



## PART III – VISION, GOALS AND ACTION PLAN

### 7.0 Vision, Goals & Objectives

One of the primary responsibilities of the MATF was to establish the vision, goals and objectives for the Plan. These reflect the group’s priorities for meeting the City’s long-term waste and resource management demands. The goals and objectives provide guideposts for determining if the City is on track to meet Houston’s needs.

#### Plan Vision

**The Vision of the SWMD is to provide exemplary service to the Houston community while enhancing our environment and protecting the health of Houston’s residents.**

#### Plan Goals

- Achieve financial sustainability for the SWMD.
- Increase reuse, recycling and organics diversion and decrease environmental risks of waste disposal in landfills. Make Houston a zero-waste community.
- Continue to provide quality services to the residents and businesses of Houston.
- Ensure long-term disposal capacity and sustainable solid waste infrastructure.
- Provide solid waste management services in a safe, equitable, responsive, and environmentally responsible manner.

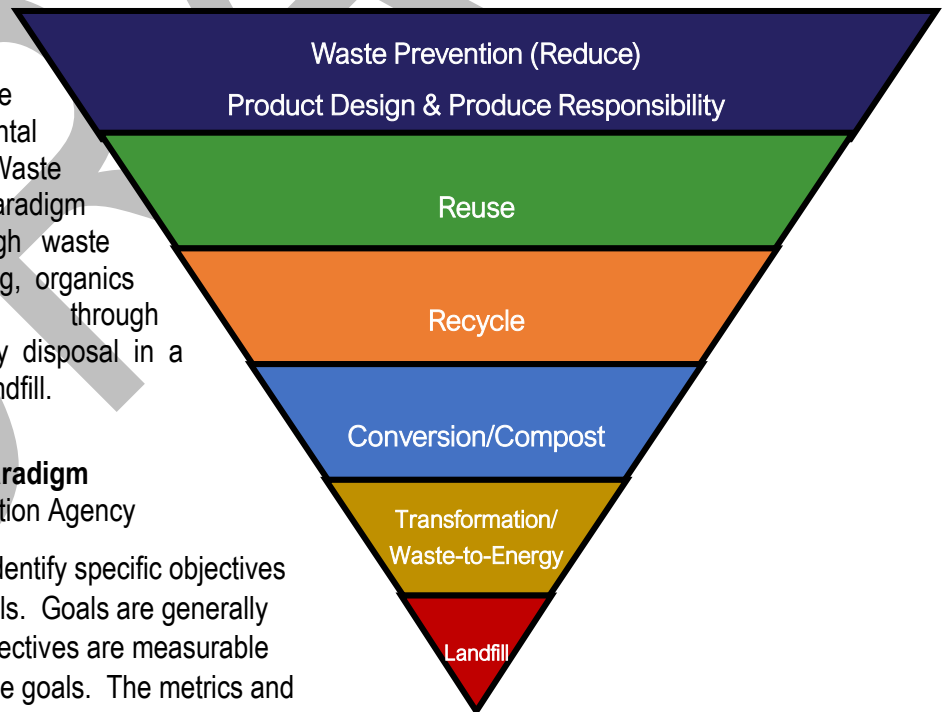
#### Plan Objectives

Objectives are means to achieve the Plan’s goals. The goals and objectives established for the Plan are consistent with the U.S. Environmental Protection Agency’s “New Waste Paradigm” (Figure 7-1).” This paradigm focuses on reducing waste through waste prevention and reuse, then recycling, organics management, transformation through energy/resource recovery and finally disposal in a properly constructed and operated landfill.

#### Figure 7-1 Waste Management Paradigm

Source: U.S. Environmental Protection Agency

The tables presented in this section identify specific objectives and metrics to achieve the stated goals. Goals are generally defined as an idea for the future. Objectives are measurable outcomes that are designed to achieve goals. The metrics and milestones presented in this section present specific timeframes and metrics to determine if the SWMD is on-target to succeed in addressing the MATF’s goals and objectives. Near-term generally means five years or less; mid-term is five to ten years and long-term is over 10 years.





**Table 7-1 Financial Sustainability Goals, Objectives and Metrics**

Goals	Objectives	Metrics & Milestones
<p><b>Achieve Financial Sustainability</b></p>	<p>Establish funding mechanisms that provide long-term financial sustainability for solid waste management needs.</p> <p>Secure alternative funding sources for paying for solid waste management strategies, including grants and partnerships.</p> <p>Provide services utilizing best management practices.</p>	<ul style="list-style-type: none"> <li>▪ In the near-term, establish monthly service fees to pay for all solid waste management services.</li> <li>▪ In the near-term, establish a monthly environmental fee to pay for non-residential waste management services.</li> <li>▪ Continue to secure grants for solid waste programs</li> <li>▪ Continue to establish partnerships with environmental organizations and the private sector to jointly fund projects.</li> <li>▪ Immediately, right-size the SWMD to improve operating efficiencies through timely equipment replacements, on-time equipment maintenance and appropriate staff sizing.</li> <li>▪ Over the long-term, effectively use private sector resources to manage City-owned facilities.</li> </ul>

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**Table 7-2 Assuring Long-term Disposal Goals, Objectives & Metrics**

Goal	Objective	Metrics
Assure long-term disposal capacity	Assure long-term disposal capacity, maintaining a minimum of 25-years disposal capacity for waste generated by City residents and businesses.	<ul style="list-style-type: none"> <li>▪ In the near-term, advocate for the efficient operation of regional landfills (as measured by in-place compaction density) through contracts as a means of extending current capacity.</li> <li>▪ Over the long-term, assure landfill facilities used by the City meet all state and federal regulations through local ordinances and contracts for service.</li> <li>▪ Continuously, assure environmental justice is taken into consideration for landfill locations and expansions.</li> <li>▪ In the long-term, site, permit and construct a City-owned landfill. It is recognized that the process requires a long lead time, therefore planning for a landfill is a near-term requirement.</li> <li>▪ In the near / mid-term, determine the need for a rail-haul facility to meet the City's long-term solid waste management needs.</li> </ul>
	Reduce haul costs by maintaining a system of transfer facilities for both MSW and recyclable materials.	<ul style="list-style-type: none"> <li>▪ Continue to operate and maintain through public private / partnerships City owned transfer facilities.</li> <li>▪ In the near-term, develop recyclable material transfer capabilities throughout the City.</li> <li>▪ In the near / mid-term, permit and build a Northeast Transfer Station.</li> </ul>
	Implement resource recovery technologies, including energy from waste for meeting the City's future waste management needs when technically and economically feasible.	<ul style="list-style-type: none"> <li>▪ Annually, report to the Mayor and City Council the status of resource recovery technologies and their potential application to Houston. These technologies include mass-burn incineration, pyrolysis, gasification and anaerobic digestion.</li> <li>▪ In the very near-term, establish a public / private framework for monitoring technical advances and what the City can do to support development.</li> </ul>



**Table 7- 3 Waste Prevention, Recycling & Organics Goals, Objectives & Metrics**

Goal	Objectives	Metrics and Milestones
<b>Increase Reuse, Recycling &amp; Organics Diversion</b>	Reduce waste from all Houston residents and businesses, while leading by example, to assist in reduction of tons-per-capita disposed by 25% compared to 2020 levels by 2040.	<ul style="list-style-type: none"> <li>▪ By 2040, reduce waste from all sectors going to regional landfills (will require cooperation from City haulers) by 25%.</li> <li>▪ By 2040, reduce residential waste collections by 25%.</li> <li>▪ By 2040 Collection of yard waste reduced through grass-cycling (25%).</li> </ul>
	Expand and innovate recycling opportunities to all Houston residents and businesses to increase amounts of materials recycled by 45% between 2020 and 2040; increase types of materials that can be recycled, and reduce contamination to 20% by 2030.	<ul style="list-style-type: none"> <li>▪ By 2040, achieve a residential recycling rate of 30% (includes yard waste and recyclables).</li> <li>▪ In the immediate future, establish an accurate, local recycling market database and benchmark.</li> <li>▪ By 2040, achieve a City-wide recycling rate of 45% (will require a local data collection effort to capture all local recycling). Assumes current is 32% including C&amp;D material.</li> <li>▪ Continuously work to establish additional markets for recovered materials.</li> </ul>
	Enhance multi-family recycling efforts.	<ul style="list-style-type: none"> <li>▪ In the near-term, establish a dedicated multi-family reduction / recycling program with baseline survey for participation tracking.</li> <li>▪ By 2025, increase the number of depositories and recycling centers for collecting materials from multi-family households; increased to one depository in each Council district.</li> <li>▪ Establish a mandatory multi-family recycling ordinance by the year 2025.</li> </ul>
	Enhance private sector source reduction and recycling efforts.	<ul style="list-style-type: none"> <li>▪ In the immediate future, establish a dedicated commercial / institutional source reduction / recycling program with baseline survey for participation tracking.</li> <li>▪ By 2027, establish a mandatory universal recycling ordinance.</li> </ul>
	Preserve landfill capacity and realize environmental and economic benefits by reducing the disposal of organic resources within regulatory and economic constraints.	<ul style="list-style-type: none"> <li>▪ In the near-term, mulch or compost 100% of recovered organics (yard waste and tree waste).</li> <li>▪ In the near-term, reduce by 30% organics collection through grass cycling and backyard composting (increased number of attendees at Master Composter courses).</li> <li>▪ By 2040, recover commercial organic materials through commercial program (survey food processors &amp; food service companies for baseline) - 25% recovery rate by 2040.</li> <li>▪ In the near / mid-term, assist in the development of organics processing capacity throughout the region.</li> </ul>



		<ul style="list-style-type: none"> <li>▪ In the near / mid-term, identify a candidate site for a food waste facility (similar to transfer or storage facility to serve food waste producers).</li> <li>▪ Continuously, use of compost, mulch and other recovered organic resources increased throughout the region to support markets and realize environmental benefits. Increased use by City departments.</li> <li>▪ Secure necessary wastewater treatment permits to allow for all of Houston’s sludge to be processed at a composting facility. Negotiate contracts with compost processors to accept biosolids instead of landfilling this waste.</li> </ul>
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**Table 7-4 Service Goals, Objectives & Metrics**

Goal	Objective	Metrics & Milestones
Continue to provide quality services to the residents & businesses of Houston	Provide efficient collection of MSW and resources to all Houston residents.	<ul style="list-style-type: none"> <li>▪ Continuously, provide once-per-week collection of municipal solid waste from residents. Level of service to be commensurate with financial resources available.</li> <li>▪ Immediately, establish a fleet replacement program that results in no residential collection vehicles older than seven years old.</li> <li>▪ Immediately, fully staff the SWMD.</li> <li>▪ Continuously, reduce transportation costs associated with the collection and hauling of wastes through the use of transfer stations. In the near-term, identify transfer options for recyclable materials.</li> <li>▪ Continuously, evaluate opportunities for the collection of recyclable materials at commercial and multi-family units.</li> <li>▪ Continuously, provide for the collection program for household hazardous materials through City facilities and point-of-sale centers.</li> </ul>
	Provide efficient, safe and responsive services in times of heavy storms or other disaster events.	<ul style="list-style-type: none"> <li>▪ Continuously, maintain a current disaster debris management plan.</li> <li>▪ Continuously, maintain active contracts for both managing and collecting disaster debris in emergency situations.</li> <li>▪ Continuously, maintain available quality collection equipment for storm debris (less than seven years old for major pieces of equipment).</li> <li>▪ In the near-term, implement the City’s Climate Action Plan, Emergency Management Plan and Resiliency Plan.</li> </ul>



**Table 7-5 Environmental & Illegal Dumping Goals, Objectives and Metrics**

Goal	Objectives	Metrics & Milestones
<p>Provide solid waste management services in a safe, equitable, responsive, and environmentally responsible manner.</p>	<p>Reduce litter throughout the City, presenting a more beautiful and healthier Houston.</p> <p>Enhance efforts to reduce illegal dumping throughout the City.</p>	<ul style="list-style-type: none"> <li>▪ In the near-term, develop partnerships to discourage litter generation through joint public information campaigns.</li> <li>▪ In the near-term, increase the number of depositories for collection of waste so that there is at least one facility in each council district. In addition to expanding the number of depositories, improve the geographic distribution of environmental service centers for HHW, electronics recycling and other special household wastes.</li> <li>▪ In the near-term, add staffing and equipment dedicated to illegal dumping clean-up efforts and for homeless camp clean-up.</li> <li>▪ Immediately, create opportunities for enforcement of illegal dumping for SWMD staff.</li> <li>▪ Immediately, establish clear lines of responsibility for future illegal dumping enforcement, communications and clean-up.</li> </ul>

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## 8.0 Plan Recommendations & Impacts

As shown in Section 6, there are a number of policy and program options available to the City to achieve the MATF goals and objectives. The next step for the City is to establish policy/program plan priorities and implement those strategies. Implementation will require an organizational structure to identify specifically who will be responsible for specific aspects of the Plan. It should be noted that in many instances, plan implementation will require a collaboration of several stakeholders, including the residents of Houston. The Plan's implementation will also require financial resources. As has been stated in this Plan, the City's program is severely underfunded. To achieve goals and objectives, additional funding will be necessary. Once implemented, the Plan's outcomes will include better service to Houston residents, improvements to the local environment and a more secure solid waste infrastructure.

### Plan Priorities

Based on an assessment of the City's needs and program options, the following are the high priority actions for the City's SWMD.

1. **Establish a long-term financially sustainable program** that includes both a monthly environmental fee and a monthly service fee.
2. **Right-size the program.** The City will need to continue to make investments in new equipment to replace older equipment and increase staff.
3. **Assure long-term disposal capacity in the region by directly investing in a process to site, permit and construct an MSW landfill in the region.** The City may operate with its own staff or operate the landfill under contract similar to the City's transfer stations.
4. **Work towards a zero-waste management system.** Five specific programs are identified as priorities.
  - a. Enhance markets for recyclable materials through cooperation with industry and the City's economic development office.
  - b. Focus attention on the multi-family and commercial / institutional sectors. This should begin with public education and coordination, ultimately leading to mandatory ordinances.
  - c. Continue to provide residential recycling services, with an emphasis on reducing contamination.
  - d. Establish an organics management program that targets the commercial sector including food processors and food service businesses.
  - e. Mobilize the entire Houston community to understand that action is required by every household and business to reduce the cost of solid waste management and preserve critical disposal capacity.
5. **Invest in a new North East transfer station** to be located at the NE service center. The SWMD should also immediately fund improvements at existing transfer stations.
6. **Improve illegal dumping clean-up efforts through increases in staff and equipment.** Increase enforcement and penalties paid for violators as part of this process.

The policies and programs recommended in this Plan address all aspects of an integrated resource recovery approach. In recent years, the SWMD has been able to address some of these issues but the SWMD still faces many challenges.

- The current collection program relies too heavily on older equipment and is under-staffed. As noted in the Mayor's Inaugural Address, the City is making strides to replace front-line equipment. There is still a need to continuously update the City's fleet and hire additional staff to reduce overtime costs.



**The challenges that face the SWMD in meeting the City's long-term solid waste needs will require both a new approach to funding and a recognition that managing the City's needs will cost more.**



- The City continues to be impacted by climate change. The increasing number of damaging storm events has required the SWMD to provide assistance in clean-up efforts and these storms negatively impact regional disposal capacity.
- The region has less than 30 years of remaining disposal capacity. While this may appear to suggest long-term disposal capacity, to secure future landfill capacity a timeframe of 15 years is necessary. And as landfills in the region reach capacity, the City will have fewer options, affecting both access and costs.
- There is increasing public pressure to be more pro-active in providing more environmentally acceptable options for managing waste and resources, including more recycling and organics management.

The Plan is very pro-active in addressing current and future needs. Table 8-1 summarizes the number of new programs recommended and expansions to current programs. There 33 new programs ranging from monthly service fees to new ways to reduce waste generation identified in the Resiliency Plan. Current programs such as public information and illegal dumping clean-ups are proposed to be expanded from their current levels.

<b>Program Area</b>	<b>New Programs</b>	<b>Expansions of Programs</b>	<b>Total</b>
Financial Assurance	1	1	2
Source Reduction	2	3	5
Recycling	9	5	14
Organics	8	2	10
Collection	2	4	6
Transfer Stations	3	0	3
Energy & Resource Recovery	3	0	3
Assuring Disposal Capacity	3	0	3
Illegal Dumping	2	4	6
<b>TOTAL</b>	<b>33</b>	<b>19</b>	<b>52</b>

### **Climate and Resiliency Plans**

As stated, the City is also implementing both a Climate Action Plan and a Resiliency Plan. Both plans address MSW management. MSW recommendations from these plans are identified below.

#### **Climate Action Plan Recommendations**

The City is committed to achieving the Paris Accord standards for climate change. It established a working group to evaluate options for addressing greenhouse gases and programs to reduce these gases significantly by 2040. Below are





specific action items referenced in the DRAFT Climate Action Plan. It is significant that this Integrated Resource Recovery Plan addresses each of these goals.

- T1.2 Convert 100% of the non-emergency, light-duty municipal fleet (cars and trucks) to EV technologies by 2030.
- M1.1 Engage public on waste reduction solutions
- M1.2 Develop, implement, and promote sustainable municipal procurement strategies
- M1.3 Promote upstream solutions to reduce/manage disaster debris
- M2.1 Expand and innovate recycling opportunities to all Houston residents and businesses to increase diversion and recovery, while reducing contamination
- M2.2 Strengthen and support efforts to reduce food waste and create infrastructure for food organics collection and composting
- M2.3 Support and expand market development and diversion infrastructure
- M3.1 Improve efficiency of all landfills, transfer stations and waste transportation
- M3.2 Ensure long-term disposal capacity and solid waste infrastructure

### Resiliency Plan

Sections of the City’s DRAFT Resiliency Plan that are included in this Plan and include the following.

- Sub-action 32.4: Reduce residential landfill waste
- Sub-action 32.1: Shift to electric vehicles and low/no emission vehicles
- Sub-action 38.1: Increase long-term landfill sustainability
- Sub-action 38.2: Increase renewable energy generated within Houston
- Sub-action 38.3: Advance multi-family and commercial recycling

### Organizational Plan

The SWMD is ultimately responsible to the Mayor for implementing the City’s solid waste services. However, to implement the Plan as recommended, every aspect of the Houston community will have to participate in the implementation of the Plan. Figure 8-1 presents an organization chart that identifies the key roles of the SWMD and key stakeholders for implementation.



### SWMD

For FY 2020, a total of 436.9 FTE positions were budgeted. The Recycling Revenue Fund has a total of 3 authorized positions. The organization chart defines a distribution of staff for the SWMD. Specific responsibilities for each section of the SWMD are presented in Appendix D.

The SWMD has direct responsibilities for the collection, processing, recycling and disposal of residential waste in the City. It also has policy making authority related to solid waste management. Per the City’s Code, the SWMD are responsible for the following.

- *Supervise and be responsible for the collection, transportation and disposal of solid waste.*
- *Carry out the policies of the Mayor and City Council in the overall planning effort to develop a reliable and efficient method for solid waste disposal.*
- *Administer and enforce this chapter and related laws.*
- *Have such other duties and responsibilities as may be assigned by the Mayor and City Council.*



- (Ord. No. 93-514, § 62, 5-5-93; Ord. No. 2015-1032, § 2, 10-21-2015, eff. 1-1-2016)

The SWMD is currently comprised of three primary functions: Department Management, Maintenance Division and two Operations Divisions. ***Because of the significance of future planning, program management and public outreach and education, it is proposed a fourth primary functional division be established – Planning and Outreach Division.***

One of the primary recommendations of the Plan is to **Right-Size** the organization. To accomplish this, the City will need to continuously work to add staff to improve reliability and to provide the additional services that are outlined in the Plan. ***Without the addition of resources, including staff and equipment, the City will have to actually cut back on the level of services provided.***

### Key Stakeholders

- **Citizens of Houston:** The citizens of Houston require a SWMD that can provide reliable services to manage municipal solid waste in order to maintain the health and environment of the community. Houston residents also have a responsibility to actively seek ways to reduce waste generation, reduce the amounts of contamination placed in recycling carts and adhere to SWMD collection ordinances.
- **Mayor & Council:** The executive and the legislative branches of the City direct the SWMD as to the services it provides and its annual budget. The Director of the SWMD reports to the Mayor.

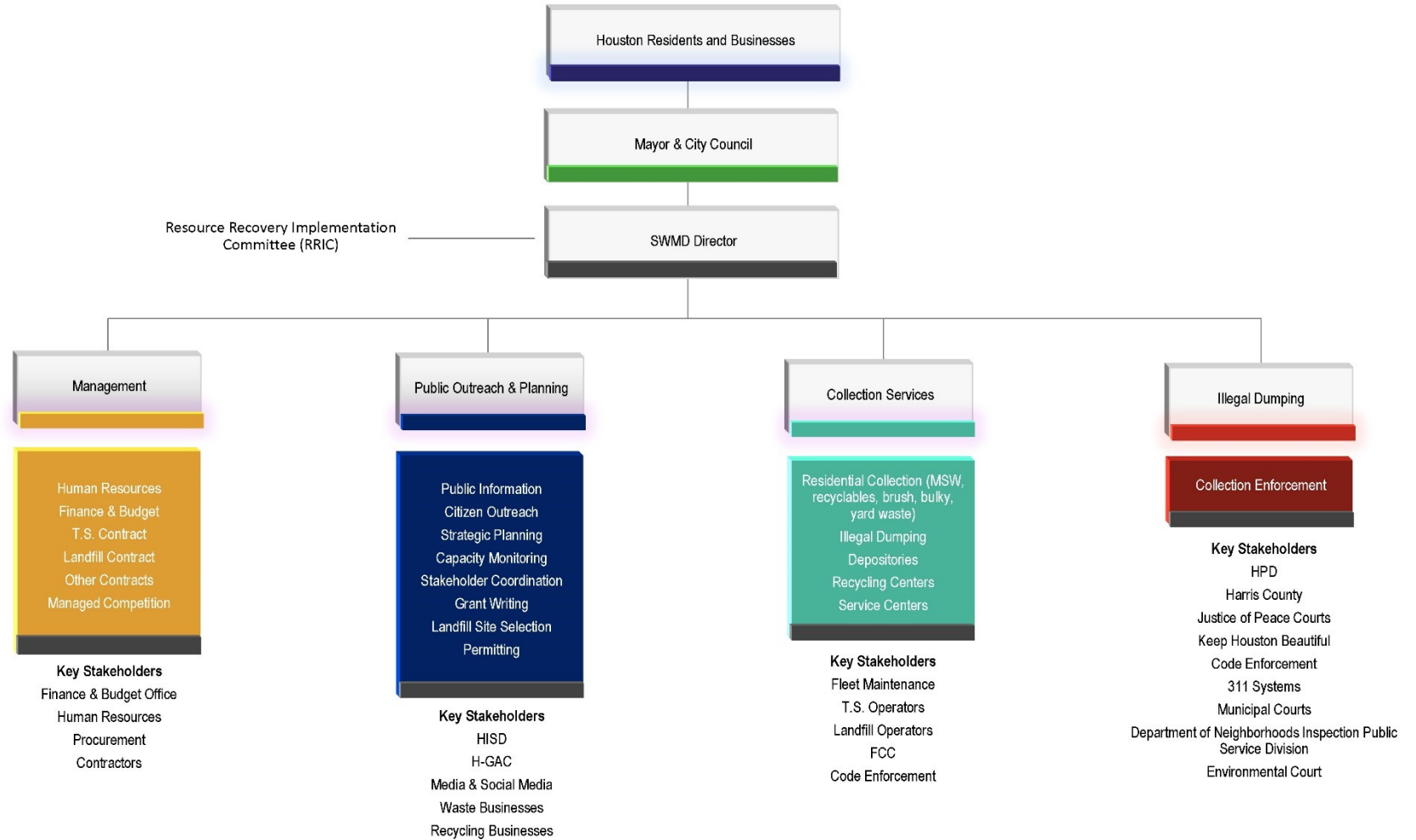
Houston residents need to understand that they are key stakeholders in the success of the Plan. By actively taking steps to ***reduce waste, follow ordinances and become aware of ways to improve recycling***, Houston residents can ***improve the local environment and reduce the cost*** of solid waste management which is paid for by their tax dollars.

### Other City Departments

- **Fleet Maintenance:** The SWMD relies on hundreds of pieces of equipment to provide their services reliably and efficiently. The Fleet Maintenance Department has the responsibility to assist in the procurement of vehicles and maintain them on a regular basis.
- **Procurement:** Each year, the SWMD procures a number of services and materials from private vendors. The Procurement Department has the responsibility to assist the SWMD procure these services including operation of the transfer stations, supplemental collection services and landfill disposal.
- **Budget & Finance:** Assists the SWMD in preparing annual budgets. This department will have a critical role to play in establishing an Enterprise Fund if this recommendation is adopted by the City Council.
- **Emergency Management:** The SWMD is a key player in responding to emergency events such as floods and hurricanes. The SWMD works closely with Emergency Management to respond quickly to these events.
- **Office of Sustainability:** Many of the priorities of the Office of Sustainability and the SWMD are aligned – specifically related to the implementation of the Climate Action Plan. SWMD should work closely in identifying funding sources for programs that are in both this Plan and the Climate Action Plan.



# Integrated Resource Recovery Plan Organization Chart



**Figure 8-1**



- **HPD & Code Enforcement & Department of Neighborhoods:** These agencies have responsibilities to identify illegal dump sites and to enforce City ordinances related to illegal dumping.
- **Office of Economic Development:** Responsible for coordinating with the SWMD in efforts to attract new markets for recyclable materials and other waste management facilities that are consistent with the Plan's goals and objectives.

### Organizational Issues and Illegal Dumping

One of the findings of the planning effort is the need for a significant restructuring of illegal dumping enforcement responsibilities and accountability. It would be useful to bring all parties together to attempt to more clearly define roles, responsibilities and budgets for identifying illegal dump sites; enforcing local codes and ordinances; and collection of waste found at illegal dump sites. The one clear responsibility is that the SWMD has the responsibility to collect waste at these sites once they have been reported.

#### Other Governmental Entities

- **Texas Commission on Environment Quality:** TCEQ is responsible for permitting MSW facilities in Texas. TCEQ also provides regional grant funds which are distributed in the Houston area through H-GAC. TCEQ also maintains an annual database on landfill capacity.
- **H-GAC:** The H-GAC has regional solid waste planning responsibilities. The H-GAC is also the agency that is responsible for distributing state grants for solid waste and recycling programs. In the past, Houston has been successful in securing grant funds from H-GAC.
- **Harris County:** The County has responsibilities related to illegal dumping enforcement.
- **Other County governments.** County governments have the authority to establish land use ordinances related to solid waste facilities. Brazoria, Fort Bend, Chambers and Waller Counties have established such ordinances and any future MSW facilities must address these regulations.



#### Environmental & Community

Groups such as Keep Houston Beautiful are able to assist in efforts to increase waste minimization, recycling, organics management and eliminate illegal dumping in the City.



## Private Businesses

There are a number of areas where the private sector can assist in achieving City solid waste management goals. It is in businesses' best interest to have successful waste management strategies since they are responsible for 85% of the City's waste generation. This is also the sector that is responsible for manufacturing and selling products that become waste. Business organizations such as the Greater Houston Partnership, the American Chemistry Council and others should be long-term partners in implementing the Plan.

## The SWMD Contractors

- **Republic** – responsible for management and operations at the City's three transfer stations. Also, they own and operate the McCarty Road Landfill and the Blue Ridge Landfill which are used by the City for MSW disposal.
- **Waste Management** – owner and operator of the Atascocita landfill and C&D landfills the City uses. The City has contracts to use these landfills.
- **FCC** – owner and operator of the FCC Material Recovery Facility. The City has a long-term contract with FCC to accept the City's single stream recyclable materials. The facility will be turned over to the City in 2021. FCC also hauls biosolids from Houston's wastewater treatment facilities.
- **Other contractors** include Texas Pride Disposal which is providing supplemental recycling collection services.

## Financial Plan

Three of the main objectives of the Plan were to accomplish the following, which will have a significant impact on the SWMD's future funding:

- Right-sizing the SWMD's services requiring a greater number of vehicles and crews to provide reliable and efficient collection of waste;
- The need to improve existing facilities and build new facilities to meet the needs of a growing population; and
- A program that is financially sustainable through an enterprise fund supported by a monthly fee and an environmental fee.

In addition to these actions, the community's demand for a more environmentally sustainable solid waste program will require funding. This includes funding the following:

- A more aggressive public education/information program;
- Greater efforts to recover resources through recycling and organics management; and
- A more aggressive illegal dumping enforcement and collection effort.

The programs and policies identified in this section of the Plan, will require funding if they are to be successful. It should be noted that many of the "high fiscal impact" items will be implemented over a long-period of time and may require bond funding.

## Resource Recovery Implementation Committee (RRIC)

It has been extremely valuable to have the MATF assist in the development of the Plan. Members provided unique insights into community needs and information on the status of the solid waste, recycling and organics industries. It is recommended that once the Plan is approved by the City Council, a Resource Recovery Implementation Committee be established. The RRIC should be comprised in a manner similar to the MATF; however, representatives from certain industries should acknowledge when potential conflicts of interest arise related to specific recommendations. The RRIC would have the responsibility to accomplish the following.

- Provide further insight relative to the actual implementation of programs and policies.
- Provide additional resources needed to gain public insight related to program implementation.
- Report to City Council on the progress of the Plan's implementation.



There are revenue streams that should be incorporated into the Enterprise Fund in addition to both monthly service fees and an environmental fee. These revenues streams include the following:

- Grants provided to the SWMD for programs from outside entities;
- Revenues from the sale of recycled materials per FCC contract;
- Royalty payments from the City’s transfer stations;
- Potential tipping fees or royalties from a City-owned landfill; and
- City’s newly adopted cart lease program.

As the City begins to implement specific strategies for each of these programs, a more defined budget can be calculated. To review how the above programs and policies might impact the City’s budget, the Project Team evaluated the costs for other mature programs and the fees that they are charging for service. In Texas, monthly fees vary depending on the level of services provided and if there are opportunities to subsidize program costs through landfill tipping fees or royalties on City-owned facilities. A review of other cities shows the range for monthly service fees is between \$14.94 per month to \$42.85 per month. Monthly Environmental Fees range are \$0.50 to \$8.95 per month.

### Monthly Environmental Fee

It is recommended as a first step in implementing the Plan, that a monthly environmental fee be established. The fee would be used to fund the following programs.

- Illegal Dumping and Litter Control
- Neighborhood Drop-off Expansion (new facilities and longer hours)
- Homeless Encampment Clean-up
- Inspections and Enforcement
- Container Lease and Management
- Keep Houston Beautiful
- Long-term Disposal
- Equipment Readiness / PSHS
- Long-term Disposal

The estimated monthly Environmental Fee will apply to all Houston households and businesses. The projected fee, and total revenue generation is shown in Table 8-2

Based on the assumptions presented in this table, approximately \$43.9 million could be raised. Table 8-2 presents the recommended fee structure for various segments of the community. Table 8-3 provides a summary of the programs that would be funded through the monthly environmental fee as well as the amount of funding each program would receive from the fee.

Table 8-2 Proposed Monthly Fee by Service Segment			
Segment	Monthly Fee	Units	Total Annual Fee Generation (million)
Direct Service Single Family	\$5.61	390,000	\$26.2
Multi-family	\$2.13	474,457	\$12.0
Non-service single family	\$2.13	87,483	\$2.2



<b>Sponsorships</b>	\$2.13	49,000	\$1.2
<b>Business</b>	\$1.86	100,000	\$2.2
<b>Total</b>			<b>\$43.9</b>

<b>Table 8-3 Programs and Revenues funded from Monthly Environmental Fee</b>	
<b>Program</b>	<b>Direct Service (million)</b>
Illegal Dumping & Litter	\$8.0
Neighborhood Drop-off Expansion (new facilities and longer hours)	\$3.2
Homeless Encampment Clean-up	\$3.5
Inspections/Enforcement	\$4.8
Container Lease & Management	\$5.3
Keep Houston Beautiful	\$1.6
Long-term Disposal	\$1.8
Equipment Readiness / PSHS	\$15.6
<b>Total Annual Generation</b>	<b>\$43.9</b>

To establish both the monthly fee and the enterprise fund, the following steps will be required.

- A detailed capital investment plan will have to be prepared.
- An assessment of the impacts of projected transfer station and disposal costs will have to be determined.
- A detailed budget for specific program implementation must be developed.
- Modification for any policies which might impact the number of households impacted by the fee (specifically adjustments for low-income households).
- The policy related to sponsorship households will have to be determined.
- Establish protocols for collecting fees, most likely through the water department.
- Determination of fund reserve balance requirements must be finalized.

To establish the Enterprise Fund, the City will need to transfer assets from the General Fund to the newly created Enterprise Fund. These assets include the collection fleet, transfer stations, depositories and service centers. The Enterprise Fund could issue bonds to pay for the transfer of these assets.

It is possible also to phase-in the proposed fees over a period of years.

### **Monthly Service Fee**

As the program evolves, it is recommended that a monthly service fee be implemented. The Monthly Service Fee would be applied to residents who receive collection services from the City. This type of fee is similar to the fee that residents



pay for water and wastewater service on a monthly basis. Table 8-4 presents recommendations for a monthly service fee to be charged to residents and businesses across the City. Section 6 of this Plan provides background on the estimated funding requirements for the fee. Table 8-2 presents preliminary calculations for a fee. **The actual fee established will require a careful evaluation of the SWMD's long-term capital plan and which programs of the Plan are adopted.**

The MATF did express concern for the impact that the monthly service fee would have on low-income residents. It is proposed that a program similar to Houston W.A.T.E.R. Program, which provides assistance to low-income individuals be established, or the existing program be supplemented to provide assistance with payment of the solid waste monthly fee.

Table 8-4 Estimated Monthly Residential User Fee			
	FY 2020	Inflation Adjustment	FY 2021
FY 2020 SWMD Budget	\$ 84,956,973	3%	\$ 87,505,682
FY 2020 Recycling Revenue Fund Budget	\$ 4,934,277	3%	\$ 5,085,305
Rolling Stock Capital Requirement	\$ 9,609,310 <sup>1</sup>	3%	\$ 9,897,589
Other Capital Requirement (Debt)	\$ 2,126,228 <sup>2</sup>		\$ 2,126,228
Other Costs	\$ 9,822,241 <sup>3</sup>	3%	\$ 10,116,908
<b>Total Costs</b>	<b>\$ 111,449,028</b>		<b>\$ 114,728,713</b>
Households	396,730	1.28% <sup>4</sup>	401,808
Estimated Cost/HH/Month	\$ 23.41		\$ 23.79

1. Per Table 7-3, Capital Needs - Vehicles  
 2. Per Table 7-4, Capital Needs – Other  
 3. Per Table 7-5, Other Costs  
 4. Household annual growth rate per Waste Generation Forecast

### Impact on the Waste Stream

**The Plan is intended to work towards zero waste.** While zero waste is currently not attainable on a City-wide basis, the City's program is intended to make strides to reducing waste through public education, recycling services and ultimately mandatory ordinances. The programs identified in this Plan will also reduce the toxicity of the waste stream through increased collection opportunities for HHW and public education strategies.

Reduction in waste quantities requiring disposal will have the following impacts.

- Waste reduction will reduce the amounts of waste that has to be disposed at either a transfer station or landfill. These contracts are on a per-ton basis. Therefore, there is a one-for-one ratio of waste reduction and costs for disposal.
- The impacts on fleet are more difficult to determine, however. A reduced quantity of waste will allow trucks to collect more homes per route. Yet a 10% reduction in waste generation does not necessarily equate to a 10% reduction in





fleet needs. Vehicle routing has to take into consideration travel times to facilities, weekly peak quantities, and other factors. If enough reductions in waste generation can be achieved, the number of vehicles could be reduced.

- Waste reduction will extend the duration of time before additional landfill capacity will be needed.
- Waste reduction will reduce the generation of greenhouse gases.

In forecasting future waste generation and recovery rates, there are a number of variables that could impact future needs. These variables include the following:

- Changes in population and economic activity;
- Changes in the types of materials that are used for material packaging;
- Changes in material markets;
- Changes in technologies associated with waste collection, disposal, processing and recycling; and
- Future storm events.

### Residential Waste Reductions

To understand future residential solid waste needs, the Project Team evaluated current waste generation rates for the City’s residential sector and applied those rates to future increases in households served. This “base case” assumes no change in the disposal rate but does take into account growth in the number of households served. Based on a review of the City’s program, a residential recycling rate of 15-20% is achieved. This includes both residential recycling, recovery of organics in the form of yard waste and tree waste and materials recovered at depositories and recycling centers. This base case scenario also assumes an average disposal rate of 1,170 pounds per capita per-year.

Table 8-5 presents a range of potential reductions that could be achieved in Houston with the residential programs later in this section. It is anticipated that the reductions would be achieved over time. The results of these reductions are presented in Figure 8-2. Figure 8-3 presents the cumulative effect for the planning period 2020 -2040. Assuming no change in the current program, the amount of waste projected to require disposal over the planning period is 16.7 million tons. If the City were to achieve a 45% reduction by 2040, the amount of waste requiring disposal would be 12.7 million tons; a 4 million ton reduction would be achieved over the planning period. ***The reductions can be achieved if the City invests the resources to implement the necessary programs. They have been achieved in other communities in Texas which have dedicated substantially more to source reduction and recovery programs.***

The data in Tables 8-5 as well as Figures 8-4 and 8-5 illustrate that the City can make significant reductions in the amounts of waste generated, but also indicates that even with significant reductions, there will be a continued need for landfill disposal to meet the City’s needs. Table 8-6 and 8-7 present a preliminary “menu” of programs required to achieve low, medium, and high reductions and recover rates. Descriptions of these policies and programs are in Section 6, as well as the tables at the end of this Section. The menu is intended to illustrate that it will require a combination of programs to achieve waste reduction and recycling goals. As the City implements the Plan, it will evaluate the current needs and identify which strategies best meet waste reduction and recovery goals, while also staying within budget. Obviously, this presents conceptual program results. Actual reductions and diversions will depend on the resources dedicated to these strategies and the level of local participation.

Scenario	Short-term (2020-2025)	Mid-term 2025-2030	Long-term 2030-2040
Base Case	15%	15%	15 %
Low	20%	25%	30%
Medium	22%	30%	40%
High	25%	35%	45%



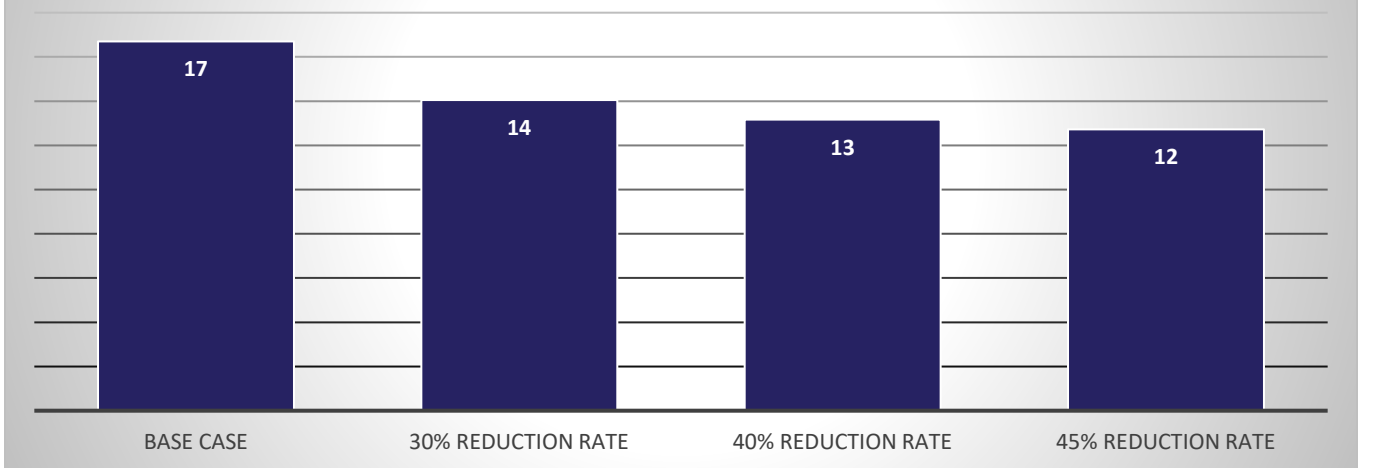
**Table 8-6  
Residential Waste Minimization and Recycling Programs**

Actions Minimization / Recovery Rates	Low 20-30%	Medium 22-40%	High 25-40%
<b>Source Reduction</b>			
Public Information (SR1)	●	●	●
Private Sector Collaboration (SR2)		●	●
City Internal Program (SR3)	●	●	●
City Procurement (SR4)	●	●	●
Pay as You Throw Rates (SR-5)			●
<b>Recycling</b>			
Recycling Collection (R-1)	●	●	●
Alternative Markets (R-2)		●	●
Residential Sector Education & Enforcement (R-3)	●	●	●
Increased Depositories (R-4)		●	●
Environmental Education (R-5)	●	●	●
More Drop-off Locations (R-6)		●	●
Increased HHW Collection (R-7)		●	●
Expand material recovery (R-11)		●	●
Data Collection (R-14)		●	●
Data Trends (R-15)		●	●
<b>Organics</b>			
Collection of Organics (O-1)	●	●	●
Brush Collection (O-2)	●	●	●
Food Waste Recovery for Low-income (O-3)		●	●
Develop capacity (O-4)			●
Mandatory participation (O-5)			●
Biosolids Composting (O-6)			●
Compost Market Development (O-7)	●	●	●
Grass clipping enforcement (O-8)	●	●	●
Expand Master Composter Program (O-9)	●	●	●
Lead by Example (O-10)		●	●
Increase drop-off locations (O-11)		●	●
Food waste collection (O-12)			●

### Residential Waste Disposal Quantities - Reduction Scenarios Figure 8-4



### Cumulative Residential Waste Disposal (2020-2040 million tons) Figure 8-5





### **City-wide Reductions**

Currently, the City's residential, commercial, and industrial sectors generate a combined 4.2 million tons per year. By the year 2040, the estimated quantities of waste requiring disposal will reach 5.4 million tons due to increases in population and economic activity. Based on data collected as part of the Waste Generation Analysis, it was also determined that the City is now diverting 2.0 million tons which is expected to increase to 2.6 million tons in 2040. The 2040 projection assumes no major change in recycling policies or practices by the commercial sector. These diversions are due in large part to a significant quantity of construction / demolition material being diverted (approximately 1.5 million tons in 2019). Other significant reductions in landfill needs are occurring in the recovery of organics and recyclable materials.

Houston's current 4.2 million tons of waste represents 57% of the total amount of waste generated in the H-GAC region. A major reduction in Houston's waste generation can have a significant impact on extending current landfill capacity. This will require a City-wide effort to not only reduce the amounts of waste generated by the commercial sector, but to convince manufacturers and retailers to design products in a manner that results in less waste generation and greater recovery through recycling. Figure 8-4 presents projected waste disposal needs; Figure 8-5 presents cumulative waste disposal under these scenarios.

Even with the 30% reduction rate, the City's total waste disposal needs decrease from a base case of 102 million tons over the planning period to 83 million tons, a 19 million ton decrease. With the highest waste reduction scenario (45%), the City disposal needs drop to 77 million tons over the planning period, a 25 million ton decrease. The H-GAC region disposes approximately 7 million tons per year. A 25 million ton decrease in waste disposal needs could extend landfill capacity by approximately 3 to 4 years.

***To achieve more success in extending capacity, the City of Houston should, to the extent practical, work on a regional basis with its partners in the H-GAC region to adopt many of its strategies to reduce disposal needs.***

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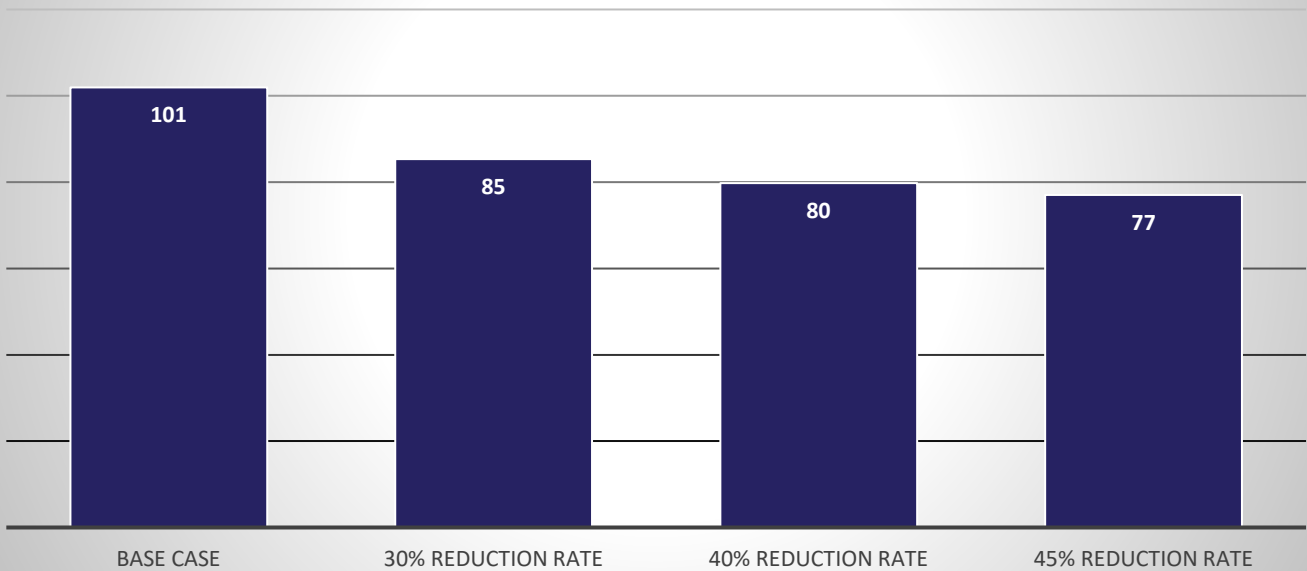
**Table 8-7  
Residential, Commercial & Institutional Waste Minimization and Recycling Programs**

Actions Minimization / Recovery Rates	Low 20-30%	Medium 22-40%	High 25-40%
<b>Source Reduction</b>			
Public Information (SR1)	●	●	●
Private Sector Collaboration (SR2)	●	●	●
City Internal Program (SR3)	●	●	●
City Procurement (SR4)	●	●	●
Pay as You Throw Rates (SR-5)			●
<b>Recycling</b>			
Recycling Collection (R-1)	●	●	●
Alternative Markets (R-2)	●	●	●
Residential Sector Education & Enforcement (R-3)	●	●	●
Increased Depositories (R-4)		●	●
Environmental Education (R-5)	●	●	●
More Drop-off Locations (R-6)		●	●
Increased HHW Collection (R-7)		●	●
Mandatory Multi-family Program (R-8)		●	●
Mandatory Business Recycling Program (R-9)			●
Green Building Code (R-10)			●
Expand material recovery (R-11)		●	●
Technical Assistance – Multi-family (R-12)	●	●	●
Technical Assistance – Businesses (R-13)	●	●	●
Data Collection (R-14)		●	●
Data Trends (R-15)		●	●
<b>Organics</b>			
Collection of Organics (O-1)	●	●	●
Brush Collection (O-2)	●	●	●
Food Waste Recovery for Low-income (O-3)		●	●
Develop capacity (O-4)			●
Mandatory participation (O-5)			●
Biosolids Composting (O-6)			●
Compost Market Development (O-7)		●	●
Grass clipping enforcement (O-8)	●	●	●
Expand Master Composter Program (O-9)	●	●	●
Lead by Example (O-10)	●	●	●
Increase drop-off locations (O-11)		●	●
Food waste collection (O-12)			●

**Total Waste Disposal Quantities -  
Reduction Scenarios  
Figure 8-6**



**Cumulative Total Waste Disposal  
(2020 -2040 million tons)  
Figure 8-7**

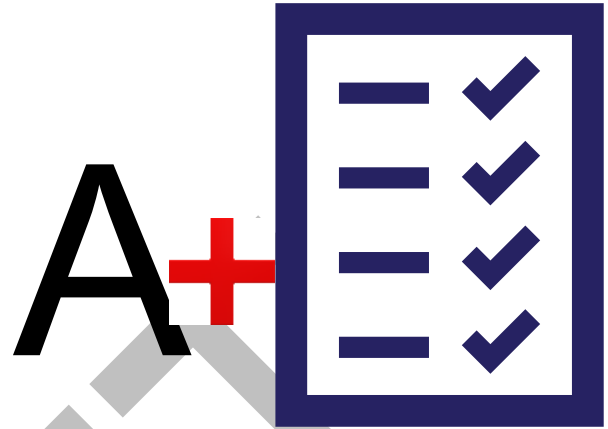




## Accountability Plan

### Program Metrics

Through the planning process, the Project Team and the MATF identified a number of program goals and objectives. It is critical that as the City adopts the recommendations of the Plan, that periodic reporting back to City Council and citizens be made as to the progress toward accomplishing these goals and objectives. In order to do this, a number of program metrics are recommended. Some of the metrics presented below can be obtained from existing data; some of the data will require the City to solve issues with its current data management program; and some of the data will require periodic sampling and surveying of both the residential and commercial sectors. Table 8-8 presents a summary of key metrics to follow as the City implements this Plan.



**Table 8-8  
Key Program Metrics**

Program	Metric	Current	Short-term Objective (1-5 years)	Mid-term Objective (5-10 years)	Long-term Objective (10-20)
Source Reduction	Residential Waste Generation (lbs./hh/day)	8.9	7.5	6.0	5.0
Source Reduction	Regional disposal rate (lbs./capita/day)	7.1	6.0	5.0	4.5
Recycling	Residential Recovery Rate	7%	15%	25%	30%
Organics	Recovery of yard waste and brush for compost or mulch recovery rate	7%	10%	15%	15%
Collection	Fleet Age (average age of fleet)	7	5	4	3.5
Collection	Missed Collections	Unknown	1/1000	1/1000	1/1000
Transfer Stations	Availability of transfer stations within 20 min of collection routes	20	20	20	20
Disposal	Available capacity over 25 years for MSW	30	25	25	25
Disposal	Control over future disposal capacity for City needs	Minimal	Site Ownership	Permit	Landfill Ownership
Disposal	Landfills in compliance with TCEQ and other environmental regs.	Compliant	Compliant	Compliant	Compliant



## Action Plan

The following Action Plan presents recommendations for achieving the goals and objectives established by the MATF. The Plan presents specific programs and policies for addressing the following:

- Financial Assurance
- Waste Minimization
- Recycling
- Organics Management
- Collection
- Transfer Stations
- Disposal Capacity
- Illegal Dumping

Several new initiatives are identified in this Plan. Some of these action items, such as the development of a new Northeast Transfer Station and the managed competition program have been recently initiated and are in the very early stages of development. These new initiatives are critical to the SWMD's ability to achieve the goals and objectives established by the MATF. With these new responsibilities, it is critical that the Council fund the programs and provide additional staff. Without such additional resources, it will not be possible to effectively implement a number of the new initiatives or program expansions.

The programs and policies identified below have been presented to the MATF along with an analysis of the potential impacts these policies and programs will have on the waste stream, their technical feasibility and potential cost impacts. The following tables provide a summary of these issues and the following figures provide an implementation chart which highlights when programs and policies should be implemented. The timetable for implementing these programs and policies is affected by the level of staff resources available to plan and manage these programs. The Strategic Analysis Report prepared for this Plan provides greater detail on the implementation steps and impacts associated with both policies and programs. Short-term actions are those that need to be implemented in years 1-5; Mid-term are years 5-10; and Long-term are years 10-20.





## Financial Sustainability Action Plan Recommendations

Table 8-9 Financial Sustainability Program Recommendations									
Financial Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Enterprise Fund and Monthly Fees (FA1)</b>	Establish an Enterprise Fund and pay for the program with a Monthly Residential Fee and a Monthly Environmental Fee	High	New	Short-term	Minimal to Medium due to Pay as You Throw Rates if adopted	High	M3.2	38.2	Provides SWMD with critical long-term funding at levels which provide more system reliability.
<b>Managed Competition (FA2)</b>	Evaluate the results of the Managed Competition Assessment and Recommendations	High	Existing	Short-term	Minimal	Unknown			Contract currently underway to evaluate SWMD and managed competition.
<b>Continue to Secure Grants (FA3)</b>	Continue to seek and secure grants for programs through H-GAC and other organizations.	Medium	Existing	Short-term (ongoing)	Medium	Revenue Generating	M3.2	38.2	The SWMD has been successful in leveraging its program with financial grants in the past.

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**Table 8-10  
Waste Minimization Program Recommendations**

Waste Minimization Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Public Information (SR1)</b>	Expand public information programs	High	Expansion	Short-term (ongoing)	Medium	Medium	M1.1 and M2.3	38.1	Improved public information. Education is needed across all aspects of the SWMD Program.
<b>Private Sector Collaboration (SR2)</b>	Collaborate with the private sector to reduce packaging and the use of non-recyclable materials	High	New	Short-term (ongoing)	Low - Medium	Minimal		38.1	The private sector is primarily responsible for much of waste generated. Improved packaging and product design can significantly reduce waste.
<b>City Internal Program (SR3)</b>	Expand the City guidelines on management of its resources through source reduction, reuse, recycling efforts for all City agencies and offices	High	Expansion	Short-term (ongoing)	Low	Minimal	M1.2	38.1	City needs to demonstrate leadership in the areas of waste minimization and recycling.
<b>City Procurement (SR4)</b>	Expand the City purchasing / procurement guidelines to expand on source reduction, reuse for City service and product providers	Low	Expansion	Short-term (ongoing)	Low	Minimal	M1.2	38.1	City needs to demonstrate leadership in areas of waste minimization and recycling.
<b>Pay as You Throw Rates (SR-5)</b>	Implement a Pay-as-You-Throw curbside collection system where setting out more garbage costs more, setting out less garbage costs less	Low	New	Short-term	Low to Medium	High		32.4	This will allow garbage collection to more closely align with other utilities where users pay based on usage.



**Table 8-11  
Recycling Program Recommendations**

Recycling Program	Definition	Priority	Program Status	Timeframe / Program Status	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Recycling Collection (R-1)</b>	Continue to provide every two week collection of recyclable materials	High	Existing	Short-term (ongoing)	Low – Medium	High	M2.3	32.4	The City currently provides once every two week collection of recyclable materials. In the future evaluate going to once per week and adding or reducing materials as markets change.
<b>Alternative Markets (R-2)</b>	Develop alternative markets for recyclable materials	High	New	Mid-term (ongoing)	Medium	Medium		38	To expand recycling in the City, markets for materials need to improve. The City can assist through its economic development programs.
<b>Residential Sector Education &amp; Enforcement (R-3)</b>	Adopt recycling ordinance to deal with contamination including public information and enforcement	High	New	Short-term (ongoing)	Low – Medium	Medium	M2.1	32.4	Current contamination rates for residential recycling are 30%-40%. This creates issues for collection and processing of recyclable materials. May have severe consequences if not addressed.
<b>Increased Depositories (R-4)</b>	Add more depositories and recycling centers throughout Houston	High	Expansion	Short-term to Mid-term	Low	Medium	M2.1	32.4	Increase the number of depositories so there is one per Council district. For increasing recycling and reducing illegal dumping. Evaluate hours of operation as well.
<b>Environmental Education (R-5)</b>	Include more information regarding environmental impacts in City education materials (e.g. upstream decisions for consumers)	High	Expansion	Short-term (ongoing)	Low	Low			Implementation can take place as part of overall education program.
<b>More Drop-off Locations (R-6)</b>	Add more drop off locations for recyclables, chemicals and electronics	High	Expansion	Short-term / Mid-term	Low	Medium	M2.1	32.4	The goal of the action item is to place a depository location in every council district. Requires 5 new depositories.



**Table 8-11  
Recycling Program Recommendations**

Recycling Program	Definition	Priority	Program Status	Timeframe / Program Status	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Increased HHW Collection (R-7)</b>	Add more collection events for household hazardous wastes	Medium	Expansion	Short-term	Low	Medium		32.4	City provides these services currently. MATF recommends additional collection events.
<b>Mandatory Multi-family Program (R-8)</b>	Adopt a mandatory recycling ordinance for multifamily housing complexes with phased approach (education then enforcement)	Medium	New	Mid-term	High	Low	M2.1	38.3	Following education effort, adopt ordinance requiring owners of multi-family housing to provide recycling opportunities to residents.
<b>Mandatory Business Recycling Program (R-9)</b>	Adopt a mandatory recycling ordinance for businesses and institutions with phased approach (education then enforcement)	Medium	New	Mid-term	High	Low*	M2.1	38.3	Following education effort, adopt ordinance requiring business owners to provide recycling opportunities to residents.
<b>Green Building Code (R-10)</b>	Implement a 'green building code' to require source reduction, reuse and recycling initiatives, including C&D for new construction or renovation projects.	Low	New	Mid-term	High	Medium	M2.1	32.4	A Green Building Code is designed to require waste minimization and recycling by the commercial sector and can include mandatory recycling in construction and day-to-day business practices.
<b>Expand material recovery (R-11)</b>	Expand types of materials collected and reused in city operated facilities; reuse of materials beyond current building materials, electronics and chemicals	Low	Expansion	Mid-term	Low	Low	M2.2	32.4	City to evaluate marketability of additional materials for collection and the potential of adding materials to either the curbside program or depositories.
<b>Technical Assistance – Multi-family (R-12)</b>	Implement a voluntary technical assistance program to assist multi-family complexes in setting up on-site recycling programs.	Low	New	Short-term	Low	Low	M1.1	32.4	City to provide technical assistance to multi-family building owners and residents on how to reduce waste; availability of city depositories; and how to implement recycling programs.
<b>Technical Assistance – Businesses</b>	Implement a voluntary technical assistance program to assist business	Low	New	Short-term	Low	Low	M1.1	32.4	City to provide technical assistance to businesses on how to establish recycling



**Table 8-11  
Recycling Program Recommendations**

Recycling Program	Definition	Priority	Program Status	Timeframe / Program Status	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
(R-13)	setting up reuse and recycling programs								programs. Coordination with commercial sector is important.
<b>Data Collection (R-14)</b>	Implement reporting requirements to better track private sector recycling	Low	New	Short-term	Low	Low	M3.2	32.4	Work with private haulers to collect data related to waste generation and recycling patterns in City to evaluate where future focus should be directed.
<b>Data Trends (R-15)</b>	Establish a more informative data management system to better track trends and provide more transparent and useful data	High	New	Short-term	Low	Low	M3.2	32.4	Develop internal data management system to better track City's performance in residential waste reduction and recycling efforts.

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**Table 8-12  
Organics Program Recommendations**

Organics Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Collection of Organics (O-1)</b>	Continue collection of separate yard waste on a weekly basis	High	Existing	Short-term (ongoing)	Low to Medium	Medium		32.4	City currently provides this service.
<b>Brush Collection (O-2)</b>	Continue separate collection of brush material every other month	High	Existing	Short-term (ongoing)	Low	Medium		32.4	City currently provides this service. It May need enforcement related to non-brush material collected on brush only days.
<b>Food Waste Recovery for Low-income (O-3)</b>	In coordination with local health department encourage greater food recovery to feed the hungry	High	New	Short-term	Low	Low	M2.2		SWMD to work in conjunction with local relief organizations and health department to develop guidelines that would promote greater food donations from commercial restaurants.
<b>Develop capacity (O-4)</b>	Encourage development of additional organics processing capacity within the City for a broader range of food residuals, and biosolids	High	New	Short-term to Mid-term	High	Medium	M2.2	38.4	This will require coordination between food waste generators, City and private compost firms. May require City to invest in some transfer infrastructure or assist in selecting sites for food waste compost capacity.
<b>Mandatory participation (O-5)</b>	Adopt a mandatory recycling ordinance for organics collection, with phased in compliance (education, then strict compliance)	High	New	Mid-term	Medium	High	M2.2	32.4	This is the mandatory residential collection of organics, including food waste, yard waste and brush.
<b>Biosolids Composting (O-6)</b>	Encourage diversion from the landfill of biosolids generated at City wastewater treatment plants to processing facilities	Medium	New	Short-term	Low	Low		38.1	Biosolid (sludge) can be composted but not all composting facilities are able to accept this material. City to coordinate efforts between treatment plants and compost facilities.



**Table 8-12  
Organics Program Recommendations**

Organics Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Compost Market Development (O-7)</b>	Encourage use of locally produced compost, mulch and soil blends outside City projects	Medium	New	Short-term	Low	Low	M1.2	32.4	City to encourage use of compost and mulch in Houston area. Market development should lead to more capacity.
<b>Grass clipping enforcement (O-8)</b>	Enforce current ordinance prohibiting placement of grass clippings in City collection carts	Medium	New	Short to Mid-term	Low	Low		38.1	In order to reduce quantities of waste going to landfill, enforce yard waste ban in trash carts.
<b>Expand Master Composter Program (O-9)</b>	Provide greater support and expand availability of Master Composter Program to build support of organics diversion and for public education	Medium	Expansion	Short-term	Low	Low	M1.1	32.4	This should be tied to a comprehensive public information campaign.
<b>Lead by Example (O-10)</b>	Lead by example by encouraging the use of locally produced compost, mulch and soil blends at City projects and facilities	Medium	New	Short-term	Low	Low	M1.2	38	The City has the potential to be a significant market for compost and mulch through parks projects, transportation projects and landscaping throughout the City.
<b>Increase drop-off locations (O-11)</b>	Increase the number and availability of manned brush/tree waste drop-off locations	Low	Expansion	Short to Mid-Term	Low	Medium	M2.1	32.4	For brush, this is low priority, but for recycling and illegal dumping, it is high priority.
<b>Food waste collection (O-12)</b>	Collect residential food residuals with yard waste and address appropriate processing capacity – requiring a third cart	Low	New	Mid-term	Low	High	M2.2	32.4	Separate collection of food waste at the residential sector will require increased collection service, contracts for processing and enhanced public information program.



Figure 8-12 – Organics Program Implementation Schedule

Organics Program	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Collection of Organics (O-1)																						
Brush Collection (O-2)																						
Biosolids Composting (O-3)																						
Expand Master Composter Program (O-4)				Element of expanded public information program																		
Support Efforts Related to Food Waste Reuse (O-5)																						
Lead by Example By Using Compost in City Projects (O-6)																						
Encourage Use of Compost outside City Projects (O-7)																						
Encourage Development of Additional Capacity (O-8)																						
Enforce Current Ordinance on Grass Clippings (O-9)				Tied to Recycling Enforcement Program																		
Increase Number of Depositories for Organics (O-10)																						
Collect Residential Food Waste in Third Cart (O-11)																						
Monitor New Organics Processing Technology (O-12)				Include as a Task Force of Implementation Committee																		

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**Table 8-13  
Collection Program Recommendations**

Collection Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Right-size collection (C-1)</b>	Right-size the collection program by adding routes and periodically evaluating program	High	Expansion	Short-term	Low	High	NA	NA	In order to provide more reliable service, the City needs to modify its routes in order to address issues such as increased housing density, traffic and other factors.
<b>Replace older vehicles (C-2)</b>	Replace older vehicles on a scheduled basis. Will require near-term accelerated replacement program	High	Expansion	Short-term	Low	High	NA	NA	Goal is to have fleet with trucks no older than 7 years. This will reduce maintenance costs and increase system reliability. Reduces reserve requirements.
<b>Enhance period maintenance (C-3)</b>	Enhance periodic maintenance of vehicles to improve reliability	High	Expansion	Short-term	Low	Medium	NA	NA	With the replacement of older trucks, maintenance can focus more attention on maintaining active maintenance program for fleet to reduce downtimes. May require additional fleet staffing.
<b>Implement data Management (C-4)</b>	Implement data management program for collection fleet and provide management support to evaluate data for more efficient routing and accountability	High	Expansion	Short-term	Low	Low	NA	NA	Management of the collection program will require ongoing program of monitoring system performance. City has system in-place; however, it requires attention by vendor to make it more effective.
<b>Slow-Down to Get Around (C-5)</b>	Enforce recently adopted Slow-Down to Get Around Law	Medium	New	Short-term	Low	Low	NA	NA	Newly adopted state law treats solid waste collection crews in the same manner as first responders and construction workers with regard to traffic safety rules.



**Table 8-13  
Collection Program Recommendations**

Collection Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Continuously evaluate new collection vehicles (C-6)</b>	Continuously evaluate alternative fuels and vehicle technologies including CNG and electric vehicles	Medium	Existing	Mid-term to Long-term	Low	High	T1.2, M3.1	32.1	Alternative technologies include compressed natural gas (CNG) and electric vehicles (EV). This requires new trucks, a new fleet fueling infrastructure and significant changes to fleet maintenance. Benefit is cleaner air. The Mayor is currently evaluating a report on fleet options including CNG & EV.
<b>Contract Outlying Areas (C-7)</b>	Contract for collection services in areas of the City that are difficult to efficiently collect waste	Medium	New	Short-term / Mid-term	Low	Low	NA	NA	To improve residential collection efficiency, the City should evaluate routes outside its primary loop and contract out service to private haulers.
<b>Evaluate managed competition (C-8)</b>	Evaluate management competition analysis currently being undertaken for collection program	Medium	Existing	Short-term	Low	Low	NA	NA	The City has a current contract to evaluate managed competition of solid waste services. SWMD will evaluate recommendations with Finance, the Mayor and City Council.

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**Table 8-14  
Transfer Station Recommendations**

Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Transfer Station contracts (T-1)</b>	Negotiate contract for the operation of the City's three transfer stations	High	Existing	Short-term	Low	High	NA	NA	In 2020, the City selected contractors for operation of transfer stations. The City will need to monitor the contracts and prepare for future negotiations once the term has been reached.
<b>Invest in transfer stations (T-2)</b>	Make necessary capital improvements to the transfer stations – continuously monitor site repair needs and fund	High	Existing	Short-term / Mid-term	Low	High	NA	NA	City is responsible for maintaining the three transfer stations. These facilities are approximately 20 years old and will require significant investments (\$8-\$10 million) in repairs and improvements.
<b>Northeast Transfer Station (T-3)</b>	Design, permit and construct a new transfer station to be located at the NE Service Center – contract operations	High	Existing	Short to Mid-term	Low	High	NA	NA	The City has initiated steps to design, permit and construct a new NE Transfer Station to be located at the NE Service Center.
<b>Recyclable Materials Transfer (T-4)</b>	Design and construct recyclable materials transfer capabilities	High	New	Short-term / Mid-term	Low	High	NA	NA	The contract with FCC to process single stream materials means that recyclable materials have to be hauled from all sectors of the City to this facility located in NE Houston. Having transfer capabilities for recyclables would reduce program costs.
<b>New Transfer Capacity (T-5)</b>	Identify sites for two additional transfer stations	Medium	New	Mid-term / Long-term	Low	High	NA	NA	As the City grows and traffic worsens, the City should identify additional locations for transfer stations. These locations will take into consideration landfill locations, traffic, existing land use and E.J.
<b>Rail Haul (T-6)</b>	Evaluate the potential for developing rail haul capacity in conjunction with transfer stations	Medium	New	Mid-term / Long-term	Low	Medium	NA	NA	As disposal capacity is reduced, one of the options available to the City is reliance on rail haul. This would require conversion of transfer stations, contracts with both rail and alternative disposal sites.



**Figure 8-13 – Transfer Station Plan Implementation**

Transfer Program	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Transfer Station contracts (T-1)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Invest in transfer stations (T-2)	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Northeast Transfer Station (T-3)																						
Design Facility	█	█																				
Permit		█	█																			
Construct			█	█	█																	
Contract Operations					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Recyclable Materials Transfer (T-4)																						
NW and SE conversions	█	█																				
SW (Brittmore facility)		█																				
Increase Potential for Recovering Materials at TS (T-5)			█	█	█																	
New Transfer Capacity (T-6)																						
Identify sites for two new transfer stations							█	█														
Design new transfer stations									█	█												
Construct new transfer stations											█	█	█									
Evaluate Rail Haul (T-6)						█	█	█														

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**Table 8-15  
Energy & Resource Recovery Recommendations**

Program	Definition	Priority	Program Status	Timeframe	Impact on Waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
Promote landfill gas recovery (E-1)	Promote the use of landfill gas technology by the region's landfills	Medium	New	Short-term	Low	Low	M3.1	38.1	The MSW landfills the City currently relies on do have gas to energy systems.
Evaluate new technologies (E-2)	Evaluate the potential for developing partnerships for energy recovery technologies	Medium	New	Short-term / Mid-term / Long-term	High	Low	M3.1	38.1	Alternative technologies such as pyrolysis, gasification and anaerobic digestion have the potential to significantly impact disposal needs. Factors affecting these technologies include reliability, capital costs, low competing disposal costs and relatively low energy prices.
Periodic industry evaluations (E-3)	Conduct periodic industry roundtable meetings to identify options for local development	Medium	New	Short-term	Uncertain	Low	NA	NA	The American Chemistry Council (ACC) is very active in supporting new technologies to resolve plastic waste problem. City should coordinate with ACC to identify strategies that could work in Houston.



**Table 8-16  
Assuring Disposal Recommendations**

Assuring Disposal Program	Definition	Priority	Program Status	Timeframe	Impact on waste Stream	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Negotiate Disposal Contracts (AD-1)</b>	Negotiate contract for disposal of waste generated from City's residential program	High	Existing	Short-term	Low	High	NA	NA	The City relies on private sector for landfill disposal. The City has negotiated for future landfill use in 2020. These contracts will need to be monitored.
<b>Monitor capacity (AD-2)</b>	Monitor regional capacity and prepare periodic reports to Mayor and Council	High	Existing	Short-term / Long-term	Low	Low	M3.2	NA	The region has approximately 30-40 years remaining capacity, however this could change dramatically if there were future storm events or landfill expansions or closures.
<b>City Landfill (AD-3)</b>	The City should evaluate whether to own a landfill – if the answer is yes, site, design, permit and construct a regional landfill	High	New	Mid-term / Long-term	Low	High	NA	NA	The City's reliance on the private sector reduces certain risks, however, its dependence also poses significant future risks regarding available disposal capacity.
<b>Contract disposal services (AD-4)</b>	In lieu of the City not building a landfill, continue to contract with private operators for disposal services	High	New	Mid-term / Long-term	Low	High	NA	NA	Based on available disposal capacity and risk analysis, it may be prudent to continue use of private landfills for future disposal needs.
<b>Identify Resource Recovery Opportunities (AD-5)</b>	Coordinate with landfill owners to identify opportunities to use sites for potential resource recovery opportunities	Medium	New	Mid-term / Long-term	Medium	Low	NA	38.1	Landfill locations are often ideal for resource recovery alternatives due to existing waste infrastructure and site access.



**Figure 8-14 – Assuring Disposal Program Implementation Schedule**

Assuring Disposal Capacity Program	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Negotiate Disposal Contracts (AD-1)	█	→	→	→	→	→	→	→	→	→	█	→	→	→	→	→	→	→	→	→	→	→
Monitor contract performance	█	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
Monitor capacity (AD-2)	█	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→
City Landfill (AD-3)																						
Landfill Policy Decision					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Landfill Site Selection					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Landfill Permitting																						
Landfill Construction																						
Contract landfill operations																						
Evaluate Potential for Existing & Closed Landfills (AD-4)			█	█	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→	→

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**Table 8-17  
Illegal Dumping Program Recommendations**

Program	Definition	Priority	Program Status	Timeframe	Impact on Illegal Dumping	Financial Impacts	Climate Action Plan	Resiliency Plan	Major Issues
<b>Increase collection crews (IL-1)</b>	Increase the number of trucks and crews assisted to cleaning up Illegal dumps	High	Expansion	Short-term / Long-term	High	Medium	NA	39.4	Additional crews will have the ability to more aggressively clean-up illegal dump sites.
<b>Increase staffing at depositories (IL-2)</b>	Increase staffing at depositories to enable them to be open seven days per week and extended hours per day- Evaluate the potential for additional depositories	Medium	Expansion	Short-term / Long-term	Medium	Low	NA	NA	Additional access in terms of sites and staffing was recommended for recycling and organics management as well.
<b>Increase camera surveillance (IL-3)</b>	Increase staffing of the camera surveillance program currently managed by the Harris County Environmental Crimes Unit	High	Expansion	Short-term / Long-term	High	Medium	NA	NA	Camera surveillance has been identified as an effective means of illegal dumping enforcement.
<b>Public information campaign (IL-4)</b>	Institute a comprehensive multilingual and ongoing public education program including billboards, announcements, and public service announcements	High	Expansion	Short-term / Long-term	High	Medium	NA	NA	This should be a focused aspect of an overall public information / outreach effort.
<b>Organizational (IL-5)</b>	Clearly identify responsibilities for illegal dumping between the Department of Neighborhoods and the Police Department's Differential Response Team	High	New	Short-term	High	Low	NA	NA	Significant organizational changes are recommended for the Illegal Dumping Program with greater authority to Code Enforcement to issue fines. Consider SWMD staff having same authority.
<b>Improved Enforcement (IL-6)</b>	Give Code Enforcement or others the authority to issue fines outside the Justice of the Peace Courts and the Environmental Courts - Rapid penalties for illegal dumping will serve as a deterrent against illegal dumping	High	New	Short-term	High	Medium	NA	NA	Clearly defining responsibilities and emphasizing the level of priority associated with illegal dumping enforcement is critical to program's success.