



MSUNDUZI LOCAL MUNICIPALITY INTEGRATED WASTE MANAGEMENT PLAN



2023-2028

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ABBREVIATIONS

ABM - Area-Based Management

CBD - Central Business District

DEA - Department of Environment Affairs

DEFF - Department of Environment, Forestry and Fisheries

ECA - Environment Conservation Act

EDTEA - Department of:-Economic Development, Tourism and Environmental Affairs

IDP - Integrated Development Plan

MIWMP – Msunduzi Integrated Waste Management Plan

LM -Local Municipality

MS Act - Municipal Systems Act

NEMA - National Environmental Management Act

NEMWA - National Environment Management: Waste Act

NWMS - National Waste Management Strategy

WIS - Waste Information System

WMU - Waste Management Business Unit

WML-Waste Management Licence

ACRONYMS

IWMP	A strategic plan developed by municipalities to manage and minimize waste in a comprehensive and sustainable manner.
IDP	Integrated Development Plan: A long-term plan that guides the development and growth of a municipality, incorporating various sectors, including waste management.
CBD	Central Business District: The commercial and economic hub of a city or town.
NEMWA	National Environment Management: Waste Act: South African legislation that governs waste management practices and promotes environmental sustainability.

WIS	Waste Information System: A system that collects, manages, and analyses data related to waste generation, collection, disposal, and recycling for effective waste management planning and decision-making.
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SECTION 1: EXECUTIVE SUMMARY

The formulation of the Msunduzi Integrated Waste Management Plan for the period from 2023 to 2028 is of utmost significance for the Municipality. It ensures compliance with regulatory and legislative requirements concerning waste management. Furthermore, the formulation of this plan is driven by several factors related to the

current state of waste management within different areas of the Municipality, particularly the New England Road landfill site. These factors have sparked the need for continuous interventions and action plans proposed by the city. Therefore, the evolution of waste management planning in Msunduzi Municipality is driven by the following factors:

- **Legislative Compliance:** Pressure to adhere to legislative frameworks namely, the National Water Act, Act 36 of 1998, and long-term commitment to the 2017 Waste Management License
- **Environmental Challenges relating to the Landfill site:** Leachate, gas release, informal settlements at the parameter fence line (buffer), illegal waste pickers, alien invasive plants, damaged equipment onsite and widespread littering leading to environmental degradation and social implications.
- **Landfill Capacity and Sustainability:** Limited landfill capacity: The limited landfill capacity with a maximum height of 654m above sea level.

Over the past 25 years, the New England Road Landfill in Msunduzi Municipality has been operating the Waste Management License, serving as the designated disposal site for general waste, excluding hazardous waste. The landfill caters a wide footprint including Pietermaritzburg residents as well as neighbouring municipalities. In 2022, it was recorded that its lifespan had dwindled to just 7 years, reaching a critical point of 654m above sea level. The New England Road Landfill has been plagued by illegal activities, leading to equipment damage and uncontrolled fires.

The presence of unauthorized waste pickers and illegal structures has disrupted the landfill's operations. To address these issues, the municipality plans to revive recycling efforts, decrease the fill rate, and extend the landfill's longevity through the utilisation of the historic landfilling area on the western wing of the New England Road landfill site.

To tackle this challenge and ensure the landfill's sustainability, the municipality is keen on adopting global best practices for waste collection, handling, and disposal, with a focus on establishing long-term waste mitigation strategies. Given these circumstances, the development of the 2023-2028 Msunduzi Integrated Waste Management Plan is necessary to address the challenges faced by the New England Road Landfill site and implement sustainable waste management practices within the municipality's jurisdiction.

SECTION 2: BACKGROUND

2.1. DEFINITION & PURPOSE

An Integrated Waste Management Plan (IWMP) is a comprehensive waste prevention, recycling, composting, and disposal strategy. The plan seeks to effect efficient and cost-effective methods to reduce open dumping, effectively manage solid waste, and protect human health and the environment.

2.2. GOALS & OBJECTIVES

The main goal for the 2023 to 2028 Msunduzi Integrated Waste Management Plan aligns itself with the purpose of an IWMP, i.e., to create a better and cleaner city by optimising waste management within the Msunduzi Municipality through efficiency and reduction in the waste related environmental impacts, while generating revenue for the city.

The objectives of the Integrated Waste Management Plan (IWMP) for the city of Msunduzi are aimed at assessing the current state of waste management and proposing measures to improve waste management practices within the Municipality. The IWMP seeks to provide a clear vision for waste management in the Municipal Local Municipality (MLM) of Msunduzi. The plan outlines a combination of short-term to long-term projects to address waste management challenges and promote sustainable practices, in line with the National waste management strategy 2020.

Figure 1: NATIONAL MANAGEMENT WASTE STRATEGY 2020



2.3. METHOD & APPROACH

During the development of this Integrated Waste Management Plan (IWMP), the Department of Environment Affairs (DEA) Guidelines for the development of IWMPs was considered. This guideline provides a framework for the planning process, which was followed to ensure a comprehensive and effective IWMP. The planning process outlined in the DEA guideline involves the following key steps:

Situational Waste Analysis: The Msunduzi Municipality IWMP includes a Situational Waste Analysis, which provides an overview and assessment of the current waste management situation within the Municipality. This includes gathering data on waste generation, collection, disposal, and recycling rates, as well as identifying any existing challenges or gaps in the waste management system.

Defining Goals and Objectives: The provincial IWMP includes a vision for waste management in the province as well as strategic goals and objectives to achieve this vision. Msunduzi Municipality's' IWM aligns to key policies including the global Sustainable Development Goals (SDGs), the National Development Plan 2030 (NDP), the National Waste Management Strategy 2020 (NWMS) and relevant provincial policies.

Public Participation: The guideline emphasizes the importance of engaging stakeholders throughout the planning process. This includes involving representatives from various sectors, such as local government, community organizations, waste management service providers, and environmental agencies. Stakeholder input and feedback help to ensure that the IWMP reflects the diverse perspectives and concerns of those affected by waste management practices.

Identify & Evaluate Options: This includes exploring technologies, infrastructure requirements, and best practices that can be applied within the Municipality. The feasibility, costs, and potential environmental and social impacts of each option should be carefully considered during this stage.

Select Preferred Method: Once the options are evaluated, the preferred waste management strategies and initiatives are selected. These strategies may include waste reduction and minimization, recycling programs, improved collection and disposal methods, public awareness campaigns, and collaborations with the private sector. The final step in the planning process is the development of an implementation plan. This plan outlines the specific actions, timelines, responsibilities, and resource requirements needed to achieve the objectives of the IWMP. Regular monitoring and evaluation mechanisms should also be established to assess the progress and effectiveness of the implemented strategies.

2.4. HISTORICAL EVOLUTION OF WASTE MANAGEMENT PLANNING

The formulation of the Msunduzi Integrated Waste Management Plan for the period from 2023 to 2028 is of utmost significance for the Municipality. It ensures compliance with regulatory and legislative requirements concerning waste management. Furthermore, the formulation of this plan is driven by several factors related to the current state of waste management within different areas of the Municipality, particularly the New England Road landfill site. These factors have sparked the need for continuous interventions and action plans proposed by the city. Therefore, the

evolution of waste management planning in Msunduzi Municipality is driven by the following factors:

- Legislative Compliance: Pressure to adhere to legislative frameworks namely, the National Water Act, Act 36 of 1998, and long-term commitment to the 2017 Waste Management License
- Environmental Challenges relating to the Landfill site: Leachate, gas release, informal settlements at the parameter fence line (buffer), illegal waste pickers, alien invasive plants, damaged equipment onsite and widespread littering leading to environmental degradation and social implications.
- Landfill Capacity and Sustainability: Limited landfill capacity: The limited landfill capacity with a maximum height of 654m above sea level.

Over the past 25 years, the New England Road Landfill in Msunduzi Municipality has been operating the Waste Management License, serving as the designated disposal site for general waste, excluding hazardous waste. The landfill caters a wide footprint including Pietermaritzburg residents as well as neighbouring municipalities. In 2022, it was recorded that its lifespan had dwindled to just 7 years, reaching a critical point of 654m above sea level. The New England Road Landfill has been plagued by illegal activities, leading to equipment damage and uncontrolled fires.

The presence of unauthorized waste pickers and illegal structures has disrupted the landfill's operations. To address these issues, the municipality plans to revive recycling efforts, decrease the fill rate, and extend the landfill's longevity through the utilisation of the historic landfilling area on the western wing of the New England Road landfill site.

To tackle this challenge and ensure the landfill's sustainability, the municipality is keen on adopting global best practices for waste collection, handling, and disposal, with a focus on establishing long-term waste mitigation strategies. Given these circumstances, the development of the 2023-2028 Msunduzi Integrated Waste Management Plan is necessary to address the challenges faced by the New England Road Landfill site and implement sustainable waste management practices within the municipality's jurisdiction.

The fact that the site is used for the disposal of general waste, including domestic waste, inert waste, and garden waste, suggests that it serves as a multipurpose landfill facility. The presence of infrastructure such as fencing, vehicle access control, a weighbridge, site security, and a site office indicates a commitment to ensuring proper management and control of waste activities. The waste management license granted to Msunduzi Municipality has a validity period of ten years. This implies a long-term commitment to adhering to regulatory requirements and continuously improving waste management practices over an extended period.

2.5. HEALTH & ENVIRONMENTAL IMPACTS OF POOR WASTE MANAGEMENT

The impacts of poor waste management on human health and the environment are well known and documented. Waste disposal is often a neglected area in many municipal jurisdictions, and improper waste management is a major environmental health hazard. Escalating quantities of waste and their changing composition are some of the major challenges facing municipal governments. Waste management originated due to its impacts on human health.

As human settlements densified, health impacts from waste intensified and it became necessary to manage them. Waste, left unprocessed, attracts insects and rodents, which in turn cause gastrointestinal parasites to develop in human beings. These lead to diseases such as intestinal disease, yellow fever and the plague.

Hazardous wastes, such as health care wastes and industrial wastes can contain carcinogens (cancer-causing substances). Typical hazardous waste sources include dry cleaners, vehicle repair facilities, hospitals, electroplating companies, mining concerns, metals recycling centres and agriculture pesticide suppliers.

Proper solid waste disposal is an important component of environmental sanitation and sustainability. Aside from the health risks of poor waste management, creating a sustainable environment and improving waste management offers opportunities for income generation, health improvements and reduced vulnerability.

Waste quantities are increasing at an alarming rate. This year alone, the 7 billion people in the world will be producing more than 2.5 billion tonnes of waste annually. The situation is exacerbated by the inability of many local governments to process these large quantities of waste, in part due to the lack of facilities for safe disposal. This leads to uncontrolled dumping and illegal dumpsites. Additional risks can occur from direct contact with toxins from poorly managed wastes, including batteries and vehicle tyres. Of particular concern is waste picking on waste disposal sites. This involves manual sorting of waste to recover sellable or reusable components, and the handling of waste from health care facilities, which carries risks of needle-stick injuries and exposure to toxic or infectious materials.

Poorly managed waste poses a severe risk to the health and well-being of communities, particularly those living adjacent to dumpsites, given the potential of the waste to pollute water, food sources, land, air and vegetation. This is primarily because untreated waste and waste that remains uncollected or improperly disposed of can be a source of contaminants and

breeding sites. Such wastes contribute to diarrhoea, vector-borne diseases, and the contamination of drinking water and other water resources. The poor disposal and handling of waste leads to environmental degradation, destruction of the ecosystem and poses great risks to public health. In 2002, 23% (2.4 million) of all deaths in Africa were attributed to environmental risks factors.

In South Africa, local authorities are primarily responsible for waste collection. Given the higher cost of cleaning litter left on streets and in public spaces, as opposed to collecting waste from formal household waste collection systems, the public has to accept co-responsibility for the cleanliness of their towns and cities, ensuring that litter and waste is disposed of in allocated bins. However, it has also long been recognised that traditional waste collection systems are inappropriate, inefficient, and costly when applied to informal settlements. As such, illegal and uncontrolled dumping of waste seems almost inevitable. Waste creates problems in a number of ways:

- It is aesthetically unattractive and impacts on tourism by creating unsightly regions in South Africa's scenic landscape.
- It pollutes air, soil, rivers, and precious groundwater; and
- It creates major health hazards to humans, particularly in areas where large amounts of waste are dumped and not cleaned up, e.g. in informal settlements.

Leachate production is the main source of pollution of landfill sites. Where it is produced in significant quantities it must be managed through an appropriate leachate collection and treatment system. Such systems are difficult to apply to illegal dumpsites, and their impacts remain uncurbed. Pollutants associated with landfills include heavy metals, polychlorinated biphenyls, and pesticides, all of which are known to affect human health.

Landfills can expose residents around them to unacceptable levels of environmental pollutants (including both heavy metals and organic pollutants), resulting in adverse health impacts. Children and adolescents living around landfills can contract illnesses related to the respiratory, gastrointestinal and dermatological systems such as upper respiratory tract infections, chronic bronchitis, asthma, fungal infections, allergic and unspecified dermatitis/pruritis (inflammation and itchiness of the skin).

Heavy metals, by definition, are metallic elements that are present in both natural and contaminated environments. In natural environments, they occur at low concentrations. However, at higher concentrations – as is the case in contaminated environments – they result in public health impacts. Heavy metals may be released into the environment from metal smelting and refining industries, scrap metal, plastic and rubber industries, various consumer products and from burning of waste containing these elements. When released into the air, these elements cover large distances and are deposited onto the soil, vegetation, and water.

Once deposited, these metals are not degraded and persist in the environment for many years, poisoning humans through inhalation, ingestion, and skin absorption. Acute exposure leads to nausea, weight loss, vomiting, gastrointestinal abnormalities, and dermatitis. Persistent organic pollutants are long-lasting, non-biodegradable organic compounds that accumulate in the food chain, especially in fish and livestock, and pose serious health risks to humans. They dissolve poorly in water and are readily stored in fatty tissue; hence they may be passed to infants through breast milk.

These toxicants may be found in air, water and soil and can find their way into the human body through:

- *Inhalation* – movement of air from the external environment through the airways during breathing.
- *Ingestion* – the consumption of a substance by an organism, either man or animals; and
- *Absorption* – the movement and uptake of substances into cells or across tissues such as skin by way of diffusion or osmosis.

The public health effects of these pollutants include the following:

- Skin Disorders – Fungal infection, allergic dermatitis, pruritus, and skin cancer.
- Respiratory Abnormalities – bacterial upper respiratory tract infections (pharyngitis, laryngitis and rhinitis), chronic bronchitis and asthma.
- Abdominal and Intestinal Problems – bacterial enteritis, helminthiasis, amoebiasis, liver cancer, kidney, and renal failure.
- Dental Disorders – dental caries and dental pain.
- Ear Infections – otitis media and bacterial infections.
- Skeletal Muscular Systems – back pain.
- Central Nervous System – impairment of neurological development, peripheral nerve damage and headaches.
- Eye Infections – allergic conjunctivitis, bacterial eye infections.
- Blood Disorders – Iron deficiency anaemia; and
- Others – malaria, chicken pox, septic wounds and congenital abnormalities, cardiovascular diseases and lung cancer.

Direct exposure to waste landfills, in the case of waste picking/scavenging by individuals is likely to show an accelerated decrease in health. Poor waste management, therefore, has significant effects on human health and the environment and should be managed with due regard to these impacts.

2.6. PUBLIC PARTICIPATION: INTERNAL & EXTERNAL STAKEHOLDERS

The Municipality has identified several stakeholders that are crucial in the implementation of the MIMWP. These stakeholders include inter alia; the waste management industry, government departments, non-government entities and the public.

Table 1: INTERNAL & EXTERNAL STAKEHOLDERS & THEIR ROLE IN THE IWMP

Stakeholder	Role in MIWMP
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The Msunduzi Rates Payers	Source constructive input from the rate payers and all affected parties and clients in the formulation of the IMWP.
KZN -Department of Economic Development Tourism and Environmental Affairs (EDTEA)	Environmental compliance monitoring and an environmental policy enforcement. This stakeholder will further assist the Municipality with Policy Co-ordination and environmental planning.
KZN-Department of Co-operative Governance and Traditional Affairs KZN-	Provide support and capacity to the Municipality by fostering relationships between the Municipality and the Provincial and National government
Department of Public Works (EPWP)	Assist the Municipality with physical assets, management practices and personnel necessary to achieve Integrated Waste Management
uMgungundlovu District Municipality	Responsibility for the provision of integrated waste management services within the district level
The Pietermaritzburg Chamber of Business	Create relationship between all businesses trading within the City of Pietermaritzburg and seek support in order to manage waste at source and minimise the impact of waste on the environment
Waste Pickers	Waste Pickers will be necessary in the diversion of waste material from Landfill site as well as creating job opportunities

SECTION 3: LEGISLATIVE & REGULATORY FRAMEWORK

Waste management in South Africa is currently governed by means of the following pieces of legislation, including:

3.1. INTERNATIONAL LEGISLATION

3.1.1. Sustainable Development Goals 2015

Figure 2: THE MOST APPLICABLE SUSTAINABLE DEVELOPMENT GOALS



Table 2: SDG's AND THEIR RELATED WASTE MANAGEMENT GOAL

Sustainable Development Goal	Specific Target	Solid Waste Management Related Goal
11: Sustainable Cities	11.1. Ensure access for all to adequate, safe, and affordable basic services, upgrading slums. 11.6. Reduce the adverse environmental impact of cities, with special attention to waste management.	Ensure access for all to adequate, safe and affordable solid waste collection services. Uncollected waste is often dumped in waterways or burned in the open air, thus causing pollution and contamination. Waste also clogs the drains, which exacerbates floods, keeping stagnant water and contributing to water borne illnesses. Children are among the most vulnerable, so they are affected the most.
3: Good Health & Well-being	3.2. End Preventable deaths of children under 5 years old. 3.3. End Malaria and combat waterborne diseases. 3.9. Reduce illnesses from hazardless chemicals and air, water and soil pollution, and contamination.	
7: Affordable and Clean Energy	7.2. Increase the share of renewable energy in the global energy mix.	Waste Management technologies can drive renewable energy from organic waste.
13: Climate Change	13. Take urgent action to combat climate change and its impacts	Adequate Waste Management practices can prevent emissions of large amounts of green house gasses.
12: Responsible consumption and production	12: Environmentally sound management of chemicals and all wastes in order to minimize their adverse impacts on human health and the environment	Eliminate uncontrolled dumping and open burning and achieve environmentally sound management of wastes,

		particularly hazardous waste.
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3.2. NATIONAL LEGISLATION

3.2.1 THE CONSTITUTION

The Constitution of South Africa, adopted in 1996, contains provisions that address waste management and environmental protection. The following sections are particularly relevant:

Section 24: Environmental Rights Section 24 of the Constitution guarantees every person the right to an environment that is not harmful to their health or well-being. It places a duty on the government to protect and enhance the environment for present and future generations. This provision forms the foundation for the inclusion of waste management as a critical aspect of environmental protection.

Section 152: Cooperative Governance Section 152 emphasizes the importance of cooperative governance between different spheres of government (national, provincial, and local) to ensure effective administration and service delivery. Waste management involves multiple stakeholders, and this provision encourages collaboration among government entities to develop and implement coordinated waste management strategies and policies.

Section 153: Legislative Authority of Municipalities Section 153 empowers municipalities to exercise legislative and executive authority within their areas of jurisdiction, including waste management. This provision recognizes the role of local governments in developing and implementing waste management plans, bylaws, and regulations that are tailored to their specific needs and circumstances.

Section 165: Judicial Authority and Environmental Disputes Section 165 establishes the independence and authority of the judiciary. It allows individuals and organizations to approach the courts for the protection or enforcement of their environmental rights, including matters related to waste management. This provision ensures that legal recourse is available to address environmental issues and challenges concerning waste management practices.

3.2.2. NATIONAL DEVELOPMENT PLAN 2030 (NDP)

The NDP maps out the vision of the country with the key objective to reduce poverty and inequality in South Africa by 2030, by creating jobs, addressing spatial transformation, the expansion of infrastructure and building environmental sustainability and resilience. The NDP specifically recognises the need to focus on gender equality, the youth and people with disabilities as transversal issues cutting across all its overarching goals. It outlines an approach to waste management which includes investment in consumer awareness, green product design, recycling infrastructure and waste-to-energy projects, which would result in significant strides to becoming a zero-waste society.

3.2.3. NATIONAL WASTE MANAGEMENT STRATEGY, 2020

The NWMS places emphasis on the waste management hierarchy and moving towards a circular economy. The three strategic pillars identified are waste minimisation, effective and sustainable waste services and compliance, enforcement, and awareness. The NWMS has the following outcomes:

- Prevent waste, and where waste cannot be prevented ensure 40% of waste diverted within 5 years; 55% within 10 years; and at least 70% within 15 years leading to zero waste going to landfill.
- all citizens live in clean communities with waste services that are well managed and financially sustainable.
- and mainstreaming of waste awareness and a culture of compliance resulting in zero tolerance of pollution, litter, and illegal dumping.

The NWMS specifically focuses on vulnerable groups by:

- Addressing the role of vulnerable groups, waste pickers and the informal sector and supporting women, youth and people living with disabilities in the circular economy; and
- Addressing the skills gap within the sector with a special focus on women, youth and people living with disabilities.

3.2.4. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT 59 OF 2008) & NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE AMENDMENT ACT, 2014 (ACT 26 OF 2014)

The purpose of the National Environmental Management: Waste Act (Act 59 of 2008) (NEM: WA) is to reform the law regulating waste management. It proposes this by "providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide national norms and standards for regulating the management of waste by all spheres of government; for specific waste management measures; and for matters incidental thereto".

The Act is the overarching legislation governing waste management in South Africa. As such compliance with its provisions is taken for granted by the IWMP. The IWMP highlights areas of waste management that are important in the context of the Msunduzi Municipality, but this does not absolve the local municipality from the responsibility of complying with every aspect of this piece of legislation.

The Act sets the framework for Integrated Waste Management in South Africa including:

- Giving effect to the National Waste Management Strategy. The NWMS is in the process of being reviewed and the draft framework is being finalised. The NWMS should be fully developed by 2011 according to NEM:WA which states an NWMS should be developed within two years of promulgation of the Act;

- Providing for the written appointment of a waste management officer in each municipality. This officer is responsible for co-coordinating matters pertaining to waste management in the municipality.
- Setting National Standards in terms of classification of wastes, provision of waste management services, the waste management hierarchy, remediation of contaminated land, and waste treatment and disposal. Provincial Standards may also be set, but Local Standards must include Municipal By-Laws.
- Integrated Waste Management Plans must be prepared by Local and District Municipalities, and Provincial Waste Management Plans must be incorporated into Provincial Development Plans contemplated under the Local Government: Municipal Systems Act (Act 32 of 2000);
- Institutional arrangements including setting the general powers and duties of the Minister and the Provincial Departments, the general powers and duties of the MECs and Provincial Departments, and Municipalities. Decision-making powers are delegated to MECs and the Minister while majority of implementation duties are assigned to waste generators and provincial departments.
- The provision to identify priority wastes and set requirements for the management of such wastes. Priority waste will be declared as such by the Minister or MEC. This will have implications in terms of generation, minimisation, storage, re-use, recycling or recovery, treatment and disposal, trade or any other measures that the Minister or MEC believes are necessary to manage the threat posed by the waste.
- Establishing the concept of General Duty of any holder or generator of waste to avoid the generation of waste, to re-use, recycle or recover waste and manage waste so that it does not endanger health or the environment; and
- Establishing a list of waste management activities that may have a detrimental effect on the environment which require a waste management licence, and the licensing procedures.

The following waste management activities require a licence in terms of NEM:WA and should be equivalent to activities that require a basic assessment or EIA in terms of NEMA respectively. Category C activities must comply with Norms and Standards determined by the Minister. The following activities have been extracted from the List of Waste Management Activities that have, or are Likely to have, a detrimental effect on the environment contemplated in Government Notice 921, November 2013, as amended on 11 October 2017, in terms of the NEM:WA.

Table 3: Other National Relevant Legislation

LEGISLATION/POLICY	APPLICABLE SECTION
National Water Act (Act 36 of 1998)	Section 19(1) Section 21 Section 22

The National Health Act (Act No 61 of 2003) & Health Act (Act 63 of 1977)	Section 1 Section 14(1)(c) Section 20(1)
Local Government: Municipal Structures Act (Act 117:1998)	Section 15
Municipal Systems Act, 2000 (Act 32 of 2000)	Section 25

3.3. PROVINCIAL POLICIES

3.3.1. KZN WASTE MANAGEMENT POLICY (KZN-WMP) – FINAL VERSION 2003

This policy represents the efforts of the province to take on its responsibility as previously prescribed in the ECA (Section 24, Act No. 73, 1998) to make regulations with respect to waste management.

The general objectives are;

- Registration of waste generators and handlers.
- Access to information.
- An equitable system of governance for generators and handlers with a view of eliminating illegal practices.

The policy states that this includes the management of waste on site and only where necessary, the transportation to suitable licensed landfill sites. With regards to hazardous and Health Care Risk Waste, the policy states that it is important to identify the need for hazardous and waste disposal sites and address issues like sighting and management “if the need exists”.

3.4. LOCAL PLANS

3.4.1. UMGUNGUNDLOVU DISTRICT MUNICIPALITY DRAFT IDP 2022/2023-2026/2027

The uMgungundlovu 2022/2023 – 2026/2027 IDP speaks to various Strategic Priorities. Strategic Priority 3 speaks to a Clean, Green City. The goal is that by 2030, Msunduzi is a city protecting our natural environment, our native plants and animal habitats, limiting pollution, greening the city, and using our natural resources, such as water, wisely. The clean, green city harnesses our renewable energy supply, public open space creation project, and urban renewal and greening programme to these ends.

Msunduzi has widespread use for renewable energy supplies, including but not limited to solar, wind, and hydro power. The city continually increases investment in delivering more sustainable energy technologies. Businesses use energy efficiently prioritising low carbon emission sources. Alternative energy sources are mainstreamed in new human settlement development for all communities and energy efficiency required in building plans.

The district has set the following targets:

- 30% of Msunduzi's electricity demand is met by renewable sources.
- 20% of liquid energy is derived from biofuel.

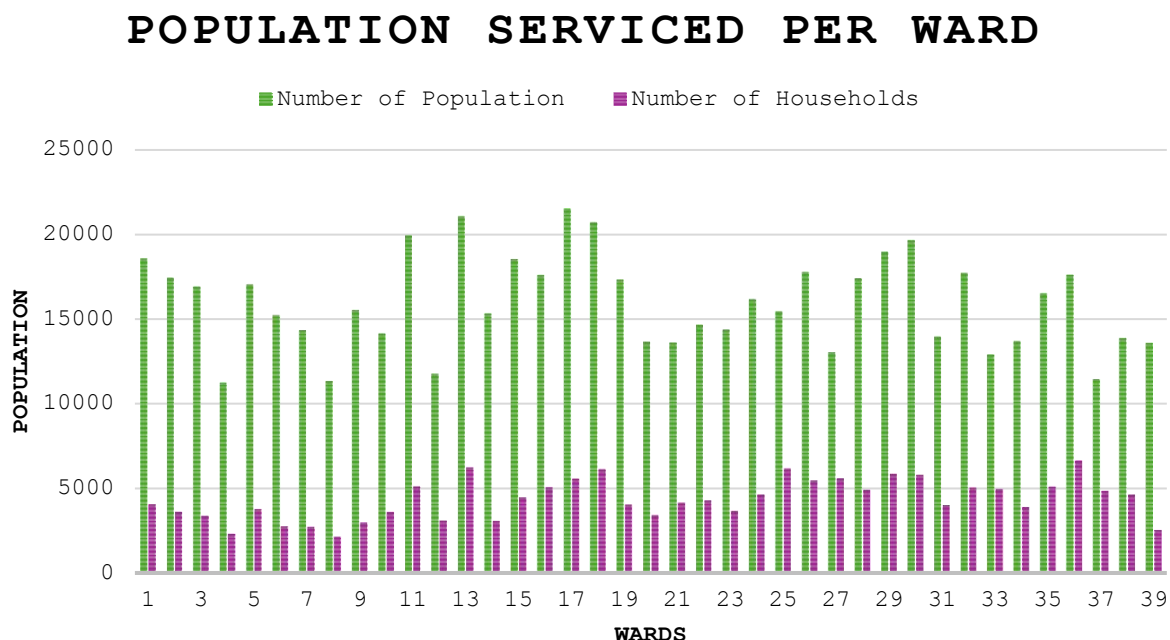
- 50% of new commercial or industrial development incorporates some form of renewable energy technology usage in its design and construction.
- 80% of new human settlement development incorporates some form of renewable energy technology usage in its design and construction.
- 100% of building plans approved have due consideration for energy efficiency.

The Msunduzi Municipality IWMP aims to align itself with above priority and its targets.

SECTION 4: SITUATIONAL ANALYSIS

4.1. DEMOGRAPHIC OVERVIEW

4.1.1 POPULATION PER WARD



The graph provides an overview of the population and household statistics for each of the 39 wards in the Municipality. The total population recorded is 621,786, with a total of 169,530 households. There is considerable variation in population size across the wards, ranging from a minimum of 11,239 in Ward 4 to a maximum of 21,532 in Ward 17. This discrepancy highlights the uneven distribution of population among the wards, which can impact waste management planning and resource allocation. For instance, Ward 17 stands out with the highest population count, indicating a greater demand for waste management services in that area. The wards are categorized into three priority levels based on population size and the number of households. High priority wards, including Wards 13, 17, 29, and 30, have a large population and a high number of households, indicating a significant need for waste management services. Medium priority wards have a moderate population and a moderate number of households, while low priority wards have a smaller population and fewer households. This classification system aids in prioritizing resources and effectively planning waste management initiatives to address the varying needs of different wards.

4.1.2. POPULATION ESTIMATES FROM 2001 TO 2025

According to the Municipal Integrated Development Plan (IDP) for the period 2022-2027, The current data on household and population growth in Msunduzi Municipality has significant implications for the future of waste management in the area. With a high concentration of approximately 181,594 households and an average of 423 households per square kilometre, the municipality faces the challenge of managing waste generated by a densely populated community. The average year-on-year

household growth rate of 1.6% indicates a continuous increase in the number of households, further exacerbating the waste management demands. As the population continues to grow, the amount of waste generated is also expected to rise, requiring effective strategies and infrastructure to handle the increasing waste load. The projected population growth rate of 1.1% until 2025, based on historical patterns, suggests that the waste management needs will continue to escalate.

The estimated population of 734,886 people by 2025 signifies a substantial increase compared to the 2016 Census figure of around 682,000 people. It implies a higher demand for waste collection, disposal, and recycling services to accommodate the growing population. These statistics are summarised below:

Table 4: 2016 TO 2025 POPULATION PROJECTIONS

STATISTICS	MSUNDUZI MUNICIPALITY
Number of Households	Approximately 181,594
Population Density	Around 423 households per sq. km
Average Year-on-Year Household Growth	1.6%
Projected Population Growth Rate (2021)	1.1%
Estimated Population (2025)	Around 734,886
Census Population (2016)	Approximately 682,000

Table 5: POPULATION BY CATEGORY 2001 TO 2016

CATEGORY	2001	2011	AVG. GROWTH	2016
Demographic Profile				
Population	552801	618536	1.1%	682000
Household	135311	164625	2.0%	181584
Education Level				
No Schooling	5.3%	2.7%	-5.1%	3.8%
Primary School	10.6%	7.2%	-2.7%	11.3%
Some Secondary	17.5%	16.6%	1.0%	31.2%
Grade 12	12.1%	17.0%	5.0%	39.0%
Higher	4.5%	6.4%	5.1%	14.7%
Age Profile				

Youth	29.2%	26.6%	0.2%	25.4%
Working Age	66.0%	68.4%	1.7%	69.5%
Elderly	4.8%	5.0%	2.0%	5.1%
Employment Profile				
Employed	51.8%	60.6%	2.7%	65.8%
Unemployed	48.2%	39.4%	-3.8%	34.2%
Household Income Profile				
No Income	21.1%	15.8%	-0.9%	12.1%
Low Income	53.8%	44.2%	-0.8%	37.6%
Low / Middle Income	19.2%	22.8%	3.8%	22.1%
Middle / High Income	5.2%	14.7%	15.5%	23.7%
High Income	0.7%	2.5%	13.5%	4.5%

Understanding the population and household figures is crucial for developing an integrated waste management plan. The increasing number of households and population implies a greater generation of waste that needs to be effectively managed. Waste collection, disposal, and recycling systems must be designed and implemented to accommodate the growing needs of the Municipality. Adequate infrastructure and resources must be allocated to address the waste management challenges posed by the expanding population and households.

Based on Table 6 provided, several assumptions can be made regarding an integrated waste management plan for Msunduzi Municipality. These assumptions are based on the observed trends and patterns in the demographic data:

- **Population Growth:** The population of Msunduzi Municipality is expected to continue growing at a relatively steady rate. Assumptions can be made that the population will increase by an average of 1.1% annually, as indicated between 2001 and 2016. This growth will likely lead to an increase in waste generation and the need for expanded waste management infrastructure and services.
- **Household Growth:** The number of households in the municipality is projected to rise based on the average growth rate of 2.0% observed between 2001 and 2011. This growth suggests an increasing demand for waste disposal and collection services to accommodate the expanding residential areas.

- **Income Distribution:** The distribution of household income across various categories provides insights into the economic profile of the Municipality. Assumptions can be made that as the percentage of households with higher incomes increases, there may be a greater capacity to invest in waste management infrastructure and services. However, it is crucial to ensure equitable access to waste management facilities and services across all income groups.
- **Education Levels:** The improving education levels, particularly the increase in individuals with some secondary education and Grade 12, suggest a growing awareness of environmental issues and waste management practices. This assumption implies that the community may be more receptive to waste reduction and recycling initiatives, making education and public awareness campaigns essential components of the integrated waste management plan.
- **Age Profile:** The changing age profile, with a decline in the youth population and an increase in the working-age population, can impact waste management. Assumptions can be made that the working-age population may have higher consumption rates and waste generation compared to the declining youth population. Waste management plans should consider age-specific waste management strategies to cater to the unique needs and behaviours of different age groups.
- **Employment Status:** The increasing percentage of employed individuals and the corresponding decrease in unemployment suggest a positive economic trend. Assumptions can be made that the employed population may have greater access to waste management services and contribute to waste management through compliance with waste disposal regulations.

4.1.3. ECONOMIC ACTIVITY

According to the IDP, the Msunduzi, Pietermaritzburg area has a diverse economy with a robust manufacturing sector that is excelling in exports to markets as diverse as aluminium products, cut flowers automotive components, and furniture. From table 7, it can be observed that the sectors with the highest GDP contributions are manufacturing, trade, finance, and community services. These sectors are likely to generate significant amounts of waste, including industrial waste, packaging materials, and commercial waste. Sectors like agriculture and mining, while contributing to the overall GDP, may have relatively lower waste generation in comparison. However, it is essential to consider specific waste management challenges associated with these sectors which may require specialized approaches for disposal.

Table 6: ECONOMIC ACTIVITY

Sectors	National	KwaZulu-Natal	uMgungundlovu	Msunduzi
Agriculture	69,048,723	22,410,742	4,616,838	1,202,546
Mining	226,153,943	8,464,447	231,105	157,066
Manufacturing	383,831,189	80,643,211	6,487,565	4,107,011
Electricity	64,619,169	9,941,020	1,577,555	1,055,043
Construction	104,150,437	19,907,444	2,001,221	1,327,061
Trade	431,719,908	71,454,018	7,231,619	4,843,359
Transport	272,178,901	57,768,590	5,409,740	3,761,186
Finance	655,040,349	87,605,074	8,502,656	6,343,355
Community	658,805,823	102,690,128	13,282,495	9,490,136
Total GDP	3,149,337,036	504,019,071	53,772,174	35,198,314

SECTION 5: CURRENT STATUS OF THE WASTE MANAGEMENT WITHIN MSUNDUZI MUNICIPALITY

The (Proposed name for the department is Solid Waste, Environmental Health and Spatial Programs), is responsible for overseeing the key aspects of waste management within the Municipality. This includes solid waste removal and solid waste disposal, which are managed as separate components. The Solid Waste Removal section handles various tasks related to waste management. These include waste collection from residential and commercial areas, maintenance and management of designated garden sites, street sweeping to keep public areas clean, upkeep of public toilets, and efforts to eradicate illegal dumping.

The Solid Waste Disposal section operates the New England Road Landfill Site, which serves as the primary facility for waste disposal in the KZN Midlands region. The landfill site is situated in Pietermaritzburg, KZN, precisely located at coordinates 29°36'22.56"S and 30°25'09.91"E. It spans a considerable area of approximately 27 hectares and is positioned between Sobantu, the Pietermaritzburg Golf Club, and the Darville Sewage Works. This landfill has been in operation for a substantial period and is under the management of the Msunduzi Municipality.

Figure 3: NEW ENGLAND ROAD LANDFILL



The landfill site is officially licensed and holds the distinction of being the largest disposal facility in the area. It spans a total area of 44 hectares, with approximately 29 hectares currently designated for waste filling. The management of the landfill site adheres to the requirements outlined in its permit and complies with relevant environmental legislation. The New England Road Landfill Site is classified as a general landfill, characterized by its large size and the presence of leachate, which refers to

liquid that percolates through the waste and may require appropriate containment measures. It's important to note that the landfill site does not accept any hazardous waste, ensuring the proper handling and disposal of potentially dangerous materials elsewhere.

The New England Road Landfill Site has obtained the necessary permits to continue its operations until it reaches a maximum elevation of 652 meters above sea level. Presently, the landfill site is approaching this limit, with its current height estimated to be within a 5% range of that threshold. Based on the current rate of waste disposal, the landfill is projected to have a remaining lifespan of approximately 6 to 10 years. To complete the filling process, an estimated volume of about 1.3 million cubic meters (M3) still needs to be deposited.

5.1. CURRENT STATUS OF THE NEW ENGLAND LANDFILL SITE

During the recent audit (March 2023 Internal Audit), conducted to assess the current state of the site, several notable improvements were observed. Firstly, the site appeared dry and noticeably neater compared to previous inspections, indicating an effort towards maintaining cleanliness and order. Moreover, there was a distinct absence of unpleasant outdoors, and the presence of pests seemed to be effectively managed, contributing to a healthier and safer environment. Furthermore, the removal of waste pickers from the site by the South African Police Service (SAPS) on August 25th, 2022, has led to significant positive changes. With the absence of waste pickers, the overall conditions on the site have markedly improved, particularly from a health and safety standpoint. This development is a commendable step towards ensuring the well-being of both the workers and the surrounding community.

However, there are a few areas that were addressed as requiring attention and action. One notable concern is the presence of substantial alien vegetation on the site, which is currently being actively managed. The municipality is persistently applying poison to eliminate these alien plants and trees until the landfill site becomes suitable for planting indigenous vegetation. This effort involves collaboration with the Parks and Recreation department, as the Municipal Waste Management Business Unit is utilizing their resources and personnel for the task. These actions are part of the sweeping and greening of areas program, which also encompasses education and awareness initiatives. Recognizing the importance of vegetation control, the Msunduzi Municipality has put in place clearing activities on the site. This proactive approach demonstrates a commitment to environmental conservation and maintaining the integrity of the landfill site.

Additionally, it was identified that the water and gas monitoring network at the site is inadequate. Many of the monitoring points could not be located, highlighting the need for its reinstatement. This matter has been recognized and will be addressed as part of the forthcoming contract. The detection of methane in some of the monitoring wells is considered an incident that necessitates reporting and appropriate action to mitigate any potential risks. On a positive note, the leachate system has been

repaired and is now fully functional, ensuring proper management of the liquid by-products. There were no spillages reported during the audit period, which indicates effective handling and containment procedures.

However, a fire incident took place on the operational section of the landfill on March 8th, highlighting the critical importance of adopting effective fire prevention measures and staying vigilant in waste management practices. In April 2023, as part of the ongoing effort to eradicate alien plants, the unit has initiated the process of cutting grass along the perimeter fence. This measure aims to create a firebreak, preventing the potential spread of fires from outside the landfill site to its active area.

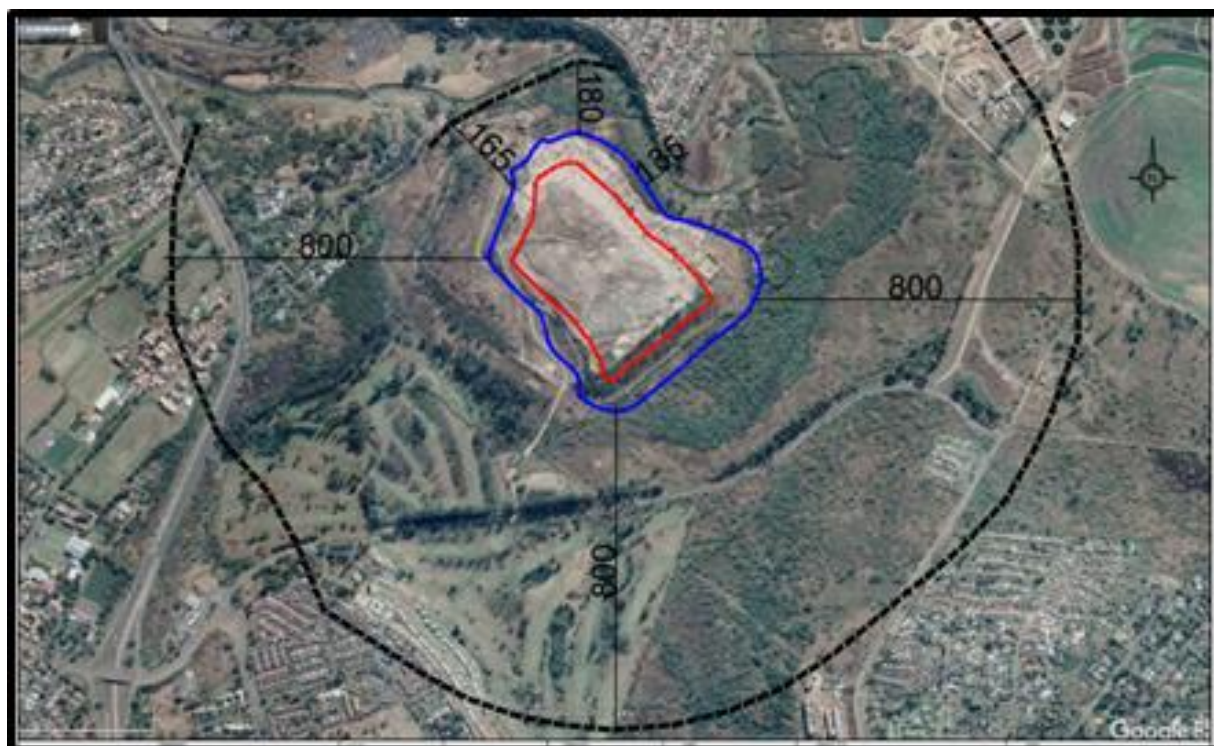
Concerning the infrastructure and facilities, specific areas demand immediate attention. The workshop located on-site has machinery that is not functioning correctly and requires repair, while the workshop/ablution area needs maintenance to ensure proper operation and cleanliness. Addressing these concerns will enhance the efficiency and productivity of the working environment. The unit has communicated with the fleets department to resolve this matter by auctioning off the unnecessary machinery that is no longer needed on-site and arranging for its removal.

Another concern is the presence of informal residences along the perimeter fence surrounding the landfill site. Despite efforts to secure the area, the broken fence allows unauthorized access to the site, especially during the night and security shift changes. This poses a security risk and compromises the integrity of waste management operations. The unit is currently devising a security plan for the buffer zone, wherein the security personnel will not only monitor the landfill site but also maintain surveillance within a 10-meter radius outside the fence to be vigilant about potential incidents and apply necessary preventive measures. As part of the landfill upgrade contract, the security plan will be incorporated to address the repair or installation of a new perimeter fence.

Moreover, the unit has engaged in communication with spatial planning authorities regarding the informal settlements situated along the buffer area, with the intention to prevent any residential and industrial development in those areas. The existing developments within the buffer zone are affecting the landfill's compliance with the National Environmental Management Act (NEMA). Figure 8 serves as a reference for spatial planning authorities, who have been specifically requested to pay close attention to the 800m buffer on the west, south, and east sides, as well as the 135m buffer that has encroached upon the Sobantu Township. The town planning department is considering the inclusion of these aspects in its spatial planning, taking them into account during the assessment of proposed land development

applications and in the forthcoming review of spatial framework plans and specifically noting that strictly no developments are allowed.

FIGURE 4: AREAS PROHIBITED FOR FUTURE DEVELOPMENTS.



5.2. CURRENT STATUS OF THE NEW ENGLAND LANDFILL SITE: CHALLENGES AND MEASURES

Alien Vegetation: The audit identified a significant concern with invasive alien vegetation on the site, threatening the ecosystem.

Active management of alien vegetation through poison application and transition to indigenous plants

Inadequate Water and Gas Monitoring Network: The audit found the current monitoring network inadequate, with missing monitoring points leading to data gaps.

Reinstatement of the water and gas monitoring network for better environmental oversight.

Fire Incident: A critical fire incident highlighted the need for effective fire prevention measures.

Implementation of fire prevention measures with grass cutting as a firebreak.

Infrastructure and Facilities: Immediate attention is required for specific areas within the site's infrastructure and facilities, including malfunctioning machinery and maintenance of the workshop/ablution area.

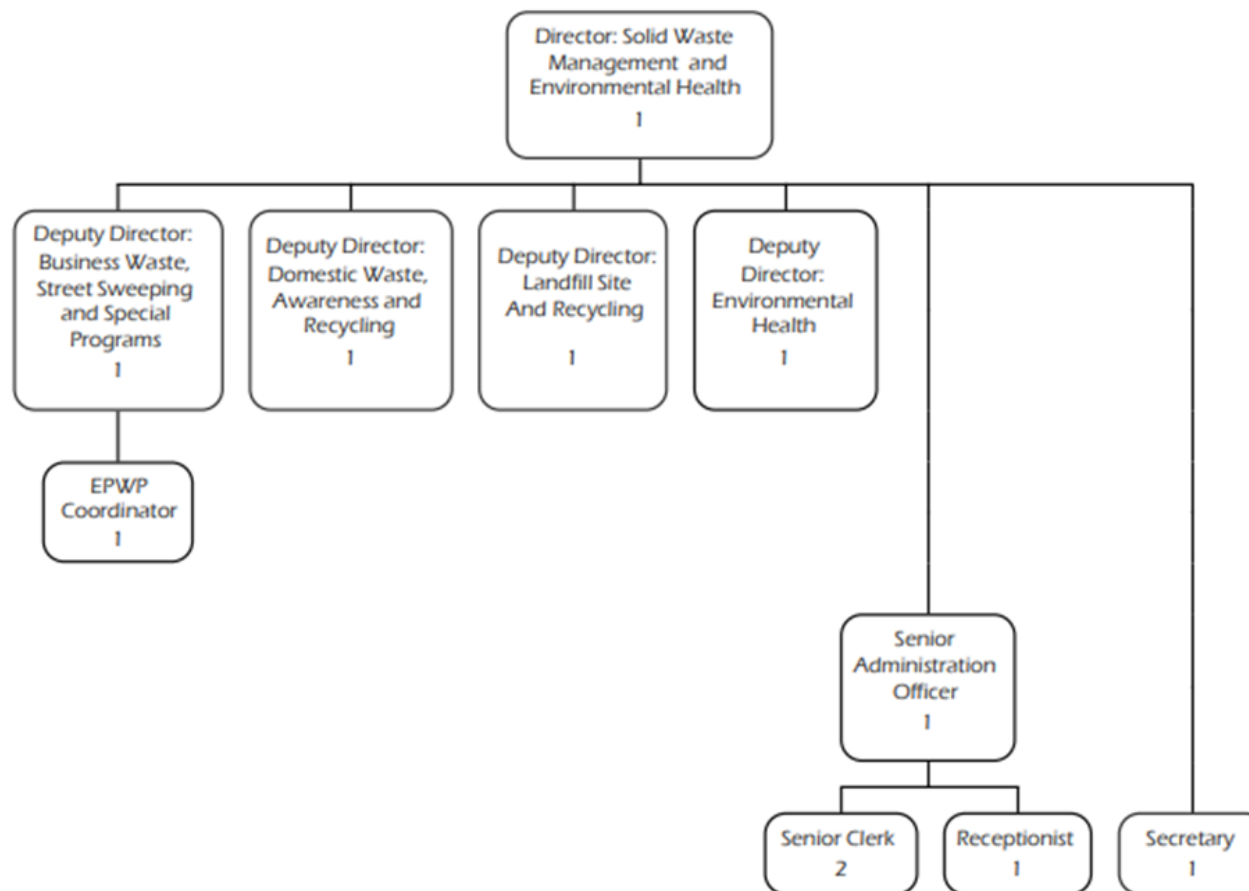
Auctioning off unnecessary machinery and arranging its removal in collaboration with the fleets department

Security Risk: The presence of informal residences near the perimeter fence poses a security risk, leading to unauthorized access during nighttime and shift changes.

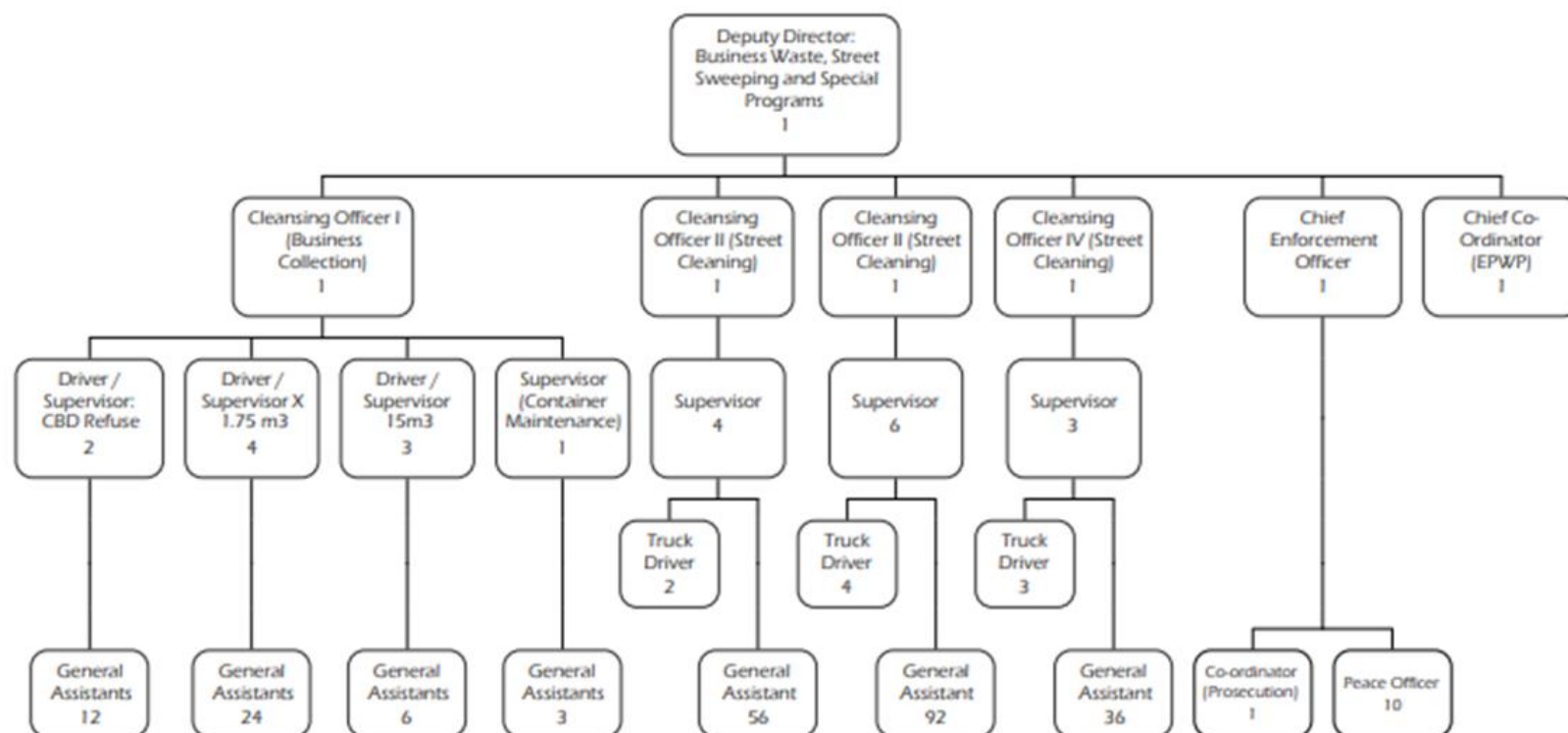
Development of a security plan to address unauthorized access and maintain site integrity. Engaging with spatial planning authorities to prevent unwanted development and ensure compliance with environmental regulations in buffer areas.

5.3. PROPOSED ORGANISATIONAL STRUCTURE

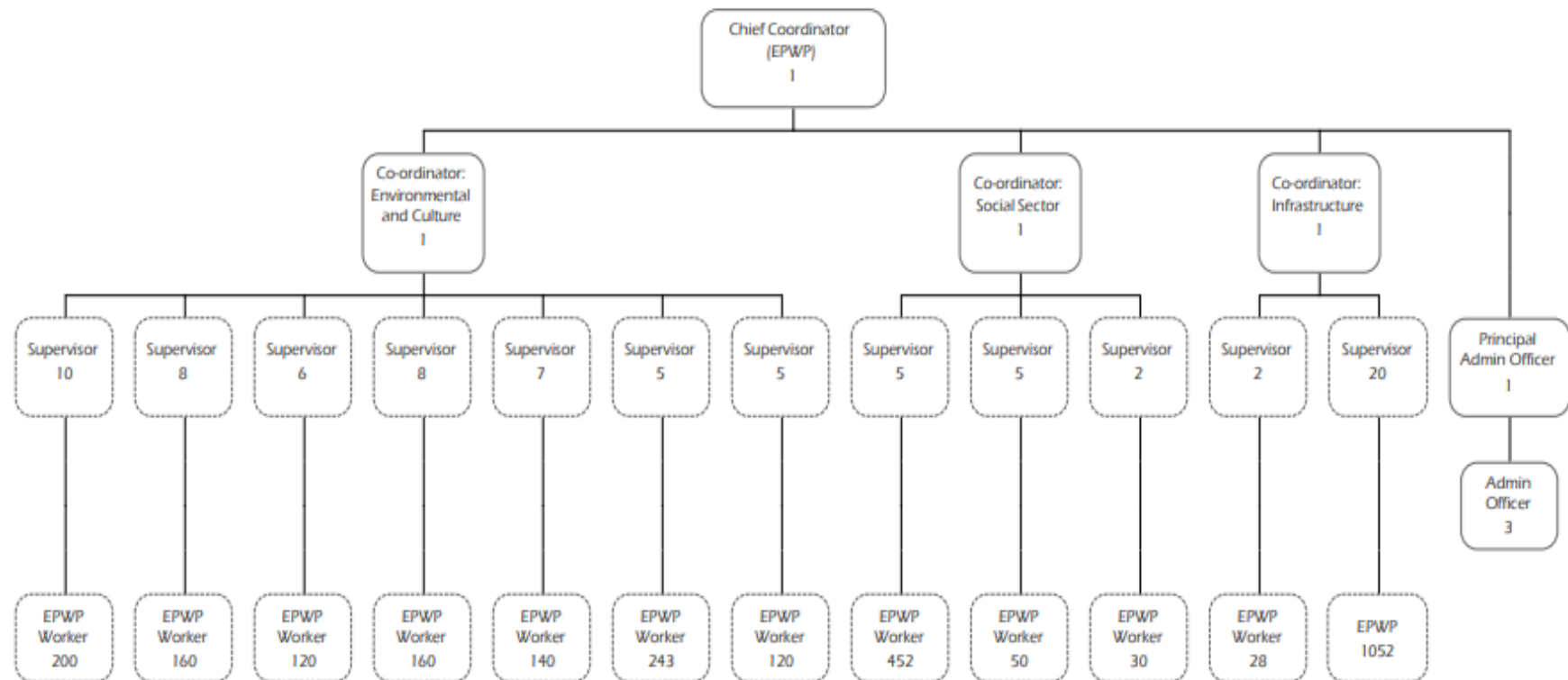
COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: MASTER CHART PROPOSED ORGANISATIONAL STRUCTURE



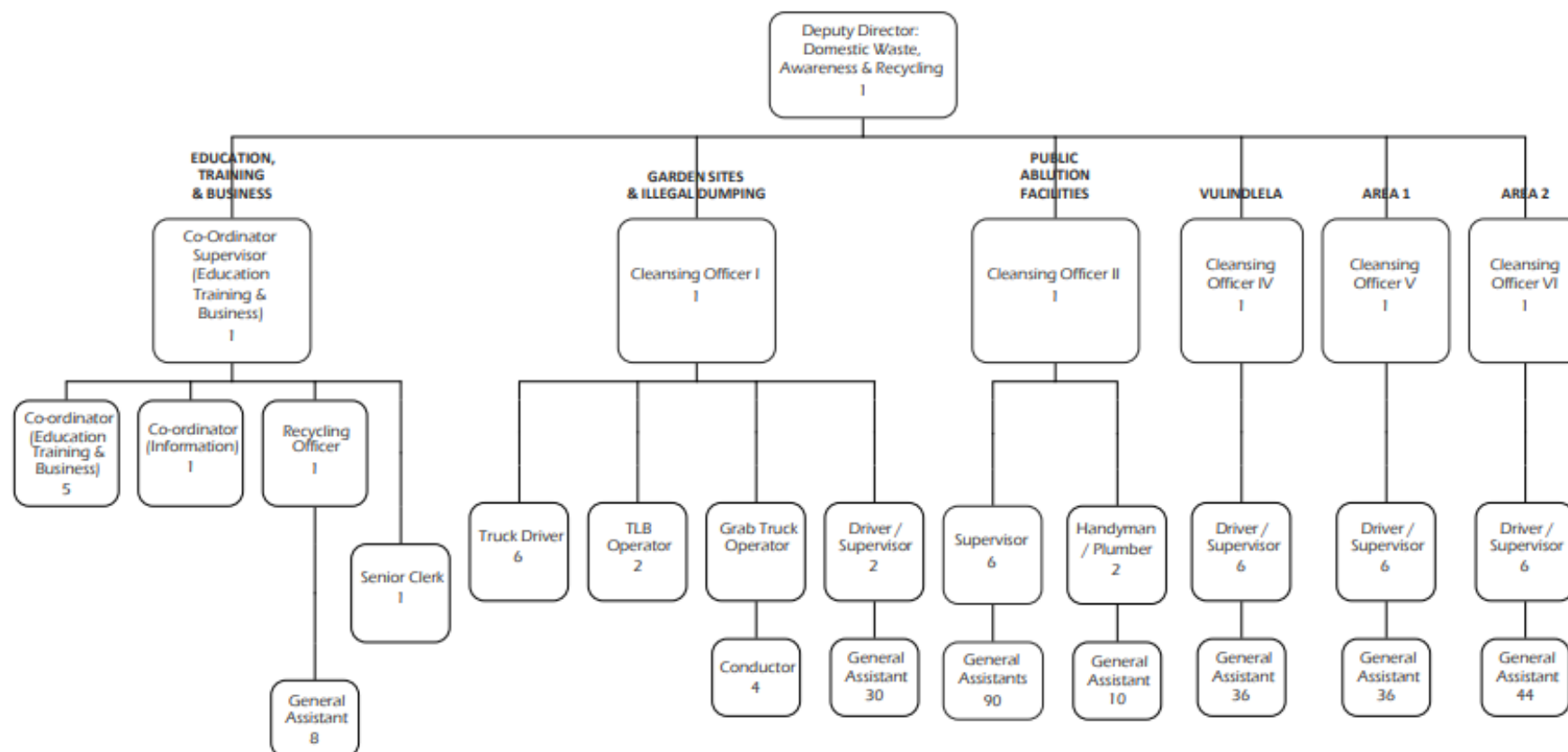
**COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH:
BUSINESS WASTE, STREET SWEEPING AND SPECIAL PROGRAMS
PROPOSED ORGANISATIONAL STRUCTURE**



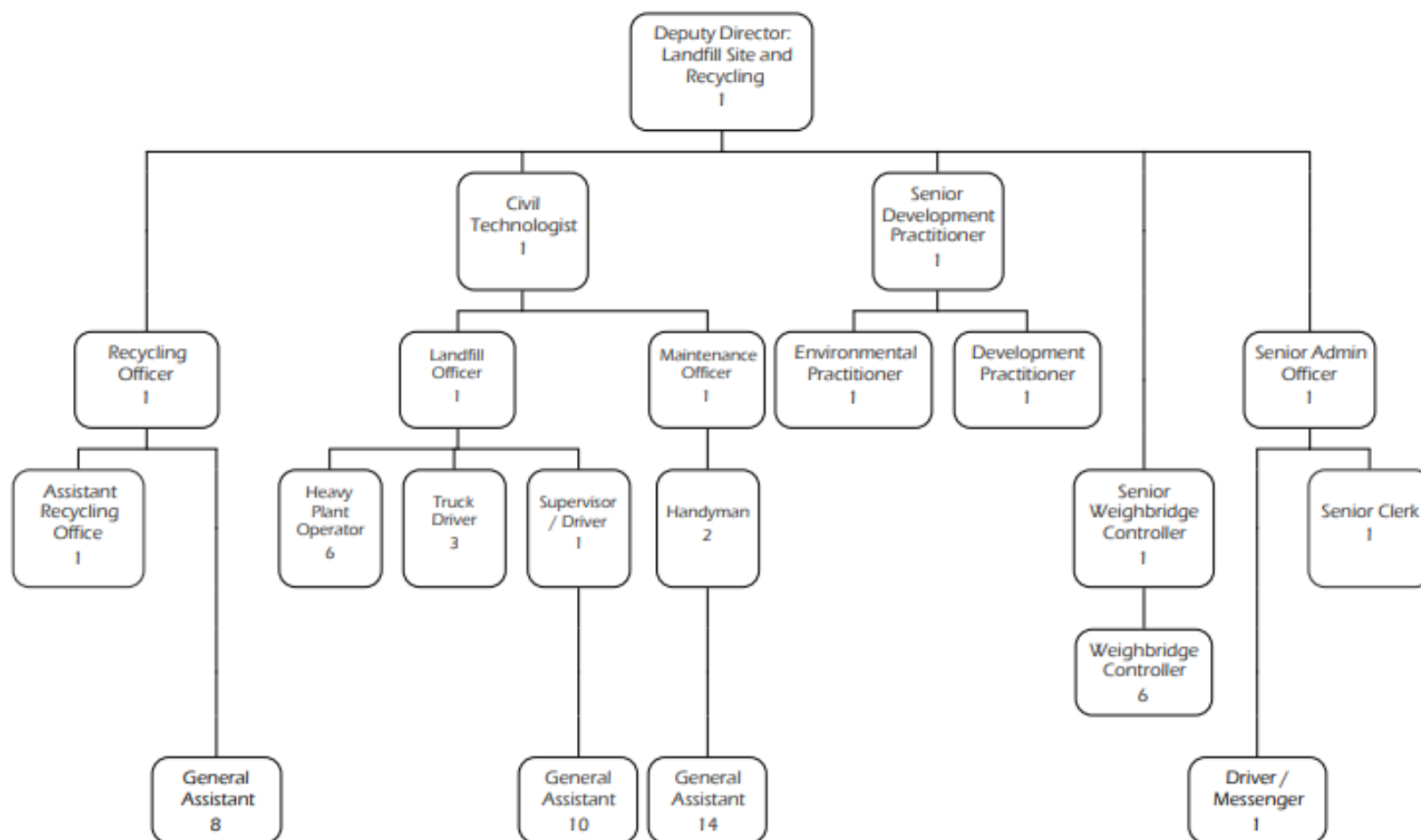
**COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: EPWP
PROPOSED ORGANISATIONAL STRUCTURE**



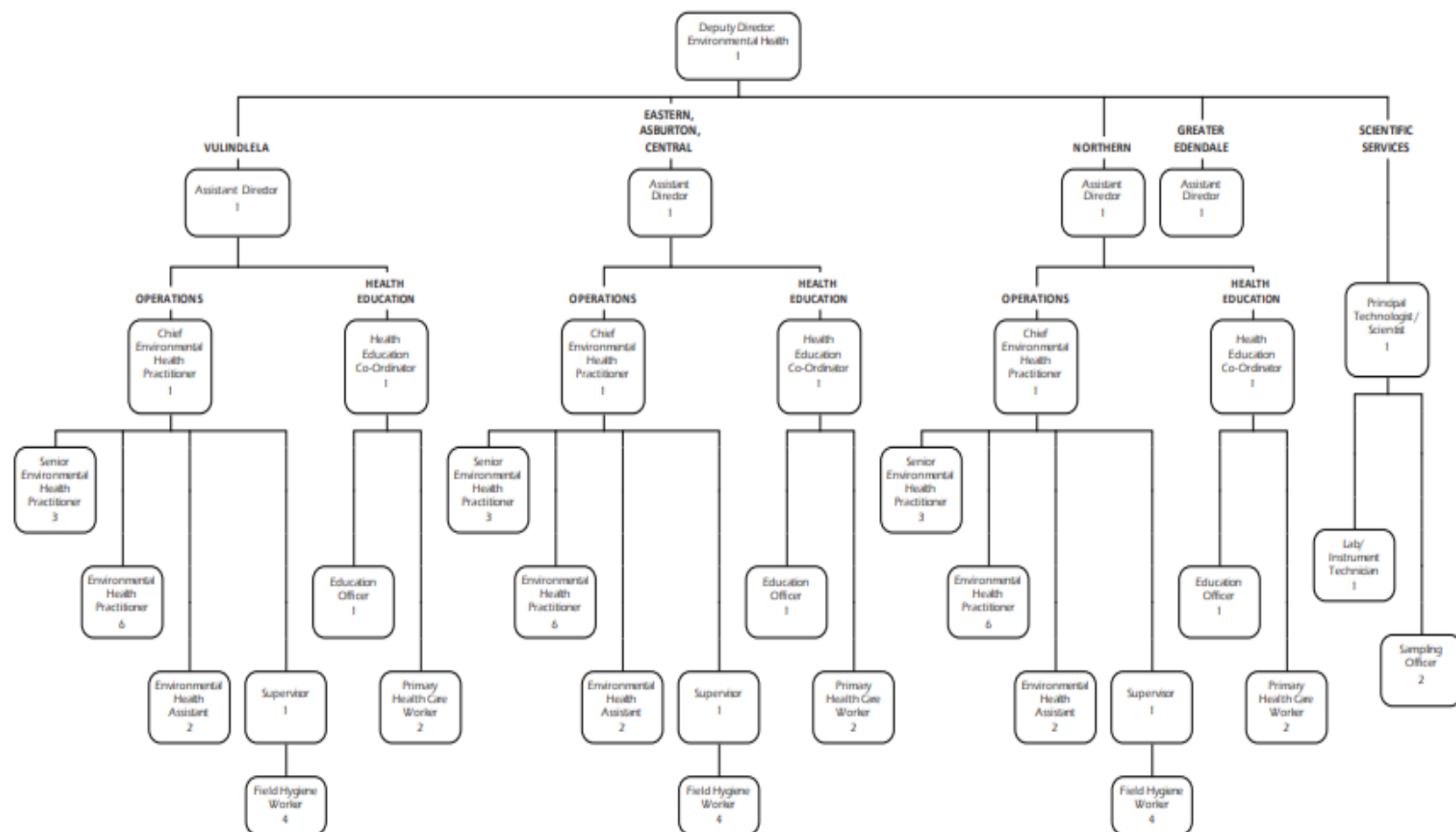
COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: DOMESTIC WASTE, AWARENESS AND RECYCLING
PROPOSED ORGANISATIONAL STRUCTURE 1 OF 2



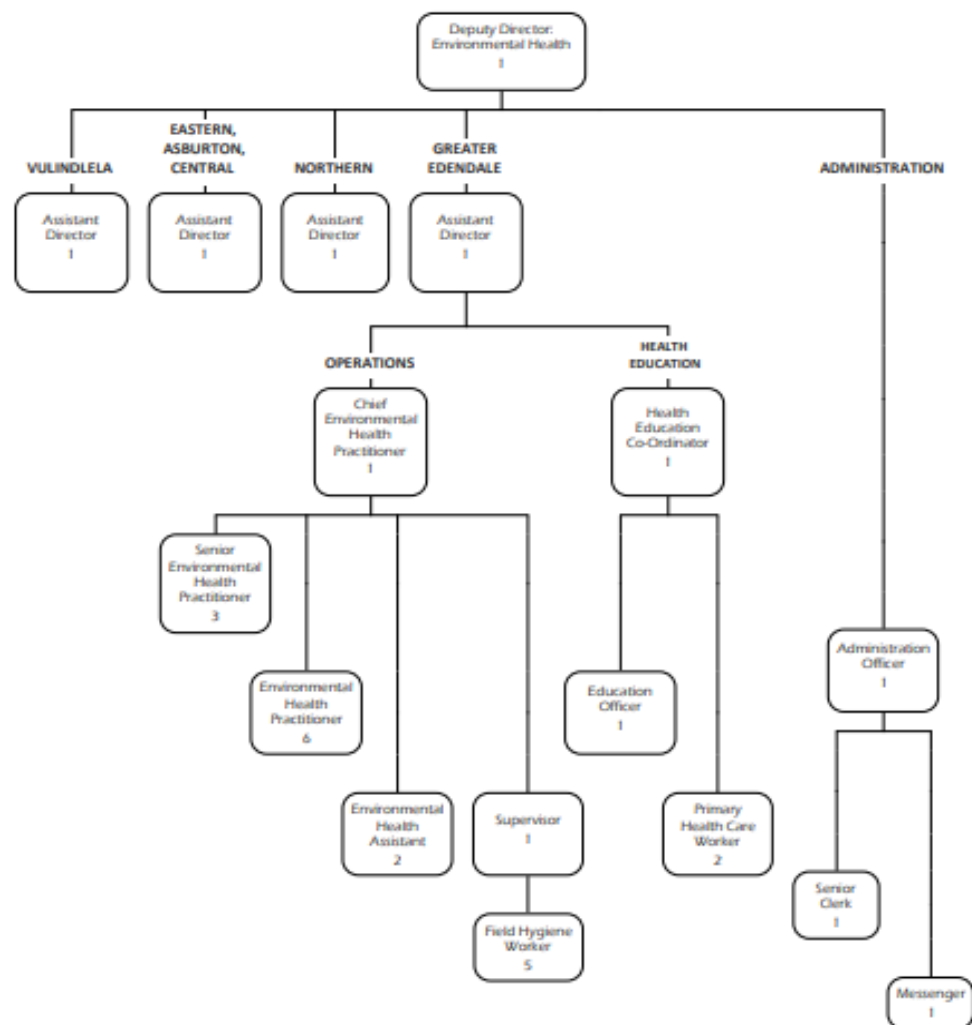
**COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: LANDFILL SITE AND RECYCLING
PROPOSED ORGANISATIONAL STRUCTURE**



**COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: ENVIRONMENTAL HEALTH
PROPOSED ORGANISATIONAL STRUCTURE**



**COMMUNITY SERVICES: SOLID WASTE MANAGEMENT AND ENVIRONMENTAL HEALTH: ENVIRONMENTAL HEALTH
PROPOSED ORGANISATIONAL STRUCTURE**



5.4. CURRENT MUNICIPAL INTERVENTIONS

Table 7: MUNICIPAL CURRENT AND ONGOING INTERVENTIONS

Challenge	Interventions	Year	Progress to Date
Shortages of earth moving yellow plant	Procurement of Yellow Plant	2023	Procurement of Landfill compactor, the procurement of Crawler mounted excavator, Front end loader. The procurement process started through the registration of contract to the regulating authority and requirement for the spending of MIG Funding.
Limited capacity of staff	Procurement of required capacity	2023	Critical positions such as Landfill site and Domestic managers has been filled.
Formalization and development of waste pickers committee	Development of business plan	2023	Demarcation of a recycling area for use by waste pickers within the New England Landfill site. Database for waste pickers does exist, and the requests in the form of funding applications have been sent. Ongoing (has not commenced).
Illegal structures in the landfill buffer zone	Removal of illegal occupiers	2023	Engagement of SAPS, Home Affairs, and other enforcement agencies to implement joint operations. Two operations have already been conducted in terms of removing illegal structures within the landfill buffer zone.
Challenge	Interventions	Year	Progress to Date
Criminal activities within the landfill site	Engagement of security and law enforcement	2023	Declaration of the site as a "security zone," fully equipped with modern camera systems and technology. Two operations have already been conducted in terms of curbing illegal activities at the landfill site and the buffer zone.
Unavailability of fire extinguishing infrastructure	Design and implementation of the fire/hydrant extinguishing	2023	Three hydrants have been resuscitated in terms of an existing network of fire water hydrants. An additional installation of four hydrants is being undertaken internally by the resident landfill manager.

	infrastructure network		
Limited lifespan of the current New England Landfill	Identification, commissioning, and purchase of the new landfill site	2023	The project has not yet commenced because the municipality plans to utilize this plan to evaluate the evidence-based impacts of interventions. The purpose is to determine whether it is possible to increase the lifespan capacity of the existing landfill site without the need to search for a new site.

In terms of compliance towards waste management, the interventions mentioned in table 8 demonstrate a proactive approach to addressing various challenges. The procurement of yellow plant equipment and the development of fire extinguishing infrastructure indicate a commitment to maintaining operational and safety standards. These actions align with waste management regulations and guidelines, ensuring the availability of necessary equipment and measures to mitigate potential risks.

5.5. SERVICES AND DELIVERY

Table 9 below presents data on waste management in the Msunduzi Municipality over a four-year period. It reveals that 73.6% of households consistently received solid waste removal services above the minimum level, while 23.4% of households consistently received services below the minimum level. The number of households in both categories remained steady, indicating a lack of improvement over the years. This raises concerns about the effectiveness and equity of waste management services in the municipality, as a significant portion of households did not receive waste removal services at the required frequency.

Table 8: SERVICES AND DELIVERY 2017 TO 2021

Description	2017/2018	2018/2019	2019/2020	2020/2021
Households	Actual Number	Actual Number	Actual Number	Actual Number
Solid Waste Removal (above min level)	120,000	120,000	120,000	120,000
Minimum Service Level and Above sub-total	120,000	120,000	120,000	120,000

Minimum Service Level and Above Percentage	73.6%	73.6%	73.6%	73.6%
Solid Waste Removal (below min level)	43,000	43,000	43,000	43,000
Removed less frequently than once a week	43,000	43,000	43,000	43,000
Using communal refuse dump	0	0	0	0
Using own refuse dump	0	0	0	0
Own Rubbish Disposal	0	0	0	0
No Rubbish Disposal	43,000	43,000	43,000	43,000
Below Minimum Service Level sub-total	43,000	43,000	43,000	43,000
Below Minimum Service Level Percentage	23.4%	23.4%	23.4%	23.4%
Total number of households	163,000	163,000	163,000	163,000

5.6. WASTE GENERATED AND FINANCE 2023

Table 9: TARIFFS GENERATED FROM 2023 WASTE

	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Product/Category	Total	Total	Total	Total	Total	Total
General Domestic Refuse	R320 259,94	R286 666,24	R295 163,47	R262 096,73	R28 666,24	R3 253 797,80
Mixed Refuse	R355 236,91	R330 140,44	R247 078,37	R333 368,07	R330 140,44	R301 882,21
Industrial Sludges	R51 409,43	R11 645,23	R37 491,96	R 40,048.23	R11 645,23	R0,00
Bulk Food Waste and Condemned Food	R9 242,34	R2 683,26	R25 640,04	R 149.07	R2 683,26	R12 521,88
Sawdust and Wood waste	R1 103,96	R802,88	R301,08	R 602.16	R802,88	R2 308,28
Garden Refuse	R34 835,29	R33 846,75	R28 517,23	R 26,712.07	R33 846,75	R24 649,03

Soil and Sand	R0,00	R0,00	R0,00	R 0.00	R0,00	R0,00
Builder's Rubble and Excavated Material	R41 024,41	R34 426,98	R36 554,49	R 38,682.00	R34 926,98	R31 096,03
Domestic waste by Council	R0,00	R0,00	R0,00	R 0.00	R0,00	R0,00
Builders Rubble for Council	R0,00	R0,00	R0,00	R 0.00	R0,00	R0,00
Illegal Dumping for Council	R0,00	R0,00	N/A	N/A	R0,00	R0,00
Garden Refuse for Council	N/A	N/A	R0,00	R 0.00	R0,00	R0,00
Cover Material by Council	R0,00	R0,00	R0,00	R 0.00	R0,00	R0,00
Private Householders	R0,00	R0,00	R0,00	R 0.00	R0,00	R0,00
Industrial waste for Council	R0,00	R0,00	R0,00	R0,00	R0,00	R0,00
Cover Material	R0,00	R0,00	R0,00	R0,00	R0,00	R0,00
Industrial Ash	R0,00	R0,00	R0,00	R0,00	R0,00	R0,00
Finely Divided Excavated Material	R0,00	R0,00	R1 928,55	R 642.85	R0,00	R0,00

Based on table 9, the waste money is generated from different categories of waste. The categories that generate the most waste money are:

- **General Domestic Refuse:** This category consistently generates a significant amount of waste money each month. It can be attributed to the large volume of general domestic waste generated by households within Msunduzi. The costs associated with collecting, transporting, and disposing of this waste contribute to the high amount of waste money generated.
- **Mixed Refuse:** Similar to general domestic refuse, mixed refuse also generates a substantial amount of waste money. This category includes waste that is a mix of different materials and may require additional sorting and processing before disposal. The costs associated with sorting, recycling, or treating mixed refuse contribute to the higher waste money generated.
- **Industrial Sludges:** Industrial sludges contribute to the waste money generated, although to a lesser extent compared to general domestic refuse and mixed

refuse. The costs associated with managing and disposing of industrial sludges, which can contain hazardous or toxic materials, contribute to the waste money generated from this category.

- **Builder's Rubble and Excavated Material:** The waste money generated from this category is relatively high. Construction and demolition activities within Msunduzi likely contribute to a significant volume of builder's rubble and excavated material. The costs associated with collecting, transporting, and disposing of these materials contribute to the higher waste money generated.

Table 10: WASTE GENERATED PER INDUSTRY

	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Product	Total	Total	Total	Total	Total	Total
General Domestic Refuse	1 159 120.00	1 012 860.00	1 048 880.00	940 900.00	1012860	1153960
Mixed Refuse	1 219 380.00	1 109 480.00	828 160.00	1 154 620.00	1109480	1038920
Industrial Sludges	42 660.00	9 600.00	31 000.00	41,240.00	9600	19540
Bulk Food Waste and Condemned Food	14 600.00	3 940.00	41 500.00	80.00	3940	5000
Sawdust and Wood waste	2 580.00	1 860.00	600.00	1,240.00	1860	0
Garden Refuge	337 800.00	325 320.00	274 200.00	263,520.00	325320	235440
Soil and Sand	54 640.00	74 280.00	169 100.00	166,960.00	74280	216540
Builder's Rubble and Excavated Material	454 800.00	378 300.00	406 220.00	426,560.00	378300	343520
Domestic waste by Council	2 408 540.00	2156680.00	1969720.00	2,261,060.00	2210160	1991260

Builders Rubble for Council	11 800.00	10 960.00	6 040.00	9,400.00	10960	23820
Illegal Dumping for Council	1 203 040.00	1681380.00	N/A	N/A	1693980	1586020
Garden Refuse for Council	N/A	N/A	66 240.00	331,440.00	63520	56360
Cover Material by Council	5 535 740.00	3692480.00	2965680.00	3,235,020.00	3692480	4347450
Private Householders	263 060.00	236 040.00	242 940.00	214,080.00	236040	232100
Industrial Ash	0	28 980.00	40.00	17,400.00	28980	9600
Industrial waste for Council	171 940.00	146 840.00	157 940.00	150,040.00	146840	119940
Cover Material	545 580.00	620 620.00	181 120.00	1,760,620.00	620620	2351720
Finely Divided Excavated Material	0	0	69 300.00	16,000.00	0	0

The waste generated from January to June 2023 in Msunduzi shows fluctuations but generally remains at a high level for categories such as general domestic refuse and mixed refuse. Efforts should focus on waste reduction, recycling, and proper disposal methods to manage these waste streams effectively. Other waste categories, like industrial sludges and bulk food waste, demonstrate lower volumes but require specialized treatment. The council should prioritize waste management practices, including recycling, proper disposal, and education campaigns. Implementing comprehensive waste management strategies will help minimize environmental impact and promote sustainable practices in Msunduzi. The implications for waste management planning based on the waste generated and revenue generated are as follows:

1. **Focus on Residential Waste Management:** Given that "General Domestic Refuse" is the category generating the most waste and contributing to the highest revenue, waste management planning should prioritize residential waste. Implementing effective waste collection and disposal strategies for households is crucial to handle the significant volume of waste generated by residents.
2. **Industrial and Construction Waste Management:** "Mixed Refuse" and "Builder's Rubble and Excavated Material" are major contributors to waste generation

and revenue. Waste management planning should address the specific challenges associated with industrial and construction waste. Collaboration with industries and construction companies is essential to implement proper disposal and recycling practices for these waste streams.

3. **Revenue Allocation for Infrastructure Improvements:** As the revenue generated from waste collection and disposal services is crucial for funding waste management initiatives and infrastructure improvements, careful planning should be undertaken to allocate these funds effectively. Investing in advanced waste management technologies, recycling facilities, and resource recovery centers can lead to more sustainable waste management practices and reduced environmental impact.
4. **Fluctuations in Waste Generation:** The observed fluctuations in waste generation for certain categories, such as "Industrial Sludges" and "Finely Divided Excavated Material," suggest that waste management planning should be flexible and adaptable. Waste management strategies should be able to respond to variations in waste generation to ensure efficient and cost-effective operations.
5. **Sustainable Landfill Management:** Proper management of "General Domestic Refuse" and other waste streams destined for landfill is critical. Waste management planning should focus on sustainable landfill practices, such as waste separation and resource recovery, to prolong the lifespan of the landfill and reduce environmental impacts.

SECTION 6: GAPS AND NEEDS ANALYSIS

Table 11: GAPS AND NEEDS ANALYSIS

No	ISSUE	GAPS AND NEEDS	RECOMMENDATIONS	TIMEFRAME
1	By laws	Reinforce illegal dumping by-laws. Outdated by-laws	Add new fines for illegal dumping by waste type. Review and approve updated by-laws	2023/2024
2	Waste collection and service delivery	Insufficient fleet	Purchase additional refuse trucks	2023/2028
3	Waste Management Education and	Lack of education and awareness	Conduct education campaigns and workshops. Educate communities through ward committees	2023/2024

	awareness campaigns						
4	Illegal dumping	Widespread illegal dumping	Enforce by-laws on illegal dumping	2023/2024			
			Engage officers to enforce the law				
			Install 24-hour surveillance cameras (current)				
			Provision Skip Waste Bins at different wards				
5	Waste information system	Outdated Waste Information System	Update and maintain the Waste Information System	Ongoing			

SECTION 7: PROPOSED STRATEGIES

7.1. STREET CLEANING

Street cleaning operations in Msunduzi are divided into three sub-sections: the Central Business District (CBD), the North/West and South/East suburbs, and the Edendale/Imbali suburbs. The CBD includes the City centre and the Raisethorpe CBD, which spans from Bombay Rd to Trichy Road. The Scottsville CBD is part of the South region, while the Edendale Mall junction falls under the Edendale/Imbali area. The central CBD and Raisethorpe CBD are cleaned daily from Monday to Friday, both during the day and at night.

Various areas, including streets, verges, pavements, and open spaces within the CBDs and suburbs, are cleaned regularly based on a predetermined schedule. The frequency ranges from twice per day in certain CBD areas to once per month in the suburbs. Workers perform tasks such as raking streets, pavements, and gutters, collecting refuse in bags, emptying street bins, and loading the collected waste onto designated trucks bound for the New England Road Landfill (NERLF). The collection of street cleaning refuse bags is carried out using a combination of rear-ended loader (REL) compactors and flatbed trucks. However, there is a shortage of suitable collection vehicles for both the day and night shifts, which hampers the efficient and timely collection of refuse.

The main CBDs face challenges leading to untidiness, illegal dumping, and littering. These issues stem from various factors, some within and some beyond the control of waste management, which hinder the safe and efficient performance of the street cleaning operations. Several factors affect the effectiveness of street cleaning, including:

- Insufficient litter bins: There is a shortage of street and pole-mounted litter bins. It is estimated that 1443 bins, spaced 40 meters apart in the main CBD, would be sufficient to reduce the daily litter to manageable levels.
- Inadequate management of informal street traders: Problems arise from blocked entrances, illegal trading furniture, stands, and equipment, as well as trading directly on the street.
- Food sales and waste disposal: Waste generated from food sales and improper waste disposal practices contribute to the cleanliness issues.
- Misuse of pavements: Some individuals use pavements as toilets, further exacerbating the cleanliness problems.
- Illegal dumping: At the close of business, illegal dumping occurs, adding to the challenges faced in maintaining a clean environment.

7.2. INDUSTRIAL WASTE

Industrial waste management in Msunduzi involves different service options and container sizes for business customers. The collection of industrial waste includes 15m³ containers, 1.75m³ containers, 240-litre containers, and standard 85-litre bin bags, which are not individually accounted for but included in the overall tonnages. Business customers are charged a standard refuse tariff, entitling them to a once-per-week service, but they also have the flexibility to opt for additional collections or larger container sizes, for which they pay an additional tariff.

The 240-litre bin customers, approximately 840 in number, and the 1.75m³ bin customers, approximately 100 business customers, are serviced using specialized rear-ended loader (REL) compactors with specific mechanisms mounted on the back. These containers cater to the specific needs of businesses, ensuring efficient waste collection. For larger customers such as supermarkets, complex businesses, and residential buildings like blocks of flats and office buildings, there are approximately 20 customers who use 15m³ containers. Due to the impracticality or high cost of collecting waste from individual units, this service is provided ranging from once per week to daily throughout the Municipality. The 15m³ bins are serviced using roll-on/roll-off (roro) bin lifter vehicles, which do not compact the refuse in transit. However, these bins have deteriorated over time, with issues such as leakage, rusty and faulty doors, and floors.

In addition to the various container sizes, there are also flats/complexes with 1.75m³ bins that are integrated into the domestic refuse collection process to optimize time and cost efficiencies. One of the challenges faced in industrial waste management is the availability of vehicles. The business unit currently has a vehicle availability rate of 44%, with only three to four out of nine vehicles being operational at any given time. This leads to poor service delivery and affects the adherence to the promised collection schedule.

7.3. INTEGRATION OF WASTE PICKERS

Integrating waste pickers into formal waste management systems requires a comprehensive and inclusive approach. Firstly, policies and programs need to be

developed that recognize the valuable contribution of waste pickers and prioritize their formalization. These policies should ensure their safety, fair treatment, and provide opportunities for their professional growth. To begin the integration process, a registration process should be implemented to identify and document waste pickers operating in the area. This involves creating a database, collecting contact information, and verifying their legitimacy.

Training and capacity-building programs are essential to enhance the skills and knowledge of waste pickers. They should receive training on waste segregation, recycling techniques, occupational health and safety, and business management. Access to essential resources such as protective equipment, tools, and storage facilities should be provided to improve their working conditions and efficiency.

Collaboration between waste pickers and formal waste management entities is crucial. Partnerships and cooperative agreements can be established to involve waste pickers in waste collection, recycling programs, or waste sorting at recycling facilities. Waste pickers should also be included in decision-making processes, participating in waste management committees or forums to ensure their perspectives are considered. Social and economic support mechanisms such as healthcare services, social security benefits, microfinance programs, and vocational training opportunities can further empower waste pickers and diversify their income sources.

Raising public awareness is important to change perceptions and foster acceptance of waste pickers' role in waste management. Public campaigns, educational initiatives, and community engagement activities can contribute to this. Finally, a monitoring and evaluation system should be implemented to assess the effectiveness of the integration efforts, collect feedback from waste pickers, and make necessary improvements for continuous progress.

7.4. WASTE TO ENERGY PLAN

The city's waste to energy plan is a comprehensive strategy aimed at implementing global best practices in waste management. The plan focuses on improving the entire waste management process, including waste collection, handling, and disposal. The goal is to enhance efficiency, minimize environmental impact, and promote sustainable practices. One of the key objectives of the plan is to decrease the amount of waste being sent to landfills through waste diversion strategies. By implementing recycling programs, promoting composting, and exploring innovative technologies, the municipality aims to reduce the reliance on landfills and maximize the utilization of valuable resources within the waste stream.

In line with the waste to energy concept, the plan includes the development of a waste beneficiation program. This program not only addresses waste management but also aims to create job opportunities and stimulate economic growth. By partnering with local businesses, the municipality intends to establish collaborations that can leverage waste as a valuable resource, such as through the production of renewable energy or the manufacturing of recycled products. The implementation

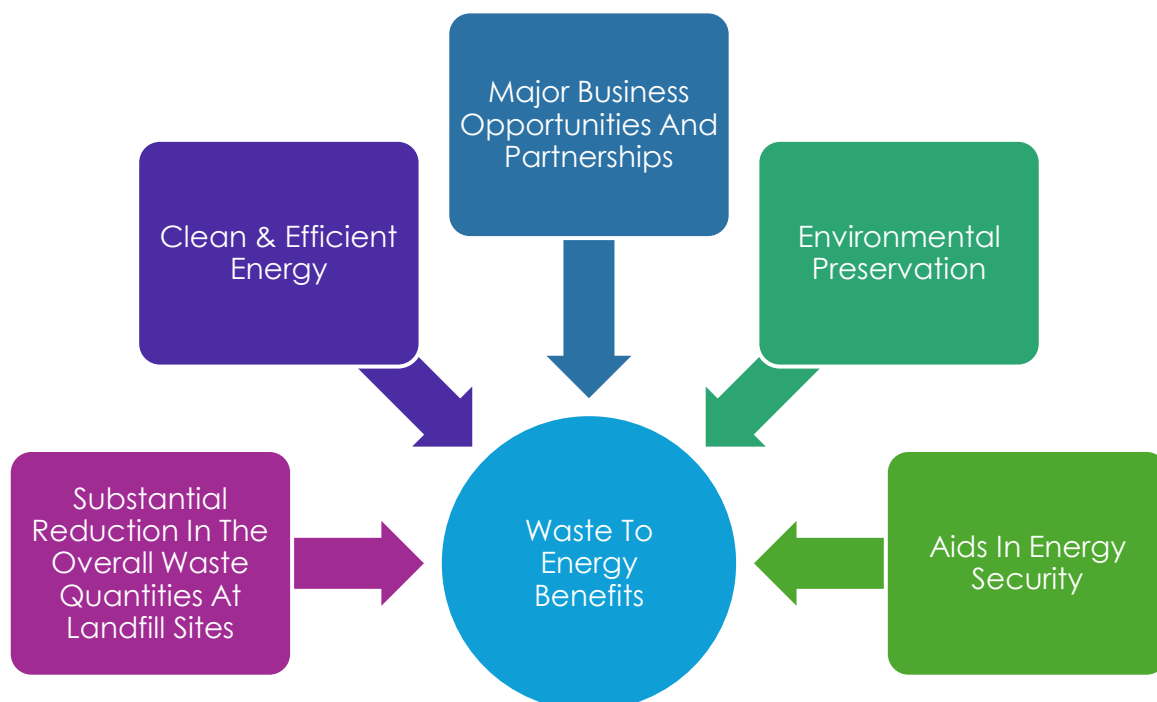
process involves several stages and milestones. In 2022, the municipality submitted funding request to the National Treasury, signalling its commitment to the waste to energy plan. Pre-feasibility studies will be conducted to assess the viability and potential impact of the proposed initiatives. In 2023, technical assistance will be sought, and feasibility studies, including bankability assessments, will be conducted to determine the economic and financial feasibility of the projects.

To ensure transparency and accountability, the municipality will engage with stakeholders through various avenues. These include initiating SD&CE (Sustainable Development and Community Engagement) inception engagements in March 2023, submitting terms of reference (TOR) in April 2023, and engaging with the National Treasury for funding and support. The plan also includes the projection of key milestones such as the BSC (Business Case) report in May 2023 and the appointment of relevant parties in June 2023.

The timeline for the pre-feasibility study is estimated to be six months, during which data collection, site assessments, and initial project scoping will be conducted. The subsequent feasibility study, which is anticipated to last for 12 months, will delve deeper into the technical, financial, and environmental aspects of the proposed waste to energy projects. This detailed analysis will provide a comprehensive understanding of the project's viability, risks, and potential benefits, ensuring informed decision-making and successful implementation of the waste to energy plan.

The waste to energy initiative is anticipated to have these benefits:

Figure 5: WASTE TO ENERGY PLAN BENEFITS



7.5. GENERATED AT SOURCE PLAN

The objective of this municipal plan is to promote and facilitate source separation of recyclable materials at the point of waste generation. By providing residents with clear bags specifically designated for recyclables, we aim to increase recycling rates, reduce contamination, and enhance the overall effectiveness of our waste management system.

7.6. PUBLIC AWARENESS CAMPAIGN

The municipality will launch a comprehensive public awareness campaign aimed at educating residents about the benefits of source separation and the use of clear bags for recyclables. This campaign will utilize various communication channels to reach a wide audience and maximize engagement. Social media platforms, such as Facebook, Twitter, and Instagram, will be utilized to disseminate informative posts, engaging videos, and interactive quizzes to raise awareness and encourage participation. Local newspapers will feature articles and interviews highlighting the environmental and economic advantages of recycling, emphasizing reduced landfill waste, conservation of valuable resources, and the creation of job opportunities in the recycling industry. In addition, community events such as workshops, seminars, and exhibitions will be organized to provide hands-on learning experiences and allow residents to interact with waste management experts.

Educational materials, including brochures, pamphlets, and posters, will be distributed to households, schools, and public spaces to serve as visual aids and quick references on proper waste separation practices. The campaign will collaborate with local schools, community organizations, and environmental groups to further amplify its reach and impact. The allocated resources will cover the development and production of educational materials, social media advertising, event organization, and collaboration efforts. By effectively communicating the environmental and economic benefits of source separation and clear bag usage, the public awareness campaign aims to inspire residents to actively participate in recycling and contribute to a sustainable future for the Municipality.

7.7. DISTRIBUTION OF CLEAR BAGS

The municipality will procure a sufficient quantity of clear bags that are specifically designed for recyclables. These bags will be of high quality and durable to accommodate various types of recyclable materials. To ensure easy accessibility for residents, distribution points will be established at convenient locations throughout the Municipality. These distribution points may include community centers, municipal offices, local stores, and other public spaces. Residents will be able to obtain the clear bags free of charge, encouraging their participation in the source separation program. In developing the distribution plan, the municipality will consider factors such as population density, demographics, and geographical distribution. This will

ensure equitable access for all residents, regardless of their location or background. The distribution plan will be carefully designed to ensure an adequate supply of clear bags at each distribution point, taking into account the anticipated demand and frequency of bag replenishment. Clear instructions and educational materials will accompany the distribution of bags to guide residents on how to properly use them for recycling purposes. The necessary resources for procurement, distribution logistics, and communication materials will be allocated to support this initiative. By providing residents with easily accessible and free clear bags, the municipality aims to facilitate and encourage their active participation in source separation, contributing to the overall success of the waste management program.

7.8. EDUCATION AND AWARENESS

The municipality will implement a clear and effective communication strategy to ensure residents are well-informed about the guidelines for using the clear bags and the types of materials accepted as recyclables. Clear and concise instructions will be provided to residents through various channels. Instructional materials, such as brochures or pamphlets, will be developed and distributed to households, community centres, and other public locations. These materials will explain the proper sorting and preparation of recyclable materials, including any specific requirements or restrictions. Visual aids, such as posters or signage, will also be prominently displayed in public spaces to serve as reminders and guides for residents on proper waste separation practices. These visual aids will feature easy-to-understand graphics and messages to reinforce the importance of source separation and the correct usage of clear bags for recyclables. The communication materials will be available in multiple languages to ensure accessibility for residents with diverse language preferences. The municipality will actively engage with community leaders, local schools, and neighbourhood associations to further disseminate the information and educate residents about the benefits of recycling and the role of clear bags in the process. By effectively communicating the guidelines and providing instructional materials, the municipality aims to enhance residents' understanding and compliance with the source separation program, leading to increased recycling rates and a more sustainable waste management system.

7.9. MONITORING AND FEEDBACK MECHANISMS

To ensure the effectiveness of the clear bag program, the municipality will implement a robust monitoring system to track its usage and evaluate its impact. This system will involve collecting data on the distribution and utilization of the clear bags, as well as monitoring the participation and compliance of residents with the source separation guidelines. Residents will be encouraged to provide feedback on their experience with the program, reporting any challenges or concerns they may encounter during the source separation process. This feedback will be valuable in identifying areas for improvement and addressing any issues that arise. Regular evaluations will be

conducted to assess the program's performance, taking into account both quantitative data and qualitative feedback from residents. Data analysis will help identify trends, measure the program's success in diverting recyclables from landfill, and identify any barriers or gaps in implementation. Based on the findings, necessary adjustments will be made to enhance the program's effectiveness and address any identified challenges. The municipality is committed to continuously improving the clear bag program through ongoing monitoring, evaluation, and responsive action, in collaboration with residents and stakeholders, to ensure a successful and sustainable waste management system.

7.10. STAKEHOLDERS AND RESOURCES

The successful implementation of the plan requires the involvement of various stakeholders and departments. The Municipal Waste Management Department will take overall responsibility for coordinating and overseeing the plan's implementation. They will ensure that all activities are executed according to the set objectives and timelines. The Communication Team will play a crucial role in developing and executing the public awareness campaign. They will design communication materials, utilize different channels to reach the target audience, and educate residents about the benefits of source separation and the use of clear bags. The Procurement Department will be responsible for procuring an adequate supply of clear bags specifically designed for recyclables. They will also manage the logistics of distributing the clear bags to various distribution points, which will be set up in convenient locations such as community centres, municipal offices, and local stores. The Waste Management team will conduct educational sessions and workshops to provide residents with the necessary knowledge and guidance on proper waste separation practices. They will explain the guidelines for using the clear bags and clarify which materials are accepted as recyclables. Local retailers will be engaged as partners in the distribution process by providing space for clear bag distribution points within their establishments.

SECTION 8: PROPOSED STRATEGIES TO ACTION PLANNING

8.1. ANNUAL RECYCLING PROGRAMS

Table 12: STREET CLEANING ACTION PLAN

No	Project	Objective	Activity	Resources Required	Targets	Timeframe	Funding Required
1	Street Cleaning Enhancement	Improve street cleanliness and efficiency	Increase number of litter bins	Litter bins, installation equipment	30 bins	2023-2028	In house
2	Public Restroom Facilities	Improve sanitation facilities	Maintain public restrooms	Maintenance	All restroom in CBD	2023-2028	In House

Table 13: INDUSTRIAL WASTE MANAGEMENT ACTION PLAN

No.	Project	Objective	Activity	Resources Required	Targets	Timeframe	Funding Required
1	Waste Collection Enhancement	Improve industrial waste collection efficiency	Increase vehicle availability	Additional waste collection vehicles	1 compactor 1 TLB 1 Tipper Truck	2023-2028	In house
2	15m3 Bin Maintenance and Replacement, and Illegal	Address issues with 15m3 bins. Combat illegal dumping activities	Provision Skip Waste Bins	replacement bins	1 in each street	2023-2028	In House

	Dumping Prevention						
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Table 14: WASTE PICKER INTEGRATION ACTION PLAN

No	Project	Objective	Activity	Resources Required	Targets	Timeframe	Funding Required
1	Waste Picker Registration	Identify and document waste pickers	Establish registration process	Database system, registration forms	10	2023-2028	In House

Table 15: PUBLIC AWARENESS AND COMMUNICATION

No	Project	Objective	Activity	Resources Required	Targets	Timeframe	Funding Required
1	Public Awareness Campaign	Educate residents, informal street trader, waste pickers	Launch comprehensive public awareness campaign	Communication channels (social media, newspapers), educational materials, workshops, seminars, exhibitions	(5 a year focused on Youth Day Waste Management Campaign (June 16). Nelson Mandela Day Waste Management	2023-2028	In House

					Campaign (July 18). Heritage Day Waste Management Campaign (September 24). World Environment Day Waste Management Campaign (June 5). World Cleanup Day Waste Management Campaign (Third Saturday in September)		
2	Communication and Instruction	Inform residents about all strategies proposed such as the distribution of clear bags and skip bins. Enhance communication	Develop instructional materials, display visual aids. Develop customer service platform	Brochures, pamphlets, posters, signage. Online portal, customer support staff.	N/A	2023-2028	In House

		and service to customers.					
3	Monitoring and Feedback Mechanisms	Evaluate the effectiveness of all programs	Implement monitoring system, collect data, resident feedback	Data collection tools, evaluation framework	N/A	2023-2028	In House
4	Fleet Management System Implementation	Optimize vehicle scheduling and tracking. Improve vehicle allocation and tracking	Install fleet management system	Software, GPS devices	N/A	2023-2028	In House

Table 16: SEPARATION AT SOURCE ACTION PLAN

No	Project	Objective	Activity	Resources Required	Targets	Timeframe	Funding Required
1	Distribution of Clear Bags	Provide residents with clear bags for recyclables	Establish distribution points, procure clear bags	Clear bags, distribution points (community centers, municipal offices, local stores)	2 per household (Weekly)	2023-2028	In House

Table 17: WASTE TO ENERGY ACTION PLAN

No	Phase	Objective	Activities	Resources Required	Targets	Timeframe	Funding Required
1	Pre-feasibility Study	Assess viability and potential impact	Data collection, Site assessments, Initial project scoping	Technical experts, Project managers, Data collection tools	N/A	6 months	R800 000
2	Feasibility Study	Determine economic and financial feasibility	Technical Financial analysis; Environmental analysis	Technical experts; Financial analysts; Environmental specialists	N/A	12 months	R2 500 000