfill and the impact of unmanaged litter on wildlife grazing in the area.

This is the **preferred** option for the proposed licensing of the Emadlangeni landfill site and will ensure that the site is environmentally and publicly acceptable and that it complies with the Minimum Requirements for Waste Disposal by Landfill, 2nd Edition (DWAF, 1998), and the National Norms and Standards for the disposal of waste to landfills promulgated in November 2013. The closure and rehabilitation of the site will entail the following:

- Shaping and landscaping of the waste body;
- The construction of storm water management infrastructure;
- Capping of the waste body in accordance with the Minimum Requirements;
- Concrete palisade fencing;
- The maintenance of access roads;
- Vegetative cover of the final landform;
- The construction of the required end-use infrastructure (once finalised); and
- Post closure environmental monitoring where necessary.

The closure of the Emadlangeni landfill will be in line with the Emadlangeni Local Municipality‘s Integrated Waste Management Plan (IWMP).

6.3 End Use Planning

An end-use plan typically guides the process of identification of the most suitable land use for the area. The choice of type of end use is dependent on several factors such as:

- The urban or rural spatial planning of the area in which the landfill is situated.
- The potential vulnerability, expressed in the average number of hours per day that people are spending at the location. The longer the time that humans spend at or near the site, the higher the chance on potential exposure to any residual effects of the landfill site and the higher the potential vulnerability.

According to the DWAF 1998 Minimum Requirements for Waste Disposal by landfill, the most common use of an area formally occupied by a landfill is an open space that can be used for sport and recreation. Based on this, the Municipality must ensure that the appropriate land use is selected in line with the existing Spatial development Plans for the area to ensure sustainability.

The ELM has already indicated that they would prefer the rehabilitated landfill footprint to be extended as part of the Balele Nature Reserve. The land is currently zoned as a park and it is likely that upon closure of the landfill the area will be rehabilitated and integrated into the remainder of theReserve.

7 PUBLIC PARTICIPATION PROCESS

Section 24 of the Constitution of South Africa, 1996 aims to guarantee everyone's right to an environment that is not harmful to their health and well-being and to have the environment protected for present and future generations. The National Environmental Management Amendment Act, (No. 62 of 2009) enables the Minister to publish guidelines on various aspects of the Act. The Guidelines on Public Participation, which have been published but the Department of Environmental Affairs, informed the steps that were taken during the Public Participation Process for this Project.

The NEMA EIA Regulations, 2014 prescribes that the Basic Assessment process must undertake public participation in accordance with the Chapter 6 of the Regulations. The purpose of the Public Participation Process is to provide all potential and/or registered Interested and Affected Parties (I&APs), including the competent authority and any other stakeholder – including organs of state - an opportunity to become involved in the BA process and provide comments during the various phases of the project. Involvement by I&APs is critical, as it contributes to a better understanding of the proposed project among I&APs, raises important issues that need to be assessed and provides local insight that will enhance the BA process.

This chapter of the report provides details on the Public Participation Process followed during the BA process for the proposed decommissioning of Emadlangeni Landfill.

7.1 Identification of Interested and Affected Parties

7.1.1 Notification of I&APs

At the commencement of the project, written notices and Notification letters were sent to the landowners and / or the current occupants of the properties surrounding Emadlangeni landfill, as well as stakeholders and organs of state with a direct interest in the project. Refer to **Appendix E6** for proof of the above.

7.1.2 Site Notices

In accordance with the NEMA EIA Regulations, 2014 a notice board detailing the proposed activity as well as the contact details of the EAP was placed on the landfill site; site and at various public and common places (Emadlangeni Local municipality offices and the landfill entrance gate) on the **19th and 20th of October 2017**. Proof of the placement of the site notices is included in **Appendix E4**.

Figure 15: Site Notice placed at the Entrance of the Landfill site

7.1.3 Newspaper Advertisement

An advertisement was published on the **20th October 2017** informing I&APs of the BA process for the proposed licensing of the Emadlangeni landfill and to invite all I&APs to register and provide comment on the project. The advertisement appeared in section 4 of *the Newcastle Advertiser* Newspaper. Proof of the placement of the newspaper advertisement is included in **Appendix E5**.

7.2 Draft Basic Assessment Report

7.2.1 Placement of Draft Basic Assessment Report for Public Comment

The Draft BAR will be placed for public comment at the Emadlangeni Public Library. Based on Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the report will be placed at this facility for the legislated period of at least 30 days. The placing of the Draft BAR will allow I&APs adequate time to review the details of the project and provide, in writing, comments and concerns relating to the proposed decommissioning of the Emadlangeni landfill site. All registered I&APs will be informed of the availability of the report through various means and proof of this will be kept.

7.2.2 Public and Focus Group Meetings

No public or focus group meetings were held with I&APs concerning the decommissioning of the Emadlangeni landfill site. The need of the public meeting was determined by following the frequency and nature of issues raised by the I&APs and other interested stakeholders after the end of the

public review period. Meetings were not deemed necessary as sufficient PPP was undertaken according to the NEMA regulations.

7.3 Interested and Affected Parties Register and Comments Database

From the onset of the project, a database of persons, organizations and organs of state identified as I&APs or registered as I&APs was opened and is constantly being maintained. The I&APs register is included in **Appendix E7**. It must be highlighted that only adjacent land owners residing next to the landfill have provided the EAP with comments during the notification phase. To date, no comments were received from any other stakeholders notified of the project during the initial Notification Phase. The Comments and Responses Report is attached as **Appendix E9.**

7.4 Stakeholder Liaison

In order to address the requirements of the competent authority, consultation with DEA and the KwaZulu Natal Department of Environment and Nature Conservation (EDTEA) was undertaken to ensure the Basic Assessment process was undertaken correctly. The Department of Water and sanitation have also been consulted as the proposed activity could potentially impact on water resources. If any additional permits or requirements are identified at any time during the Basic Assessment process, the relevant competent authority will be notified and be provided with the opportunity for involvement in the process.

8 IMPACT ASSESSMENT METHODOLOGY

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the BA. Based on the requirements of the impact assessment, impacts identified and issues and concerns raised are assessed with regard to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their nature, extent, duration, intensity and probability.

In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision, unless they can be effectively mitigated to a low significance, whereas impacts with a high significance - despite mitigation - would influence the decision to proceed with the proposed development. The impacts listed in this section were identified by the EIA Project Team (including specialists) and will be augmented through input from I&APs during the public review of the Draft Basic Assessment Report.

8.1 Impact Assessment Methodology

In accordance with Government Notice R. 982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), the EAP is required to assess the significance of potential impacts in terms of the following criteria:

- Cumulative impacts;
- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Non-reversibility of impacts;
- Impact on irreplaceable resources; and
- Confidence level.

Activities within the framework of the proposed development and their respective construction/decommission and rehabilitation phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into three phases from which impacting activities can be identified, namely:

Construction/Decommission phase:

This phase refers to all the construction related activities on site during closure of the site, until the contractor leaves the site. This includes all activities associated with the closure and decommissioning of the proposed development, including any removal of infrastructure and rehabilitation that may need to occur.

Rehabilitation phase:

This includes all post construction activities, to ensure the site is returned to its initial state.

Monitoring phase:

This includes all activities undertaken to ensure that the environmental integrity of the site is maintained and preserved after Rehabilitation has taken place.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure. The methodology that will be used comprises of the following four steps:

- Step 1: Identification of positive and negative impacts of the project;
- Step 2: Identification of the significance rating of the impact before mitigation;
- Step 3: Identification of the mitigation measure and the mitigation efficiency; and
- Step 4: Identification of the significance rating of the impact after mitigation;

Activities that will be undertaken to give effect to the proposed development gives rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the following phases discussed in **Table 3.** For the purpose of this impact assessment, the phrase *'construction'* and *'decommission'* will be used interchangeably as it is understood that construction activities will take place during the decommissioning process.

Table 3: Project phases in a development

PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR
Status Quo
The study area as it currently exists.
Preconstruction/ decommission phase
All activities undertaken before construction/decommission phase including specialist studies and assessments
Construction/decommission phase (pre- rehabilitation phase)
All activities on site up to the start of construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts that would be associated with planning.
Rehabilitation phase (closure and rehabilitation phase)
All activities undertaken to ensure the site is restored to its original state as humanely possible.
Monitoring phase (post-closure phase)
All activities after Rehabilitation, including the operation and maintenance of the proposed development.
The activities arising from each of the relevant phases have been included in the impacts assessment tables. The assessment endeavours to identify activities that would require environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

8.3.1. Assessment Criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2006) and integrated environmental management series published by the Department of Environmental Affairs and Tourism (DEAT) currently Department of Environmental Affairs (DEA). In addition to this, it is a requirement of the National Environmental Management Act (NEMA) 2014 Regulations as amended, Appendices 1 and 2 that an Impact and Risk Assessment process be undertaken for Basic Assessments and Environmental Impact Reporting. The Assessment Criteria is based on the following:

- Nature of impact;
- Extent;
- Duration;
- Intensity;
- Probability;
- Determination of significance; and
- Reversibility of impact.

Each of these are explained in **Table 4**

Table 4: Assessment Criteria

ASSESSMENT CRITERIA
i). Nature of Impact
This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.
b) Extent
The physical and spatial size of the impact. This is classified as: **i) Site** The impact could affect the whole, or a measurable portion of the site. **ii) Local** The impacted area extends only as far as the activity, e.g. a footprint of the specific activity **iii) Regional** The impact could affect areas such as neighbouring farms, transport corridors and the adjoining towns.
c) Duration
The lifetime of the impact; this is measured in the context of the lifetime of the proposed project. **i) Short term** The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases. **ii) Medium term** The impact will last up to the end of the phases, thereafter it will be entirely negated. **iii) Long term** The impact will continue or last for the entire operational life of the development, but will be mitigated by

direct human action or by natural processes thereafter.

iv) Permanent

The only class of impact which will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

d) Intensity

Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as:

i) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

ii) Medium (Moderate)

The affected environment is altered, but function and process continue, albeit in a modified way.

iii) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

e) Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

i) Improbable

The possibility of the impact occurring is very low, due either to the circumstances, design or experience.

ii) Probable

There is a possibility that the impact will occur to the extent that provisions must be made.

iii) Highly probable

It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.

iv) Definite

The impact will take place regardless of any prevention plans, and mitigation actions or contingency plans are relied on to contain the effect.

f) Determination of significance

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

i) No significance

The impact is not substantial and does not require any mitigation.

ii) Low

The impact is of little importance, but may require limited mitigation.

iii) Medium (Moderate)

The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

iv) High

The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable.

g) Reversibility of impact

Natural or human aided intervention:

(i) Irreversible

The impact will be permanent.

(ii) Short term
The impact is reversible within two years after construction.
(iii) Long term
The impact is reversible within 2 to 10 years after construction.
f) The degree to which the impact can cause irreplaceable loss of resources
(i) Low
The impact result in the loss of resources but the natural, cultural and social processes/functions are not affected.
(ii) Medium
The loss of resources occur but natural cultural and social processes continue, albeit in a modified manner.
(iii) High
The impact result in irreplaceable loss of resource.

In order to maintain consistency, all potential impacts that have been identified during the BA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.

9 IMPACT ASSESSMENT

The potential impacts and key issues identified during the BA as per the specialists investigations include:

- Loss of biodiversity;
- Wetland impacts;
- Surface and groundwater contamination;
- Loss of faunal habitat;
- Soil compaction;
- Social impacts;
- Heritage impacts;
- Transportation requirements;
- Increased noise levels;
- Atmospheric pollution and odours (air emissions); and
- Safety and security.

These impacts are discussed in further detail in the various sections within this chapter. It must be noted that the impact assessment has also considered potential impacts on the waste recycling activities of the reclaimers. Potential cumulative impacts that may arise from the proposed activities have been identified and discussed in this section. Specialists' investigation reports have also been attached in **Appendices F1** to **F3** to support the findings of this BA.

In this BA, mitigation measures will refer to the precautionary measures that can be implemented in the planning stage in order to avoid, reduce or remedy the impacts of activities from the proposed project. An EMPr, specifying the methods and procedures for managing the environmental aspects of the proposed development, during the construction/decommissioning and rehabilitation phase as detailed in the EMPr attached in **Appendix H.** Potential impacts identified and elaborated on in this chapter has been presented as follows:

- **Theme 1:** Impacts on the Biodiversity Environment; and
- **Theme 2:** Impacts on the Human Environment.

For the purposes of this assessment, this impact assessment will only focus on the impacts that are likely to occur during the decommissioning phase (capping and closure) of the landfill site. It must also be noted that, the phrase 'decommissioning' and 'construction' will be used interchangeably as it is understood that although the site will be decommissioned, construction activities such as excavation, backfilling and levelling related to the 'decommissioning'/ 'closure' will be undertaken.

9.1 Biophysical Environment

9.1.1 Impacts on the Ecological systems

This existing landfill site is located within a game reserve with severe soil erosion issues and the environmental impacts of the proposed activities are expected to be significant without mitigation. During the construction/decommission period, Plant activity and waste could impact on the

ecological integrity of the remaining natural environments outside the boundary of the site. Of particular concern would be soil and water contamination that may result from irresponsible management substances such as oils, paints and general waste.

According to the Ecological Scientist the NFEPA database does not indicate any wetlands or river systems to be situated within the eMadlangeni landfill site, nor within 500m thereof. From digital satellite imagery it is evident that the western portion of the study area, and the immediate area to the west are associated with erosion dongas. *These erosion dongas have resulted over a period of time due to the susceptibility of the soils to erosion. These features do not have direct hydrological connectivity to the Dorpspruit River downstream, and as such are not considered true watercourses* as per the definitions in Section 1 of the National Water Act (NWA) (Act 36 of 1998), a definition of a watercourse.

Furthermore, the formalisation of this landfill site for closure can cause ecological and human health problems if not well managed. The impacts of the project activities on the ecological systems are described below.

9.1.1.1 Flora Impact

The status of the flora **within** the Emadlangeni landfill boundary site has already been markedly transformed where landfill activities have taken place whereas the areas surrounding the western and southern portion of the site are relatively untransformed. The transformation of the vegetation in other areas within the boundaries of the site is due to the presence of landfill infrastructure, humans and their associated activities. According to the ecological opinion undertaken the western section of the site is undisturbed and proposed activities in this area will result in impacts on flora species.

The impacts on the flora of the area is considered significant in areas where the waste body is not located and is of *moderate significance* if not mitigated. The existence of the current landfill site has already caused severe disturbances to the existing floral communities and may result in the establishment of alien invasive species in the undisturbed area. This is expected to have *moderate significance* without mitigation. Effective mitigation is therefore recommended. Typical mitigation measures should include the following:

- Rehabilitation of areas where soils have been compacted to encourage regrowth, once construction has been completed;
- Natural regeneration of grass is to be encouraged by reinstating the topsoil originally scraped from the area;
- Controlling of alien vegetation after the removal of grass;
- Prevention of runaway fires by keeping vegetation short in working areas, ensure that lighting of fires on windy days are prohibited and ensuring that adequate firefighting equipment and emergency services contact numbers are available; and
- Should trees be planted for visual mitigation, no alien invasive trees may be used and the Town Council should make use of indigenous trees.

The impacts on the flora will be reduced to *low significance* with mitigation. The potential impact on the flora in the area is considered to be of *low significance* without mitigation for normal

construction activities. Refer to **Table 5** for significance rating approach.

9.1.1.2 Faunal impacts

Landfill sites have the potential to attract and negatively affect fauna if any edible waste remains uncovered and available. The Balele Game Reserve is home to various game and these have been found to frequent the landfill in search or food and grazing. The landfill also attracts small animals that burrow and reside within the undisturbed section of the landfill.

Scavenging birds are also common in the area and are highly mobile and therefore able to vacate areas should adverse environmental conditions prevail. The Nature reserve provides natural habitats for the majority of fauna in the area and construction impacts must be managed carefully to prevent impacts on fauna. With regard to the mammal species, the disturbed nature of the landfill footprint area results in very few natural occurring habitats and thus no animal species were observed during the site visit.

The impact on other vulnerable areas can be reduced even further if mitigation measures are introduced, which should typically include the following:

- The Balele Game reserve must be treated as “no go’ area during the rehabilitation of the site
- Maintain the integrity of the landfill boundary fence and ensure all waste is generated during construction is safely disposed and game have no access into the landfill site;
- Hunting and killing of fauna, including snakes should be prohibited;
- Carrying out routine litter patrols to ensure litter is not consumed by game;
- Minimisation of quantities of fuel, and other hazardous material kept at the construction site;
- Minimisation of disturbance of trees and construction footprint;
- Refraining from any impact on indigenous trees;
- Refraining from clearing/removal vegetation as much as possible. Where this is not possible, cut vegetation such as grass and reeds short rather than removing it; and
- Prevention of construction and maintenance personnel from setting snares to capture animals. Intentional killing of invertebrates should be avoided by means of awareness programmes presented to the labour force. The labour force should be made aware of the conservation issues pertaining to the taxa occurring on the study site

The impacts on fauna will be reduced to *low significance* with mitigation.

9.1.1.3 Impacts on Soil

As per observations noted during the site inspection it is evident that the western portion of the study area, and the immediate area to the west are associated with erosion dongas. As described in section 9.1.1 *the erosion dongas have resulted over a period of time due to the susceptibility of the soils to erosion.* The Impact on erodible soils located in the western section of the site is *moderate to high* and remains largely significant without mitigation.

Areas susceptible to erosion must be protected by installing the necessary temporary and/or permanent drainage works as soon as possible and by taking other measures necessary to prevent surface water from being concentrated in streams and from scouring slopes, banks or other areas. Any tunnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted, and the areas restored to a proper condition;

Anti-erosion compounds shall consist of an organic or inorganic material to bind soil particles together and shall be a proven product able to suppress dust and erosion. The application rate shall conform to the manufacturer's recommendations. The material used shall be of such quality that grass seeds may germinate and not prohibit growth. The following erosion control methods can be considered where required:

- Gabion construction;
- Planting/sodding;
- Hand seeding/sowing;
- Hydro seeding;
- Retaining walls;
- Soil binders and anti-erosion compounds; or
- Log/pole fencing.

These erosion control measures, including storm water drainage systems, will be installed before construction commences. Contingency plans will be in place for extreme storm events.

9.1.1.4 Wetland impacts

According to the Ecological Scientist the NFEPA database does not indicate any wetlands or river systems to be situated within the eMadlangeni landfill site, nor within 500m thereof. No sensitive wetland systems were noted on the site where the decommissioning activities will take place. The following mitigation measures can therefore be considered for the above mentioned impacts:

- To avoid impact on water bodies located downstream of the landfill site, litter traps should be introduced where necessary;
- Engage with the Department of Water and Sanitation with regard the applicable water use requirements for the closure of the landfill and potential drainage lines;
- As far as possible, limit construction activities to the existing footprint of the Emadlangeni landfill; and
- On site water use and point discharges require proper management.

The impacts on wetland resources will remain of *low significance* with mitigation and monitoring.

9.1.2 Groundwater Contamination (water quality)

Waste disposal sites are known to influence and have significant potential impacts on ground water. Potential impact of pollutants through leachate seepage or migration from the landfill on the groundwater is thus anticipated during both construction and operational phases. A Specialist Geohydrological assessment has been undertaken to determine the potential impact of the landfill

on groundwater. Refer to **Appendix F2** of this report.

During construction, pollutants may find their way into the surface and underground water systems. Typical sources of pollution include oils and fuels from construction vehicles and construction materials such as cement, detergents, paints and other chemicals. Improper design of the lining system for landfill could also provide a pathway for the contamination of the groundwater resources. Careful management and implementation of an appropriate EMPr at the site, including environmental awareness training for all construction staff, would reduce the risk of pollution.

To minimise the possibilities of increasing the area potentially exposed to pollution, the following is recommended:

- Protection of stream diversions; dams; leachate ponds; and any other critical infrastructure.
- Avoid activities within 1:100 year flood line;
- Use of impermeable liner (HDPE or GCL) to prevent ground water contamination and leachate;
- Conduct regular inspections of infrastructure at regular intervals in order to identify any potential failure of infrastructure and repair immediately;
- Design the landfill to comply with DWAF Minimum requirements and the Norms and Standards for waste disposal by landfill where applicable;
- Contaminated water should be directed into the correct disposal system and none should go into the storm water system;
- Water contaminated by contact with waste, as well as leachate must be contained within the site.

The impacts on underground water resources will be reduced to *low significance* with mitigation.

9.2 Human Environment

9.2.1 Environmental Nuisances (noise, dust and traffic)

It should be noted that public interest in the project is moderate particularly due to the smoke emanating from the site. The impacts of noise, smoke and dust on the nearby communities adds to the undesirability of the landfill and its continued operation. Some residents have complained about suffering from asthma and other respiratory diseases caused by the smoke emanating from the landfill. The proposed closure of the landfill would result in a positive impact for communities residing in this area.

The impacts on noise air quality will be reduced to *low significance* with mitigation. The following mitigation measures must be considered:

- Silencers must be installed on all plant and site machinery;
- Construction hours should be restricted to a period of 8:00 to 17:00 hours; and
- Appropriate dust suppression measures must be implemented.

9.2.2 Impacts on Heritage Resources

No obvious heritage resources were observed on the existing landfill site during the site visit. In line with standard recommendations from AMAFA, contractors must be made aware of the possibility of heritage resources being unearthed when working and taught how to deal with such finds. The Emadlangeni Local Municipality must have a registered heritage specialist that they can contact if any heritage resources (including human remains, artefacts, are palaeontological findings are made. Care should be taken to ensure that no heritage resources are destroyed. The impact will be reduced to *low significance* with mitigation. The following mitigation measures must be considered:

- Adhere to the mitigation measures outlined above and as prescribed by AMAFA;
- Should any heritage remains or graves be found, all work must cease and a heritage specialist be call on site to investigate; and
- If fossil plant material is discovered during the excavation and construction of the development, AMAFA APM Unit must be contacted.

9.2.3 Impact on Job Creation

The proposed licencing of Emadlangeni landfill forms part of the planning process, specifically for provision of waste disposal infrastructure to operate in line with the relevant environmental legislative requirements, which will enable the Emadlangeni Local Municipality to secure funding for the closure of the landfill. The decommissioning of the existing landfill site is also likely to create direct and indirect job opportunities (temporary) for the local people. It is imperative that the Contractors consider the use of labour intensive methods where necessary for the construction of some works of the landfill site. The impact is considered to be positive. The impact assessment is depicted in **Table 5.**

In mitigating the potential negative side of the impact as far as possible, preference should be given to local labour. Procurement should also be done locally as far as possible. The applicant should consider using their internal recruitment procedures to popularise the project. The municipality should encourage all the people contributing to the waste stream to recycle at the source of the waste. They should make the sorting of rubbish a pre-requirement for accepting any household waste.

9.2.4 Health and Safety Impacts

Due to the construction activities being largely restricted to the existing landfill boundaries, the risk to public safety during construction is considered to be insignificant. The potential impact on public health and safety is considered to be of *moderate significance* without mitigation. The impact will be reduced to *low significance* with mitigation. The following mitigation measures must be considered:

- Ensure that the landfill remains fenced off and has lockable gate and clearly stipulated working hours; and
- Ensure effective operation, monitoring and control of the waste that is disposed on the landfill at all times.
- Ensure all livestock grazing in the area are adequately protected from construction activities

- Ensure that residents of Utrecht are well informed of the construction activities and regular consultation is maintained during the duration of the project.

9.2.5 Summary of Impacts

The decommissioning phase will entail the closure of the landfill site, the covering of the waste body, re-capping, reshaping, and landscaping of the waste disposal area and ultimate rehabilitation of the landfill. It is anticipated that the applicant in consultation with various stakeholders will determine appropriate rehabilitation measures to ensure the future use of the landfill as an extension of the nature reserve following rehabilitation of the site. The decommissioning phase will eliminate environmental problems that occur as a result of landfill operations and ensure the ecological functions can be effectively restored to allow the landfill site to play a support role for the nature reserve.

The key impacts that were identified as part of this BA relate to loss of top soil, loss of biodiversity, impacts on surrounding water resources downstream of the landfill, potential groundwater contamination, social impacts; impacts on roads and traffic, possible heritage impacts, and increased noise levels. These impacts are summarised in **Tables 5.** It should be noted that the majority of the impacts outlined in this table have a low significance, which implies that they will not influence the decision to proceed with the proposed closure, provided they can be effectively mitigated. Mitigating measures to address these impacts are already described in this Section and in greater detail in the EMPr attached as **Appendix I.** The EMPr would be used to ensure compliance with environmental specifications and management measures.

Important note: Activities that will be undertaken to give effect to the proposed development gives rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the construction/decommissioning, Rehabilitation and Monitoring phase discussed in **Table 3**. It must be noted that the phrase 'construction' will be used interchangeably with 'decommission" as it is understood that although the sites will be licensed for closure, construction activities such as Shaping and landscaping of the waste body, construction of stormwater and leachate management infrastructure and the Capping of the waste body will be undertaken. Refer to **Table 5** for Impacts that can arise during the various project phases.

Table 5: Impacts on the Biophysical Environment during the Construction (Decommissioning), Rehabilitation and Monitoring Phase

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
Construction/Decommission Phase										
Shaping and Landscaping of waste body	Loss of vegetation	Negative	The shaping of the landfill will result in the clearing of existing vegetation which has not been cleared.	Site	Medium Term	Low	Probable	Medium	Long Term	L
	Surface water impact due to construction activities	Negative	There are no watercourses on the site although water bodies downstream	Local	Long Term	Low	Low	Medium	Irreversible	Medium

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
			of the landfill could be affected by soil erosion.							
	Surface and groundwater contamination	Negative	Hydrocarbon leakages from plant vehicles and poor management of sources of hydrocarbon leakages have the potential to pollute underground and surrounding resources.	Local	Long Term	Low	Probable	Medium	Short Term	Medium
	Loss of faunal habitat	Negative	The shaping of the landfill will result in the clearing of	Local	Medium Term	Medium	Improbable	Medium	Short Term	Medium

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
Capping of the waste body			vegetation associated to faunal habitats. There were however no faunal species observed on the site during the two visits.							
	Loss of top soil and soil contamination	Negative	Top soil around sections of the site with Dongas could be lost due to clearance of vegetation or activities that loosen the soil. Contamination of surrounding soil resources	Site	Short Term	Moderate	Probable	Medium	Short Term	Medium

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
			through spillages and overflows emanating from the construction activities may result in the contamination of soil							
	Soil compaction	Negative	Compaction from landfill construction activity may emanate thereby causing erosion problems	Local	Medium Term	Moderate	Probable	Medium	Short Term	Medium
	The status of the biophysical environment within the Emadlangeni landfill boundary site has already been markedly transformed. The potential impact on the biodiversity in the area is considered to be of low significance with mitigation during the landfill upgrade.									

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
Rehabilitation and Monitoring Phase										
Clean up of the site and revegetation	Alien species infestation	Negative	The clearing of vegetation during landfill maintenance and site rehabilitation activities will enhance the establishment of alien species particularly in undisturbed areas	Local	Medium Term	Moderate	Probable	Medium	Long Term	Medium
	Insufficient storm water control measures on site	Negative	Rehabilitation activities associated with the decommissioning of the landfill may result in the	Local	Medium Term	Medium	Probable	Low	Short Term	Medium

Activity	Aspect	Nature of Impact	Description of Impact		Criteria					
Theme 1: Biophysical Environment				**Extent**	**Duration**	**Intensity**	**Probability**	**Determination of Significance**	**Reversibility**	**Irreplaceable loss of Resources**
			erosion of soil used for capping.							

Table 6: Impacts on the Human Environment during the Construction, Operational and Decommissioning phases

Theme 2: Human Environment				Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources
Construction/Decommission Phase										
Decommissioning of the Emadlangeni Landfill	Efficient solid waste disposal services	Positive	The applicant has proposed Buy Back Centres which will result in various socioeconomic spin offs.	Site	Long Term	Low	Probable	Low	Long Term	Medium
	Services disruption	N/A	The disposal of waste on the landfill site will not cease during the upgrade. It is recommended that the Contractor designate a site for temporary disposal during the upgrade. Besides the landfill, there	Site	Short Term	Low	Probable	Low	Short Term	Low

Theme 2: Human Environment				Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources
			are no other services that are known to exist in the area.							
	Local Economy	Positive	Creation of potential opportunities to support local business and communities, including education and training as well as community based projects and programmes.	Local	Long Term	Medium	Probable	Low	Long Term	Medium +
	Increased noise generation	Negative	The use of heavy machinery during construction may result in the generation of noise on site	Local	Short Term	Low	Probable	Low	Short Term	Low

Theme 2: Human Environment				Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources
			as noise levels are currently low.							
	Visual & Aesthetic	Negative	Visual and aesthetic impacts activities such as excavation, stockpiling of construction material, waste and rubble handling of materials will occur.	Local	Short Term	Medium	Probable	Medium	Short Term	Low
	Air quality - dust	Negative	Dust emanating from construction related activities (excavation, earth grading etc.) will cause a visual	Local	Short Term	Medium	Probable	Moderate	Short Term	Low

Theme 2: Human Environment				Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources
			nuisance.							
	Air quality - odour	Negative	Odours associated with the biological and chemical processes that occur during the decomposition of wastes.	Site	Long Term	Low	Probable	Low	Short Term	Low
	Loss of heritage and paleontological resources	Negative	Construction activities may unearth and damage heritage resources present within the planned excavation works. No heritage features were noted within the site boundary.	Site	Short Term	Low	Probable	Low	Irreversible	Low

Theme 2: Human Environment				Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources
	Local roads and Traffic	Insignificant	Since the development will be undertaken only on the landfill site located outside the boundaries of the community, there will be minimal traffic disruptions.	Local	Short Term	Low	Probable	Medium	Short Term	Low
	Health and safety	Insignificant	Construction is restricted to the landfill site boundaries, the risk to public safety is lower.	Site	Short Term	Low	Probable	Low	Short Term	Low
	The project will thus have an overall positive socio-economic impact for the receiving area, which can be considered as of high positive significance. The proposed development is limited within the landfill boundary and none of the neighbouring properties will be directly affected. Negative impact identified will reduce the impacts to lower significance with mitigation.									

Theme 2: Human Environment		Extent	Duration	Intensity	Probability	Determination of Significance	Reversibility	Irreplaceable loss of Resources

9.3 No Go Alternative

Although this alternative forgoes all the potential negative impacts related to the decommissioning activity, it also forgoes the potential long term positive impacts that the proposed decommissioning of the site would have. The No-go alternative would not only imply the continued degradation of the landfill site, but also the gradual and steady deterioration of the Balele Nature Reserve environment and the overall site.

The no-go alternative would entail continuing with the status quo, i.e. a situation where the landfill continues to operate in its current state. Current operation provides no protection for erodible soils located within the donga area of the landfill site. Impacts such as increased soil erosion and sedimentation of water bodies downstream could result in accumulative impacts affecting water quality in the area. The significance of the no-go alternative will therefore have far more negative impacts and implications than the preferred alternative, namely the decommissioning and closure of the site.

The failure to decommission and fully rehabilitate the site as well as propose a suitable End-use Plan is therefore not considered a viable or sustainable alternative as it also does not conform to the Best Environmental Option available. The significance of the no-go alternative will result in more negative impacts and implications than the preferred alternative, namely the decommissioning and closure of the site. It is therefore concluded that the No-go alternative will have an overall, long term, negative effect on the immediate environment. It is not recommended that this alternative be supported.

9.4 Cumulative Impacts

The NEMA EIA Regulations (2014) defines “cumulative impact” in relation to an activity, as the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

The environmental impacts that will emanate from the licencing of the landfill have already been discussed in this BAR. The impacts on the biodiversity environment (flora and fauna) are considered to have insignificant impacts as they are localised to the disturbed area and the waste body. Impacts beyond the disturbed area could result in soil erosion which will result in sedimentation of water bodies downstream of the landfill.

Uncontrolled soil erosion and sedimentation of water bodies will have a cumulative impact on the ecological function of the area and water quality. Impacts on the geohydrological environment are considered to have significant cumulative impact because, if not managed, these impacts can extend beyond the site and may affect the underlying geohydrological conditions thereby affecting the quality of groundwater.

Other impacts that will be of cumulative significance associated with the closure of the existing landfill will include impacts on the environmental quality (dust and noise from traffic and landfill grading activities, visual nuisances), and these may occur during the construction phase. It must

however be noted that the landfill is located within town and impacts will also affect adjacent land owners.

Mitigation measures to ameliorate these impacts during the construction phase have been discussed in some sections of this chapter and are prescribed in detail in the Environmental Management Programme Report (EMPr) attached as **Appendix H** of this report.

9.5 Impact Management and Mitigation

During the planning and construction phases, the Emadlangeni Local Municipality in consultation with an independent, suitably qualified person(s) will be responsible for the monitoring of environmental impacts and for the management of mitigation strategies as prescribed in the EMPr and the Closure plan compiled for the project. The ELM will also be required to conduct environmental auditing and monitoring in line with the conditions of the Waste management License.

An Environmental Management Program, a Closure and Rehabilitation Plan for the use during construction, operation and closure phases has been compiled for the project subject to the review and approval by EDTEA. The Contractors that will be appointed by the applicant are required to strictly adhere to the requirements of these documents.

10 CONCLUSION AND RECOMMENDATIONS

The proposed Licencing of the Emadlangeni Landfill Site for Closure is expected to improve the current site condition which has created a visual and other environmental nuisances for residents and nature lovers over the years. The Emadlangeni landfill is at present being operated illegally as it is not in compliance with the National Norms and Standards for disposal of waste to landfill and is incorrectly located within the Balele Nature Reserve.

Based on the summary of environmental observations, it is a conclusion of this Basic Assessment Report that the proposed decommissioning will have low impacts on the bio-physical environment, all of which can be fully mitigated and managed, and sometimes prevented. The landfill activities on the site are not likely to negatively affect local ecological functions noted during the assessment.

Although activities related to the closure and rehabilitation of the landfill site may have a potentially adverse impacts of a low to medium significance on surface and ground water pollution, air quality and the quality of soil (erosion and degradation), these impacts are envisaged to be immediate to the site and can easily be mitigated with the application of recommended mitigation measures.

10.1 Environmental Impact Statement

Decommissioning activities are disruptive in nature, and some impacts pertaining thereto will remain regardless of how closely the decommissioning phase is managed. Fortunately the impacts resulting from decommission activities are usually short-lived and site specific such that management of these once identified in the planning phase will most likely have a temporary effect on the wider environment.

Based on the summary of environmental observations presented, the proposed decommissioning will have minimal impacts on the bio-physical environment, all of which can be fully mitigated and managed, and where possible prevented. The Ecological Opinion undertaken during the Basic Assessment identified the undisturbed section of the landfill as an area of ecological sensitivity within the boundaries of the site. A full rehabilitation of the site to return disturbed portions to their original ecological state is required in order for the site to support wildlife and restore inherent species which have been largely lost or replaced by aliens.

Sedimentation and soil erosion is of moderate significance if not effectively managed which could lead to increased erosion and sedimentation of water bodies located downstream. The implementation of effective soil erosion measures will ensure that the Impact on water courses will be of a low significance. No impacts of unacceptably high significance are foreseen once proper mitigation measures have been implemented.

All mitigation and management measures should be guided by the Environmental Management Program and the Closure Plan attached as **Appendix H** and **Appendix G** of this report. The conditions and recommendations will be updated with additional conditions from the Waste Management License. It is therefore a conclusion of the EAP that the applicant's preferred alternative (licencing of the Emadlangeni landfill) for decommissioning be approved, provided the essential mitigation measures are implemented. It is crucial that the site management requirements and procedures

outlined in this report be implemented to restore the site to a future beneficial land use.

10.2 EAP Recommendations

This BA has provided a comprehensive assessment of the potential environmental impacts associated with the proposed activity. These impacts have been identified by the EAP. The key findings of the BA are discussed in this Report. The decommissioning of Emadlangeni landfill site is considered the **only** viable alternative, based on the minimal impacts of the proposed licensing on the disturbed bio-physical environment.

No unacceptable impacts of high significance are foreseen once proper mitigation measures have been implemented. It is therefore recommended that the environmental authorities subject the proposed application to the following conditions:

The Planning Phase:

a. Site specific work plans addressing environmental and personnel safety must be drawn up for each work area before commencing with decommissioning activities. Work plans to specify required Equipment, Staffing, and Practices for Safe Handling of waste, Protective Equipment, Monitoring and reporting and Feedback. Refer also the Appendix I EMPr. *These work plans must pay particular attention to undisturbed section of the landfill were no activity must take place.*
b. Final planning must be done in accordance with applicable legislation. All necessary registration, permits and licenses must be acquired as necessary.
c. Draw up a Construction Plan indicating how the construction site will operate in terms of access and activities, during project planning. The Construction plan must include a specific site plan demarcating the undisturbed part of the site as a No go area.
d. Develop and maintain a forum for communicating with adjacent land owners for information sharing, complaints and problem solving throughout the project lifecycle.
e. In support of the Waste Transfer Station and Buy back centers, the Emadlangeni Local Municipality must initiate projects to raise awareness on waste management and reduction strategies in communities;
f. The Emadlangeni Local Municipality must prioritise the implementation of alternative waste disposal options (construction of waste transfer stations, buy-back centres, etc.);
g. All adjacent landowners must be informed of construction activities at least 30 days before their commencement;

The Decommissioning Phase:

a. Compliance with the mitigation measures outlined in this BA report, the EMPr and the Closure Plan;
b. Implementing and adhering to the procedures and measures outlined in the Closure

Plan;

c. Adhering to the mitigation measures outlined in the Ecological Opinion Report with focus on the undisturbed western section of the site;
d. Operational of Plant and site vehicles should be done with care to minimize any accidental spills of hazardous and harmful materials. Swift reaction and remedial actions will limit the local risk of polluting groundwater.
e. An independent Environmental Control Officer (ECO) should be present during construction of the new infrastructure to ensure the works are undertaken in an environmental sensitive manner;
f. The Applicant must appoint an engineer to compile detailed designs for the capping layers. The proposed landfill must be carefully designed to avoid significant ground water and visual impacts.
g. The 1:50 and 1:100 flood lines should be mapped in relation to the site;
h. If it should be determined that the site is within 500m of the watercourse or 1:100 flood zone; then appropriate Water Use Authorization should be obtained for (i) altering the bed, banks, course or characteristics of a watercourse; and/or (c) impeding or diverting the flow of water in a watercourse;
i. Storm water must be prevented from mixing with the leachate and disposal of Leachate should not adversely affect water quality is water resources;
j. The dirty water pond should not be located within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, or a borehole which is utilized for drinking water or stock watering, whichever is further. Additionally , the site should not overly a major Aquifer;
k. The Contractor must be trained to recognise heritage and paleontological objects (including human remains). Should there be a sign of such objects, construction must halt in that area immediately and a suitably qualified heritage specialist must be called to investigate. In addition to this, any expansion beyond the authorised/licensed landfill boundaries must done in consultation with SAHRA; and
l. Compliance with all legal requirements in relation to environmental management and conditions of the authorisation issued by EDTEA.

Based on the environmental assessment of the conditions, the proposed licensing of the site for decommissioning has emerged as the most viable option. It is therefore recommended that the site be licensed for decommissioning as per the recommendations of this report. It is further recommended that decommissioning must commence within a period of at least five (5) years from the date of issue of the licence in order to provide the municipality with the necessary time in which to source the required funding to address closure and rehabilitation requirements.

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