



**AUDITOR GENERAL'S**  
DEPARTMENT OF JAMAICA



# Management of Solid Waste

National Solid Waste Management Authority (NSWMA)

## Performance Audit Report

July 2022

The Auditor General is appointed by the Governor General and is required by the Constitution, Financial Administration and Audit Act, other sundry acts and letters of engagement, to conduct audits at least once per year of the accounts, financial transactions, operations and financial statements of central government ministries and departments, local government agencies, statutory bodies and government companies.

The Department is headed by the Auditor General, Pamela Monroe Ellis, who submits her reports to the Speaker of the House of Representatives in accordance with Section 122 of the Constitution of Jamaica and Section 29 of the Financial Administration and Audit Act.

This report was prepared by the Auditor General's Department of Jamaica for presentation to the House of Representatives.

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DEPARTMENT OF JAMAICA

*'A better Country through effective audit scrutiny'*

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This report contains our findings on our review of solid  
waste management in Jamaica

# Auditor General's Overview

The management of solid waste in Jamaica, in particular the collection of garbage has been a perennial public concern despite the significant expenditure of public funds over the years. Over the period 2016-17 to 2020-21, approximately \$32 billion was allocated for solid waste management, with more than half (\$17.5 billion) disbursed from the collections of property tax. Complaints from citizens include the poor quality of service provided relative to that expected, the pileup of garbage in communities and along roadways and the threat to the environment and public health. Issues relating to inefficient waste collection and improper disposal are among several factors that informed the development of a National Solid Waste Management (NSWM) Policy in 2000, and the passing of the NSWM Act in 2001. Vision 2030 Jamaica National Development Plan (NDP), published in 2009, acknowledged the range of issues related to solid waste management, and articulated a comprehensive National Strategy to 'manage all forms of waste effectively' in achieving National Outcome No. 13 "Sustainable Management and Use of Environment and Natural Resource'. The agencies responsible for implementing the related strategy actions to address the problems affecting solid waste management were outlined in the Vision 2030 NDP and the Government's Medium-Term Socio-Economic Framework (MTF).

The performance audit assessed the process by which these frameworks for effective solid waste management, were being implemented. We found that the necessary regulations to fully establish the National Solid Waste Management Authority (NSWMA) as a regulatory body were not in place. In the absence of supporting regulations, Jamaica is at risk of not achieving its national goal to 'manage all forms of waste effectively' by the year 2030. This report also outlines other issues relating to the funding and management of solid waste and provides recommendations for consideration by the NSWMA and Ministry with oversight responsibility.

I wish to express my sincere thanks to the management and staff of NSWMA for the cooperation and assistance provided to the audit team. Thanks to the many agencies and stakeholders, who provided valuable information and insights, qualitative evidence, as well as feedback through focus group discussions, to enable the delivery of this audit report.



Pamela Monroe Ellis, FCCA, FCA  
**Auditor General**

## Main Issues: At A Glance!



# Summary

Recognizing that improper management and disposal of waste can have adverse effects on the environment and public health, the Government developed the National Solid Waste Management (NSWM) Policy, in 2000. Thereafter, the National Solid Waste Management (NSWM) Act, was passed by Parliament in 2001. In developing the Vision 2030 Jamaica National Development Plan (NDP), published in 2009, the Government also made waste management one of the priority areas to achieving National Outcome No. 13 “Sustainable Management and Use of Environment and Natural Resources”. One of the national strategies in achieving National Outcome No. 13, is for the Country to “manage all forms of waste effectively”. The Vision 2030 NDP identified improper management of waste among the issues and challenges that could prevent Jamaica from achieving National Outcome No. 13. In 2015, Jamaica reinforced its commitment to Vision 2030 NDP by adopting the Sustainable Development Goals (SDGs), whereby National Outcome No. 13 is linked to SDG 11 and 12.

The overall objective of the performance audit was to evaluate the effectiveness of solid waste management in Jamaica given perennial concerns regarding the management of waste by the responsible public entity. The focus of the audit was to assess the process by which the legal and policy frameworks for the management of solid waste were implemented and to evaluate the strategic planning, operational processes, and funding for solid waste management. The report is arranged in four parts. Part One introduces the study topic, whilst parts two, three and four contain the audit findings. Part Two includes findings on the effectiveness of implementing waste management legal and policy frameworks. Part Three focuses on waste management planning, collection, and disposal. Issues relating to funding for solid waste management are detailed in Part Four.

The audit found that whereas existing legislation and policy established the framework for effective management of solid waste, there was poor implementation of the framework. There were challenges with insufficient resources for solid waste management, which were exacerbated by governance and operational weaknesses. Operational weaknesses contributed to inefficient waste collection and disposal practices, given the failure to effectively introduce waste reduction strategies, through the Three Rs model of waste management – Reduce, Reuse and Recycle to make waste management sustainable.

## What we found

### Waste Management Framework

**A legal and policy framework is essential for the effective management of solid waste. The National Solid Waste Management (NSWM) Act and Vision 2030 Jamaica National Development Plan (NDP) set the legal and policy framework for effective management of solid waste in Jamaica. However, our review of the progress of implementing the framework indicated poor coordination among the agencies responsible for implementation, chief among these is the National Solid Waste Management Authority (NSWMA).**

- 1. The passing of the NSWM Act in 2001, as the principal legislation governing solid waste management in Jamaica was a good first step towards the sustainable management of solid waste in Jamaica.** The NSWM Act emphasises NSWMA’s regulatory role; however, the enabling regulations to support the NSWM Act and provide the structures that would establish NSWMA as a regulatory entity are yet to be established. Twenty-one years later, instead of focusing on its

regulatory functions, NSWMA's operations are mainly confined to the collection and transportation of solid waste and operation of waste disposal sites.

2. **Under Vision 2030 NDP, NSWMA was charged to spearhead the revision of the governance framework and the National Solid Waste Policy for waste management, to reflect emerging issues such as hazardous waste, e-waste, medical waste, and agricultural waste, as well as to promulgate the national solid waste regulations.** Whereas NSWMA drafted the Disposal of Solid Waste Facilities, Public Cleansing and E-Waste regulations and submitted these to the Chief Parliamentary Council for review, between 2013 and 2015, the regulations are yet to be promulgated. An unfulfilled consideration for NSWMA, in the NSWMA Act, was the establishment of procedures and development, implementation and monitoring of a national plan relating to solid waste management.
3. **In addition, Vision 2030 NDP identified six priority sector strategies to “manage all forms of waste effectively”.** These included an initial first step in years 1 to 3, for the responsible agencies to “create an appropriate institutional framework for the integrated management of all types of waste, including the development of a comprehensive waste management policy and associated standards and regulations.” However, our analysis of the Planning Institute of Jamaica (PIOJ) Medium-Term Socio-Economic Framework (MTF) and the MTF progress reports, on the status of the implementation of the Vision 2030 NDP priority sector strategies for the management of solid waste, revealed that the agencies responsible made no progress in implementing the strategies.

In most instances, the MTF identified the NSWMA as the lead agency responsible for spearheading the required actions, including the promulgation of the national solid waste regulations and revision of the NSWMA Policy. The Ministry of Local Government and Rural Development (MLGRD) was responsible for separating the regulatory and operational functions of NSWMA. With approximately eight years remaining for Jamaica to achieve the goals under Vision 2030 NDP, the actions, summarized in **Table 1** and detailed in **Appendix 1**, that would serve to assist NSWMA in its waste management functions, are yet to be achieved. We found no evidence that NSWMA's Board and MLGRD provided the necessary strategic direction and support, respectively, for the implementation of these actions.

Lead agencies responsible for implementation	No. of actions	Implementation Progress		
		✓	⚠	✗
National Solid Waste Management Authority (NSWMA)	21	0	2	19
Ministry of Local Government and Rural Development (MLGRD)	5	0	0	5
Ministry of Health and Wellness (MoHW)	1	0	0	1
Ministry of Economic Growth and Job Creation (MEGJC)	1	0	0	1
Petroleum Corporation of Jamaica (PCJ)	1	0	0	1
Resort Boards	1	0	0	1
<b>Total</b>	<b>30</b>	<b>0</b>	<b>2</b>	<b>28</b>
✓ Achieved      ⚠ Partially Achieved (improvements needed)      ✗ Yet to be Achieved				



4. **To date, Jamaica has no sanitary landfills although the NSWM Act and Vision 2030 NDP provided for the conversion of existing dumps into sanitary landfills and the designation, development, and management of new sanitary landfills<sup>1</sup>.** A waste disposal site, generally referred to as a dump, is where solid waste is disposed of in Jamaica, largely because NSWMA's waste management practices have not advanced towards the adoption of modern engineering methods for the disposal of solid waste. The design of engineered sanitary landfills is a technical measure, which is essential for sustainable solid waste management to reduce the negative impact on the environment. However, NSWMA indicated that only the Riverton waste disposal site, which has been upgraded overtime, exhibit characteristics like that of sanitary landfill. The other seven are deemed inefficient and have outlived their life cycle, although still in operation, posing serious risks to the environment and human health; a case in point being the Church Corner waste disposal site in St. Thomas. Of the eight waste disposal sites, only three that underwent significant upgrading work have the required environmental permit. However, these sites have a high rate of non-compliance with the specific conditions of the permits<sup>2</sup>.

### **Waste Management Planning, Collection and Disposal**

**Waste separation is considered as an effective waste management strategy to minimize the volume of waste transported to disposal sites; this means, preserving disposal sites' lifespan, reducing the negative impact on the environment, and sustainable funding for waste management.**

5. **Sound waste management requires reliable data on solid waste generation and composition.** NSWMA's records indicated that it conducted 10 waste characterisation studies between 2000 and 2017; however, NSWMA only provided us with eight reports. Waste characterisation studies identify the composition of the waste collected, daily household generation rates, patterns of generation among households and communities and the overall waste generation within each parish and wasteshed. Despite evidence of an increasing trend in estimated waste volumes, due to varying factors, NSWMA has not conducted the required annual study since 2017<sup>3</sup>. Nonetheless, in a context where the studies revealed that an average of 94.6 per cent of the residential waste collected was recyclable and could be diverted from waste disposal sites, NSWMA conducted public education initiatives and implemented seven waste separation pilot projects, aimed at creating awareness about waste recycling to reduce the volume of recyclable waste transported to disposal sites. However, given the limited scale of public awareness campaign, there is still great opportunity to raise the level of awareness and encourage better waste disposal practices.

<sup>1</sup> The NSWM Act defines sanitary landfill as "a land disposal site employing an engineering method of solid waste disposal in a manner that minimizes environmental hazards and meets any prescribed design and operation standards"

<sup>2</sup> Permits issued in keeping with the Natural Resources Conservation (Permits and Licences) Regulations, 1996.

<sup>3</sup> Demographic changes caused by population growth, increase in housing developments, changes in consumption patterns etc.

6. **Jamaica's waste generation continues to outstretch collection resources in a context where effective and sustainable waste reduction strategies are yet to be implemented, threatening the sustainability of funding for solid waste management.** As at May 25, 2022, NSWMA's fleet consists of 77 collection trucks, but 34 (44 per cent) were not operational due to various mechanical issues; leaving 43 (56 per cent) trucks to provide waste collection function. This was similar to the situation at the end of 2019-20 and 2020-21. NSWMA supplements its waste collection activities by engaging independent contractors; nonetheless, it continues to face shortage in the number of waste collection trucks. To spread the reach of the limited collection trucks, NSWMA reduced its initial twice weekly collection schedule to once weekly and set a collection target of only 70 per cent. The reduction in the collection schedule has contributed to an increase in the number of complaints from citizens about delays in solid waste collection. This appears to have contributed to an increase in acts of illegal burning or dumping. NSWMA acknowledged that uncollected waste was either burnt or dumped in gullies or waterways. Of note, NSWMA has experienced a 93 per cent increase in the number of complaints about illegal dumping, posing risks to the environment and public health<sup>4</sup>.
7. **Data provided by NSWMA suggested collection of an average of 85 per cent of the estimated waste generated, between 2017 and 2020, exceeding the 70 per cent target using the characterisation study of 2017, given no data for 2021 and 2022.** However, in the absence of an efficient weigh-in system to determine actual waste volumes collected, we could not place any reliance on the reported volume of waste collected by NSWMA. NSWMA calculated the volume of waste collected by simply multiplying the load capacity of the truck by the number trips. Without using a scale, it would be difficult to accurately determine the tonnage hauled by each truck. In December 2015, NSWMA purchased a scale at a cost of US\$41,444 and indicated that it conducted a test run of the scale between July 2016 and January 2017. NSWMA has not used the scale since 2017, and instead made payments to independent contractors on a per trip basis. There is still a need for a more accurate system of measurement to determine the payment of expenditure under this activity, which totalled \$5.7 billion, between 2016-17 and 2021-22. NSWMA indicated that the scale was purchased *"...to ensure value for money through the initiation of revised rates and management decision to change the method of contractor payments from a per trip basis to a per tonne basis"*.

### **Funding for Solid Waste Management**

**NSWMA has not conducted a proper needs assessment; hence, it is unaware of the full extent of the gaps, which are heightened by poor internal controls to mitigate risks and properly account for monies received for waste management.**

8. **NSWMA receives annual subventions from the Government towards the financing of solid waste management, which increased to \$6.2 billion in 2020-21 from \$4.4 billion in 2016-17, in a context where other funding sources combined, primarily commercial income averaged only 11 per cent of total income over the review period, demonstrating NSWMA's increased need for government funding.** NSWMA's reliance on Government funding is engendered by the non-establishment of the enabling regulations to provide the supporting structures for an effective waste management system involving private contractors, with proper regulatory oversight by

<sup>4</sup> NSWMA Environmental Wardens Training Manual

NSWMA. Total funding over the last five years, amounted to \$32.5 billion, of which \$28.9 billion represented Government subvention (net) with more than half of the amount (\$17.5 billion) coming from property tax. Although NSWMA has asserted that insufficient resources negatively impacted its waste management activities NSWMA did not provide evidence that it conducted a comprehensive needs analysis to accurately quantify the gap between the resources it received and what is required for effective solid waste management. Further, NSWMA did not implement and maintain an effective fleet management system, to include information such as the vehicle maintenance, operational efficiency and cost-effectiveness of its waste collection trucks.

9. **Over the last five years, 2016-17 to 2020-21, NSWMA paid \$5.5 billion to contractors under its special projects and seasonal works programme.** Special projects and seasonal works include desilting (street sweeping and cleaning) activities to remove sanding materials, bushes, and debris from roads and sidewalks as part of NSWMA's public cleansing activities. However, NSWMA did not implement adequate control procedures to ensure that the works were in fact executed and at agreed standard. Consequently, there was a high risk of expenditure not being accompanied with value and the system being manipulated by individuals with ill-intent. We noted that the internal auditors identified cheques written to 154 individual contractors totalling \$32 million, which were lodged to a third-party account. Our audit identified an additional 166 cheques with a value of \$38.8 million, which were also lodged to the same third-party account. We noted that in all cases the cheques were not endorsed by the payees; therefore, we could not determine the basis on which the commercial bank honoured the cheque deposit request by the third-party. The third-party is a contractor engaged by NSWMA but was not party to the related transactions. NSWMA have since commissioned an investigation into the matter. Nonetheless, the internal control system is in urgent need of strengthening. This is critical in a context where NSWMA is challenged for adequate resources.

## What Should be done

**Review of Waste Solid Management**

- If sustainable waste reduction strategies are not implemented, closing the resource gap may be difficult as waste volumes continue to exceed waste collection resources, placing more reliance on government funding to meet collection demand. An urgent review of solid waste management in Jamaica, by an independent team of experts, in consultation with NSWMA and other public and private stakeholders interest, is required. Given the risks to the environment and public health, posed by worsening waste management practices, the MLGRD should liaise with the Enterprise Team of consultants appointed by Cabinet to expedite its review of the NSWMA in determining the way forward in fixing the problem, so that citizens can benefit from improved waste management. The review should consider the need for the introduction of efficient waste reduction strategies.



Collaboration

**Whole of government and multisectoral collaboration**

- The Government should adopt a whole of government approach to solid waste management. Effective waste reduction strategy requires an integrated approach, backed by legislation and policy, to generate co-operation among public, private and citizen stakeholders. This would facilitate a cultural shift in contributing to sustainable recycling and disposal systems for improved solid waste management. Such whole of government and multisectoral collaboration is necessary to stimulate improved co-operation among key stakeholders to foster better waste management practices, starting at the household level.



Accountability

**Better control and accountability of solid waste expenditure**

- To ensure proper management and accountability, NSWMA must urgently conduct a comprehensive review of its operations, to revamp its special projects and seasonal works programme and the current practice of quantifying the volume of solid waste transported to disposal sites by independent contractors. Given that the combined expenditure for these two activities was \$11 billion, over the last five years, the review should include detailed assessment of the risks that may prevent the achievement of the objectives, and thereby implement adequate internal controls to mitigate the risks to obtain maximum value from the money spent.

# Part One

## Introduction

### The 2030 Agenda for Sustainable Development and Vision 2030 Jamaica NDP

**1.1** The 2030 Agenda for Sustainable Development, adopted by all United Nations member states in 2015 provides the basis for peace and prosperity for people and the planet, now and into the future. The SDGs and 2030 Agenda provide an integrated roadmap for sustainable development by outlining 17 Sustainable Development Goals (SDGs), with set targets and indicators for achievements by all member states (**Figure 1**).

Figure 1 These are the 17 Sustainable Development Goals (SDGs)



Source: Sustainable Development Goals

**1.2** Jamaica’s adoption of the SDGs reinforced the Country’s commitment to the goals of Vision 2030 Jamaica National Development Plan (NDP), which seeks to “make Jamaica the place of choice to live, work, raise families, and do business”. Waste services prominently feature in the targets and indicators of both SDG 11 and SDG 12, notably with commitments to prevent, reduce, recycle and reuse – as well as to properly collect and discharge of waste. SDG 11 identifies waste collection and management as essential public services for every community and are necessary for the protection of public health and the environment. SDG 12 highlights the need for more efficient and environmentally friendly management of materials across the lifecycle, through production, consumption, and disposal (**Figure 2**).

Figure 2: SDG 11 and 12:

To ensure sustainable waste services, we must value waste workers and make sure they are in decent jobs



Waste collection and management are essential public services for every community and are necessary for the protection of public health and the environment. Quality waste-related services are critical to urban management and policies, they underpin thriving local economies and are vital to ensure public spaces can be enjoyed by everyone. Whenever urban waste services and management systems are poor or fail, inhabitants suffer bad living conditions – especially those in the poorest neighbourhoods and slums – and social discontent rises.

Managing plastic and food waste for a sustainable future

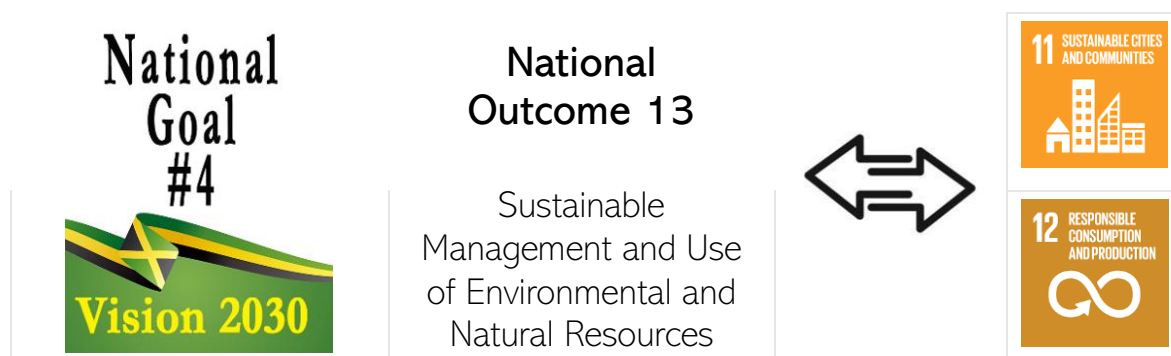


Recognizes that long-term development and economic growth depend on changing how we produce and consume goods. It demands more efficient and environmentally friendly management of materials across the lifecycle, through production, consumption, and disposal.

Source: Sustainable Development Goals (SDGs)

**1.3** Goals 11 and 12 under the 2030 Agenda SGD are linked to Vision 2030 NDP National Outcome 13 National Strategies – Sustainable Management and Use of Environmental and Natural Resources (**Figure 3**). Therefore, the management of waste is a critical issue for Jamaica to achieve sustainability both under the global Agenda for Sustainable Development and Vision 2030 NDP. This in a context where the safe collection, disposal or recycling of wastes reduce harmful impacts on the environment and public health.

Figure 3 Vision 2030 NDP - Goal No. 4 “Jamaica has a healthy natural environment”



Source: Vision 2030 NDP, SDGs

### NSWMA's role in managing solid waste in Jamaica

**1.4** The National Solid Waste Management Authority (NSWMA) is the agency responsible for the management of solid waste in Jamaica, with its roles and responsibilities outlined in the National solid Waste Management (NSWM) Act (**Figure 4**).

Figure 4 NSWMA's Main Role

The Authority shall:

- a) Take all such steps as are necessary for the effective management of solid waste in Jamaica to safeguard public health, ensure that the waste is collected, stored, transported, recycled, reused or disposed of, in an environmentally sound manner and promote safety standards in relation to such waste; and,
- b) Promote public awareness of the importance of efficient solid waste management and foster understanding of its importance to the conservation, protection and proper use of the environment.

Source: NSWM Act 2001 Part II Section 4(1) (a) and (b)

**1.5** In 2016 the cabinet appointed an Enterprise Team of consultants to look on the way forward for solid waste management in Jamaica. The review should have been completed in March 2021, but a one-year extension was given to March 2022. The areas to be considered by the Enterprise Team included the privatization of solid waste management, waste characterisation, disposal site management, staff number and wages, waste collected, waste to energy and waste recycling.

### **Audit rationale, scope, and methodology**

**1.6** Waste management continues to be a major issue in Jamaica with increasing complaints about delays in the collection of solid waste, poor disposal practices and management of disposal sites and concerns about the use and adequacy of funding for solid waste management. Furthermore, waste management is an important element in the Vision 2030 NDP to attain sustainable development as ineffective waste management can create serious negative environmental, natural resources and public health impacts. The audit focused on the implementation process of the legal and policy framework for the management of solid waste as well as, waste management planning, collection and disposal and funding for solid waste management. We also considered how the audit would contribute to the wider strategic aim of the Auditor General's Department (**Figure 5**).

Figure 5 In scoping the study, we considered how the audit would contribute to the achievement of the Auditor General's Department wider strategic aims by:

- a) Assisting the Government of Jamaica with useful recommendations that will aid in improvements in the delivery of public services.
- b) Targeting coverage of the Auditor General's Department (AuGD) Audit Themes, governance, resource management and accountability to aid in achieving the AuGD's vision of promoting a better Country through effective audit scrutiny of Government operations; and,
- c) Providing assurance to Parliament and the public on the efficiency, effectiveness, and economy of the operations of Government Ministries, Departments and Agencies (MDAs).

Source: AuGD's Audit Study Plan










**1.7** We planned and conducted our audit in accordance with the Government Auditing Standards, which are applicable to Performance Audit, as well as standards issued by the International Organization of Supreme Audit Institutions (INTOSAI). In this regard, the audit team gained knowledge of the study topic by reviewing internal and external information, conducting interviews with management and staff of NSWMA and other stakeholders including focus groups, as well as performed site visits, walkthroughs, and analytical reviews. We conducted risk assessments and developed issue analyses with the questions which the audit sought to answer, to form our opinions and conclusions. We conducted fieldwork, between December 2021 and June 2022, to gather sufficient and appropriate audit evidence on which we based our conclusions.



## Part Two

### Solid Waste Management Framework

 At A Glance			
Systems and practices	Criteria	Key Findings	Assessment Against Criteria
Legal and policy framework for waste management	Adequate legal and policy framework exist for effective solid waste management.	The NSWM Act and Vision 2030 NDP created the legal and policy frameworks for effective management in Jamaica.	
Implementation of legal and policy framework for waste management	Effective implementation of framework requirements to improve waste management.	Non-Implementation of the frameworks because of poor coordination among the responsible agencies.	
Compliance with environmental laws for waste disposal	Adherence with environmental laws relating to waste management.	Only three of eight waste disposal sites have the required environmental permit to operate but were not in compliance with most of the permit conditions.	
 MET the criteria  Criteria partially met  Did not meet the criteria			

#### NSWMA regulatory role hampered by delays in the regulations to support the NSWM Act

**2.1** The Ministry of Local Government, Youth and Community Development developed a National Solid Waste Management (NSWM) Policy, in May 2000<sup>5</sup>. As highlighted in **Figure 6**, the intention of the NSWM Policy was for the National Solid Waste Management Authority (NSWMA) to be established to regulate the solid waste operations of collection, transportation, transfer, and disposal of solid waste, through the enactment of the National Solid Waste Management (NSWM) Act, which would be the principal legislation governing solid waste management in Jamaica.

<sup>5</sup> Current name: Ministry of Local Government and Rural Development (MLGRD)

Figure 6 The Solid Waste Management Act, 2001 establishes the National Solid Waste Management Authority, as a statutory body that will have management responsibility for solid waste island wide. It is responsible for:

- Overall management of solid waste
- Establishing sector standards and performance criteria
- Public and community education
- Licencing solid waste companies, solid waste collection vehicles and disposal site operators
- Contracting solid waste collectors for municipal garbage collection
- Planning and defining collection zones in collaboration with Parish Councils, the Kingston and St. Andrew Corporation (KSAC) and the Town and Planning Authority
- Establish the tipping fee structure and rates
- Operate solid waste disposal sites in the short-term, preparing them for divestment to the private sector subsequently

Note: The NSWMA Policy noted that:

- *"In the short-term, disposal sites will be operated by the NSWMA until they are divested. The private contractors will provide solid waste collection services for municipal solid waste and the NSWMA will be the vehicle to contract the collectors and administer payment for the services provided. If the collectors fail to operate according to standard this can be a basis for applying penalties or terminating services..."*
- *"Collection vehicles currently owned by the Government, will be divested through a transparent bidding process to those interested in establishing themselves in the solid waste collection business..."*
- *"Disposal facilities will be operated by the private sector as discreet enterprises with the ability to earn their revenue by charging Tipping fees". Initially it is envisaged that the NSWMA will operate the disposal sites island wide until the new regional landfill sites and transfer stations are established".*

Source: National Solid Waste Management Policy – May 2000 Ministry of Local Government, Youth and Community Development

**2.2** It was envisaged that NSWMA would continue operate existing solid waste disposal sites in the short-term, preparing them for subsequent divestment to the private sector, along with waste disposal vehicles owned by the government. Then, NSWMA would become a self-financing entity that focuses on regulating the solid waste operations. Along with the Act, there would be enabling regulations to allow NSWMA to carry out its regulatory functions as outlined in **Figure 7**.

Figure 7 The Solid Waste Management Act will be the principal legislation governing solid waste management in Jamaica. Along with this Act, there will be enabling regulations covering issues such as:

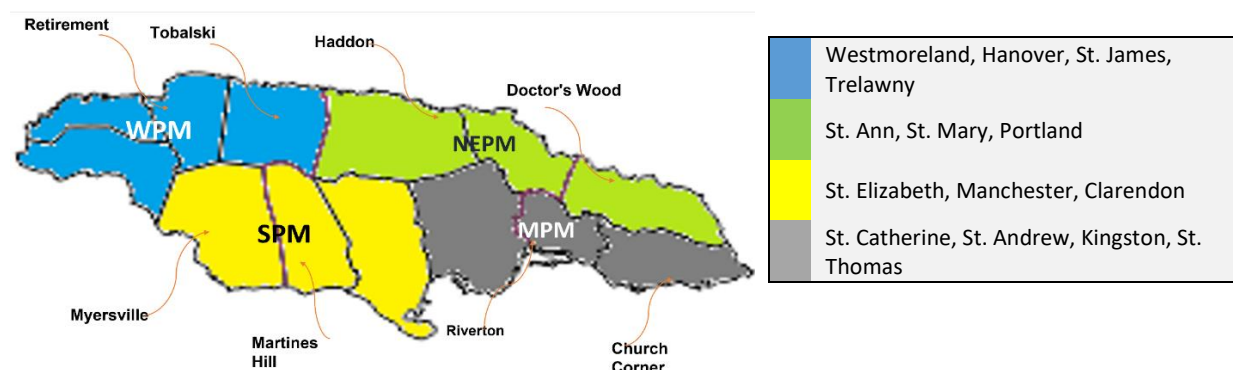
- |   |                                    |
|---|------------------------------------|
| ▪ Licencing companies to collect and transfer waste   | ▪ Illegal dumping and littering    |
| ▪ Licencing trucks to collect and transport waste   | ▪ Recycling                        |
| ▪ Licencing operators of waste disposal facilities  | ▪ Waste processing/waste to energy |
| ▪ Tipping fee structure and rates   | ▪ Ship/aircraft generated waste    |
| ▪ Standard for storage containers, collection vehicles, operation of disposal sites and transfer stations | ▪ Hazardous and medical waste.     |
| ▪ Performance criteria for solid waste collectors and operators of landfill sites and transfer stations   |                                    |

Note: The NSWMA Policy noted that *"where legislation specific to solid waste management currently exists, for example the Litter Act, these will be subsumed and incorporated into the Solid Waste Management Act. Where other jurisdictions cover some aspects of solid waste management, for example, the Public Health and Natural Resources Conservation Authority Acts, appropriate cross-referencing will be done"*.

Source: National Solid Waste Management Policy – May 2000 Ministry of Local Government, Youth and Community Development

**2.3** In 2001, Parliament passed the NSWMA Act, under which the NSWMA was established to manage solid waste in Jamaica. To this end, NSWMA inherited eight waste disposal sites and four parks and markets companies – Metropolitan Parks and Markets (MPM), North Eastern Parks and Markets (NEPM), Western Parks and Markets (WPM) and Southern Parks and Markets (SPM) (**Figure 8**). The primary functions of NSWMA under the NSWMA Act is to safeguard public health, by ensuring waste is collected, stored, transported, recycled, reused, or disposed of in an environmentally sound manner and promote safety standards in relation to such waste<sup>6</sup>. The NSWMA Act emphasises NSWMA’s enforcement and regulatory functions to manage solid waste, consistent with the NSWMA Policy. However, twenty-one years later since the passing of the NSWMA Act, instead of playing a regulatory role, NSWMA’s operations are mainly confined to the collection and transportation of solid waste and the management of waste disposal sites. This, as the enabling regulations to provide the supporting structures that would firmly establish NSWMA as a regulatory entity are yet to be established.

Figure 8 Regional Locations of Parks and Markets Companies and Waste Disposal Sites



Source: NSWMA records

### Priority sector strategies under Vision 2030 to manage all types of waste yet to be achieved

**2.4** Under Vision 2030 Jamaica National Development Plan (NDP), one of the national strategies is to achieve National Outcome #13, “Sustainable Management and Use of the Environment and Natural Resources”. The aim is to “*manage all forms of waste effectively*” (**Figure 9**).

Figure 9 National Outcome #13 Sustainable Management and Use of Environmental and Natural Resources – National Strategy: Manage all Forms of Waste Effectively

1. Appropriate institutional framework for the integrated management of all types of waste
2. Modernize the waste management infrastructure
3. Harmonize all national and sectoral policies
4. Comprehensive waste management policy and associated standards and regulations
5. Integrate communities and private sector participation
6. Development of markets for waste (Waste-to-Energy)
7. Promote awareness among the general public

Source: Vision 2030 Jamaica NDP

<sup>6</sup> National Solid Waste Management Act Part 4(1)(a)

**2.5** Vision 2030 NDP, identified six deficiencies in the overall management of waste; the prolonged effects of which can be harmful, posing serious risk to public health and the environment. These are the lack of a comprehensive waste management policy, increased volume of waste generated, inadequate waste disposal infrastructure, poorly managed landfills, outdated waste management technology and lack of awareness of proper waste management practices (**Figure 10**).

Figure 10 Vision 2030 Jamaica NDP: Improper Management of Waste: Deficiencies in the collection, disposal and treatment and overall management of waste include:

1. Lack of a comprehensive waste management policy resulting in the haphazard management of waste
2. The volume of waste generated especially solid waste is increasing significantly and the waste stream is changing, and now includes a higher proportion of inorganic materials (e.g. plastics and packaging materials)
3. Infrastructure for disposal of solid and liquid waste is inadequate, and non-existent for hazardous waste, including e-waste
4. A network of poorly managed landfills, with very little progress being made towards modernizing the landfill infrastructure to sanitary landfills
5. Outdated waste management technology that is not sufficiently responsive to the changing conditions
6. Lack of awareness by the general population of the importance of proper waste management practices as well as cultural practices such as illegal and indiscriminate dumping and burning which contribute to human and environmental health problems

Source: Vision 2030 Jamaica NDP (Challenges identified - Page 238)

**2.6** In proposing a whole of government approach, to address these deficiencies, the responsible agencies were expected to coordinate efforts in executing this national strategy, “to manage all forms of waste effectively”. The responsible agencies are the Ministry of Health and Wellness (MoHW), Office of the Prime Minister (OPM), National Environment and Planning Agency (NEPA), Ministry of Local Government and Rural Development (MLGRD), local authorities and NSWMA. Vision 2030 NDP outlined six priority sector strategies in setting the framework for effective waste management. In executing these six strategies, Vision 2030 NDP identifies an initial first step in years 1 to 3, that the responsible agencies would “*create an appropriate institutional framework for the integrated management of all types of waste, including the development of a comprehensive waste management policy and associated standards and regulations.*” However, this strategy which sets the foundation for the achievement of the other five strategies, is yet to be implemented (**Figure 11**).

Figure 11 Vision 2030 Jamaica NDP: National Outcome #13: Sustainable Management and Use of Environmental and Natural Resources - National Strategy: Manage all forms of waste effectively

Selected Sector Strategies	Where are we now?
1. Create an appropriate institutional framework for the integrated management of all types of waste, including the development of a comprehensive waste management policy and associated standards and regulations (Years 1-3).	Not Yet Achieved
2. Harmonize all national and sectoral policies to take into account potential implications for waste generation and management.	Not Yet Achieved
3. Modernize the waste management infrastructure.	Not Yet Achieved
4. Integrate communities and private sector participation in the management of waste.	Not Yet Achieved
5. Create incentives for the development of markets for waste (e.g. waste-to-energy conversion, recycling, zero-waste processing).	Not Yet Achieved
6. Promote awareness among the general public to influence their waste management practices.	Ongoing

Source: Vision 2030 Jamaica NDP

**2.7** The Planning Institute of Jamaica (PIOJ) adopts the Medium-Term Socio-Economic Framework (MTF) as the implementation tool for Vision 2030 NDP National Strategies in line with the SDGs. Our analysis of the MTF, for 2012-15, 2015-18 and 2018-21, and the MTF progress reports revealed that the responsible agencies made no progress in completing various priority sector strategy actions relating to waste management. As summarized in **Table 1** and detailed in **Appendix 1**, in most instances, the MTF identified NSWMA as the lead agency responsible to spearhead the required actions, specifically under National Outcome No. 13 “manage all forms of waste effectively”.

Table 1 Implementation of Priority Sector Strategy Actions “Manage All Types of Waste Effectively”

Lead agencies responsible for implementation	No. of actions	Implementation Progress		
		✓	⚠	⊖
National Solid Waste Management Authority (NSWMA)	21	0	2	19
Ministry of Local Government and Rural Development (MLGRD)	5	0	0	5
Ministry of Health and Wellness (MoHW)	1	0	0	1
Ministry of Economic Growth and Job Creation (MEGJC)	1	0	0	1
Petroleum Corporation of Jamaica (PCJ)	1	0	0	1
Resort Boards	1	0	0	1
<b>Total</b>	<b>30</b>	<b>0</b>	<b>2</b>	<b>28</b>
✓ Achieved      ⚠ Partially Achieved (improvements needed)      ⊖ Yet to be Achieved				

**Source:** PIOJ Medium Term Socio-Economic Policy Framework – 2012-15, 2015-18, 2018-21, Vision 2030 Jamaica NDP

**2.8** For example, since 2012, NSWMA was charged with spearheading the revision of the governance framework and the National Solid Waste Policy for waste management, to reflect emerging issues such as hazardous waste, e-waste, medical waste, and agricultural waste, as well as to promulgate the national solid waste regulations. Whereas NSWMA drafted the Disposal of Solid Waste Facilities, Public Cleansing and E-Waste regulations and submitted these to the Chief Parliamentary Council for review, between 2013 and 2015, these regulations are yet to be promulgated. From our review of the minutes of NSWMA’s Board meetings, we saw no evidence of discussion relating to the NSWMA’s strategic deficiencies, direction and the National Solid Waste Policy for waste management. In addition, the MLGRD was responsible for separating the regulatory and operational functions of NSWMA; however, we found no evidence that MLGRD provided strategic support for the implementation of this action.

**2.9** With approximately eight years remaining for Jamaica to achieve the goals under Vision 2030 NDP, these actions, which would serve to assist NSWMA in its waste management functions are yet to be achieved. The main objective of such whole of government and multisectoral collaboration would be to stimulate improved co-operation among key stakeholders to foster better waste management practices, starting at the community level, and leveraging resources for effective waste reduction and recycling. This would help in addressing the social and financial issues, highlighted by NSWMA in its strategic business plans, affecting waste management (**Figure 12**).

Figure 12 Social issues affecting NSWMA

- Unplanned and unregistered housing development is often created without adequate provision for the storage and collection of solid waste.
- Inadequate waste management threatens public health and lead to environmental degradation.
- Mainstream housing developers do not take solid waste management into consideration in housing construction. This negatively affects storage, collection and ultimately the cost associated with disposal and treatment of waste.
- Irresponsible methods of managing solid waste by the citizens threaten human health through the generation and proliferation of pathogens and disease-causing vectors.
- Proliferation in the use of computers and related hardware has resulted in an increase in electronic-waste (E-waste) generation.

Source: NSWMA Business Plan 2019-2023

## NSWMA has not converted waste disposal sites into sanitary landfills to better manage waste

**2.10** Jamaica has no sanitary landfill, a longstanding issue highlighted in the NSWMA Policy and Vision 2030 NDP, which noted problems with the use of dumpsites. Considerations for NSWMA, under the NSWMA Act included the conversion of existing dumps to sanitary landfills; designate, develop, and manage new sanitary landfills and other solid waste disposal operations and to provide facilities for the collection, treatment, and disposal of solid waste (**Figure 13**). The NSWMA Act defines a sanitary landfill as “a land disposal site employing an engineering method of solid waste disposal in a manner that minimizes environmental hazards and meets any prescribed design and operation standards”. The introduction of sanitary landfills was considered necessary to ensure better waste management practices to reduce potential harm from accumulated waste by safe decomposition.

Figure 13 Jamaica has no sanitary landfill; instead, there are a myriad of small dumpsites across the island: Over the last 10 years there has been a reduction from 26 such sites to 10, as some are no longer used due to sanitation and environmental problems. Some of these problems include:

- Leaching of toxic and hazardous substance into the ground and surface water bodies as the disposal sites are unlined
- Transmission of infections to sorters and livestock that rummage through waste which often times includes medical and hazardous waste
- Uncontrolled burning as a result of spontaneous combustion from wastes with low flash points and/or the build up of methane gas
- Foul odours, vermin and flies resulting from uncovered waste

NOTE: Generally, these dumps have not had the benefits of appropriate equipment nor sufficient funding for adequate management to be sustained. In addition, the small size of the disposal sites has affected the economies of scale for proper management to be instituted.

Source: National Solid Waste Management Policy – May 2000 Ministry of Local Government, Youth and Community Development

**2.11** However, since its establishment in 2001, NSWMA neither converted any of the disposal sites into sanitary landfills nor developed any new sanitary landfills. NSWMA stated, in a February 2020 document titled “Church Corner Disposal Site Closure plan” that “*there exist no official registered sanitary landfills in Jamaica*”. The document noted that the closest site that exhibits characteristics like that of a sanitary landfill is the Riverton disposal site, which received significant upgrades over the years. This is the largest and the most heavily used disposal site. It was further noted that the other disposal sites do not have the capacity and potential to be upgraded like the Riverton disposal site, as they are deemed inefficient and have outlived their life cycle. These waste disposal sites are still in operation posing serious threats to



public health and the environment. NSWMA could not provide information on the estimated useful life remaining for the Riverton disposal site, an important statistic for planning and assessment of the sustainability of the site. NSWMA indicated that it created storm water management systems and compacts and covers waste at all its disposal sites, and implemented gas venting at Riverton, Retirement and Haddon disposal sites. In addition, NSWMA indicated that it divided disposal sites into manageable designated cells for the various types of waste and install fire suppression systems at the Riverton disposal site. However, as shown in **Table 2**, NSWMA's waste disposal sites do not meet all the basic requirements of a sanitary landfill.

Table 2 Basis Requirements of Sanitary Landfills

No.	Waste Disposal Sites	Bottom liner	Leachate Collection System	A Methane Collection System	A stormwater management system	Compact waste and Cover with soil
1	Riverton	X	X	✓	✓	✓
2	Retirement	X	X	✓	✓	✓
3	Haddon	X	X	✓	✓	✓
4	Tobalski	X	X	X	✓	✓
5	Martins Hill	X	X	X	✓	✓
6	Myersville	X	X	X	✓	✓
7	Doctors Wood	X	X	X	✓	✓
8	Church Corner	X	X	X	✓	✓

Features of a sanitary landfill:

1. A bottom liner made from clay and durable synthetic plastic.
2. A leachate collection system to remove liquids.
3. A methane collection system that removes landfill gas as it is generated.
4. A stormwater management system that keeps surface water from flowing into the garbage
5. Waste compaction and covering is the process of compacting waste, reducing it in size and cover with dirt

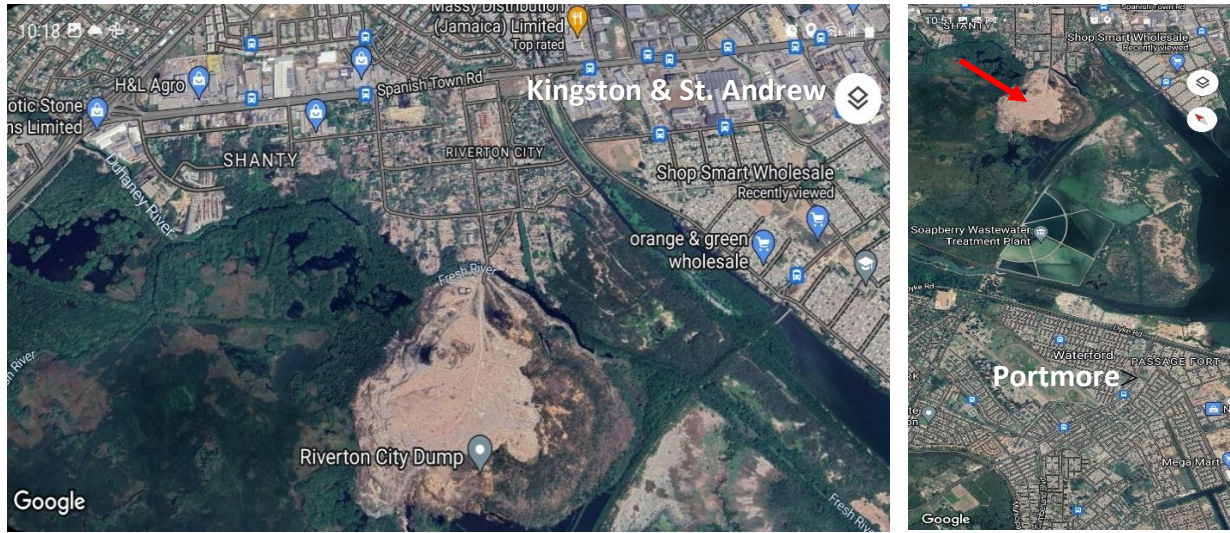
**Source:** AuGD research

**2.12** Minutes of its Technical and Operational meeting held April 8, 2021, indicated that NSWMA considered the requirement for a functional landfill, but budgetary constraints hindered the implementation of the relevant systems, such as the construction of a leachate pond at the Riverton disposal site, which would cost approximately \$700 million. Satellite images in **Image 1** showed that Riverton disposal site is located close to urbanized areas of Kingston, Saint Andrew and Portmore, posing public health threats to the general environment, resulting from the propensity for dust, odour, and smoke from fires<sup>7</sup>. Information from NSWMA revealed that a total of 51 fires occurred across its waste disposal sites, between January 2018 and December 2021, reducing to 11 in 2021 from 17 in 2018, resulting from mitigating measures to contain and lessen the occurrences of fire<sup>8</sup>.

<sup>7</sup> In relation a fire at Riverton waste disposal site in 2018, NEPA Enforcement Notice issued July 31, 2018, indicated that: "The discharge of air pollutants into the atmosphere is a serious threat to the environment and to the health of the public as it contains particulates which impact all persons inclusive of those with specific respiratory vulnerabilities due to congenital limitations or pre-existing illnesses".

<sup>8</sup> Installation of firebreak to confine blaze, covering of inactive cells, strategic placement of stockpile of soil, maintenance of fire suppression system, engagement of spotters and installation of venting pipes to release combustible gasses (NSWMA 2018-19 Annual Report).

Image 1 Satellite Images showing the location of the Riverton disposal site



Source: Google Map

### NSWMA is not monitoring the remaining lifespan of waste disposal sites for forward planning

**2.13** The delay in establishing the framework to integrate the management of waste, as required in Vision 2030 NDP, prevented NSWMA from planning for future waste disposal facilities. This deficiency in NSWMA's waste management activity may impair the effective management of waste disposal to safeguard public health. Based on our research, accurately estimating the lifespan of existing waste disposal sites is necessary for forward planning in exploring new engineering methods, for the creation of new waste disposal facilities, and the risks involved in acquiring new lands for the disposal of solid waste. Finding suitable locations for waste disposal facilities, will require careful assessment to avoid possible harmful effects from the toxic gases and liquids being released into the environment and contamination of rivers and streams, which are sources of potable water supply. Therefore, to effectively manage existing and plan for future waste disposal facilities, it is important that the lifespan of existing waste disposal sites be monitored. A case in point is the Church Corner waste disposal site in St. Thomas.

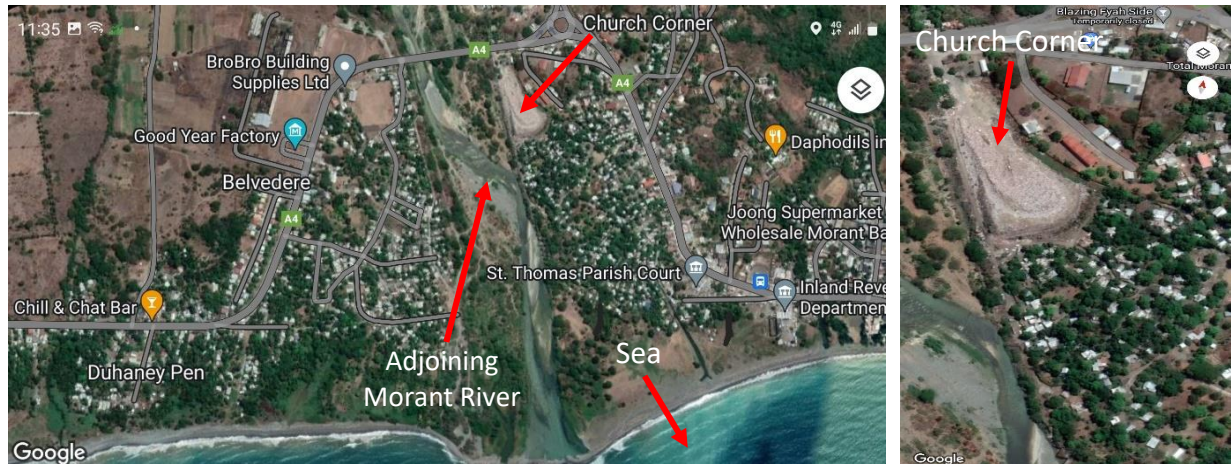
**2.14** In the Church Corner Disposal Site Closure Plan (February 2020), NSWMA noted that *"since 2008, the Authority has envisioned and predicted the closure of church corner disposal site due to the small capacity of the site. The site is estimated to be approximately 2.5 acres – This is considered severely inefficient for a [sic] long-term use and has depleted significantly."* It was noted that as of September 2019, the disposal site had only three to four months operational time remaining. The document also indicated that *"despite, the practices of annual covering, it is difficult to maintain acceptable operational and environmental standards due to the limited space available for tipping. The surface area of the disposal site decreases as the landfill gets higher"*.

**2.15** The document noted that the current height of the landfill is of significant concern as the residents living on the periphery of the eastern and southern boundaries are at risk in the event of a landslide. In addition, three major human and environmental health challenges highlighted were the disbursement of loose papers and plastics into the adjoining Morant River and the communities, the outcrop of leachate



on the southern and western boundaries of the disposal site, and the unpleasant odour from the disposal site affects the individuals located within the town of Morant Bay. Additionally, it was optional to convert the disposal site to a transfer facility and/or identify a suitable location within the parish to construct a new disposal site. Satellite images in **Image 2** shows the Church Corner waste disposal site located close to communities and the Morant River that runs into the sea.

Image 2 Satellite Images showing the location of the Church Corner disposal site



Source: Google Map

**2.16** We gleaned from the April 2019 board meeting minutes that the Church Corner disposal site was scheduled for closure within three months as it was near maximum capacity. In an effort to extend the life of the site by 18 months, from March 2020 to August 2021, NSWMA indicated that it spent approximately \$29 million to transfer 17,500 cubic yards of waste from that site to the Riverton disposal site. In a letter dated June 15, 2020, to MLGRD, NSWMA indicated the negotiations commenced and a 10 per cent deposit made for the purchase of lands in the sum of \$23.9 million to relocate the Church Corner disposal and storage facility. Nevertheless, NSWMA indicated that *“the Authority in 2019 purchased lands in Pleasant Hill St. Thomas to carryout disposal activities for the St. Thomas region. However, preparatory works are necessary, and representation was made for funding to execute these works in the 2020/21 budget. The requisite project documents were prepared and submitted to PIMSEC commencing in 2018 but in 2020 with the onset of the Coronavirus it was placed on hold as there was no fiscal space to realize this”*<sup>9</sup>. To date, NSWMA continues to dispose waste at the Church Corner disposal site and has further proposed another project to transfer waste from the site. Also, whereas NSWMA indicated in its Strategic Business Plan 2019-23, that the Doctors Wood site had exceeded the carrying capacity and the necessary closure activity would be initiated during the 2019-20 financial year, this site was still operational, underscoring a lack of planning.

### Waste disposal sites operated by NSWMA not in compliance with environmental regulations

**2.17** Under the Natural Resource Conservation Authority (NRCA) Act, NSWMA is required to obtain permits to construct and operate waste disposal facilities. However, NSWMA was not ensuring that all its waste disposal sites complied with this requirement. Of the eight waste disposal sites, only the Riverton, Haddon, and Retirement disposal sites, which underwent significant upgrading work, had the required

<sup>9</sup> PIMSEC-Public Investment Management Secretariat

permit from the National Environment and Planning Agency (NEPA), and these sites were not in full compliance with the conditions of the permits<sup>10</sup>. The minutes of NSWMA's technical and operational meeting held June 17, 2021, indicated that *"permit applications would not be submitted for Church Corner and Doctor's wood disposal sites based on the nature and operations of the sites, including the lifespan and environmental concerns"*. NSWMA indicated that it is currently seeking permits for the Myersville, Martins Hill and Tobalski waste disposal sites.

**2.18** The permits for Riverton, Retirement and Haddon disposal sites set out specific and general conditions to improve the operations of solid waste disposal facilities through a phased implementation of management activities. We noted that NEPA issued site warning notices and monitoring reports, which indicated that NSWMA was in breach of the NRCA Act and Regulations, because it was not in compliance with several conditions specified in the permit for these waste disposal sites. NEPA monitoring report for Riverton waste disposal site dated March 15, 2022, concluded that NSWMA was in full compliance with only nine of the 55 applicable conditions of the permit; 12 were partially compliant and 34 were non-compliant. The specific conditions under the permit cover three phases, spanning April 2015 to March 2022. For the Retirement waste disposal site, NEPA issued two site warning notices, dated March 28, 2022, in which it observed that NSWMA was in breach of 25 specific conditions to be complied with within year one (phase one) of the permit, which was issued February 11, 2020. While NEPA did not provide warning notices and monitoring reports for Haddon waste disposal site, NSWMA did not provide evidence that it satisfied the 32 specific conditions stated in the permit, which was also issued February 11, 2020. The summary of our analysis of the compliance status for the three waste disposal sites is shown in **Table 3** and detailed in **Appendix 2**.

Table 3 Waste Disposal Sites Permit Compliance Status

Waste Disposal Sites	Cond. Assessed	Phase 1			Phase 2			Phase 3		
		✓	⚠	✗	✓	⚠	✗	✓	⚠	✗
Riverton	55	8	8	20	1	3	6	0	1	8
Retirement	25	0	0	25	N/A	N/A	N/A	N/A	N/A	N/A
Haddon	N/P	N/P	N/P	N/P	N/A	N/A	N/A	N/A	N/A	N/A
✓ Full Compliance		⚠ Partially Compliance			✗ Non-compliance					

N/A – Not Applicable (Permit not yet in the specific phase)

N/P – NEPA did not provide Warning Notices and Monitoring Reports for Haddon (permit issued February 11, 2020)

**Source:** NEPA's Site Warning Notices and Monitoring Reports








NSWMA indicated that, while the permits outline specific and general conditions to improve the overall operations of the disposal sites, they also require the finances to ensure that these conditions are properly met. The planning and research department has consistently made representation for a budget for the department to ensure that the major ticket items in relation to cost are achieved. The department however has not been furnished with finances based on these budgets.

**2.19** Notwithstanding, we noted that many of the activities, could be undertaken within NSWMA's existing operations and do not require additional funding; for example, the requirement to furnish various operational and monitoring reports, and water and air quality monitoring plans.

<sup>10</sup> Permits issued in keeping with the Natural Resources Conservation (Permits and Licences) Regulations, 1996.

## Part Three

### Waste Management Planning, Collection and Disposal

 At A Glance			
Systems and practices	Criteria	Key Findings	Assessment Against Criteria
Waste Characterisation study	Annual Waste Characterisation study conducted to effectively plan for solid waste management.	NSWMA's records confirmed eight studies between 2003 and 2017. Since 2017, no survey was conducted despite a requirement to do so annually.	
Strategy for waste reduction	Comprehensive strategy and action plan for waste reduction.	NSWMA has not formulated comprehensive strategy and action plan for waste reduction using the 3 'Rs' model – <i>reduce, reuse, and recycle</i> .	
Public education and awareness	Create awareness through public education to promote waste minimization, specifically reduction, reuse, and recycling.	NSWMA's waste reduction initiatives were not effective and sufficient to raise the level of awareness necessary to encourage better waste disposal practices, supported by policy and legislations to foster compliance.	
 Met the criteria  Criteria partially met  Did not meet the criteria			

#### NSWMA's Waste management planning not informed by recent waste generation studies

**3.1** Increases in population and housing development (both planned and unplanned), changes in lifestyle and poor waste disposal practices, contribute significantly to waste generation. Accordingly, sound waste management practices require reliable data on solid waste generation and composition, based on waste streams<sup>11</sup>. One of the methods commonly used internationally to gather data on solid waste generation and composition is waste characterisation<sup>12</sup>. This is the process by which the waste generation is estimated, and the composition of different waste streams is analysed.

**3.2** Having an effective system to track waste generation and composition is an important starting point for the effective planning for the management of solid waste. Conducting annual waste characterisation studies would also be in keeping with Vision 2030 NDP priority sector strategy action in the MTF for 2015-18 ([Appendix 1](#)). NSWMA's Strategic Business Plan for 2017-21 identified annual waste characterisation studies as an important objective. To its credit, based on records provided by the planning and research

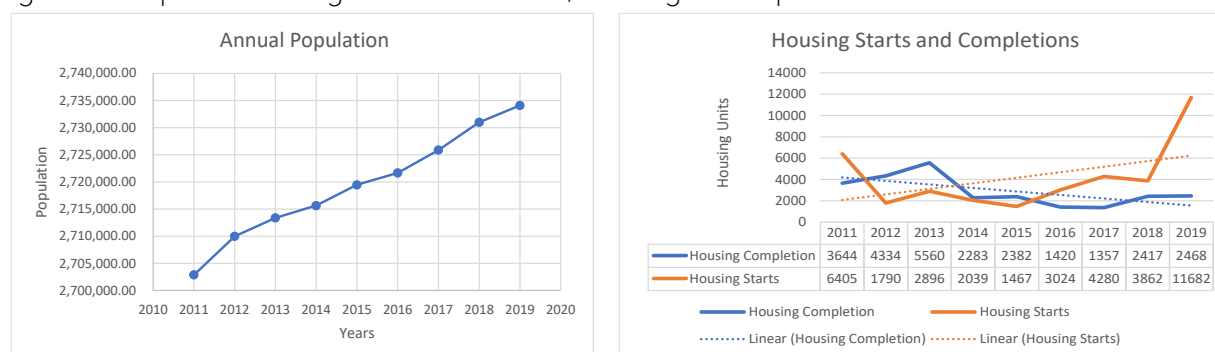
<sup>11</sup> Waste streams can be divided into two broad types: streams made of materials (such as metals or plastics) or streams made of certain products (such as electronic waste or end-of-life vehicles) which require specific treatment and ultimately feed into materials-related streams.

<sup>12</sup> Waste characterisation data is collected by taking samples of residential waste and sorting it into material types like newspaper and aluminum cans and weighing each type.

department, NSWMA conducted ten waste characterisation studies between 2000 and 2017. However, only eight were presented for our review. NSWMA indicated that *“waste characterisation exercises are conducted in order to improve solid waste management efficiency and the effectiveness of service delivery”*. Therefore, NSWMA conducted the studies mainly to determine the composition of the waste collected, daily household generation rates, patterns of generation among households and communities and to determine (by extrapolation) the overall waste generated within each parish and wasteshed. In the 2017 waste characterisation study, NSWMA indicated that *“waste generation is a computation based on the population and the island wide per capita generation from the most recent waste characterisation study”*.

**3.3** Our analysis of the 2017 characterisation study showed average daily solid waste generation of 1.09 Kg/per person. The waste characterisation studies conducted in the previous years did not cover all parishes to enable an assessment of the overall movement in the waste generation. Vision 2030 NDP (2009) highlighted that Jamaica generated approximately 1 kg of solid waste per person per day, and this was projected to increase to 1.5 kg per person per day by 2030 due to population increase, changes in consumption patterns, technological changes, and modernization of the economy. Data obtained from the Statistical Institute of Jamaica (STATIN) showed a 1.14 per cent increase in the population, between 2011 and 2019. Over the same period, there were 37,445 planned housing starts, with 25,865 completions (**Figure 14**).

Figure 14 Population changes 2011 to 2019/Housing Development

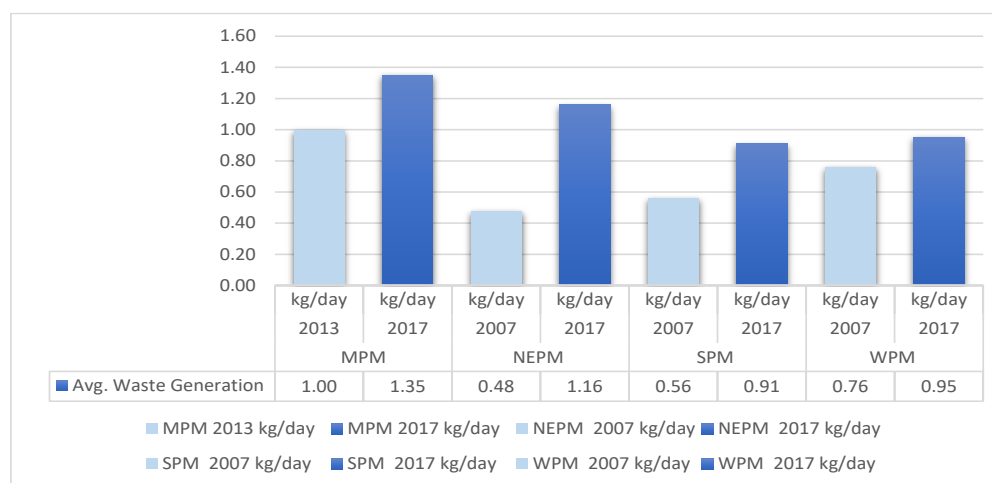


Note – Population data was available only up to 2019.

Source: Statistical Institute of Jamaica (STATIN) Economic and Social Survey Jamaica

**3.4** A comparative analysis of the waste characterisation studies showed an increase in the waste generation in NEPM, SPM and WPM between 2007 and 2017, and MPM between 2013 and 2017, ranging from a low of 25 per cent to a high of 142 per cent (**Figure 15**). Given the increase in population and housing development, coupled with the factors highlighted by Vision 2030 NDP that contribute to increased waste generation and the absence of characterisation studies since 2017, NSWMA was unaware of waste generation between 2018 to 2022. Consequently, NSWMA relied on data from the 2017 waste characterisation study to estimate waste generation up to 2020.

Figure 15 Analysis of Average Waste Generation Per Person (kg/day)



- MPM: Waste generation increased to 1.35 kg/per person (35 per cent) in 2017 from 1.00 kg/per person in 2013
- NEPM: Waste generation increased to 1.16 kg/per person (142 per cent) in 2017 from 0.48 kg/per person in 2007
- SPM: Waste generation increased to 0.91 kg/per person (63 per cent) in 2017 from 0.56 kg/per person in 2007
- WPM: Waste generation increased to 0.95 kg/per person (25 per cent) in 2017 from 0.76 kg/per person in 2007

**Source:** NSWMA Waste Characterisation Survey Reports 2010 and 2017

**3.5** Further, NSWMA's 2015 waste characterisation study identified that *"more than half of the total waste generated annually is comprised of yard and food waste. This fraction is substantial enough to encourage the development of an economically viable composting or bio-fuel program. Such programs, if implemented, may result in a significant reduction in the amount of yard and food waste that enters the various disposal sites, thus increasing their life span."* NSWMA repeated this statement in its 2017 waste characterisation study. The studies contain recurring recommendations for increased waste recycling and recovery programmes ([Appendix 3](#)). For example, the 2010 waste characterisation study recommended that *"greater opportunities for waste recovery from the domestic waste stream must also be capitalized on. Composting and the diversion of plastics fraction to recycling facilities must be increased. If the organization cannot undertake this by itself private sector interest must be invited to participate."* The study also recommended that *"the frequency of these waste characterisation surveys must be increased, and the recommendation implemented"*.

**3.6** Despite recognising the adverse impact of increasing waste generation, NSWMA did not conduct waste characterisation surveys after 2017 and we found no evidence that NSWMA, since 2010, has successfully developed and implemented any sustainable national programme to divert recyclable waste away from its disposal site and convert these waste streams to value initiatives.

NSWMA indicated that to prevent duplication, it has decided to use a waste characterisation study, published in June 2022 as part of the Enterprise Team scope of work, to inform solid waste management going forward.



### NSWMA does not have a system to accurately measure the volume of waste collected

**3.7** Estimated waste generation provided by NSWMA, shown in **Table 4**, suggested 1.1 million tons of residential waste generated each year, between 2017 and 2020. The data further indicated that over the same period, NSWMA collected an average of 85 per cent of the estimated waste generated, exceeding the target which it set at only 70 per cent. However, in the absence of an efficient weigh-in system to determine actual waste volumes collected, we could not be assured of the reliability of the volume of waste reportedly collected by NSWMA. Instead of using a weight system to accurately calculate the volume of waste collected and transported to waste disposal sites, NSWMA estimated the volume of waste collected by multiplying the load capacity of the truck by the number of trips made to disposal sites.

Table 4 Estimated annual residential waste generated 2017 to 2022 vs actual collection

Calendar Year	Estimated Annual Waste Generated (Tons)	Target Collection (Tons)	Waste Collection per Calendar Year (Tons)	Collection as a % of Estimated Annual Waste Generated	Estimated waste not collected (Tons)
2017	1,112,030	729,367	863,744	78%	248,286
2018	1,113,940	750,000	895,666	80%	218,274
2019	1,115,071	886,250	1,009,997	91%	105,074
2020	1,116,206	935,589	1,029,009	92%	87,197

**NOTE:** Information for 2021 and 2022 not provided

**Source:** AuGD Analysis of data provided by NSWMA's Planning and Research Department

**3.8** Further, NSWMA utilized a system whereby it dispatches collection trucks from various dispatch points island wide and issues dispatch tickets, which included a field for the mass of solid waste collected to be recorded. However, from our review of the dispatch tickets, this information was not recorded. The dispatch tickets require the disposal site attendant to indicate whether the truck was full, three-quarter, half, quarter, or empty by ticking the relevant field. We noted that the field 'full' was always ticked; and, on this basis, NSWMA assumed the tonnage of solid waste collected based on the capacity of the truck, without a weigh-in system. Of the eight disposal sites operated by NSWMA, only the Riverton disposal site has weigh-in scale to measure volume of waste on each truck. NSWMA purchased the scale at the Riverton disposal site in December 2015 at cost of US\$41,444 and indicated that it conducted a test run of the scale, between July 2016 and January 2017, based on random weight data provided, but has not used the scale since.

**3.9** Also, NSWMA made payments to independent contractors based on the number of trips, instead of the volume of waste collected, which underscores the need for a more accurate system of measurement to determine the payment of expenditure under this activity. NSWMA, indicated in the procurement request for the scale that *"in an effort to ensure value for money, we have taken the initiative to revise our rates and make payments on a per tonne basis rather than a per trip basis, which would be beneficial to both the MPM Waste Management Limited and the truckers"*. However, NSWMA did not provide evidence that it made payments to independent supplementary fleet contractors on a per tonne basis during the period when the scale was in use. NSWMA used \$5.7 billion, between 2016-17 and 2021-22, to pay independent contractors to supplement its fleet of trucks used for the collection and disposal of solid waste island wide. Over that period, the total expenditure on independent contractors increased by an average of 32 per cent, moving to \$1.1 billion in 2021-22 from \$815 million in 2016-17 (**Table 5**).

Table 5 Supplementary Fleet Contractor Expenditure, 2016-17 to 2021-22

Region	2016-17 \$'000	2017-18 \$'000	2018-19 \$'000	2019-20 \$'000	2020-21 \$'000	2021-22 \$'000*	TOTAL \$'000	% Total	% 5-year Increase
MPM	534,635	502,557	514,715	684,331	811,546	643,276	3,691,060	65%	20%
WPM	187,637	175,863	180,951	162,980	200,231	203,996	1,111,658	20%	9%
NEPM	46,925	44,885	103,390	104,354	113,429	119,402	532,385	9%	154%
SPM	45,932	27,891	23,820	54,604	90,791	105,509	348,547	6%	130%
<b>Total</b>	<b>815,129</b>	<b>751,196</b>	<b>822,876</b>	<b>1,006,269</b>	<b>1,215,997</b>	<b>1,072,183</b>	<b>5,683,650</b>	<b>100%</b>	<b>32%</b>

Note: \*Unaudited Figures

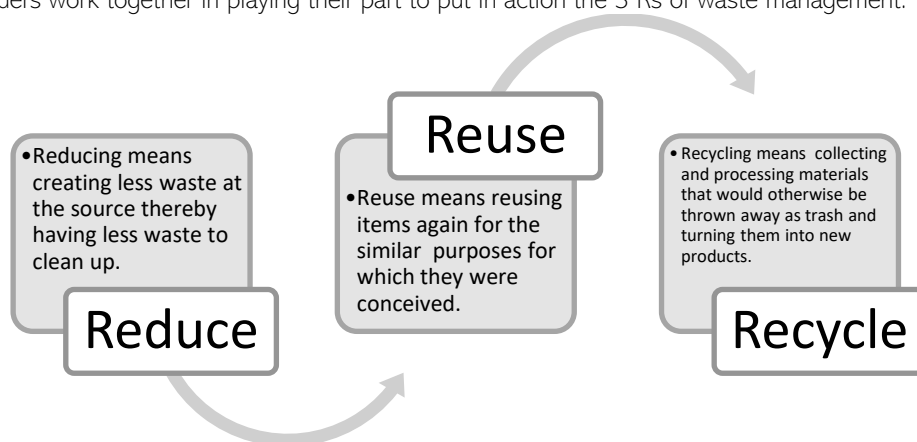
Source: Regional Audited Financial Statements

### Most residential waste collected could be recycled and diverted from dumpsites

**3.10** Successful implementation of the Three Rs model of waste management can cause less waste to be generated in the first place, resulting in less waste being transported to waste disposal sites, contributing to more efficient use of waste management resources; for example, reducing the need for more dumpsites, manpower, collection vehicles and equipment. Most residential waste collected by NSWMA contains items classified into waste streams that can be recycled and diverted from waste disposal sites, heightening the need for the introduction of waste reduction strategies, through the Three Rs model of waste management – Reduce, Reuse, Recycle (**Figure 16**).

Figure 16 Three 'Rs' in Waste Management:

Keeping as much material as possible out of landfills requires a multi-stakeholder approach, where public, private and citizen stakeholders work together in playing their part to put in action the 3 Rs of waste management.



Source: AuGD's research analysis

**3.11** Compostable, plastic, metal, glass, paper, wood, board, and e-waste are considered the most recyclable waste streams and account for on average 94.6 per cent of waste streams, with compostable materials accounting for 54 per cent of all recyclable materials (**Table 6**)<sup>13</sup>. Compostable materials are those that are certified to breakdown into non-toxic components (water, carbon dioxide and biomass) that will not harm the environment, given the right conditions<sup>14</sup>. Examples of compostable waste include fruits, food and vegetables, and eggshells. However, whereas NSWMA has demonstrated knowledge of what is necessary in this area evidenced by the pilot projects, it is still necessary for it to ramp up its activities to garner targeted waste reduction and recycling programmes that will lead to reduced waste management costs.

Table 6 Average Solid Waste Composition (Percentage)

No.	Waste Types	2003 %	2007 %	2008 %	2009 %	2013 %	2014 %	2015 %	2017 %	Avg. %
1	Compostable	48.8	55.7	58	53.75	62.22	55	54.7	44	54.0
2	Paper	4.5	7.3	11	9.84	9.27	17	13.6	11	10.5
3	Plastics	20.8	20	17	20.37	12.20	18	14.85	16	17.4
4	Glass	7.8	5	5	5.12	2.81	3	3.9	5	4.7
5	Cardboard	3.9	3.7	4	3.18	5.46	2	3.7	4	3.7
6	Wood/Board	0.6	0.3	-	0.25	0.53	-	0.45	2	0.5
7	Metal/Tin	6.3	4	3	3.31	2.38	2	4.65	1	3.3
8	E-Waste	0.3	0.3	-	0.16	0.04	-	0.05	3	0.5
9	Textile	5.5	3	2	4.02	5.09	3	4.1	3	3.7
10	Hazardous	1.0	-	-	-	-	-	-	-	0.2
11	Other	0.5	0.7	-	-	-	-	-	11	1.5
<b>Total</b>		<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Most recyclable items</b>		<b>93</b>	<b>96.3</b>	<b>98</b>	<b>95.98</b>	<b>94.91</b>	<b>96</b>	<b>95.9</b>	<b>86</b>	<b>94.6</b>

**NOTE:** Items 1 – 8 are listed in the top 10 most recyclable waste materials.

**Source:** AuGD's compilation and analysis of data from NSWMA's waste characterisation studies

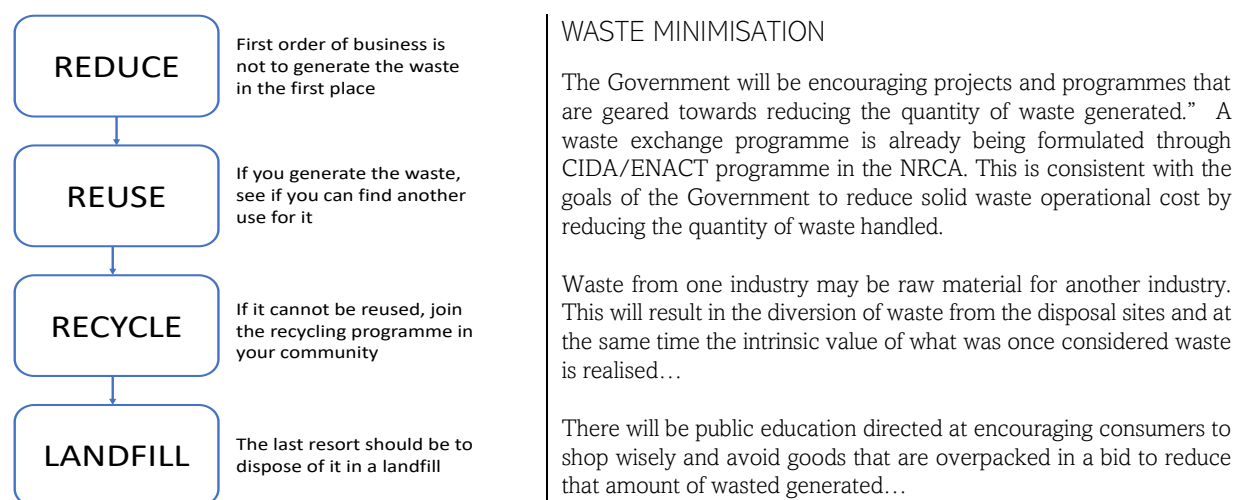
**3.12** NSWMA's strategic objectives, outlined in the strategic business plan, were geared towards reducing the quantity of waste generated and disposed of at the disposal sites. In this regard, NSWMA's strategic business plans supported and encouraged waste reduction strategies through reuse, reduce and recycling initiatives. The strategic objectives were also consistent with the goal of integrated solid waste management, reflected in the NSWMA Policy hierarchy, to make disposing of waste in landfill a last resort (**Figure 17**).

<sup>13</sup> 13-4 Manage all Forms of Waste Effectively: The characterisation of the solid waste stream indicates that close to 20 per cent of the waste is inorganic, consisting of plastics, glass and other non-biodegradable materials. The corollary is that the high organic content of the waste produces large quantities of methane which self-ignite at the landfills and contribute to air pollution and respiratory illness. There is also a problem with the inadequate management of hazardous waste (e.g. chemicals, e-waste) which has implication for both human and environmental health. Vision 2030 NDP Jamaica Page 242

<sup>14</sup> NSWMA indicated on its website that composting is nature's process of recycling decomposed organic materials into a rich soil known as compost. Anything that was once living will decompose. Basically, backyard composting is an acceleration of the same process nature uses. By composting your organic waste, you are returning nutrients back into the soil in order for the cycle of life to continue. Finished compost looks like soil—dark brown, crumbly and smells like a forest floor”.



Figure 17 Hierarchy of Integrated Solid Waste Management



Source: National Solid Waste Management Policy – May 2000 Ministry of Local Government, Youth and Community Development

**3.13** NSWMA in its Strategic Business Plan 2017-21, indicated that *“the Agency will be embarking on projects that are geared towards reducing the quantity of waste generated and disposed of at the disposal sites”*. One of the objectives was to encourage residents to separate their compostable waste from their regular household waste at the point of collection. NSWMA noted that it would place marked bins at each residence for the containerisation of the separated waste and carryout the necessary public education to sensitize residents and to secure ‘buy in’. Another project was to engage in waste processing activities at the Ferry site in St. Catherine to generate valuable and useful by-products. This project was slated to commence in December 2017 and would serve to decrease solid waste operational costs by reducing the quantity of waste handled. However, we found no evidence that NSWMA initiated this project. At the same time, there was an apparent disjuncture between NWSMA’s strategic planning and implementation, given the observed ineffectiveness of NSWMA waste management system.

### Waste reduction initiatives not effective and sufficient to improve waste disposal practices

**3.14** From our review of records, we noted that NSWMA developed public education initiatives and implemented seven waste separation pilot projects, aimed at creating awareness about waste recycling to reduce the volume of recyclable waste transported to disposal sites. From all accounts, NSWMA’s waste reduction programmes were not effective and sufficient to raise the level of awareness necessary to encourage better waste disposal practices, supported by policy and legislation to foster compliance. In addition, we found no evidence that NSWMA has taken actions, from a strategic standpoint in spearheading a national plan, through a wholistic approach, to encourage better waste disposal practice through waste separation (**Figure 18**). We noted that the stated periods for the execution of projects have expired, with no indication of expansion on a larger scale at the community or national levels. NSWMA’s strategic business plans, for the period 2016 to 2023, include specific targets for waste collection; however, we found that the strategic plans did not include any objectives, targets, and strategies for waste reduction through programmes for waste recycling. With very little or no results from waste reduction initiatives, the volume of waste being generated continues to increase.

Figure 18 NSWMA waste separation and recycling pilot projects

No.	Waste Recycling Projects	Period	Project outcome
1	NSWMA/JICA Solid Waste Reduction Through Waste Separation – Waste Diversion and Recycling	Aug 2016-Jan 2017	140,000 pounds of plastic collected
2	Waste Separation and Compost	Jul 2016	No information provided
3	Chambers Pen Composting (Hanover)	Sept 2022-Feb 2022	Over 5,000 lbs. of plastic bottles collected. Over 200 lbs. of mature compost generated. No more illegal dumping in the community.
4	NSWMA/JICA Solid Waste Reduction Through Waste Separation	Sept 2015-Mar 2016	No information provided
5	Plastic Recycling Pilot Project in Rae Town	Oct 2019-Mar. 2021	33,580 lbs of plastic collected.
6	Northern Belt Plastic Separation Initiative	Jan 2020 - Ongoing	187,479 lbs. of plastics collected
7	Drax Hall Recycling Project	Jan 2021 - Ongoing	No information provided

Source: NSWMA's Annual Reports

**3.15** Citizens are NSWMA's primary stakeholder, because they are impacted by solid waste management and their involvement is essential in fostering better waste management practices. By effectively engaging citizens, NSWMA could obtain valuable insights that will help important waste management decisions to develop better policies, procedures, and systems. To this end, we conducted a crude satisfaction survey to garner feedback from citizens regarding how they are impacted by NSWMA's waste management activities, and their willingness to contribute to the process. We invited responses mainly by targeting community groups using an online survey tool. The result reflects the views of 338 respondents.

**3.16** When asked to rate solid waste collection in their neighbourhood and the overall management of solid waste in Jamaica on a scale 1-10, with one being very dissatisfied and 10 being very satisfied, respondents gave an average number of 5.27 and 3.59 respectively, indicating a low satisfaction rate. Meanwhile, a significant majority was concerned about the health and environmental impact of improper waste storage and disposal, while agreeing to solid waste recycling and expressing willingness to participate in a recycling programme. Also, most of the respondents indicated unawareness of NSWMA's public education initiatives regarding proper garbage collection and disposal practices. The complete result of survey is shown in [Appendix 4](#).

### No national plan to foster multi-stakeholder cooperation to improve waste management

**3.17** It is our view that for NSWMA waste reduction strategy to be effective, it requires a comprehensive integrated approach to generate co-operation among public, private and citizen stakeholders to create a cultural shift in contributing to sustainable recycling and disposal systems for improved solid waste management. As shown in [Figure 19](#), NSMWA is required to, among other things, establish procedures and develop, implement, and monitor a national plan and other plans and programmes relating to solid waste management. However, NSWMA did not play a lead role to coordinate all stakeholders in order to develop a national plan and other plans for effective solid waste management.

Figure 19 Solid Waste Management Act - NSWMA Functions:

The Authority shall (a) take all such steps as are necessary for the effective management of solid waste in Jamaica in order to safeguard public health, ensure that the waste is collected, stored, transported, recycled, reused or disposed of, in an environmentally sound manner and promote safety standards in relation to such waste. (b) Promote public awareness of the importance of efficient solid waste management and foster understanding of its importance to the conservation, protection, and proper use of the environment.

In performing the functions specified in Sub Section (1), the Authority may:

(a)	Convert existing dumps into sanitary landfills
(b)	Designate, develop, and manage new sanitary landfills and other solid waste disposal operations
(c)	Provide facilities for the collection, treatment, and disposal of solid waste
(d)	Institute measures to encourage waste reduction and resource recovery
(e)	Introduce cost recovery measures for services provided by or on behalf of the authority
(f)	Establish procedures and develop, implement and monitor a national plan and other plans and programmes relating to solid waste management
(g)	Formulate standards, guidelines and codes of practice relating to solid waste management and monitor compliance with such standards, guidelines and codes.

**Source:** National Solid Waste Management Act Part 2 Section 4(1-2)

**3.18** As shown in **Figure 20**, NSWMA outlined objectives and strategies for waste minimization, separation, and diversion. However, we could not determine from subsequent strategic business and operational plans, the status and extent to which NWSMA achieved these objectives. While NSWMA struggled to meet its mandate, we found no evidence that the Ministry of Local Government and Rural Development (MLGRD) provided strategic support. Such high-level support could serve to generate co-operation among stakeholders.

Figure 20 Strategic Business Plan 2017-21 objectives and Strategies

■ Waste Minimization and Separation

Objectives: To improve the sustainability of the NSWMA through Public Private Partnership (PPP)

Strategies	Implementation Status
• Collect e-waste from residential and commercial entities	CND
• Assigned designated collection units for E-Waste Collection	CND
• Identify purchaser for E-Waste	CND

Objectives: To encourage projects and programmes geared towards reducing quantity of waste generated

Strategies	Implementation Status
• Implement system for waste separation at point of generation	CND
• Promote private public partnership in recycling	CND

■ Waste Separation and Diversion: Composting and Plastic Recycling Project

Objectives:	Implementation Status
• Encourage residents to separate their compostable waste from their regular household waste at the point of collection <ul style="list-style-type: none"> <li>○ Provide specially marked bins to facilitate household waste</li> <li>○ Conduct sensitization activities to educate the public on the projects</li> <li>○ Prepare a draft for waste separation regulation</li> </ul>	CND
• To engage in waste processing activities that generate valuable and useful by-products	CND
• To encourage projects and programmes geared towards reducing quantity of waste generated	CND

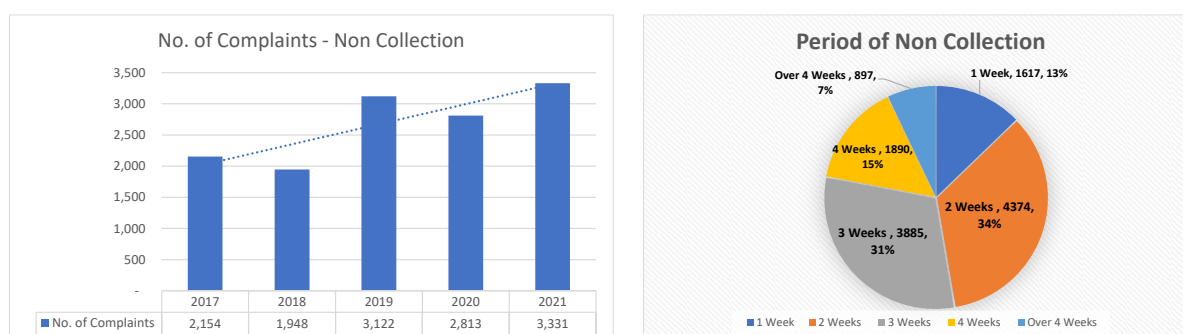
**CND:** Could Not be Determined

**Source:** NSWMA's Strategic Business Plan 2017-21

## Increase in complaints about non collection and illegal dumping activities

**3.19** NSWMA initially set a performance target in its operational plans to collect residential waste twice weekly. However, NSWMA records showed that it received 13,368 complaints from citizens about non-collection of waste. The complaints, which were received through its mobile application and phone calls to its head and regional offices increased by 55 per cent to 3,331 in 2021 from 2,154 in 2017. Reports of non-collection periods, ranged from a low of one week to a high of over four weeks, with the majority 4,374 (34 per cent) reporting delays in solid-waste collection of two weeks (**Figure 21**). NSWMA attributed the delays in collecting waste to resource limitations, particularly collection trucks. Hence, to spread its resources, NSWMA reduced its collection schedule to once weekly in 2016-17; however, despite the reduction in the collection schedule, citizens reported non-collection of solid waste for periods over four weeks.

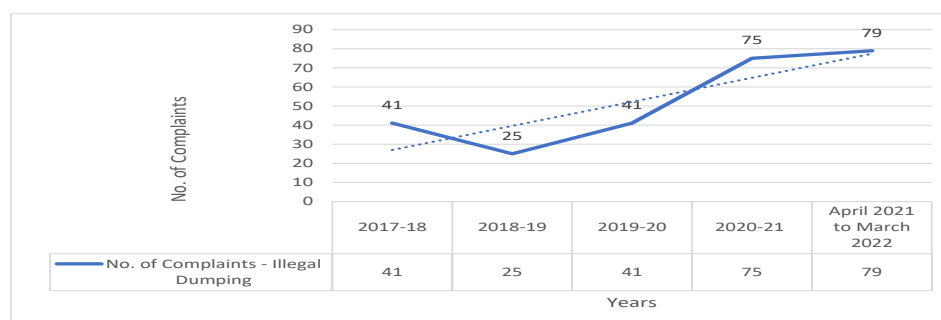
Figure 21 Customer complaints – Non collection of Waste



Source: AuGD's analysis of NSWMA complaints records

**3.20** The high rate of non-collection of waste and NSWMA's expectation that 30 per cent of solid waste will not be collected, increased the potential for illegal burning or dumping. NSWMA acknowledged in its Environmental Wardens Training Manual that the 30 per cent of waste not collected was either burnt or dumped in gullies or waterways. Our analysis of complaints received by NSWMA revealed a considerable increase in the number of calls reporting acts of illegal dumping. The Enforcement and Compliance Unit recorded a total of 261 complaints about illegal dumping, between April 2017 and March 2022, increasing to 79 as at March 2022 up from 41 in 2017-18, a 93 per cent increase (**Table 7**).

Table 7 No. of Customer Complaints – Illegal Dumping

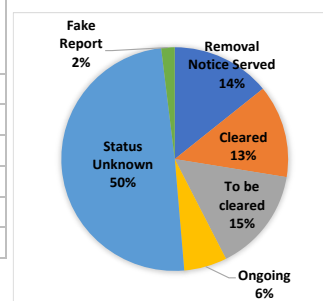


Source: AuGD's analysis of NSWMA's complaints data (call log and mobile application)

**3.21** We were not assured that NSWMA adopted a targeted approach in its monitoring and enforcement activities. NSWMA did not provide evidence that it maintained a list of illegal dumpsites, to enable effective surveillance and efficient utilisation of its resources in its enforcement activities. Further, we noted that NSWMA does not have a system to effectively track the outcome of all complaints. Whereas the status of reports made to the mobile application was recorded, this was not the same for reports made through calls. As shown in **Table 8**, we could not determine the status of 50 per cent of the calls reporting illegal dumping, as the Enforcement and Compliance Unit did not update the logbook with this information. In addition, we noted that in 37 instances, the Enforcement and Compliance Unit indicated that it served removal notices, but there was no record of follow up to determine the level of compliance. In 35 cases, it was noted in the logbook that NSWMA removed the waste.

Table 8 Status of Illegal Dumping Reports

year	Number of calls	Removal Notice Served	Cleared	To be cleared	Ongoing	Status Unknown	Fake Report
2017-18	41	5	7	3	2	21	3
2018-19	25	0	2	0	1	22	0
2019-20	41	3	9	6	0	23	0
2020-21	75	17	7	14	2	33	2
2021-22	79	12	10	16	11	30	0
<b>Total</b>	<b>261</b>	<b>37</b>	<b>35</b>	<b>39</b>	<b>16</b>	<b>129</b>	<b>5</b>



**Source:** AuGD's analysis of NSWMA's Enforcement and Compliance Offences logbook

**3.22** NSWMA's enforcement officers are required to conduct enforcement and compliance duties, in addition to security duties as indicated in the job descriptions (**Figure 22**).

Figure 22 Enforcement Officers - Description of duties and responsibilities

- Advise the public on the proper use of solid waste receptacles;
- To issue tickets to offenders of the NSWMA Act and Regulations;
- Deter misuse and ensure the proper use of solid waste receptacles
- Identify and report immediately, all potential offenders to the investigator, as it relates to litter and the full provision of the NSWMA Act;
- Maintain a daily log of all activities
- Apprehend individuals who breach the NSWMA Act and hand over to the investigator/ police;
- Gather and properly secure evidence for possible use in court;
- Serve Removal Notices as instructed by the Senior Investigator or any other Authorised Officer;
- Monitor litter hotspots to ensure compliance;
- Provide Security duties as required by the Authority;

**Source:** Enforcement Officers' Job Description

**3.23** NSWMA's Enforcement and Compliance Unit has a compliment of 39 staff, which include 34 contracted enforcement officers (**Table 9**). Of the 34 enforcement officers, eight were assigned security and administrative duties at NSWMA's head office; with the remaining 26 enforcement officers to carryout monitoring and compliance duties: three each in NEPM and SPM, two in WPM and 18 in MPM.

Table 9 Analysis of Compliance and Enforcement Staff

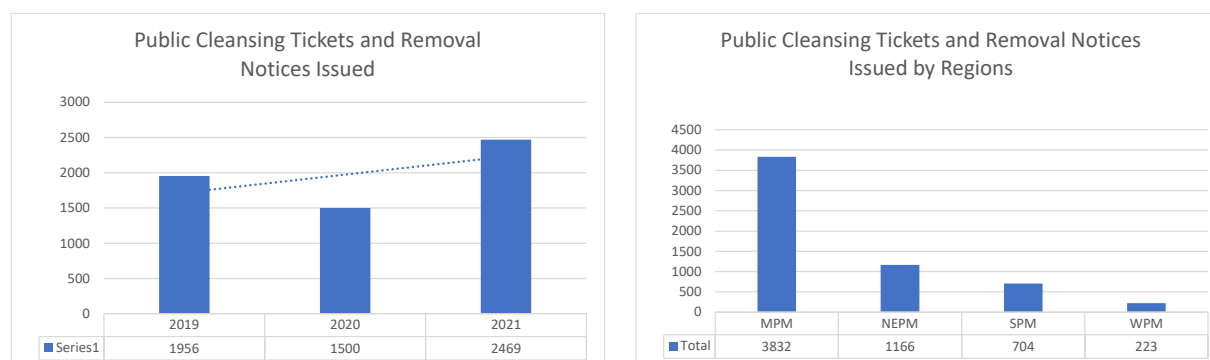
Posts	Approved Establishment	Nature of Employment	Actual	Location
Director of Enforcement	1	Contract	1	Head Office
Senior Investigator	1	Permanent	1	Head Office
Investigator	3	Permanent	2	1-MPM and 1-NEPM
*Senior Enforcement Officer	0	Contract	1	Head Office
**Enforcement Officers	0	Contract	34	18-MPM, 3-NEPM, 3-SPM and 2-WPM
<b>Total</b>	<b>5</b>	<b>-</b>	<b>39</b>	<b>-</b>

\*Senior Enforcement Officer: Post not established, \*\*Enforcement Officers: Post not established

**Source:** AuGD's analysis of NSWMA's establishment and staff records

**3.24** Data provided by NSWMA's Enforcement and Compliance Unit indicated that it issued 5,925 public cleansing tickets and removal notices, between 2019 and 2021. We noted that the number of public cleansing tickets and removal notices issued, increased to 2,469 in 2021 from 1,956 in 2019 (**Table 10**). The majority of public cleansing tickets, 3,832 (65 per cent) and removal notices were issued in MPM. From our review of the deployment schedule, we noted that most enforcement officers in MPM were assigned to conduct monitoring and enforcement activities in downtown Kingston. Our analysis of a sample of 110 tickets issued by MPM enforcement officers shows that the majority 107 (97 per cent), were issued for urinating in public space. This offence generates a fine of \$2,000, which can be paid at any municipal authority office or NSWMA head office. Further, for the tickets we sampled, all except one, were reportedly paid. NSWMA could not provide information on the complete number and type of public cleansing tickets issued compared to the number of tickets paid each year.







Table 10 Public Cleansing and Removal Notices Issued, 2019 – 2021



**Source:** AuGD's analysis of data provided by NSWMA Enforcement and Compliance Unit

## Part Four

### Funding for Solid Waste Management

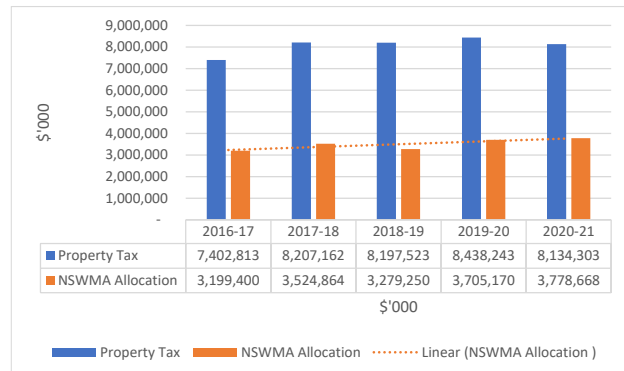
 At A Glance			
Systems and practices	Criteria	Key Findings	Assessment Against Criteria
Solid waste resource needs assessment	Needs assessment conducted to identify and evaluate all the resources that are available to achieve objectives and determine gaps.	NSWMA did not provide evidence that it conducted a comprehensive needs assessment to accurately quantify the gap between the resources it received and what is required for effective solid waste management.	
Strong Internal Controls	Strong internal controls are implemented to minimize risk and meet objectives.	NSWMA did not implement adequate control mechanism over its special projects and seasonal works programme to reduce the risk exposure to system manipulation.	
 Met the criteria  Criteria partially met  Did not meet the criteria			

#### NSWMA received \$32.5 billion for waste management over five years since 2016-17

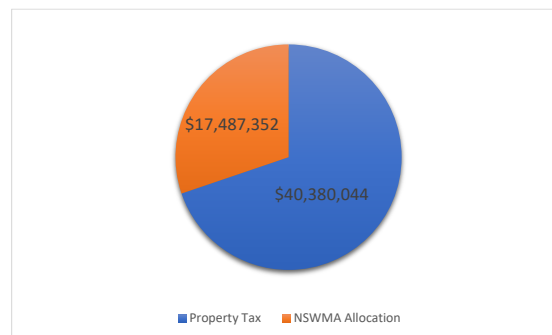
**4.1** Our analysis of NSWMA's funding for waste management showed that NSWMA received \$28.9 billion in Government subvention (net) and a total \$3.6 billion from other income, between 2016-17 and 2020-21. Government subvention (net) increased to \$6.2 billion in 2020-21 from \$4.4 billion in 2016-17. Of the \$28.9 billion, \$17 billion was allocated from property tax collection. This represented 43 per cent of the \$40 billion collected for property tax by Tax Administration Jamaica, over that period (**Figure 23**).

Figure 23 NSWMA's Funding Requirement and Budget Allocation

Annual Allocation



Five Year Allocation 2016-17 to 2020-21



Source: Information provided by MLGRD



**4.2** As shown in **Table 11**, the \$17 billion subvention allocation from property tax represents 60 per cent of NSWMA's total allocation received. This amount increased to \$3.8 billion in 2020-21 from \$3.2 billion in 2016-17. Property tax is imposed on owners of residential and commercial properties to provide revenue for the provision of public and community services, such as solid waste collection.

Table 11

NSWMA's Approved Budget Allocation vs Subvention Received, 2016-17 to 2020-21

Years	Approved Budget Allocation (Estimates of Expenditure)			Allocation Received (Subvention as per Audited FS)			Property Tax	
	Recurrent A	Capital B	Total A+B	Recurrent C	Other Income D	Total C+D	E	E÷C
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	%
<b>2016-17</b>	961,927	225,271	1,187,198	4,397,523	788,988	5,186,511	3,199,400	73
<b>2017-18</b>	1,251,123	458,000	1,709,123	5,365,123	532,570	5,897,694	3,524,864	66
<b>2018-19</b>	2,520,398	481,326	3,001,724	6,131,489	544,060	6,675,549	3,279,250	53
<b>2019-20</b>	1,263,532	67,970	1,331,502	6,869,031	878,294	7,747,325	3,705,170	54
<b>2020-21</b>	2,364,230	419,876	2,784,106	6,175,999	856,522	7,032,521	3,778,668	61
<b>Total</b>	<b>8,361,210</b>	<b>1,652,443</b>	<b>10,013,653</b>	<b>28,939,165</b>	<b>3,600,434</b>	<b>32,539,600</b>	<b>17,487,352</b>	<b>60</b>

Allocation of NSWMA Revenues, 2016-17 to 2020-21

Details	2016-17 \$'000	2017-18 \$'000	2018-19 \$'000	2019-20 \$'000	2020-21 \$'000	Total \$'000	% Revenue
Primary allocation	3,855,392	4,331,114	4,661,578	4,904,479	3,489,697	21,242,260	65.28
Emergency and special projects	542,131	1,034,009	1,304,919	1,903,016	2,530,991	7,315,066	22.48
Earmarked income	-	-	-	-	45,203	45,203	0.14
Constituency Development Fund	-	-	6,000	5,000	-	11,000	0.04
Statutory liabilities paid	-	-	158,992	56,536	110,108	325,636	1.00
<b>Government Subvention - Group</b>	<b>4,397,523</b>	<b>5,365,123</b>	<b>6,131,489</b>	<b>6,869,031</b>	<b>6,175,999</b>	<b>28,939,165</b>	-
Commercial revenue	443,183	410,150	529,919	696,361	556,320	2,635,933	8.10
Other income and gains	341,857	119,006	10,499	178,519	297,882	947,763	2.91
Interest income	3,948	3,415	3,642	3,414	2,320	16,739	0.05
<b>Total Income</b>	<b>5,186,511</b>	<b>5,897,694</b>	<b>6,675,549</b>	<b>7,747,325</b>	<b>7,032,521</b>	<b>32,539,600</b>	<b>100</b>

Source: NSWMA's Audited Financial Statements

## NSWMA demonstrates lack of understanding of the gap between resources and needs

**4.3** NSWMA indicated that available solid waste management resources, particularly collection trucks, were insufficient because of low budget allocation, which negatively impacted its ability to efficiently handle the increasing demand for waste collection. However, our analysis revealed that the \$32.5 billion in total income, inclusive of subvention allocation received by NSWMA represented 95 per cent of the \$34.4 billion it requested, between 2016-17 and 2020-21, to support its solid waste management functions (**Table 12**). NSWMA did not provide evidence that it conducted a comprehensive needs assessment to accurately quantify the gap between the resources it received and what is required for effective solid waste management.



Table 12 NSWMA's Funding Request Summary vs Allocation Received, 2016-17 to 2021-21

Years	Consolidated Fund A	Property Tax (PRF) B	Own Source C	Total A+B+C	Allocation Received (Subvention as per Audited FS)	Excess/ Shortfall (+/-)	%
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	
2016-17	528,060	-	307,111	835,171	5,186,511	4,351,340	84%
2017-18	1,462,180	3,736,788	307,111	5,506,079	5,897,694	391,614	7%
2018-19	2,338,680	4,929,199	307,111	7,574,990	6,675,549	-899,441	-13%
2019-20	3,940,447	5,484,600	407,111	9,832,158	7,747,325	-2,084,833	-27%
2020-21	4,354,447	5,813,853	488,533	10,656,833	7,032,521	-3,624,312	-52%
<b>Total</b>	<b>12,623,814</b>	<b>19,964,440</b>	<b>1,816,977</b>	<b>34,405,231</b>	<b>32,539,600</b>	<b>-1,865,632</b>	<b>95%</b>

Source: NSWMA records

**4.4** NSWMA provided information, which showed that as of May 25, 2022, its fleet consisted of 77 collection trucks, but 34 (44 per cent) were not operational due to various mechanical issues. Of note, 23 (68 per cent) of the 34 collection trucks that were not operational were newer trucks with ages ranging between two and five years (**Table 13**).

Table 13 Status of NSWMA's collection trucks as at May 25, 2022

Age	No. collection vehicle	In Use	Not In Use	Transmission issues	Engine issue	Crash unit	Other mechanical issues
2	21	16	5	-	1	1	3
3	9	8	1	-	-	-	1
4	21	7	14	5	2	1	6
5	8	5	3	-	-	-	3
6	6	3	3	-	2	-	1
14	10	3	7	-	2	-	5
15	1	1	0	-	-	-	-
24	1	0	1	-	-	-	1
<b>Total</b>	<b>77</b>	<b>43</b>	<b>34</b>	<b>5</b>	<b>7</b>	<b>2</b>	<b>20</b>

Source: AuGD's analysis of information provided by NSWMA

**4.5** In addition, NSWMA provided incomplete information on the number, type, and operational status of waste collection trucks it owned and those contracted at the end of each year, between 2016-17 and 2020-21. Having an efficient system to track the availability of waste collection trucks should be part of NSWMA's fleet management activity to aid in effective planning and decision making. NSWMA fleet management system was not complete as it did not include information such as the vehicle maintenance, operational efficiency and cost-effectiveness of its waste collection trucks. Notwithstanding, our analysis of the data provided shows that 57 per cent of waste collection trucks owned by NSWMA and assigned to its four parks and markets companies were operational, at the end of 2019-20 and 56 per cent at the end of 2020-21. The percentage of NSWMA's waste collection trucks that were operational at the four parks and markets companies ranged from a high of 71 per cent to a low of 44 per cent at the end of 2020-21, meaning that many of NSWMA's waste collection trucks were unavailable for use (**Table 14**).

Table 14 NSWMA's Collection Vehicle Allocation and Availability per Parks and Markets Company

**MPM**

Years	NSWMA Units	Units in Service	Contracted Units	Available Units
2016-17	29	14	131	145
2017-18	26	8	132	140
2018-19	28	10	144	154
2019-20	28	10	129	149
2020-21	32	14	148	162
<b>Average</b>	<b>29</b>	<b>11</b>	<b>137</b>	<b>150</b>

Fourteen (44 per cent) of the 32 assigned vehicles were operational at the end of 2020-21.

**WPM**

Years	NSWMA Units	Units in Service	Contracted Units	Available Units
2016-17	25	16	27	43
2017-18	30	18	29	47
2018-19	30	15	35	50
2019-20	28	17	35	52
2020-21	28	20	31	51
<b>Average</b>	<b>28</b>	<b>17</b>	<b>31</b>	<b>48</b>

Twenty (71 per cent) of the 28 assigned vehicles were operational at the end of 2020-21.

**SPM**

Years	NSWMA Units	Units in service	Contracted Units	Available Units
2016-17	24	13	N/P	N/A
2017-18	22	13	N/P	N/A
2018-19	24	15	N/P	N/A
2019-20	22	16	N/P	N/A
2020-21	23	12	N/P	N/A
<b>Average</b>	<b>23</b>	<b>13</b>	<b>N/A</b>	<b>N/A</b>

Twelve (52 per cent) of the 23 assigned vehicles were operational at the end of 2020-21.

**NEPM**

Years	NSWMA Units	Units in service	Contracted Units	Available Units
2016-17	20	13	7	20
2017-18	26	9	10	19
2018-19	23	12	12	24
2019-20	21	13	16	29
2020-21	23	13	13	26
<b>Average</b>	<b>22</b>	<b>13</b>	<b>12</b>	<b>23</b>

Thirteen (57 per cent) of the 23 assigned vehicles were operational at the end of 2020-21.

N/P - Data Not Provided, N/A – Could not determine due to incomplete data

**Source:** NSWMA records

**4.6** NSWMA's waste characterisation studies were essential for estimating the volume, types, and location of waste generation to inform waste management activities, including allocating resources for waste collection. However, the absence of current studies would have impeded NSWMA in deriving realistic estimates to determine the number of collection trucks required for efficient waste collection. In 2019, NSWMA estimated daily waste generation was 3.6 million kilograms (3,644 tons), using the waste generation rate in its 2017 waste characterisation study. NSWMA estimated that it required 255 trucks in 2019 to collect 70 per cent (2,551 tons) of the estimated daily waste generation, an increase from the 191 trucks required in 2016 to collect 1,910 tons per day (**Table 15**).

Table 15 Gap Analysis of NSWMA's Waste Collection Trucks

Year	Total Population (000)	Avg. upper Generation Rate (kgs)	Daily Solid Waste Generated (kgs)	Estimated Service Coverage	Quantity Solid waste to be collected (kgs)	Quantity Solid waste to be collected (Tons)	Truck Capacity (Tons)	Quantity Solid Waste Trucks required Daily	Number of Trucks Available	Gap
2016	2,729	1	2,728,969	70%	1,910,278	1,910	10	191	N/A	N/A
2017	2,727	1.35	3,681,908	70%	2,577,335	2,577	10	258	N/A	N/A
2018	2,727	1.35	3,681,000	70%	2,576,700	2,577	10	258	N/A	N/A
2019	2,699	1.35	3,644,190	70%	2,550,933	2,551	10	255	N/A	N/A

NOTE: N/A – Could not determine due to incomplete data

**Source:** Information provided by NSWMA

**4.7** Considering demographic and technological changes and increased housing developments, the requirement for 2022 could be significantly higher than 2019, but NSWMA did not provide the complete dataset to facilitate our analysis of the gap between the available and required waste collection trucks. The absence of the data demonstrated NSWMA's unawareness of the extent of the current resource deficits affecting waste collection activities.

In its response, NSWMA estimated that it would require 395 collection trucks in 2020 and 2021 and 372 collection trucks in 2022 for 100 per cent efficiency for a once weekly collection cycle, using only eight tonne trucks.

**4.8** NSWMA's failure to effectively plan budget requirements, conduct needs assessment, annual waste characterisation studies and maintain collection trucks availability, therefore impaired its ability to effectively address the challenges with waste collection. If sustainable waste reduction strategies are not implemented, closing the resource gap may be difficult as waste volumes would continually exceed waste collection resources. NSWMA would be required to continuously increase and maintain its dumpsites, equipment, waste collection trucks and human resources at a level to meet the increasing waste collection demand, and that approach would not be financially sustainable.













### **Special projects and seasonal works lack adequate controls to mitigate risk exposure**

**4.9** Over the last five years, 2016-17 to 2020-21, NSWMA paid \$5.5 billion to contractors under its special projects and seasonal works programme, which forms part of its public cleansing activities. However, NSWMA did not implement adequate control procedures to prevent individuals from manipulating the system, given the nature of the programme and the cost associated with it. Special projects and seasonal works include desilting (street sweeping and cleaning) activities to remove sanding materials, bushes, and debris from roads, sidewalks, and open lots.

**4.10** The four parks and markets companies are responsible for managing the entire process for special projects and seasonal work arrangements, in their assigned regions. The parks and markets companies received funding allocations from NSWMA and engaged individuals as contractors to undertake these activities. The individual contractors further employed labourers to perform various tasks such as bushing and sweeping. We reviewed the process of managing special projects and seasonal work arrangements at MPM and found several control weaknesses. Considering that special projects and seasonal works is a costly expenditure item and important to public health, we expected NSWMA to implement robust control mechanisms to ensure that works were in fact executed and at agreed standard.

**4.11** Instead, we found that NSWMA did not employ adequate checks and balances in identifying and scoping the works, selecting, and engaging individual contractors, monitoring the execution of the work, and paying for works completed. Therefore, we were not able to determine how NSWMA satisfied itself that it obtained full value from the monies spent for these services. To start with, NSWMA did not have an approved standard operating procedure, setting out the step-by-step instructions that act as guidelines for effectively managing special projects and seasonal works to ensure consistency across its four parks and markets companies (**Table 16**).

Table 16 AuGD's Analysis of Internal Controls for Special Projects and Seasonal Works

Audit Criteria for effective internal control	Observation
1 Standard Operating Procedure for special projects and seasonal works	
2 System for identifying and selecting individual contractors	
3 System for scoping of work	
4 Contracts in place and signed by individual contractors	
5 Quotations and invoices submitted, and purchase orders prepared	
6 Notation on invoice certifying work was satisfactorily completed	
7 System for physically verifying works done (including before and after photographs)	
8 Payees sign disbursement log to collect cheques	
9 Segregation of duties	
 Control fully established  Control partially established  Control not established	

Source: NSWMA's Audited Financial Statements

**4.12** The system of identifying and selecting individual contractors was generally informal and not all contracts were signed by the individual contractors. We noted that quotations and invoices submitted by the individual contractors outlined the nature and scope of the work, and the number of laborers and equipment to be employed to undertake different tasks. However, not in all cases did the invoices bear the required notation that work was satisfactorily completed, and in cases where it did, there was no evidence for example, before and after photographs, to support this declaration, given the nature of the work. NSWMA indicated that it had subsequently implemented this requirement.

**4.13** In addition, there was no documented evidence to attest that the locations were visited to verify the work done. We also found a general lack of segregation of duties. For example, we noted in many instances that the operations manager performed multiple functions in the process of collating the projects, authorizing the purchase requisitions, approving the purchase orders, signing the engagement contracts, certifying the works as satisfactorily completed and signing the cheques. Separation of these duties would make it difficult for individuals to manipulate the system. Further, a security feature on NSWMA's cheques to protect against fraud and forgery was removed by the operations manager and the accountant by the un-crossing of cheques without evidence of the payees' approval, which made the cheques payable to anyone.

**4.14** These weaknesses in the internal control can enabled individuals to manipulate the system, thereby increasing NSWMA's risk exposure. Of note, NSWMA's internal auditors revealed in a report, dated November 2020, that 165 cheques written to 154 contractors totalling \$32 million for desilting works were lodged to two bank accounts belonging to an individual who was not party to these contracts. The desilting works were undertaken in December 2019 and January 2020 in parishes covered by MPM. Following the internal audit review, NSWMA reported the anomalies to the relevant law enforcement authority and relocated the accountant and procurement officer at MPM to its head office and did not renew the contract for the regional operations manager. Our review of works conducted between January 2019 and December 2019, revealed similar anomalies, demonstrating that the period and value of the anomalies were more widespread than initially reported by NSWMA's internal auditors. Of the 399 payments sampled, we found 297 additional cheques written to 132 individuals totalling \$67 million, deemed to be suspicious transactions, increasing NSWMA's risk exposure to \$99 million.

**4.15** Our review of MPM bank statements and cleared cheques revealed that 166 cheques totalling \$38.8 million were lodged to the same two bank accounts at the same commercial bank, belonging to the same third-party individual, who was not party to these contracts (**Table 17**). In these instances, the respective bank account numbers belonging to the third-party individual, were written on the back of the cleared cheques. Our checks revealed that commercial banks generally do not accept third-party cheques because of the increased risk of fraud, and in cases where such cheques are accepted, they must be endorsed by the payees. We observed that although not endorsed by the individual payees, the cheques were processed and lodged to the third-party bank accounts. Of note, the third-party individual is engaged as a contractor at NSWMA and received payments totalling \$229.6 million between April 2016 and March 2022 for solid waste collection and other services.

Table 17 Analysis of Suspicious Cheque Payments

Deposit Accounts	No. of Cheques	Value of Cheques	No. of Cheque Endorsed
Third-party Bank Account 1	18	\$3,487,751	Nil
Third-party Bank Account 2	148	\$35,306,597	Nil
Third-party Bank Account (Not stated)	131	\$28,197,490	Nil
<b>Total</b>	<b>297</b>	<b>\$66,991,838</b>	<b>Nil</b>

Source: AuGD's analysis

**4.16** As shown in **Table 18**, while we were not able to confirm the bank accounts to which the other 131 cheques totalling \$28 million were deposited. We noted that multiple cheques were lodged, on the specific days, at the same commercial bank with the same teller processing most of the transactions<sup>15</sup>. Also, some of the quotations and invoices submitted by these, and other individual contractors had identical design. Further, there is no record of payees signing to collect the cheques as disbursement logs for the period examined were not presented.

Table 18 Analysis of Suspicious Cheque Payments Not stated

Lodgement Date	No. of Cheques	Value of Cheques	Teller No.
July 3, 2019	22	\$4,274,000	2
August 29, 2019	26	\$5,044,000	14
September 27, 2019	22	\$4,197,628	14
November 15, 2019	4	\$3,832,955	14
November 20, 2019	19	\$3,624,919	14
November 25, 2019	15	\$2,852,227	14
December 4, 2019	4	\$705,859	14
December 11, 2019	19	\$3,665,902	14
<b>Total</b>	<b>131</b>	<b>\$28,197,490</b>	<b>-</b>

Source: AuGD's analysis

<sup>15</sup> Teller number identified as per bank stamp on the back of the returned cheque

**4.17** In a memorandum dated October 25, 2018, NSWMA Executive Director issued a directive that effective October 29, 2018, all purchase orders valuing \$200,000 and above are to be approved by the Executive Director. Thereafter, irrespective of the location of the works, we noted that in many instances, the scope of work covered approximately 3.7 kilometre of roadways valuing just under \$200,000 using the standard rate of \$53,000 per kilometre. Prior to this, the value of special projects and seasonal works normally exceed this threshold.

# Appendices

## Appendix 1: Medium-Term Socio-Economic Framework (MTF)

### MTF 2012-2013 - 2014-2015

No.	Priority Strategies and Actions	Responsible Agency	Progress Results
<b>National Outcome # 14 – Hazard Risk Reduction and Adaptation to Climate Change</b>			
13	Complete hazardous materials plan and identify hazardous waste disposal sites	NSWMA	⊖
<b>National Outcome #12 – Internationally Competitive Industry Structures: Tourism</b>			
14	Develop adequate infrastructure in communities and resort towns, improving the state of roads, and creating additional facilities for sanitary conveniences, sewage etc.	Resort Boards, NEPA, NWA, NSWMA, MTE	⊖
16	Develop a comprehensive strategy for improving sanitation and waste management in resort towns – solid waste	NSWMA	⊖
19	Develop waste management programmes in establishments (hotels, attractions, craft markets, restaurants) with respect to plastics, compostable materials, bio-degradable materials, chemical and hazardous substances	NSWMA	⊖
<b>National Outcome #13 – Sustainable Management and Use of Environmental and Natural Resources</b>			
19	Revise governance framework for waste management	NSWMA, MLGCD, MOWLECC	⊖
20	Revise National Solid Waste Policy	NSWMA, MLGCD, NEPA, MSTEM, NWC	⊖
21	Implement integrated waste management strategy and action plan, specifically for hazardous waste, e-waste, sewage, medical waste, agricultural waste etc.	NSWMA, MLGCD, NEPA, MOH, MOWLECC, MSTEM, NWC, PCJ, MOAF	⊖
22	Pursue waste-to-energy options including revise draft waste-to energy policy, seek Cabinet approval and develop action plan for waste to energy	NSWMA, MSTEM, MLGCD, NEPA, MOH, MOWLECC, NWC, PCJ	⊖
23	Create management framework for better management of disposal sites	NSWMA, NEPA, MOH, MOWLECC, MLGCD	⊖
24	Develop local area plans for the management of wastes and disposal sites	NSWMA, MOH, MOWLECC, MLGCD	⊖
25	Construct infrastructure for hazardous waste, including collection points and transfer stations	NSWMA, NEPA, MOH, MOWLECC, MLGCD	⊖



Achieved



Partially Achieved (improvements needed)



Yet to be Achieved

Source: PIOJ Medium Term Socio-Economic Policy Framework – Vision 2030 Jamaica NDP

## MTF 2015-2016 - 2017-2018

No.	Priority Strategies and Actions	Responsible Agency	Progress Results
<b>National Outcome #10 – Energy Security and Efficiency</b>			
24	Complete the feasibility study for waste to energy development	PCJ, NSWMA, MLGCD, NEPA	⊖
<b>National Outcome #13 – Sustainable Management and Use of Environmental and Natural Resources</b>			
46	Revise the National Waste Management Policy to <ul style="list-style-type: none"> <li>• Reflect emerging issues such as hazardous waste, e-waste,</li> <li>• medical waste, white waste, agricultural waste, sewage etc.</li> <li>• Separate regulatory and operational functions of the NSWMA</li> </ul>	NSWMA, MLGCD, MOH, MWLECC, NEPA	⊖
47	Develop and promulgate the national solid waste regulations	MLGCD, NSWMA, CPC	⚠
48	Revise and approve hazardous waste policy	NSWMA, MLGCD, MOH, MWLECC, NEPA	⊖
49	Update the plastic packaging materials policy	NSWMA, MLGCD, MWLECC, NEPA	⊖
50	Promulgate “Take Back” legislation for e-waste	NSWMA, MLGCD, MWLECC, NEPA	⊖
51	Revise and approve the medical waste policy	MOH, NEPA, NSWMA, MLGCD	⊖
52	Undertake an organizational analysis and capacity assessment of the NSWMA	MLGCD, NSWMA, MOFP	⊖
53	Implement a system for quantification and reporting of waste streams	NSWMA, MLGCD, MOH, MWLECC, NEPA	⚠
54	Conduct a feasibility assessment of waste-to-energy options	MLGCD, MSTEM, NSWMA, PCJ	⊖
55	Implement annual solid waste characterisation studies	NSWMA	⊖



Achieved



Partially Achieved (improvements needed)



Yet to be Achieved

Source: PIOJ Medium Term Socio-Economic Policy Framework – Vision 2030 Jamaica NDP



## MTF 2018-2019 - 2020-2021

No.	Priority Strategies and Actions	Responsible Agency	Progress Results
<b>National Outcome #13 – Sustainable Management and Use of Environmental and Natural Resources</b>			
43	Separate regulatory and operational functions of the NSWMA	<b>MLGCD</b>	⊖
44	Undertake organizational analysis and capacity assessment of the NSWMA	<b>MLGCD</b> in collaboration with MFPS	⊖
47	Promulgate the national solid waste regulations	<b>NSWMA</b>	⚠
51	Implement pilot waste minimization project in one gully area in the KMA	MEGJC, NEPA in collaboration with NSWMA	☑
52	Revise National Waste Management Policy	<b>NSWMA</b>	⊖
54	Implement system for quantification and reporting of waste streams	<b>NSWMA</b>	☑
55	Implement annual waste characterisation studies	<b>NSWMA</b>	⊖
60	Conduct feasibility assessment of waste-to-energy options	<b>NSWMA</b>	⊖



Achieved



Partially Achieved (improvements needed)



























Yet to be Achieved

**Source:** PIOJ Medium Term Socio-Economic Policy Framework – Vision 2030 Jamaica NDP

## Appendix 2: Permit Specific conditions

### Riverton disposal facility permit 2021-02017-EP00145

Count	Permit No.	Specific Conditions	Compliance Status
<b>Phase one :1 year (1 April 2014- 31 March 2015)</b>			
1	5	shall ensure that all Phase 1 works are implemented within one (1) year of the date of issue of this Permit.	
2	6	shall ensure that hazardous waste, including but not limited to e-waste, used tyres, condemned foods and poultry waste and Asbestos containing material is not co-disposed of with the solid waste in the solid waste disposal cells	
3	7	shall ensure that the designation of active and dormant cells, quarterly cell rotation.....	
4	8	shall ensure that compacting of the tipped solid waste is done daily	
5	9	shall ensure that the covering of the compacted solid waste on the active cell is done at least every two weeks	
6	10	shall ensure that cover material thickness is at least 150mm thick.	
7	11	shall submit to the Agency information on cover material on a monthly basis.	
8	12	shall ensure that the active cell for tipping of solid waste is rotated every quarter.	
9	13	shall ensure that active cells that are closed for rotation to dormant status remains dormant for at least six months, unless otherwise approved in writing by the Agency/Authority	
10	14	shall notify in writing the “Manager, Enforcement Branch, National Environment and Planning Agency on planned activation of a dormant cell at least two (2) weeks prior to the activation of the dormant cell	
11	15	shall submit for the Authority’s approval, the proposed method to be employed for the physical division of each cell (active and dormant). within thirty (30) days from the date of issue of this permit.	
12	16	shall submit for the Authority’s approval a Fugitive Dust Emission Control Plan. within three (3) months of the date of issue of this permit.	
13	17	shall cover materials during transport to prevent the generation of fugitive dust.	
14	18	shall during the construction and operation phase of the entire disposal facility, wet road surfaces and stockpiles of soil and marl to prevent the generation....	
15	19	shall enforce speed limit restrictions of 15km/h throughout the disposal facility, to minimize the generation of fugitive dust	
16	20	shall ensure that used tyres received at the facility are baled, stacked, stored and separated into baled tyre piles.....	
17	21	Shall ensure that the road network within the disposal facility site is maintained to support all vehicles hauling waste.....	
18	22	shall ensure that the solid waste disposal facility is secured to prevent access to the disposal site by unauthorized persons and animals	
19	23	shall create and maintain a buffer zone between the disposal cells and the property boundary of at least 50 metres.....	
20	24	The Permittee shall submit a Landscape Plan to the Agency within thirty (30) days of the date of issue of this permit.	
21	25	shall submit a list of the plant species to be used in landscaping to the Agency within ninety (90) days of the date of issue of this environmental permit.	
22	26	Shall comply with all representations made in document titled “Vector Control & Management Program Riverton Solid Waste Disposal Facility”	
23	27	Shall ensure that the Vector Control & Management Plan is implemented based on the design approved by the Environmental Health Unit (EHU) of the Ministry of Health	
24	28	Shall maintain a minimum distance of 100m between the disposal cells, (including the tyre cell, the composting cell and special waste cell and Hazardous waste cells) and any surface water feature.	

Count	Permit No.	Specific Conditions	Compliance Status
25	29	Shall resuscitate the established boreholes at the disposal facility by the end of Phase I to facilitate water quality monitoring in accordance with Specific Condition 42.	○
26	30	Shall develop a detailed Water Quality Monitoring Plan for the Authority's approval and submit to the Manager, Enforcement Branch, National Environment Planning Agency within nine (9) months from the date of issue of this permit....	○
27	31	Shall develop a detailed Air Quality Monitoring Plan in consultation with the Agency and the portfolio Ministers (Local Government and Water, Land, Environment and Climate Change) within nine (9) months from the date of issue of this Permit....	○
28	32	Shall ensure that burning is strictly prohibited at the disposal facility	✓
29	33	Shall develop a detail Emergency Response Plan (ERP) and contingency plan for the facility and submit to NEPA within eight (8) weeks of the date of commencement of phase 2 works.....	○
30	34	Shall develop a facility Fire Monitoring and Prevention Programme and submit to NEPA within three (3) months of the date of issue of this permit....	○
31	35	Shall notify NEPA of an incident that has created a fire or any other emergency at the facility within 24 hours of being detected....	○
32	36	Shall submit a written report within two weeks of the fire or any other emergency at the facility ...	○
33	37	shall ensure that adequately sized signs are posted at each entrance...	⚠
34	38	shall record and maintain the following information (copy of the permit, inspection records, training procedures, contingency plan and closure and post-closure care plans) ....	○
35	39	Shall submit to NEPA an annual Operations and Monitoring Report....	○
36	40	Shall submit an "End of Phase" progress report to NEPA within sixty (60) days of the end of Phase I.....	○
<b>Phase two: 2 years (1 April 2015- 31 March 2017)</b>			
37	41	shall ensure that all Phase 2 works are implemented within two (2) years of the date of commencement of Phase 2 works....	⚠
38	41	Shall install the means of physical designation/division of each cell (active and dormant) as approved by the Authority....	✓
39	42	Shall conduct ambient water quality monitoring in accordance with the approved Water Quality Monitoring Plan as outlined in Specific Condition 29.....	○
40	43	shall conduct air quality monitoring in accordance with the approved detailed Air Quality Monitoring Plan as outlined in Specific Condition 31....	○
41	44	Shall ensure that the disposal facility is equipped with firefighting equipment.....	⚠
42	46	Shall comply with all conditions for the collection of hazardous waste as outlined in Permit # 2012-02017-EP00176 granted by the Authority....	○
43	48	Shall ensure that the access road to and the road network within the disposal facility is rehabilitated and maintained to support all vehicles hauling waste as well as to prevent the generation of fugitive dust....	⚠
45	49	Shall record and maintain the following information (copy of the permit, inspection records, training procedures, contingency plan and closure and post-closure care plans) .....	○
45	50	Shall submit to NEPA an annual Operations and Monitoring Report.....	○
46	51	Shall submit an "End of Phase" progress report to the "Manager, Enforcement Branch, National Environment and Planning Agency", within sixty (60) days of the end of Phase II....	○
<b>Phase three: 3-5 years (1 April 2017- 31 March 2022)</b>			
47	53	Shall develop a Gas Collection System Implementation Plan for the Authority's approval and submit to the Manager, Enforcement Branch, National Environment & Planning	○

Count	Permit No.	Specific Conditions	Compliance Status
		Agency, 10 Caledonia Avenue, Kingston 5 within ninety (90) days from the date of commencement of Phase 3 ....	
48	54	Shall develop an Implementation Plan for the Leachate Collection System, including the leachate collection pond, for the Authority's approval and submit to the National Environment & Planning Agency within ninety (90) days from the date of commencement of Phase 3.....	⊖
49	55	Shall ensure that the storm water drainage plan, is implemented based on the design approved by the National Works Agency (NWA) in letter dated 18 July 2013 and subject to the conditions contained therein....	⊖
50	56	Shall ensure that all surface drainage on the land filled areas and storm water runoff is effectively intercepted by the Leachate Collection System and channelled to the proposed leachate collection pond.	⊖
51	57	The Permittee shall ensure that storm water generated at the used tyre cell is collected by the Leachate Collection System.....	⊖
52	58	Shall develop a Closure Plan for the entire facility for the Authority's approval and submit to the Enforcement Branch, National Environment & Planning Agency, within ninety (90) days from the date of commencement of Phase 3....	⊖
53	59	Shall record and maintain the following information (copy of the permit, inspection records, training procedures, contingency plan and closure and post-closure care plans)	⚠
54	60	Shall submit to NEPA an annual Operations and Monitoring Report.	⊖
55	61	Shall submit an "End of Phase" progress report to the "Manager, Enforcement Branch, National Environment and Planning Agency", within sixty (60) days of the end of Phase II	⊖



Condition met



Condition partially met (improvements needed)



Condition not met

**Retirement waste site Permit 2016-08017-EP00394 issued February 11, 2020**

Count	No.	Specific Conditions breach	Compliance Status
1	1	The Permittee shall comply with all representations made in the Permit Application Form dated 14 March 2019....	○
2	2	Shall ensure that all correspondence, notification, plans report or any other documents being submitted to the Agency...	○
3	7	Shall ensure that all Phase 1 works are implemented within one (1) year of the date of issue of this Permit....	○
4	8	Shall ensure that hazardous waste, including but not limited to e-waste, used tyres,.... and Asbestos containing material is not co-disposed of with the solid waste	○
5	9	Shall develop a detail operation and maintenance manual and submit for approval within 3 months of the date of issue of permit....	○
6	12	Submit to the agency information on cover material on a bi-annual basis from the date of issue of this permit....	○
7	16	Shall submit for the Authority's approval, the proposed method to be employed for physical division of each cell.... within thirty days from the date of the permit	○
8	17	Shall submit for the Authority approval a Fugitive Dust Emission Control Plan... within three months from the date of the permit.	○
9	20	Shall ensure that the method(s) of sewage treatment and disposal is to the tertiary level & to the satisfaction of MOHW....	○
10	21	Shall ensure that the access road to and the road network within the landfill is maintained to support all vehicles hauling waste....	○
11	22	Shall ensure that the solid waste disposal facility is secured to prevent access...	○
12	23	Shall create and maintain a buffer zone between the disposal cells and the property boundary...	○
13	24	Shall submit a Landscape Plant to the Agency within 30 days from the date of the permit	○
14	25	Shall submit a list of the plant species to be used in landscaping to the Agency within 90 days from the date of the permit...	○
15	26	Shall ensure that storm water drainage plan is implemented based on a design approved by NWA....	○
16	27	Shall design and implement a Pest and Vector Control Programme...	○
17	28	Shall undertake mapping and monitoring of the site....	○
19	29	Shall identify water quality monitoring points with consultation with WRA...	○
19	30	Shall develop a detailed Water Quality Monitoring Plan for the Authority's approval...	○
20	31	Shall develop a detail Air Quality Plan in consultation with the Agency within 9 months from the date of the permit.	○
21	32	Shall ensure that there is no burning of waste at the disposal facility.	○
22	33	Shall develop a facility fire monitoring and prevention programme...	○
23	35	Shall ensure that adequate size signs are posted at each entrance....	○
24	36	Shall record and maintain information on (permit, inspection records, training....	○
25	38	Shall submit an End of Phase progress report....	○



Condition met



Condition partially met (improvements needed)



Condition not met

### Haddon waste site Permit 2016-06017-EP00393 issued February 11, 2020

Count	Permit No.	Specific Conditions	Compliance status
1	7	Shall ensure that all Phase 1 works are implemented within one (1) year of the date of issue of this Permit....	Not known
2	8	shall ensure that hazardous waste, including but not limited to e-waste, used tyres, condemned foods and poultry waste and Asbestos containing material is not co-disposed of with the solid waste in the solid waste disposal cells....	Not known
3	9	Shall develop a detail operation and maintenance manual and submit for approval within 3 months of the date of issue of permit....	Not known
4	10	Shall ensure that compacting of tipped solid waste followed by covering ...at least every two weeks.	Not known
5	11	Shall ensure that cover material thickness is at least 150mm thick.	Not known
6	12	submit to the agency information on cover material on a bi-annual basis from the date of issue of this permit....	Not known
7	13	Shall ensure that active cells for tipping of solid waste is rotated quarterly or at a greater frequency.	Not known
8	14	Shall ensure that active cells that are closed for rotation...remains dormant for at least six months...	Not known
9	15	Shall notify NEPA in writing.... Planned activation of a dormant cell at least two weeks prior...	Not known
10	16	Shall submit for the Authority's approval, the proposed method to be employed for physical division of each cell.... within thirty days from the date of the permit	Not known
11	17	Shall submit for the Authority's approval a Fugitive Dust Emission Control Plan... within three months from the date of the permit.	Not known
12	18	Shall cover material during transport to prevent the generation of fugitive dust.	Not known
13	19	Shall enforce speed limit restrictions of 15km/h throughout the disposal facility...	Not known
14	20	Shall ensure that the method(s) of sewage treatment and disposal is to the tertiary level & to the satisfaction of MOHW....	Not known
15	21	Shall ensure that the access road to and the road network within the landfill is maintained to support all vehicles hauling waste....	Not known
16	22	Shall ensure that the solid waste disposal facility is secured to prevent access...	Not known
17	23	Shall create and maintain a buffer zone between the disposal cells and the property boundary...	Not known
18	24	Shall submit a landscape plan to the Agency within 30 days from the date of the permit	Not known
19	25	Shall submit a list of the plant species to be used in landscaping to the Agency within 90 days from the date of the permit...	Not known
20	26	Shall ensure that storm water drainage plan is implemented based on a design approved by NWA....	Not known
21	27	Shall design and implement a Pest and Vector Control Programme...	Not known
22	28	Shall undertake mapping and monitoring of the site....	Not known
23	29	Shall identify water quality monitoring points with consultation with WRA...	Not known
24	30	Shall develop a detailed Water Quality Monitoring Plan for the Authority's approval...	Not known
25	31	Shall develop a detail Air Quality Plan in consultation with the Agency within 9 months from the date of the permit.	Not known
26	32	Shall ensure that there is no burning of waste at the disposal facility.	Not known
27	33	Shall develop a facility fire monitoring and prevention programme...	Not known
28	34	Shall notify NEPA of an incident that has created a fire or any other emergency at the facility within 24 hours of being detected.	Not known
29	35	Shall ensure that adequate size signs are posted at each entrance....	Not known
30	36	Shall record and maintain information on (permit, inspection records, training....	Not known
31	37	Shall submit to NEPA an annual status report....	Not known
32	38	Shall submit an End of Phase progress report....	Not known

Source: NEPA permit document

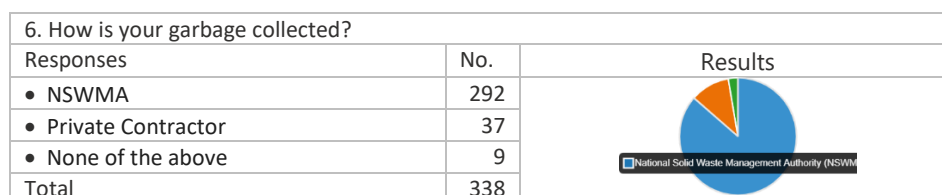
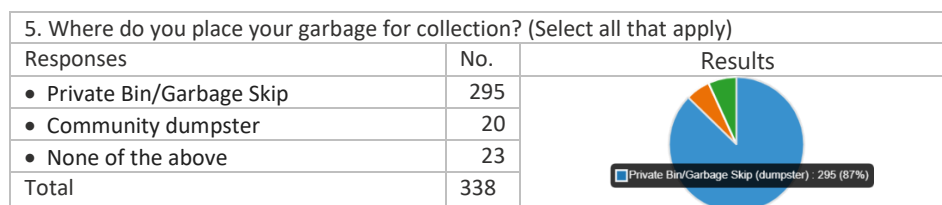
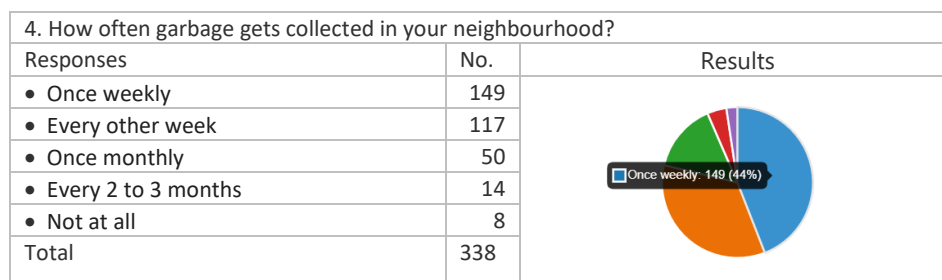
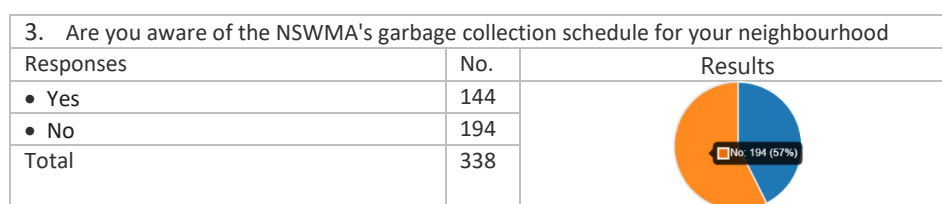
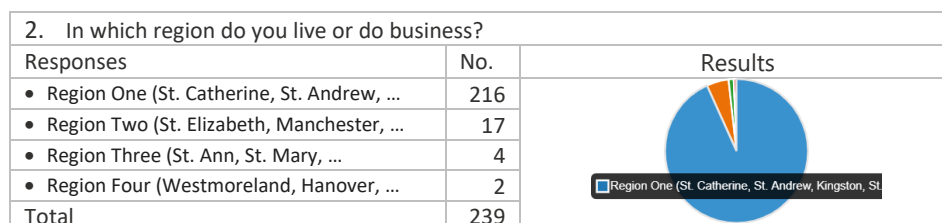
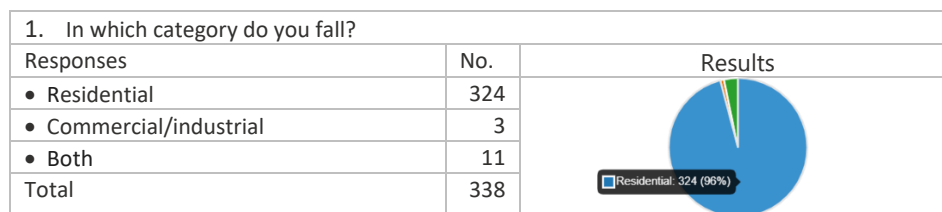


### Appendix 3: Waste Characterisation Survey Report Recommendations

2010 Recommendations	Status
<ul style="list-style-type: none"> <li>The frequency of these waste characterisation surveys must be increased and the recommendation implemented.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>The organizations recycling or recovery programs must be increased significantly.</li> </ul>	⚠
<ul style="list-style-type: none"> <li>Greater opportunities for waste recovery from the domestic waste stream must also be capitalized on. Composting and the diversion of plastics fraction to recycling facilities must be increased. If the organization cannot undertake this by itself private sector interest must be invited to participate.</li> </ul>	⚠
<ul style="list-style-type: none"> <li>The policy for collection and disposal of the reusable waste fractions (compostable, plastics &amp; textiles) must also be changed. A cost benefit analysis must be done to determine efficiencies as well as the viability of establishing these enterprises.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>Efforts to construct a 'waste to energy' facility in the island is commendable, but the collection mechanisms and revenue issues must be solved at all level if this will work. An urgent fix is therefore intrinsic.</li> </ul>	⊖
2015 Recommendations	Status
<ul style="list-style-type: none"> <li>Greater opportunities for waste recovery from the domestic waste stream must also be capitalized on. Composting and the diversion of plastics fraction to recycling facilities must be increased.</li> </ul>	⚠
<ul style="list-style-type: none"> <li>The frequency of these waste characterisation surveys must be increased, and the recommendations implemented.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>The organization's recycling or recovery programs must be increased significantly.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>The efforts of the Enforcement and Compliance Division should focus more on the organizations core responsibility (residential waste management) and not the compliance of commercial entities and securing new commercial collection contacts.</li> </ul>	⊖
2017 Recommendations	Status
<ul style="list-style-type: none"> <li>The waste management efforts within the wasteshed must be focused around the compostable, plastic and paper waste fractions.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>Waste management technologies such as composting, anaerobic digestion and recycling must be considered to solve the issues in the wasteshed.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>A cost benefit analysis of implementing these new technologies must be done to determine efficiencies as well as the viability of establishing these enterprises.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>A social impact analysis of implementing these new waste management technologies should be conducted to determine the extent to which the residents will participate in these initiatives.</li> </ul>	⊖
<ul style="list-style-type: none"> <li>Efforts to construct a 'waste to energy' facility in the island is commendable, but the collection mechanisms and revenue issues must be solved at all level if this will work. An urgent fix is therefore intrinsic.</li> </ul>	⊖
 Met  Partially met (improvements needed)  Not Met	

Source: NSWMA's Waste Characterisation Survey Reports 2010, 2013 and 2017

## Appendix 4: Stakeholder Satisfaction Survey



7. How do you dispose of your garbage if not collected by NSWMA or private contractors?  
(Follow from question 6)

Responses	No.	Results
• Public dump site	0	
• Burn	5	
• Dump on roadsides	2	
• Dump on vacant lots	0	
• Dump in gullies or other water	0	
• Other	2	
Total	9	

8. Do you have illegal dump sites in your neighbourhood?

Responses	No.	Results
• Yes	95	
• No	243	
Total	338	

9. Do you know how to report illegal dumping activities to the NSWMA?

Responses	No.	Results
• Yes	70	
• No	268	
Total	338	

10. Have you ever reported illegal dumping activities to the NSWMA? (Follow from question 9)

Responses	No.	Results
• Yes	20	
• No	50	
Total	70	

11. On a scale 1-10, with one being very dissatisfied and 10 being very satisfied, how would you rate garbage collection in your neighbourhood?

<div> <div>338</div> <div>Responses</div> </div> <div> <div>5.27</div> <div>Average Number</div> </div>	
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12. Are you aware of the importance of garbage recycling?

Responses	No.	Results
• Yes	300	
• No	38	
Total	338	

