



July 2016

2016-2036 Comprehensive Solid Waste Management Plan



Risa Weinberger & Associates, Inc.

Submitted to:

Robert Smouse,
Assistant Director – Solid Waste Services
Code Compliance Department,
4100 Columbus Trail
Fort Worth, Texas 76133

Submitted by:

Gershman, Brickner & Bratton, Inc.
8550 Arlington Boulevard, Suite 304
Fairfax, Virginia 22031
(800) 573-5801

We Print on Recycled Paper

GERSHMAN, BRICKNER & BRATTON, INC.

City of Fort Worth, TX, Comprehensive Solid Waste Management Plan

Gershman, Brickner & Bratton, Inc.

8550 Arlington Boulevard • Suite 304

Fairfax, Virginia 22031

Phone 800.573.5801/ 703.573.5800 • Fax 703.698.1306

www.gbbinc.com

© 2016 Gershman, Brickner & Bratton, Inc.

We Print on Recycled Paper

Client Reference No: C14010

Table of Contents

Table of Contents i

1 Executive Summary 1-1

 1.1 The City of Fort Worth as Part of a Larger World 1-1

 1.2 Solid Waste Planning in Fort Worth 1-3

 Fort Worth Solid Waste Management Plan – 1995-2015 1-4

 2016-2036 Fort Worth CSWMP 1-5

 1.3 Public Participation 1-7

2 Introduction to the Project, Process, and Plan Document 2-1

 2.1 Competitive Procurement 2-2

 2.2 Task Management 2-3

 2.3 Public input, Stakeholder Engagement, and Professional Solid Waste Management 2-4

 2.4 Implementing the CSWMP as a “living document” 2-2

 2.5 Comprehensive Solid Waste Management Plan Structure and Implementation 2-2

3 Evaluation of Program Elements 3-1

4 Incorporated Data 4-1

 4.1 City History 4-1

 4.2 City Description 4-2

 4.3 Economic Growth and Development 4-6

 4.4 Demographics 4-9

 4.5 Waste Generation and Composition 4-10

5 Present and Future Resources 5-1

 5.1 Southeast Landfill 5-1

 5.2 Regional Landfills 5-1

 5.3 MSW Recycling Systems 5-2

 5.4 Construction and Demolition Recycling and Disposal Systems 5-2

 5.5 Compost and Organics Management Systems 5-3

 5.6 Emerging Technologies 5-3

6 Identification and Evaluation of Recommendations 6-1

7 Strategic Planning 7-1

 7.1 Comprehensive Planning 7-1

 7.1.1 Leadership from the City 7-1

 7.1.2 Influences on Solid Waste Planning 7-1

 7.1.3 Impacts of Solid Waste Planning 7-2

 7.2 Strategic Planning for City of Fort Worth Solid Waste Management 7-2

 7.3 Strategic Planning Actions in the Fort Worth CSWMP 7-1

8 CSWMP Implementation 8-1

 8.1 5-Year Action Plan 8-1

 8.1.1 Evaluating: Studies and Feasibility 8-1

 8.1.2 Changing: Revising or Adjusting Programs 8-4

 8.1.3 Beginning: New Operations 8-15

 8.1.4 Maintaining: Continuing Programs and Actions 8-18

 8.2 Mid- and Long-term Actions and Implementation 8-21

 8.2.1 Services to Residents 8-21

 8.2.2 Services to the Community 8-22

 8.2.3 Solid Waste Management Facilities 8-23

8.2.4 Solid Waste Services Division Activities 8-24

9 Performance Assessment and Plan Updating9-1

Appendix A – Glossary A-1

Appendix B – Index B-1

Appendix C – Outreach Efforts..... C-1

 Outreach Plan..... C-1

 Survey instruments C-1

 Interview instruments..... C-1

 Print pieces and Web content..... C-1

 Workshop and Open House Presentations..... C-1

 Feedback Memo C-1

 Task 4 Interim Report..... C-1

Appendix D – Program Evaluation Report..... D-1

Appendix E – Recommendations Report E-1

Appendix F - City's Draft 2016 Solid Waste CIP Report..... F-1

Tables

Table 4-1 2010 Land Use (Acres); Source; NCTCOG4-4

Table 4-2 Employees on nonfarm payrolls by industry supersector, Fort Worth-Arlington, TX Metropolitan Division, not seasonally adjusted, March 2016. Source: U.S. Census Bureau.....4-7

Table 5-1 Regional Landfills around Fort Worth5-2

Table 5-2 U.S. Waste Management Technologies and Risk5-3

Figures

Figure 1-1 Total and Per-capita Waste Generation in the U.S., 1960 – 2013. Source: U.S. EPA1-1

Figure 1-2 Total and Percentage Waste Recycled in the U.S., 1960 – 2013. Source: U.S. EPA1-2

Figure 1-3 Partial Composition of Waste in the U.S., 1960 – 2013; Year 2008 highlighted. Source: U.S. EPA1-3

Figure 1-4 Outreach and Public Involvement Techniques from the 2015/16 City of Fort Worth CSWMP Process.....1-8

Figure 2-1 Outreach and Public Involvement Techniques from the 2015/16 City of Fort Worth CSWMP Process.....2-4

Figure 2-2 Environmental Issues Prioritized by Fort Worth Residents in Surveys, Summer 20142-6

Figure 4-1 Nighttime view of DFW Metroplex from space, by NASA Astronaut, provided to the public domain courtesy of NASA4-2

Figure 4-2 Developed Land in Fort Worth and its Extraterritorial Jurisdiction, 2005 Source: 2016 Draft Comprehensive Plan.....4-3

Figure 4-3 Future Land Use in Fort Worth Source: 2016 Draft Comprehensive Plan4-5

Figure 4-4 Employment Change in Fort Worth 2015-2040; Source: Draft 2016 Comprehensive Plan and NCTCOG4-6

Figure 4-5 Employment by Industrial Sector; 2015,4-8

Figure 4-6 Employment by Industrial Sector; 2040 Projected,.....4-8

Figure 4-7 Growth of Median Family Income, 2001-2015; Source: 2016 Draft Comprehensive Plan4-9

Figure 4-8 Historic and Projected Population of Fort Worth; Source: 2016 Draft Comprehensive Plan 4-10

Figure 4-9 Projected Fort Worth Residential MSW Generation	4-11
Figure 4-10 Projected Fort Worth Commercial Waste Generation.....	4-12
Figure 4-11 US EPA Garbage Composition (After Recycling) – <i>Advancing Sustainable Materials Management: Facts and Figures 2013</i>	4-13
Figure 4-12 Fort Worth Garbage Composition (After Recycling) – 2014 Waste Characterization Study	4-14
Figure 7-1 Strategic Actions in the Comprehensive Solid Waste Management Plan.....	7-2
Figure 9-1 Reasons to Update a CSWMP during the Planning Period.....	9-1

DRAFT

(This page intentionally left blank)

1 Executive Summary

1.1 The City of Fort Worth as Part of a Larger World

Fort Worth, Texas, is one of the largest cities in one of the largest countries on a small planet. Fort Worth’s people and its economy have measurable impacts on both the immediate and the larger environment. One of the main ways individuals and businesses impact their environment is by how they manage their material resources: made up of waste, recyclable materials and residues. Waste that is disposed on land generates liquid and methane gas. Materials that are recycled are remanufactured into new products around the world. Residues that are recycled return beneficially to society.

It is no great revelation that the composition of solid waste—the types of materials we’re regenerating and discarding—has changed significantly since the previous Fort Worth solid waste management plan was created in 1995. What is much more impressive is how much the waste stream has changed since 2008. The following figures show national trends in waste generation and characterization, with data from the U.S. Environmental Protection Agency. The first, [Figure 1-1](#), shows that while total generation of MSW (municipal solid waste) has been increasing—a function of population growth—the per capita waste generation has been decreasing. This is not a result of recycling, as these figures include all waste that is discarded. Rather, it is mainly the aggregated result of light-weighting. This is an industrial practice by which individual items—and particularly, their packaging—are becoming smaller and lighter in an effort to reduce production and transportation costs.

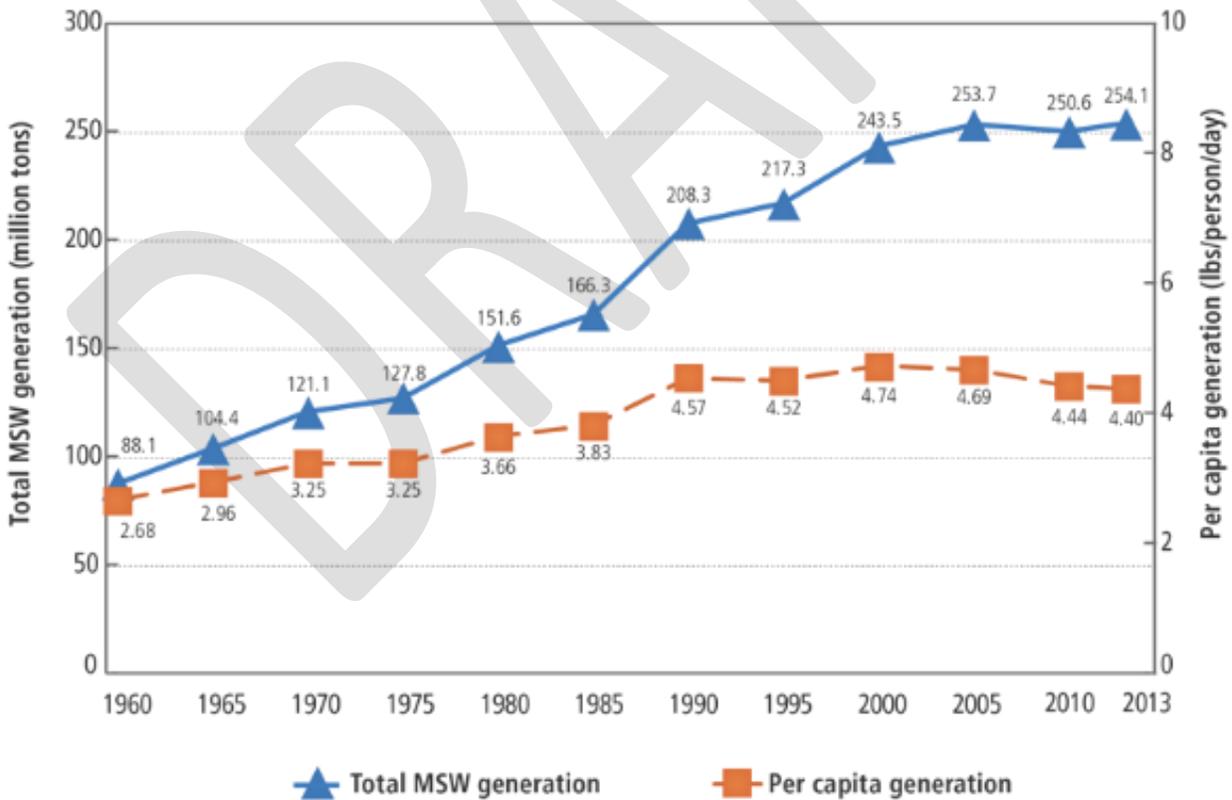


Figure 1-1 Total and Per-capita Waste Generation in the U.S., 1960 – 2013. Source: U.S. EPA

The next chart, **Figure 1-2**, shows that similar to waste overall, tons of material recycled continues to increase. The percent recycling line shows that since 2005 the recycling rate has remained relatively flat. This means that while there are more tons entering the economy as commodities and feedstock, Americans have been recycling practically the same proportion of their waste for about ten years.

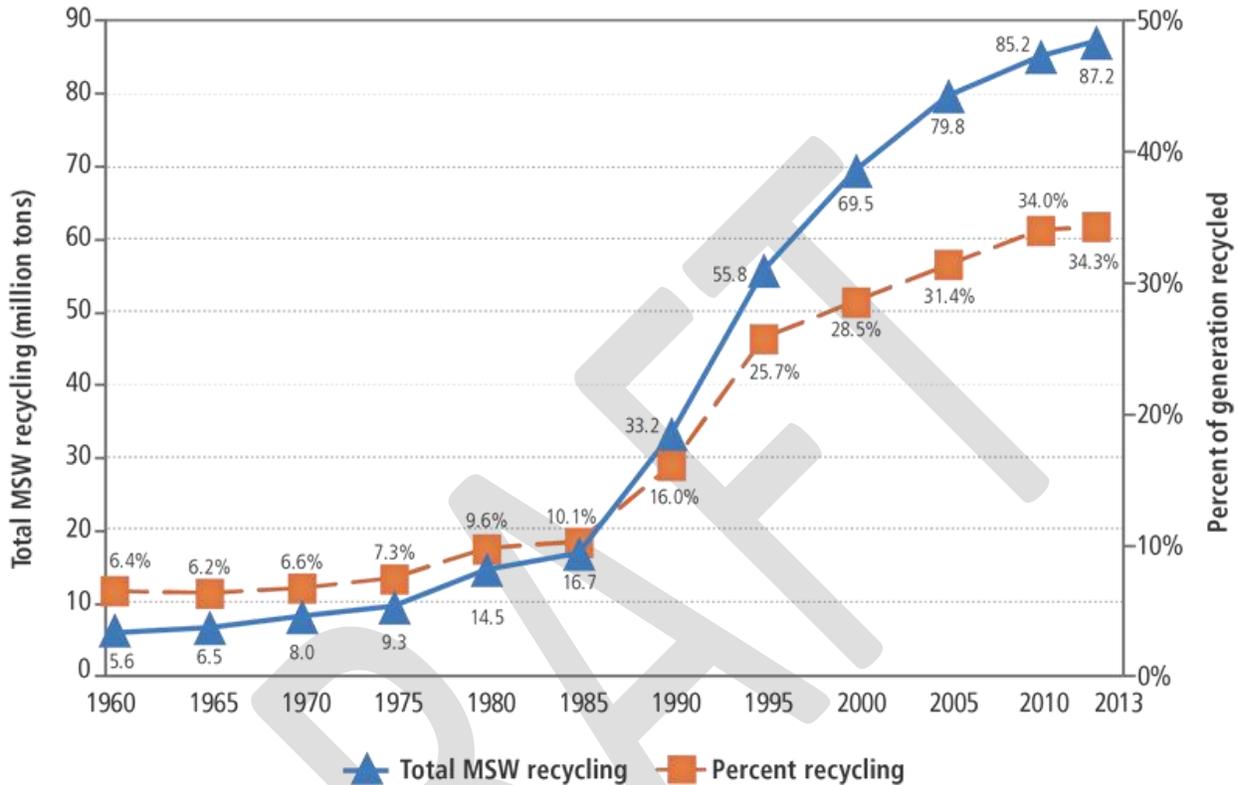


Figure 1-2 Total and Percentage Waste Recycled in the U.S., 1960 – 2013. Source: U.S. EPA

Beyond amounts and proportions, the composition of waste and of recyclables has changed dramatically. In general terms, in the material available for recycling, there is roughly twice as much plastic as in 2008 and half as much paper. This is critically important to understand, because it has been and will continue to fundamentally change the economics of waste recovery. Previously, paper was the revenue-based “bread and butter” of recycling businesses, and the production and recovery of newsprint was relied on to fuel the business. The precipitous decline in newspaper publication has decimated that line of business. Additionally, while valuable, the wide variety of plastics present in the waste stream makes them complicated to process, sort, and market. Furthermore, the recycled plastic markets have been more directly impacted by the drastic industry/market volatility of oil and petroleum resources, driving recycling revenues lower. **Figure 1-3** shows the widely recyclable components of MSW; the vertical line indicates the 2008 timeframe.

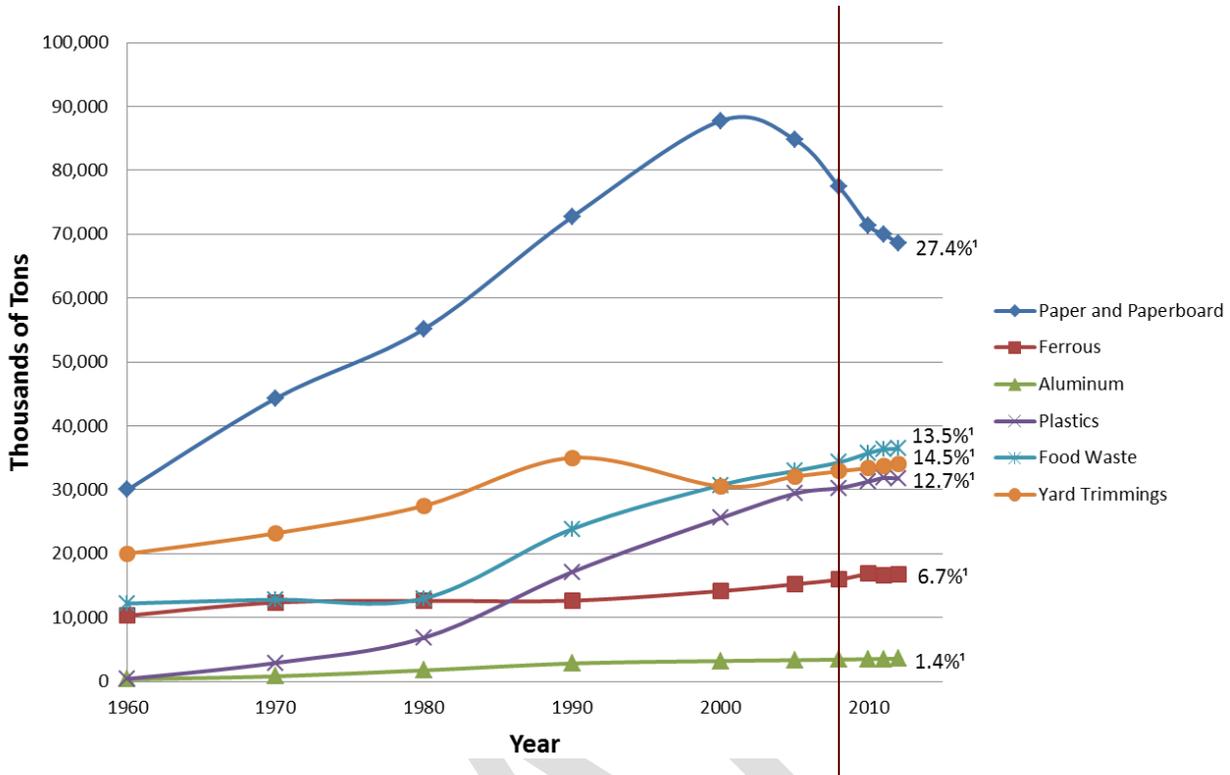


Figure 1-3 Partial Composition of Waste in the U.S., 1960 – 2013; Year 2008 highlighted. Source: U.S. EPA

Economies—and the related population surges—often develop faster than the ability of cities to manage the impacts. The management of solid waste is no exception. It is critical to have a comprehensive integrated approach to be effective and financially sustainable, and this approach needs to be developed in a manner that considers all aspects of the system, including waste reduction, storage, collection, transportation, processing and ultimate disposal.

1.2 Solid Waste Planning in Fort Worth

Beginning in 2014, the City of Fort Worth, Texas (the City) sought to create an updated plan to succeed the Fort Worth Solid Waste Management Plan – 1995-2015. Fort Worth’s revised Comprehensive Solid Waste Management Plan (CSWMP) aims to perform several functions:

- Purposeful effort to re-think and re-evaluate the very notion of “waste”;
- Comprehensiveness of approach to the management of Fort Worth’s MSW which deals with the city’s MSW globally rather than with some of its sectors;
- Deliberate attempt to reflect upon the management of solid waste in Fort Worth from a systemic rather than an atomized way; and,
- Intentional goal of identifying and seizing potential synergies with other City departments and outside agencies.

As with its predecessor, this CSWMP has a 20-year planning horizon and should be reviewed and, if necessary, updated every five years.

Fort Worth Solid Waste Management Plan – 1995-2015

Over all, the City accomplished or fulfilled almost all of the goals set out in the previous plan. The goals could be generally categorized as Maintaining, Innovating, or Aspiring.

Maintaining: These are goals that called for continuing to provide a certain level of service and achieving certain benchmarks of performance.

- The City has maintained the once monthly service level for bulk collection, an above-average amount of access to this type of service. Program metrics indicated growing customer compliance with set-out instructions.
- The City has maintained service levels in the illegal dump cleanup program. 98 percent of incoming work orders are cleared within 3 days, exceeding the goal.
- Keep Fort Worth Beautiful is a premier Keep America Beautiful (KAB) affiliate engaging thousands of people.
- The City has maintained service levels in the dead animal cleanup program. 99 percent of all work orders are cleared within 24 hours.
- Throughout the 1995-2015 planning period, the City achieved a primary goal to maintain adequate disposal capacity, at reasonable rates, to meet long-term solid waste management needs.
- The 1995-2015 Plan stated a goal of providing “Quality service to residents.” Surveys indicate that customers are satisfied with the solid waste services offered by the City. They also find the service level to be a good value to the price paid, more so than other utilities / basic services.
- The plan called for a “public information campaign” and public input on current and new programs. The City has executed such a campaign, and used surveys and public meetings to gather feedback from residents and customers.

Innovating: These were new programs or goals set out by the 1995-2015 Plan.

- The 1995-2015 Plan laid out goals and implementation steps for transitioning to collection of MSW in rolling carts. This program was completed and the transition successful.
- The 1995-2015 Plan noted that the City’s state-approved Storm Water Pollution Prevention Plan called for the construction and operation of a permanent collection center for household hazardous waste/chemicals. The City has fulfilled this goal, with the development of the Environmental Collection Center (ECC).
- The 1995-2015 Plan established the goal that residents of apartments should have the same access to household hazardous waste collection centers that are available to residents of single family household. This was fulfilled, as these residents are allowed at the ECC and at the mobile events.
- The creation of the Grants of Privilege system was called for in the 1995-2015 Plan, and has since been completed.

Aspiring: These were goals that were not defined quantitatively. They can be evaluated only with regards to whether or not the City took any actions in the vein of the goal, and therefore “fulfilling” the goal does not necessarily indicate programmatic success or completion.

- There were nine recommended actions from the existing 1995-2015 Plan with regards to the industrial, commercial and institutional (ICI) sector. They mostly involved action statements like “encourage,” “assist,” and “incentivize,” and the areas of focus included buying recycled content,

reducing waste, recycling, and composting. For seven of the nine actions (see “Program Evaluation” report), there was at least one effort made in fulfillment of the aspiration.

- The 1995-2015 Plan stated a goal to “assist” ICI organizations with waste management, within the context of customer service. The most direct outcome of this intention is the adoption and implementation of the multi-family recycling ordinance and the related outreach.

2016-2036 Fort Worth CSWMP

Planning Horizon

The following factors and assumptions were identified and considered when projecting the waste management needs for the City during the 2016-2036 planning period:

- The City anticipates considerable population and employment growth and, accordingly, significant growth in the generation of refuse and recyclables in both the residential and ICI sectors;
- The City will continue to provide all the services it currently operates or contracts for, including residential curbside collection of garbage, recyclables, and yard waste, along with outreach activities, drop-off station services, illegal dump clean up and litter abatement, and regulation of haulers;
- The City must improve current recycling rates and reduce recycling contamination at the curb;
- The Southeast Landfill (SELF) has a projected facility life that is in flux, and the City must consider alternate and new options for disposal sooner rather than later;
- The region’s material recovery facilities will continue to operate and be available for the City;
- The City will continue to report on its recycling and disposal tonnages to the North Central Texas Council of Governments and other industry entities, in the interest of data sharing; and,
- The City must investigate, evaluate, and support ways to increase recycling/waste diversion in the ICI sector to assure future landfill capacity.

Planning Areas and Actions

To provide comprehensive solid waste management, the City has used an approach that establishes clear service areas, intended actions, a timeframe for enacting them, and evaluation criteria during the planning period and upon updates and reviews. Below is an explanation of how the City strategizes to support and promote best management practices, highlighting some of the program and strategic actions and their components.

Services to Residents

The City is placing renewed and intense focus on improving recycling and waste diversion efforts at the curb. The following initiatives address this priority:

- Continuation of providing high-quality and responsive service on a weekly basis.
- Implementation of renewed efforts to reduce contamination of the source-separated recycling stream.
- Promotion of “right-sizing” collection carts, including migrating more customers to smaller, 64-gallon garbage carts and implementing use of larger, 96-gallon recycling carts.
- Encouragement of at-home or “backyard” composting by residents.
- Enforcing bulk and brush separation for curbside collection

The City does not provide services directly to multi-family residents; however, there are several actions in this CSWMP aimed at indirectly ensuring the residents of apartments and condominiums have as much access to recycling as do residents of single family homes.

Services to Industrial, Commercial, and Institutional Sectors

The City is seeking ways to actively encourage and incentivize recycling in the commercial sector.

- The City will use the Grants of Privilege process, such as the reporting requirements, to spread access to recycling for businesses and gather more information on the current conditions.
- The City is also planning to evaluate collection of food scraps from businesses for the purpose of diverting them to composting or anaerobic digestion.
- The City will seek to use permitting and development processes to divert more construction and demolition (C&D) material to recycling.

Services to the Community

This area of activity includes programs and policies that the City promotes regarding solid waste management in the larger community, both directly and indirectly. The City desires a greater proportion of the recycling rate arising from materials directed into single stream recycling bins (e.g. plastic, metal, glass, and paper) from all sectors, including when residents are away from home or when people are visiting from other communities.

- The City will devise goals and requirements that result in more diversion in public venues, pedestrian areas, and special events, while not burdening businesses unduly.
- The City will continue to provide exemplary service response to illegal dumping cleanups, litter abatement, and dead animal removal, and expand these excellent programs to accomplish more dumping and litter prevention in the first place.
- The City will continue to provide information and drop off services for hard-to-manage and potentially-polluting materials such as electronic waste, household hazardous waste, pharmaceuticals, and fireworks and ammunition. The City will evaluate ways to expand access to programs to encourage participation.
- The City will evaluate ways to support increased sustainable development, including environmental design considerations and C&D waste processing.

Solid Waste Management Facilities

The City is responsible for planning for the management of all solid waste generated in Fort Worth. The material is collected, processed, and disposed by a network of public contracts and private service providers, and therefore reducing the environmental impacts associated with solid waste management is dependent on public/private partnerships. To ensure that proper solid waste management is provided in a way that continually applies best practices for environmental impacts, the CSWMP lays out actions for the following:

- The City will assure that there is adequate disposal capacity available and reserved for materials generated in Fort Worth, either by contract or by creation of a new facility, which provides value for the cost involved.
- The City will evaluate options for ensuring the Southeast Landfill (SELF), or another disposal facility, has capacity for secure disposal of the City's future (2035 – 2060 or beyond) solid waste during the planning period.

- The City will press for additional clean recycling and garbage collection vehicles, and to properly manage other sources of pollution such as landfill gas.
- The City will promote alternative sources of energy and the monitoring and reduction of emissions throughout the solid waste management process.

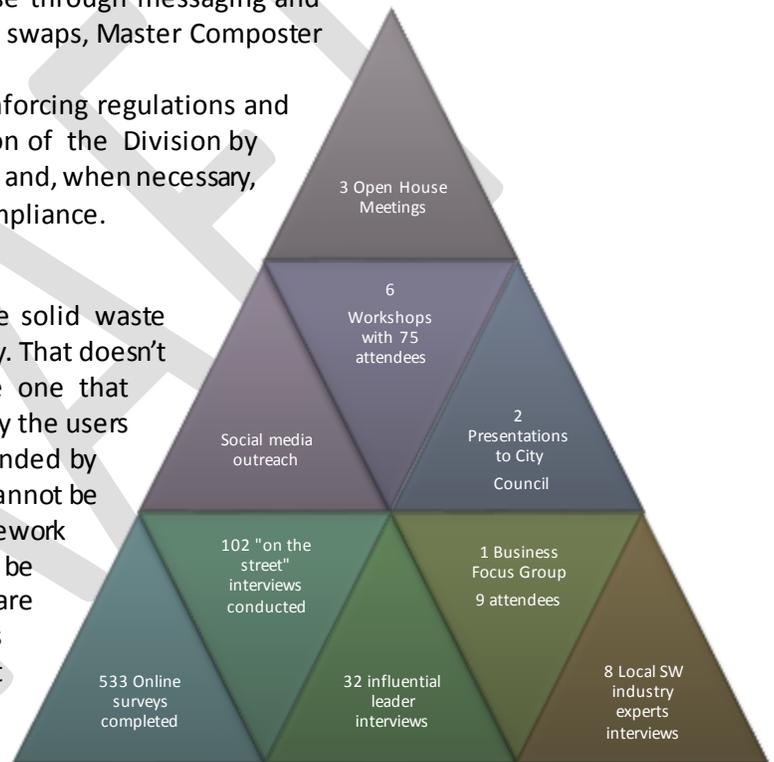
Solid Waste Services Division Activities

The Solid Waste Services Division (SWSD) is responsible for a variety of activities, contracts, reporting, and information management. The CSWMP provides actions and strategies to empower the SWSD to support the programs in the plan document. These include:

- Providing excellent and responsive customer service.
- Creating and implementing a high-quality outreach and education program that uses contemporary and up-to-date tools and technology to reach people where they are.
- Promoting waste reduction and reuse through messaging and programs, including charitable reuse, swaps, Master Composter programs, and education efforts.
- Promulgating, implementing, and enforcing regulations and ordinances which further the mission of the Division by setting the performance expectations and, when necessary, provide for consequences for noncompliance.

1.3 Public Participation

There are many attributes to an effective solid waste management system - the first is affordability. That doesn't mean the least expensive system, but the one that provides value at a cost that can be paid for by the users of the system. Even if the system is not funded by public dollars, the system will not work if it cannot be afforded by its users. Second, the legal framework for the development of the system needs to be well defined—what permits or approvals are needed, what are the limits for the emissions that are produced by the system—so that businesses and vendors know what is expected of them. Third, social acceptance of the system is critical. A system is made up of people, and they must see their values reflected and be willing to join the effort.



From the initialization of the project, the creation of the CSWMP included substantial public input, as detailed in Chapter 2 and in Appendix C. Public input is critical to a solid waste management planning process because no program can succeed without public engagement. Even the best-designed and funded system cannot function if people do not participate. As shown in Figure 1-4 and in Figure 2-1, the City used several different avenues and technologies to reach out to residents and the community:

Figure 1-4 Outreach and Public Involvement Techniques from the 2015/16 City of Fort Worth CSWMP Process

- Social media;
- An Online Survey of residents;
- “Man on the Street” Interviews;
- Public open house meetings;
- Business Focus Group;
- Subject specific workshops; and
- In-depth Interviews with business people, waste industry experts, elected officials and influential community leaders.

The City worked with public, stakeholders, influential leaders, elected officials, other City staff, and industry consultants to contribute to the plan in thoughtful, meaningful ways. City staff and the consultant team, agreed that an appointed advisory committee was not the most beneficial path to seek the communities input due to the nature of the new plan focusing on technical improvements and advances, instead of significant new and complex programs. In the most succinct terms, the public input reflected a City where people are concerned about conserving the environment and aware that their actions have impacts; at the same time, they are sensitive to the need to balance that with the realities of costs and capabilities.

2 Introduction to the Project, Process, and Plan Document

A comprehensive solid waste management plan is the cornerstone of integrated solid waste management, which addresses all aspects of waste from generation to final disposition. As consumer recycling systems



mature, the characteristics of waste transforms, and technologies evolve that allow greater amounts and types of waste to be recycled, integrated solid waste management must consider an ever-widening sphere of influence. This is because integrated solid waste management and comprehensive plans do not only address collection, processing, recycling, and disposal. They also address business systems and financing, greenhouse gas emissions, generation and adoption of alternative fuel systems; they intersect with wastewater management and stormwater permits, school bus fleets, and sustainability objectives; and,

the comprehensive solid waste management plan addresses what for many individuals in the community is one of their primary and most visible impacts on the environment.

The City of Fort Worth has a tradition of being proactive regarding waste management, going back almost 50 years. Fort Worth is dedicated to providing residents with opportunities to divert, recycle, and reuse. The concept is global in nature, going beyond customer service and the financial bottom line, as demonstrated in this statement:

We cannot keep losing our nation's valuable resources by using them once and burying them in a landfill forever. Fort Worth has to do its part by finding our own solution.

-Former Fort Worth Code Compliance Solid Waste Assistant Director Kim Mote

Increasingly, residents and businesses are thinking about their wastes. Residents reduce the amount of waste generation by bringing their own shopping bags to the store. Residents and businesses know that many materials can be reused or diverted and made into something new. Businesses and residents are interested in landfilling less material, and seek opportunities to recycle as much as possible. The City of Fort Worth is committed to making solid waste management an activity in which residents and businesses are active participants, not something that simply happens to and around them.

These aspirations of building sustainability, protecting the environment, and engaging people do not exist in a vacuum. There is an economic component, in that operations must have funding and also the programs have beneficial short- and long-term financial impacts. Therefore, the solid waste management plan must make provisions for business planning in addition to permitting and programming.

From one community to another, planning periods vary, with many in the 5- and 10-year range. A 20-year plan—the model adopted by Fort Worth—offers both greater strengths and challenges. A plan of this magnitude requires much more sophisticated analysis and financial projections and the foresight to accommodate future developments such as population or technology shifts. At the same time, a 20-year plan empowers the community to utilize long-term contracts for services and facilities—as Fort Worth has done previously—and thereby benefit from operational steadiness and stabilized costs.

Due to the long-term and wide-ranging implications of a comprehensive 20-year plan, substantial public outreach was required. An entire task (see below) was devoted to accomplishing this critical obligation. As a result, direct interaction was held with more than 750 individuals, and many additional people reached via mass communications, including an updated page on the City web site, <http://fortworthtexas.gov/swplan>.

One of the most foremost interests for the current process of solid waste planning in Fort Worth was to energize the commercial sector to reduce and recycle more waste. The first step was a new regulation on January 1, 2014, requiring multifamily properties (which are regulated similarly to businesses and institutions) to provide recycling. Properties are required to submit recycling plans, with City staff to follow up on the plans with site inspections. Residentially generated solid waste is estimated to account for only one-third of the waste generated in the City, and the commercial sector (which includes the multifamily properties) accounts for the remaining two-thirds. The new multifamily recycling regulation will address some of the commercial sector, but presently, there is no stated incentive or regulatory requirement for businesses to recycle in Fort Worth, and the City does not provide services to the business sector.¹ There are many businesses that do recycle, and some, like Miller-Coors and Coca-Cola, are leaders in waste management. There is, however, a sizable improvement opportunity that could reduce the volume of landfilled waste by more than a projected 19% from Fort Worth businesses. There are various ways to address this condition, and determining which methods would achieve the greatest diversion potential comprised a considerable part of the analysis conducted during the planning process.

As an intangible outcome of this plan, the City of Fort Worth will continue its position as an innovator not only in Texas but nationally. Diversion or recycling of 40 percent of waste is now commonplace in mature American recycling programs. Single stream collection, rolling carts for recycling, and differential pricing for waste carts otherwise known as “Pay as You Throw” (PAYT) of which Fort Worth was an early adopter, are now the best practice for communities far and wide. With its dedication to innovation and detailed comprehensive planning, Fort Worth can and will set the bar for the best in fiscally responsible and cutting-edge waste reduction, recycling, and disposal programs.

2.1 Competitive Procurement

In 2014, the City of Fort Worth sought to update its comprehensive solid waste management plan (CSWMP). The prevailing plan was dated 1995 – 2015. The intentions of the revised CSWMP, as presented to the City Council in January 2013, were to:

- Move from residential to global/all waste focus;
- Leverage emerging and sustainable technologies;
- Develop and implement strategies to foster market driven collection and diversion programs;
- Foster collaborative public/private partnerships; and,
- Develop a capital funding plan for new technologies and future infrastructure.

A Request for Proposals was released in February 2014 to procure consulting services for creation of a CSWMP that would “ensure that the material handling and resource recovery of the solid waste collected in all sectors (residential and industrial, commercial and institutional (ICI)) is done in a logical, manageable,

¹ The City does not provide collection services to the business sector other than such small businesses as may request to be added to the City’s residential collection program, utilizing rolling carts for trash.

and cost efficient manner that takes into account the City’s sustainability needs over the next 20 years.”² In addition, the CSWMP was envisioned to “serve as a business planning document that identifies financial requirements, short and long-term financing options, facility requirements, and program requirements for the coming two decades.”³

In July 2014, Gershman, Brickner & Bratton, Inc. (GBB), was contracted to help the City develop a CSWMP to cover 2016-2036, and to devise and manage a robust public input program throughout the planning process.

2.2 Task Management

This planning project was conducted using a Task Management approach, beginning with a Project Kickoff Meeting followed by the Data Request, with the ensuing work divided into Tasks and Subtasks.

- **Project management:** A combination of formal and informal communications and contact, regularly scheduled meetings, oversight of the interim work products, and other administrative tasks.
- **Data gathering:** Phase of the project to research and analyze existing available planning related data and information which are pertinent to the alternatives development process. Included socio-economic forecasts, land use projections and the previous CSWMP and other documents.
- **Program evaluation:** A detailed review of current City solid waste programs and initiatives for quality, efficiency, participation, cost performance, and achievement of any existing City goals. The program elements to be evaluated were identified and agreed upon among the Project Team members. Each element was described, assessed given available data, and evaluated through the lens of standing goals and standards, or industry and national best practices. An interim report was generated for this Task.
- **Public involvement process:** A successful CSWMP hinges on having the buy-in and participation from the community it serves. The public involvement process for this project was designed to ensure an understanding of stakeholder issues, attitudes, and expectations such that the CSWMP would best reflect community values and ideas. Stakeholders involved included residents, business owners, public officials, academia, policy makers and industry representatives. As described in further detail herein, the outreach involved surveys, interviews, workshops, open house meetings, online outreach, and a public hearings.
- **Recommendations:** Developed collaboratively with the consultant and the City, the recommendations for each of the areas analyzed during Task 3 ultimately became the action items for the CSWMP. The recommendations draw on feedback from the public from Task 4, input from the City, and solid waste industry experience, including best practices.
- **Creation of the CSWMP:** The recommendations from Task 5 were the beginning of the Plan document. Once they are finalized, “recommendations” became “Actions,” implementation

² City of Fort Worth, RFP No. 14-0071

³ City of Fort Worth, RFP No. 14-0071

plans were added, the findings of Task 3 and 4 were incorporated, and the CWSMP emerged as a document.

- Disaster Debris Management Plan (DDMP): One of the critical services the City provides to its residents is the management of debris generated during a disaster – be it natural or man-made. The DDMP developed as an integral part of the CSWMP establishes the protocols for disaster response, identifying the roles and responsibilities of the various city departments and outside agencies involved.

2.3 Public input, Stakeholder Engagement, and Professional Solid Waste Management

As part of the update to the City’s CSWMP process, the City has conducted extensive public outreach for the purpose of garnering opinions and insight regarding the interest of the residents of Fort Worth in solid waste and other environmental issues.

As shown in Figure 2-1 (and in Figure 1-4, above), the City used several different avenues and technologies to reach out to residents:

An interim report on the activities and findings of the public outreach effort was submitted to the City and is attached to this document as Appendix C. Also in the Appendix are the outreach plan for the entire CSWMP process; survey instruments administered to the public; questionnaires prepared for one-on-one interviews; presentations and materials distributed at open houses and workshops; and, detailed results of responses and feedback, including incoming correspondence.

In general terms, the public outreach process identified that the following topics are of interest or important to residents:

- Nearly all of the residents agreed that “managing waste in the most environmentally responsible manner” is very important or critical to the City’s future.
- Most of the businesses felt that there is a connection between waste management and the City’s economy because it influences quality of life.
- By almost 2-to-1, residents prioritized public space recycling bins and increased recycling efforts at businesses as tools to increase recycling overall. Half or less of residents prioritized changes to the curbside program that would encourage waste reduction, and lesser priority was given to food waste separation.

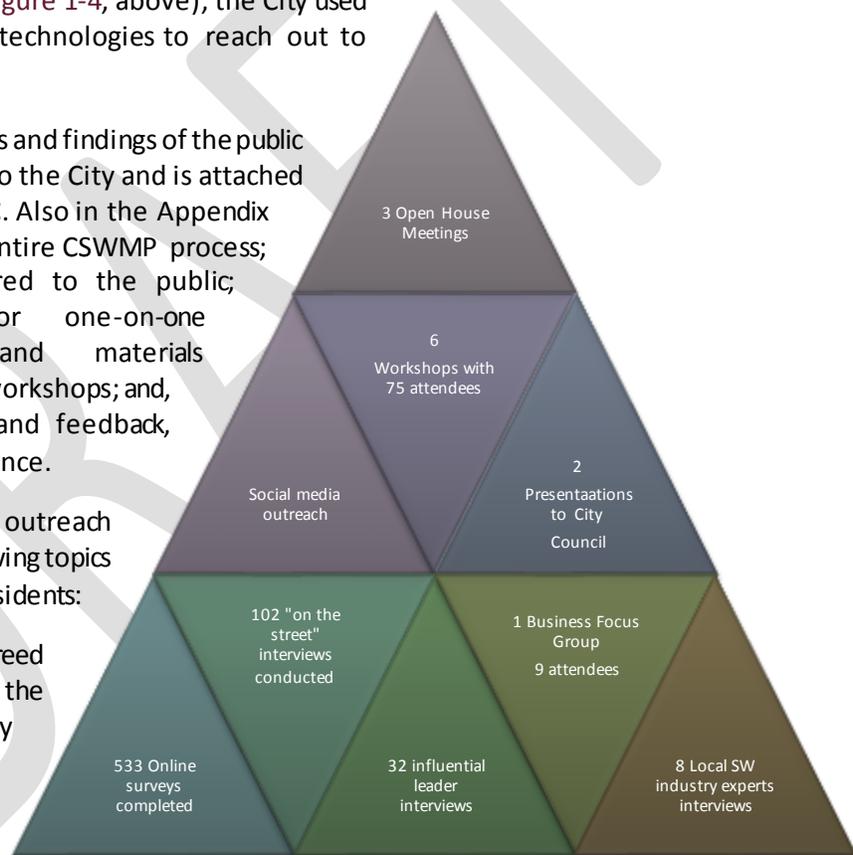


Figure 2-1 Outreach and Public Involvement Techniques from the 2015/16 City of Fort Worth CSWMP Process

- Recycling is viewed by residents as an important environmental issue; however, residents viewed air quality, litter, and water conservation as more pressing (see figure below). In open workshop discussions, residents expressed concern about recycling being a “value” for Fort Worth, and many people stressed the importance of recycling education at all levels, especially for youth. Businesses talked about companies who have adopted “green” as a corporate tenet.
- Businesses said recycling was important, but qualified that many businesses are too busy to care or want an economic incentive to recycle.
- When asked what is the hardest thing about recycling at their locations, businesses lamented that “people don’t care,” and cited problems with implementing a system such as not having space for containers and having to rely on individuals to carry recycling to their homes due to lack of service. They also noted that turnover means education is a never-ending process, even for people who are engaged. In a later question, several of the businesses noted that recycling always gets “pushed down” below other priorities and demands on their time.
- Businesses indicated that the potentially-recyclable materials they were most likely to generate were cardboard, paper, and batteries.

In the surveys, residents were asked to give open-ended answers to the question, “What are the three most important environmental issues facing Fort Worth?” Their answers were consolidated under summary headings such as “recycling,” or “water supply/conservation,” and weighted by the respondents’ rankings. As shown in [Figure 2-2](#), indicated in colored data labels, the highest priorities were recycling, litter, clean air, and water conservation.

A successful CSWMP hinges on having buy-in and participation from the community it serves, as well as the City’s Leadership Team: Mayor, City Council, City Manager, various Department Directors all the way down to the individual involved employees. The outreach activity undertaken in this planning process helped assure that the City heard from a broad and diverse group of stakeholders, comprising residents, business owners, public officials, academia, policy makers and industry representatives. Stakeholder opinions, ideas, attitudes, and engagement provided context and perspective when developing the elements and direction of the CSWMP.

In general, the influential leader interviews, or ILIs, identified that the following topics are of interest and/or important to community leaders:

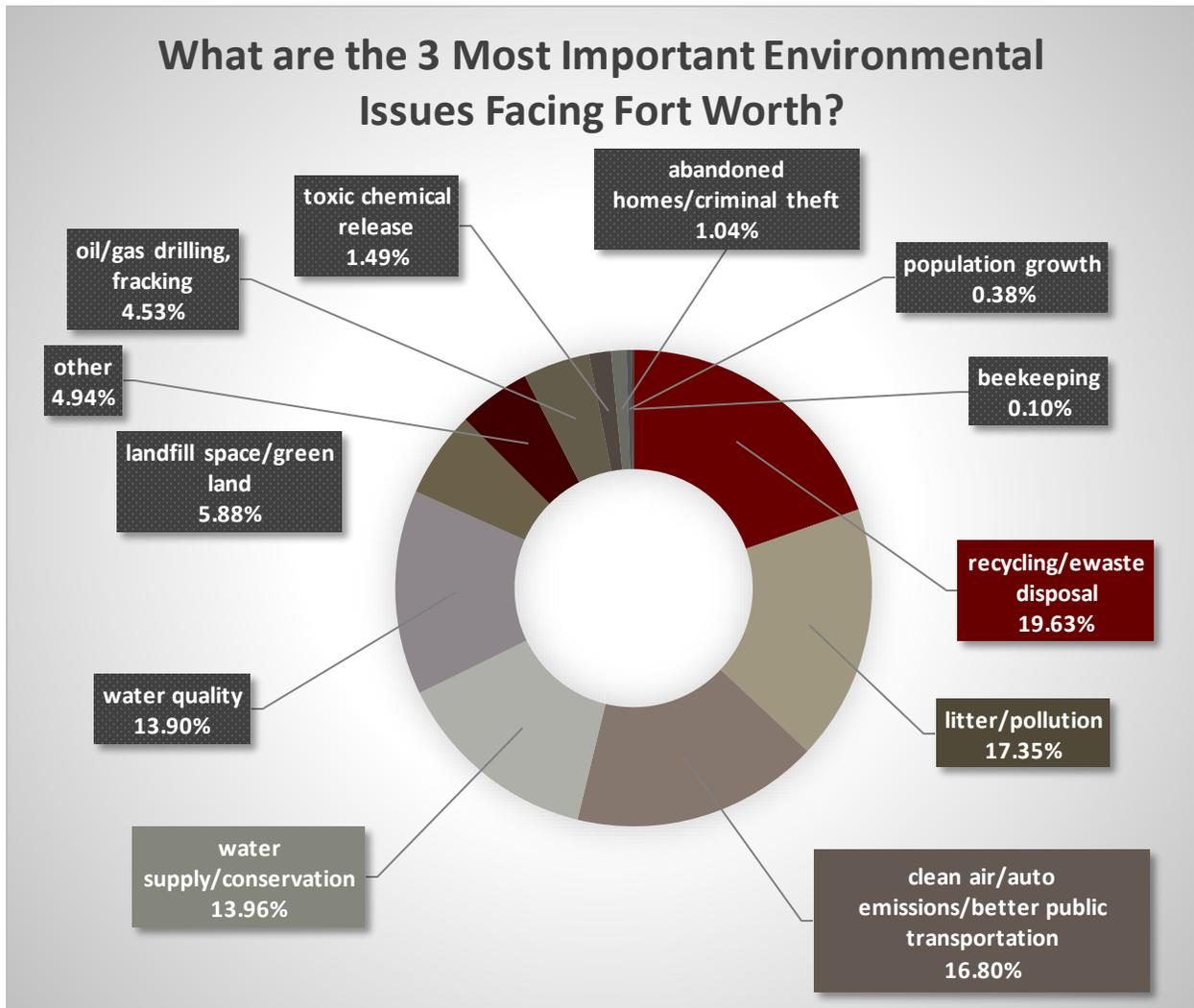


Figure 2-2 Environmental Issues Prioritized by Fort Worth Residents in Surveys, Summer 2014

Regarding residential sector:

- The City should consider adding used clothing/textiles to curbside (i.e. like SimpleRecycling), partnering with charities; additionally promote the use of the public space “Recycle on the Go” bins.
- The City should change large bulk and brush collection services by separating bulk from large brush so the brush can be recycled (i.e. composted) more.
- Removing glass from single stream curbside recycling cart is acceptable; implement glass drop off location opportunities instead for recovering cleaner materials to market.
- Cart repair requests need to be enhanced: by online requests; by staff and route drivers reporting too; in addition to more than just calling in by residents.
- Carts need instructions added to give clear direction and educational information to households; idea: replace current lids with lids with educational messaging.

Regarding Institutional/Commercial/Industrial (ICI) sector:

The City should:

- Consider food waste separation and recycling at City and school facilities;
- Consider uses for contaminated wood waste.
- Develop a reward/tax credit incentive for businesses to recycle.
- Develop a recycling ordinance for the ICI developed through the Chamber of Commerce and Real Estate Council; have focus groups through the Chamber and Real Estate Council.
- Promote documented success stories, perhaps give recycling awards.
- The City should consider developing a public-private partnership project for source-separated food waste, working in partnership with other nearby cities, e.g. Arlington and Irving.
- Develop a requirement for food waste separation and collection in the City; having something in place like MA, CT, and RI does at state level.⁴
- Consider developing permit requirements with large deposits that are refunded if recycling of C&D materials is confirmed—i.e. City of Plano, TX or CA approach.
- Create incentives for increasing commercial recycling.
- Determine how Miller-Coors got to zero waste to landfill, identify other businesses in Fort Worth that are or have and share their stories.
- Develop commercial recycling education materials and outreach should be bilingual with English and Spanish.
- Give attention to multi-family properties recycling with additional trained staff members.
- Increase Grant of Privilege percentage, perhaps tiered; have funds go direct into solid waste enterprise fund and not general fund.

Regarding solid waste in general:

The City should:

- For greater diversion of reusable furniture and bulk, promote more partnering with charities, businesses and schools.
- Have stronger education and positive reinforcement to promote better and more recycling.
- Evaluate opportunities for composting including organics/food scraps and biosolids that are currently being land applied.
- Work to create specifications for including trench bedding to encourage an internal market for recycled concrete.
- Create alternative channels for pharmaceutical wastes management. Most of the waste is flushed down the drain/toilet now causing issues at the Waste Water Treatment Plant (WWTP).
- Develop robust awareness, education and communications needed with results of CSWMP; use automated calling.
- Consider developing landfill as a bioreactor using biosolids as feedstock –similar to City of Denton.
- Determine if biosolids management can be combined with MSW management.

⁴ These states are in the process of considering or implementing various degrees of banning food waste from disposal.

2.4 Implementing the CSWMP as a “living document”

The CSWMP is, in many ways, a discussion of how the City has and will impact and affect various components of the solid waste management system, and sets goals for those efforts. The City intends to have positive and lasting effects via the CSWMP, including:

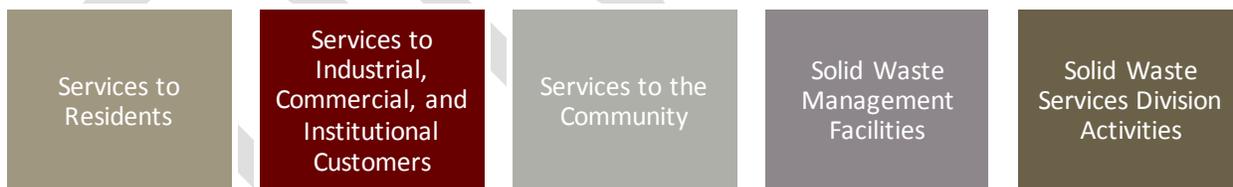
- Residential collection;
- ICI sector services;
- Public space recycling and waste diversion;
- Organics;
- Special wastes;
- Reuse and diversion;
- Material and energy recovery;
- Disposal;
- Sustainability efforts;
- Extended producer responsibility; and,
- Public education.

City laws and SWSD policies affecting solid waste were evaluated for effectiveness, best practices, and the extent to which they accurately reflect the intentions and programs the City has or intends to implement. Recommendations were developed accordingly, and transformed into action statements with implementation plans.

Solid waste management is undergoing structural changes, regionally and nationally, which impact local solid waste management issues and programs. Yet, all local solid waste decision-making takes place, ultimately, in a unique sociopolitical climate. To ensure the greatest likelihood of new program success, it is crucial to determine the needs and concerns of the many stakeholders involved. This view to the past, the present, and the long-term, produced a CSWMP document that empowers the City to provide the best services and systems to the residents. In this way, by laying the groundwork for ideas that may not be implemented for fifteen or more years, the CSWMP is a “living document” that continues to serve the City’s changing needs over time.

2.5 Comprehensive Solid Waste Management Plan Structure and Implementation

All of the program analysis in the CSWMP document, including the interim reports of Program Evaluation and Recommendations, is organized by the following service areas and activities:



An evaluation was conducted on each of the City’s programs with the service areas listed above and the results of that evaluation are discussed in Chapter 3. Accompanying each program were:

Program Description

Brief description of the program element, including services, operations, and dimensions; and, qualitative information about the program performance, participation, etc.

Program Evaluation

Includes identification and description of any existing goals or standards which were applied, such as from the previous SWMP, the City budget document, Texas state goals, or industry standards, and how the program compares.

Chapter 4 details the incorporated data that was utilized in the development of the CSWMP. This is information about Fort Worth that influences solid waste generation and management. It includes demographics like population, economic factors such as employment and land use, and less tangible effects such as history, culture, and geography.

Chapter 5 describes the solid waste management facilities available to the City now and over the course of the CSWMP horizon. This includes briefly addressing available facility capacity for disposal and for processing of recyclables and organic material. It also talks about possibilities for future system developments. More in-depth discussion of the facilities is included in the Program Evaluation in Chapter 3 and in the Recommendations in Chapter 6.

Chapter 6 provides the recommendations for the CSWMP. As in the Program Evaluation content, each service was populated by the City's programs. Accompanying each program are:

Recommendations

Recommended course of action, including any new goals or standards associated with the recommendations and how the new goals should be evaluated.

Impacts Analysis

Each recommended course of action was analyzed with regards to its impacts on policy or regulations; potential landfill diversion; economics; and, other possible factors such as jobs creation or greenhouse gas emissions.

Implementation Schedule

Briefly, each recommendation was identified for implementation in the Short-term (1-5 years), Mid-term (6-10 years) or Long-term (10-20 years).

In Chapter 7, there is a discussion of the importance of strategic planning and several of the CSWMP actions are featured. The role of planning in the City of Fort Worth government is presented, and the lasting positive impacts that best practice planning can effect.

Finally, the recommendations from Chapter 6 have been transformed into actions, and implementation plans for each adopted recommendation are laid out in Chapter 8. As in other chapters, the actions are organized by program and by service area. The information is presented in tables as follows:

<i>Program Name</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Brief description of the action; more detail can be found in Appendix C	Funding, staffing, facilities, etc. Will be in general terms.	Party or parties responsible for implementing the action. Subject to change.	Short-, Mid-, or Long-term

Thereby, this is how the actions in the CSWMP will be realized.

3 Evaluation of Program Elements

Each program element in the solid waste management program was identified as being part of one of five operational categories. The categories are primarily identified as three service sectors (services to Residents; services to Industrial, Commercial and Institutional (ICI) sectors; and services to the Community), along with solid waste facilities and internal agency operations. Data for the purposes of evaluation came directly from City sources, and most goals or standards came from the prevailing solid waste management plan or other City sources. Any external standards are based on the United States Environmental Protection Agency (EPA), established industry sources, and from common knowledge of exemplary programs.

The analysis was provided in a detailed report to the City, which involves an evaluation of current City solid waste programs and initiatives for quality, efficiency, participation, cost performance, and achievement of any existing City goals. The program elements to be evaluated were identified and agreed upon among the Project Team members. Each element was assessed given available data, and evaluated through the lens either of standing goals and standards or industry and national best practices.

The report is provided in its entirety as Appendix D.

4 Incorporated Data

This section presents information pertaining to Fort Worth, such as population, housing concentrations, geographic conditions, economic growth and development, markets for the reuse and recycling of materials, and transportation conditions. This content excerpts several information and data points from the City's 2016 Draft Comprehensive Plan, and uses such data to project waste generation. Other sources of data for projections include the U.S. Census Bureau; the North Central Texas Council of Governments (NCTCOG); a waste characterization study conducted for the City by GBB in 2014; and, the U.S. Environmental Protection Agency (U.S. EPA). All are referenced and cited accordingly.

4.1 City History⁵

The area in and around Fort Worth was inhabited by Native Americans long before the first settlers established a fort near present-day Birdville in 1840. Fort Worth's slogan of "Where the West Begins" dates back to this time, when a boundary treaty was negotiated with the native people to remain west of a particular map line. The town that became Fort Worth arose from civilian activities when the actual fort was vacated in 1853. Fort Worth was incorporated in 1873 with a population of 500.

Fort Worth's economic growth was fueled by its location on the Chisholm Trail, a major route for driving cattle from the grazing lands to the markets and railheads in Kansas City. In 1876, the railroad reached Fort Worth, transforming it from a waypoint on the cattle drives to the trail's end. The first stock show was held in 1886, and well over a century later, the historic stockyards and surrounding business area remain as a prominent feature in the City.

The City continued to grow and develop. From 1890 to 1900, the population increased by more than 20,000 people, from about 6,600 to more than 26,600. Building on the stockyards, the meat packing industry came to town, and by the 1910 census, the population increased by nearly another 50,000, to over 76,300.

In the years between World War I and World War II, Fort Worth continued to grow rapidly, benefitting greatly from the oil boom. Investments were made in infrastructure such as hospitals, water supplies, highways, and cultural resources. World War II brought aeronautics to Fort Worth, and over 3,000 B-24 Liberator bombers were built there during the war.

From 1940 to 1960, Fort Worth grew at an astronomical rate of roughly 100,000 people between each census-taking. Changes in the downtown core and the decentralization of the livestock marketing industry made it clear that Fort Worth needed to plan aggressively for its future. City leaders and businesses continued to seek long-term economic drivers for the area during the 1960s and 1970s, and fixtures such as the opening of the Dallas/Fort Worth (DFW) Airport, the Tarrant County Convention Center (now known as the Fort Worth Convention Center), the Amon Carter Museum, and the Kimbell Art Museum.⁶ In the 1970s, a second oil boom in North Texas again benefitted Fort Worth.⁷

⁵ Unless otherwise noted, historical information in this section was sourced from information compiled at <http://fortworthtexas.gov/about/history/>,

⁶ Texas State Historical Association, <https://tshaonline.org/handbook/online/articles/hdf01> and <https://tshaonline.org/handbook/online/articles/dif04>, retrieved March 30, 2016.

⁷ https://en.wikipedia.org/wiki/Fort_Worth,_Texas#Late_20th_and_early_21st_centuries

Technological developments in 2007 began opening up the possibility of tapping the Barnett Shale beneath Fort Worth for natural gas production.⁸

The City of Fort Worth now encompasses 353 square miles and is part of the 13-county Dallas/Fort Worth Metroplex, which covers 9,286 square miles and has more than 7 million residents. This is the fastest-growing metro area in the U.S., the largest in the South, and the largest landlocked metropolitan area in the country.⁹

4.2 City Description

Fort Worth is served directly by DFW International Airport, and also by Dallas Love Field, plus several private/commercial aviation airports and airfields like Meacham and Spinks. Amtrak train service connects Fort Worth to Oklahoma City, with limited stops in between. Also, Amtrak’s *Texas Eagle*, which traverses the Midwest from Chicago to San Antonio, passes through Fort Worth daily; three times per week, the *Texas Eagle* connects directly to the *Sunset Limited*, which connects New Orleans and Los Angeles. There are four Federal highways through Fort Worth (I-20, I-30, I-35W, and I-820), two U.S. highways (Route 287 and Route 377), and a large network of Texas state highways and local roadways. Public buses serve the City, along with a commuter railway connecting downtown Fort Worth to downtown Dallas.¹⁰

The City has long used annexation to grow, with infill and increase planned for five-year periods on a rolling basis.¹¹ This system allows for planned and more-orderly expansion of critical services. The map in Figure 4-2 is from the draft City’s 2016 Comprehensive Plan shows developed land in Fort Worth and the immediately surrounding areas, known as “extraterritorial jurisdiction.” Abbreviated “ETJ,” this is “the unincorporated area that is contiguous to the corporate boundaries of the municipality.”



Figure 4-1 Nighttime view of DFW Metroplex from space, by NASA Astronaut, provided to the public domain courtesy of NASA

⁸ https://en.wikipedia.org/wiki/Fort_Worth,_Texas#Late_20th_and_early_21st_centuries

⁹ https://en.wikipedia.org/wiki/Dallas%E2%80%93Fort_Worth_metroplex

¹⁰ https://en.wikipedia.org/wiki/Fort_Worth,_Texas

¹¹ <http://fortworthtexas.gov/annexation/>

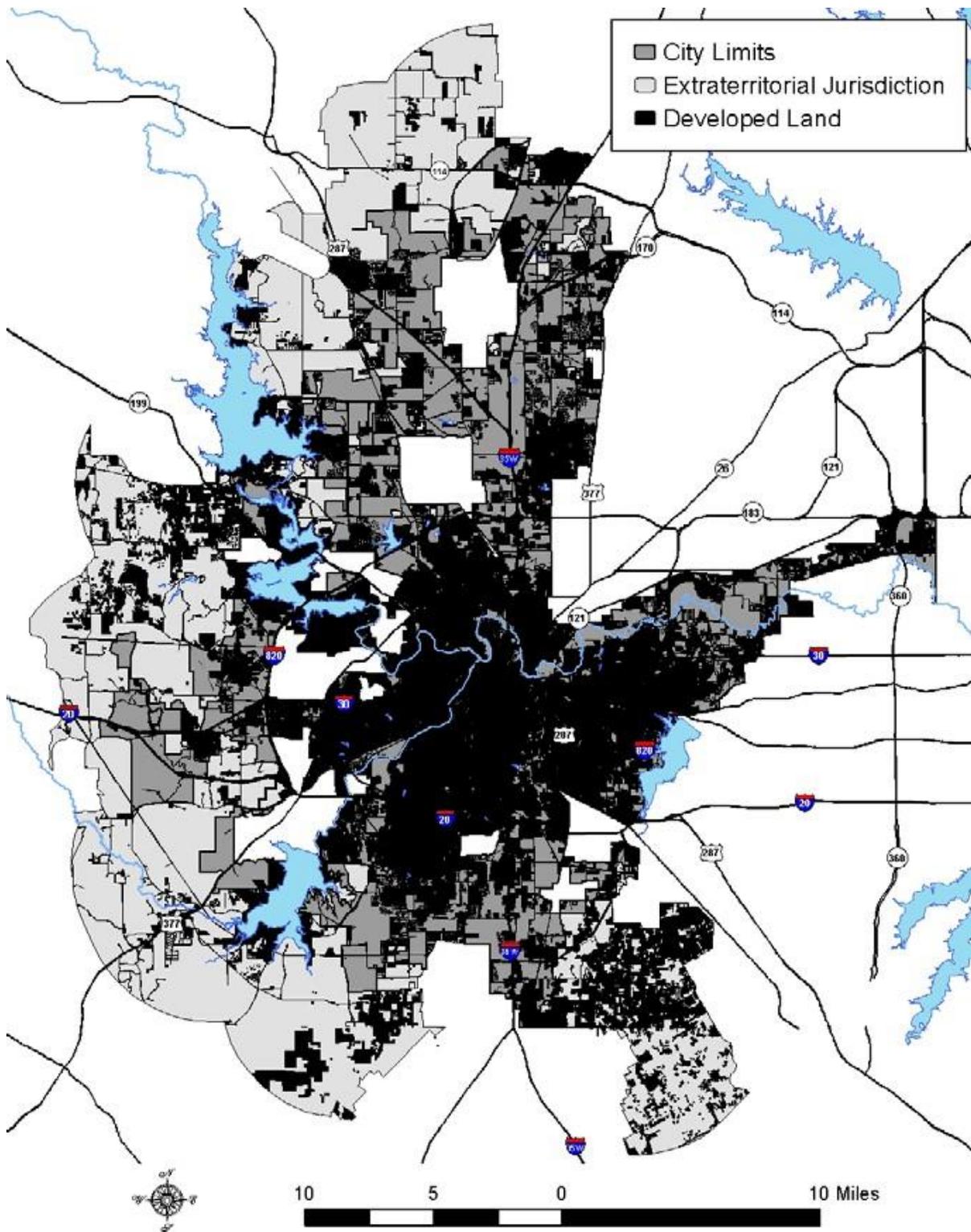


Figure 4-2 Developed Land in Fort Worth and its Extraterritorial Jurisdiction, 2005
Source: 2016 Draft Comprehensive Plan

The ETJ around Fort Worth extends for 5 miles beyond its boundaries,¹² and the City has authority over development within the ETJ.¹³ In Figure 4-2, above, the darkest color indicates developed land; the medium color is land within the City limits not yet developed (approximately 27 percent of the area), and the lightest color is the ETJ. Future job growth in Fort Worth will likely be linked to this undeveloped or underutilized land and the mostly vacant areas in the ETJ. The details of the acres of each type of use are shown in Table 4-1. The map in Figure 4-3 (next page) shows the planned land use for the next 20 years. This shows how the land uses extend into the ETJ.

Table 4-1 2010 Land Use (Acres); Source; NCTCOG

2010 Land Use	Acres
Single-Family	43,469
Multi-Family	3,960
Other Residential	2,634
Commercial and Industrial	24,096
Institutional/Semi-Public	7,375
Infrastructure	42,249
Dedicated Areas (Parks, Flood Plain)	20,225
Water	6,147
Under Construction	824
Vacant	70,661 (31.9%)
Total Acres	221,638

¹² Unless such area abuts to another municipality.

¹³ http://fortworthtexas.gov/uploadedFiles/Planning_and_Development/Planning_and_Design/Annexations/annexation-faq.pdf

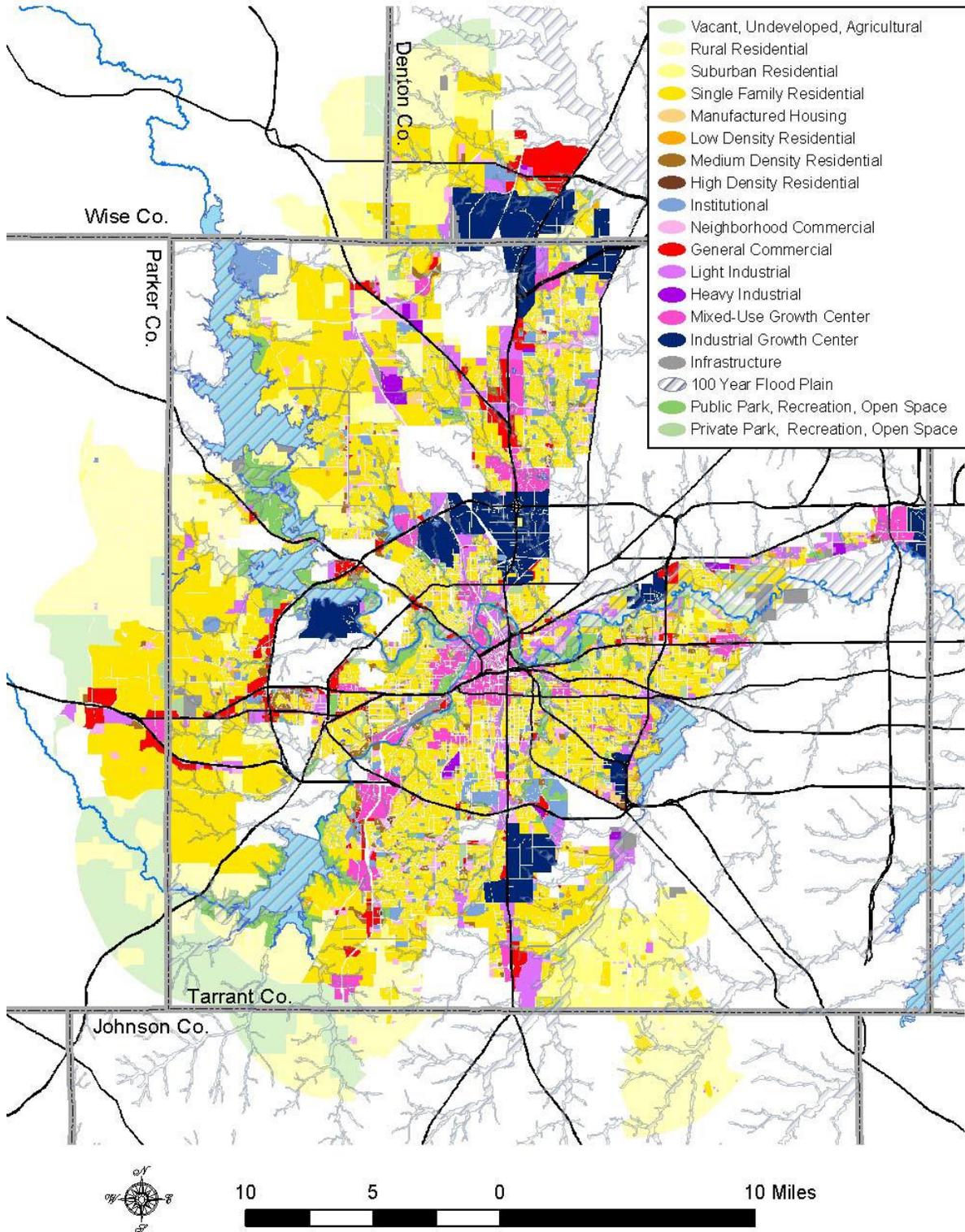


Figure 4-3 Future Land Use in Fort Worth
 Source: 2016 Draft Comprehensive Plan

4.3 Economic Growth and Development

One of the greatest factors in determining solid waste generation is employment. Fort Worth is in a long-term economic growth phase, and the daytime population of 880,002 people means that for each actual resident, there are 1.18 jobs in the City.¹⁴ The jobs growth has been spread across the City, as shown in Figure 4-4. According to the North Central Texas Council of Governments' employment forecast, employment in the City of Fort Worth will continue to rise by 2.5 percent, reaching approximately 900,000 jobs within the city limits in 2040.

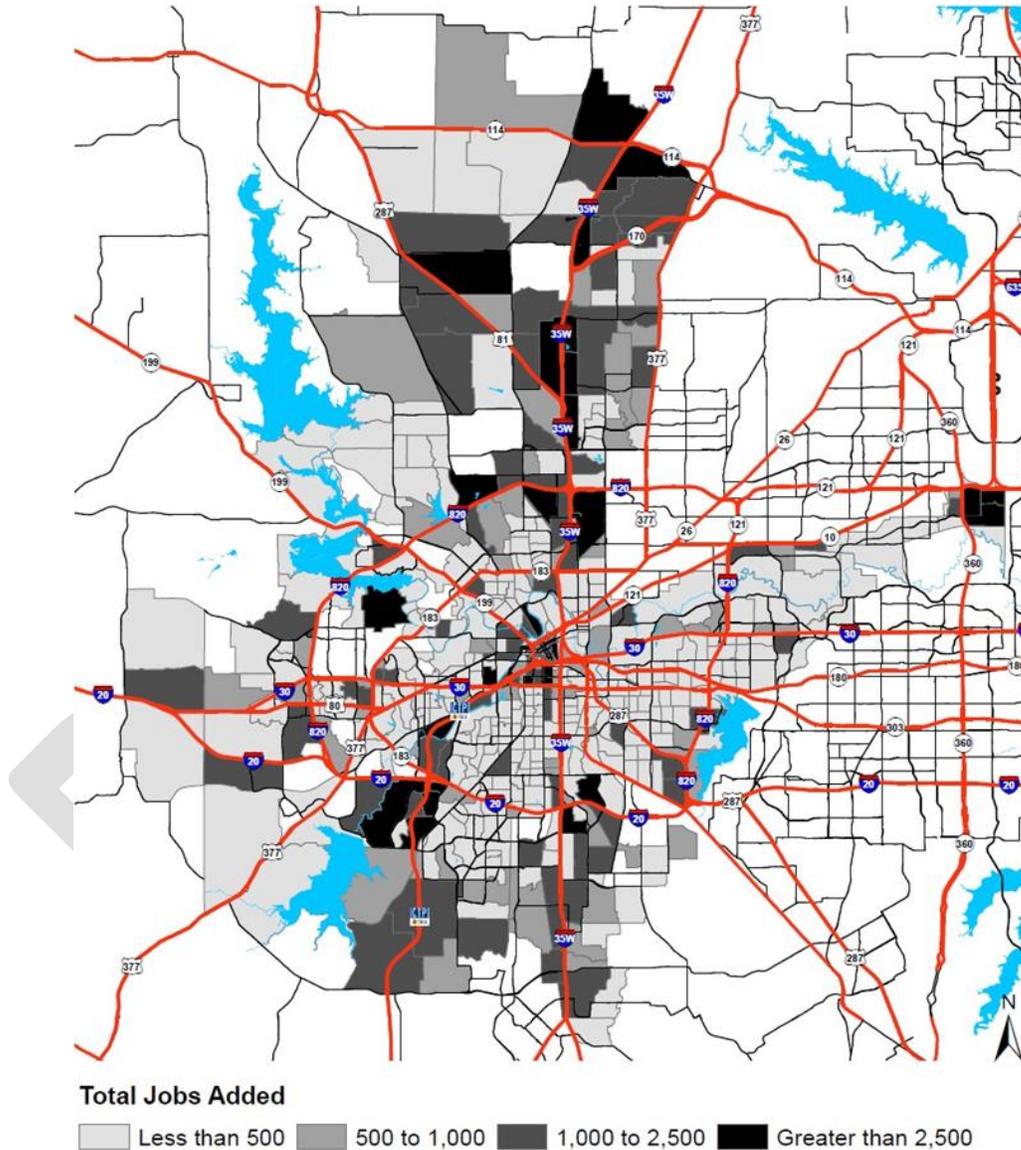


Figure 4-4 Employment Change in Fort Worth 2015-2040;
Source: Draft 2016 Comprehensive Plan and NCTCOG

¹⁴ NCTCOG, 2014

As shown in Table 4-2, employment is spread across a variety of employer types, including businesses, government agencies, and non-profit organizations, with no sector constituting more than a quarter of the employment.

Table 4-2 Employees on nonfarm payrolls by industry supersector, Fort Worth-Arlington, TX Metropolitan Division, not seasonally adjusted, March 2016. Source: U.S. Census Bureau¹⁵

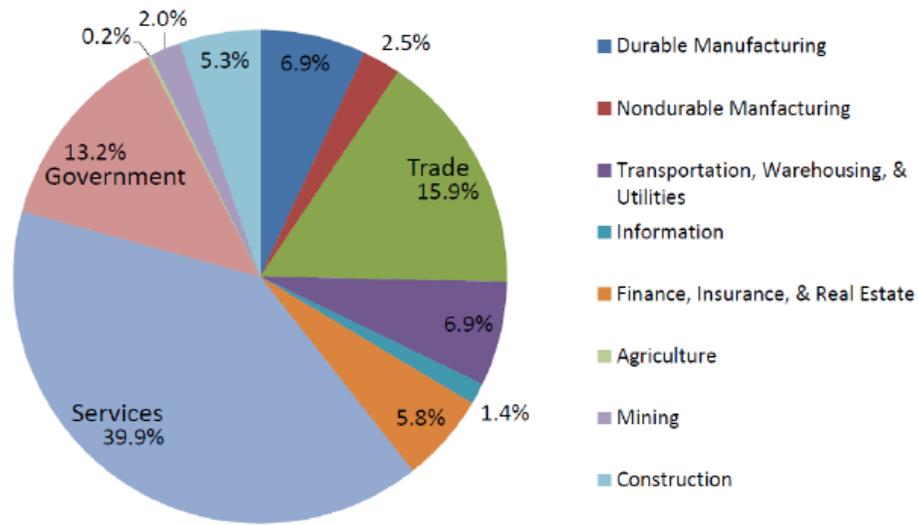
Total nonfarm employment	1,001,400
Mining, logging, and construction	69,100
Manufacturing	94,100
Trade, transportation, and utilities	244,200
Information	11,500
Financial activities	56,400
Professional and business services	113,000
Education and health services	129,200
Leisure and hospitality	112,500
Other services	36,200
Government	135,200

Employment in Fort Worth is diverse and projected to grow an average of 2.3 percent annually from 2015 through 2020, an increase of 160,061 jobs. Projecting that trend out to 2040 produces an increase of 1,048,903 total jobs from 2015 to 2040.¹⁶ Job diversity can also be tracked by looking at the employment by North American Industry Classification System, also known as the NAICS code. This is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. Approximately 64 percent of wage and salary workers are currently in the services, government, and trade industries. Over the long-term forecast horizon, those three sectors will account for almost 70 percent of employment in the Fort Worth-Arlington Metro Division, as shown in Figure 4-5 and Figure 4-6.

¹⁵ http://www.bls.gov/regions/southwest/news-release/areaemployment_dallasfortworth.htm

¹⁶ 2016 Draft Comprehensive Plan

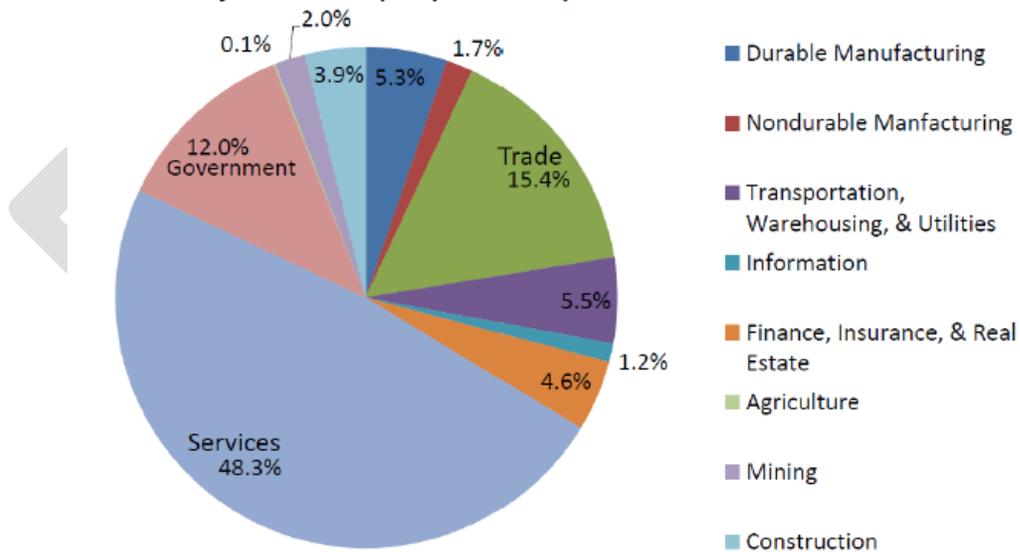
2015 Employment by Industrial Sector



Services and Trade were the largest employment sectors in the Fort Worth-Arlington MD in 2015. (Source: Perryman Group Inc., 2015, Fort Worth-Arlington Metro Division)

Figure 4-5 Employment by Industrial Sector; 2015, Source: 2016 Draft Comprehensive Plan

2040 Projected Employment by Industrial Sector

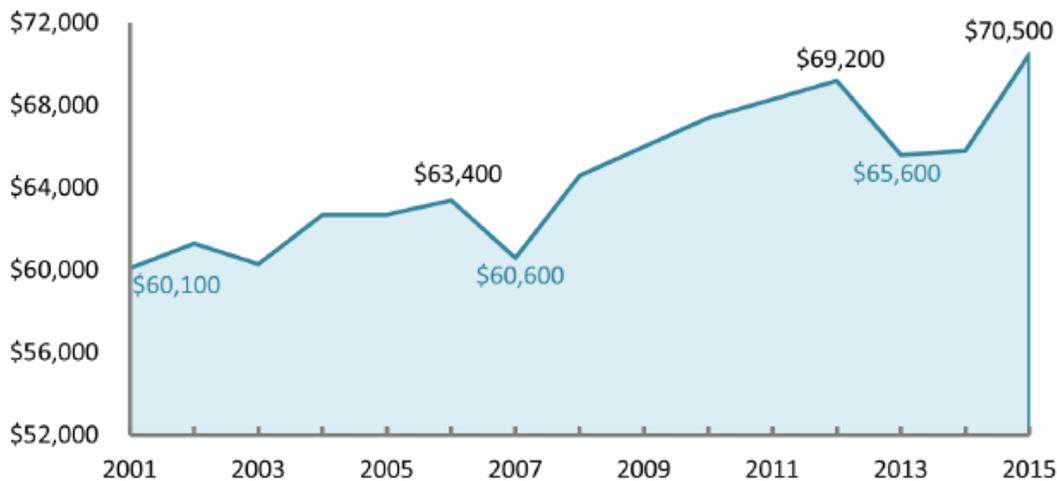


Services and Trade are forecast to remain the largest employment sectors in the Fort Worth-Arlington MD in 2040. (Source: Perryman Group Inc., 2015, Fort Worth-Arlington Metro Division)

Figure 4-6 Employment by Industrial Sector; 2040 Projected, Source: 2016 Draft Comprehensive Plan

As shown in Figure 4-7, median family income for the Fort Worth-Arlington HUD Metro FMR Area increased from \$60,100 to \$70,500 between 2001 and 2015, an average annual increase of 1.4% over the 15-year period.

Median Family Income, Fort Worth-Arlington Metro Area, 2001–2015



Source: Department of Housing and Urban Development, 2015, Fort Worth—Arlington, TX HUD Metro FMR Area

Figure 4-7 Growth of Median Family Income, 2001-2015; Source: 2016 Draft Comprehensive Plan

4.4 Demographics

As described previously, the population of Fort Worth has been in a “boom” cycle of growth, and barring unforeseen circumstances, that growth is not expected to abate. This is due in part to the fact that Fort Worth has room to annex and expand into its ETJ, whereas some other municipalities in the region cannot grow any further in area. Forecasts released by the NCTCOG project that the City’s population will reach approximately 1.38 million by 2040 and is expected to exceed one million between 2025 and 2030.¹⁷

¹⁷ Sources: U.S. Census Bureau, 1950-2014; North Central Texas Council of Governments, 2015; Planning and Development Department, 2015.

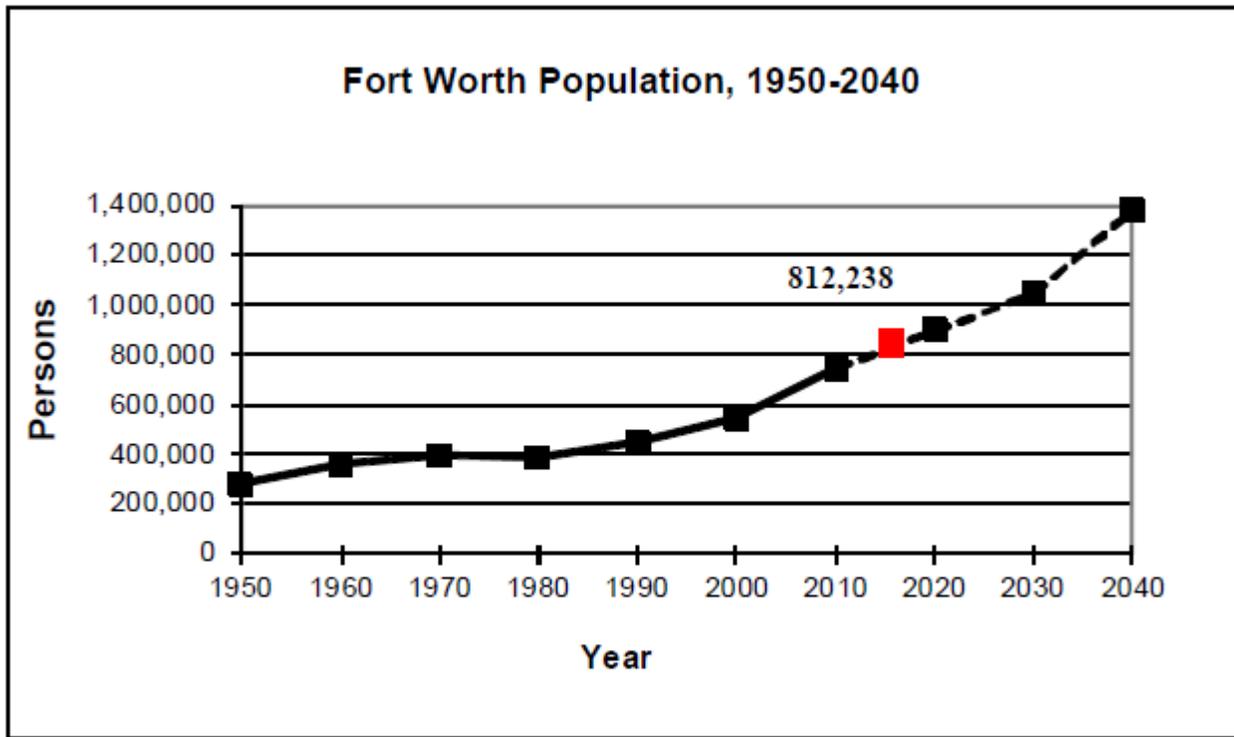


Figure 4-8 Historic and Projected Population of Fort Worth; Source: 2016 Draft Comprehensive Plan

Population data is an important part of estimating future waste generation, as current data can be used to help predict future activity.

4.5 Waste Generation and Composition

To create the following waste generation projections, the following assumptions and data were used:

- Population forecasts from NCTCOG;
- 2015 residential pounds per capita waste generation figures, calculated by the City of Fort Worth based on its collection customers;
- Composition data from the waste characterization conducted by GBB;
- Employment forecasts from NCTCOG;
- Employment by NAICS code, based on current data from NCTCOG; and,
- Waste generation rates by NAICS code, based on industry-standard figures produced by CalRecycle.

This method yielded a residential generation projection (including multi-family residents) and a commercial generation projection (including businesses and institutions). Combined, they represent the waste generation for the City. Additionally, future composition of the waste stream was estimated using the following:

- The projected tonnages from the above generation modeling;
- A waste characterization study conducted in Fort Worth in 2014; and,
- A composition model developed by Gershman, Brickner & Bratton, Inc.

The figures and tables below show the project waste generation and composition for the planning period of this plan. As a comprehensive plan for an integrated solid waste management system, this plan and the City are responsible for ensuring this material is properly collected, transported, sorted, diverted, recovered, and disposed in a way that protects air, soil, water, and people.

Figure 4-9 shows projected residential generation. It is based on a historic average tons per year (TPY) per capita (i.e., per person) rate of 0.391 tons, derived from actual reporting in the years 2010 through 2015, projected across the extrapolated population figures generated by the NCTCOG, the City of Fort Worth, and the U.S. Census Bureau. The projection shows that residential generation will increase by less than 80,000 TPY by the end of the planning period.

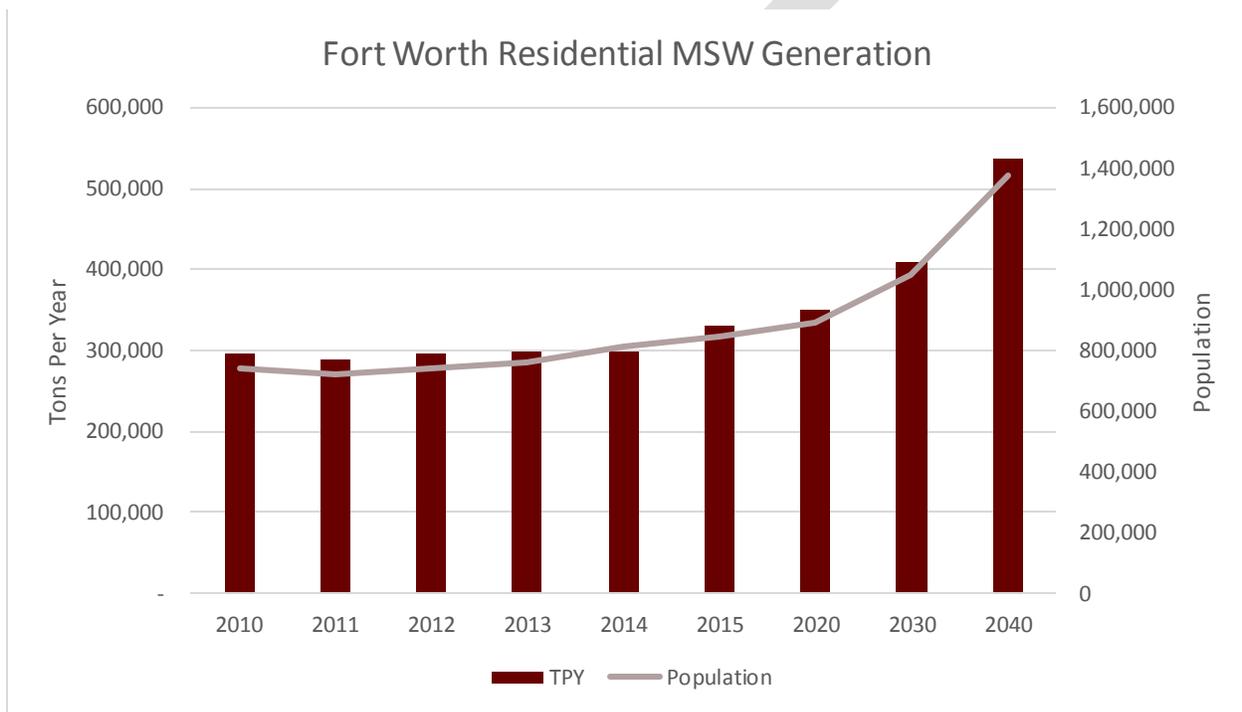


Figure 4-9 Projected Fort Worth Residential MSW Generation

Figure 4-10 shows projected employment growth and the commercial waste generation associated with it. The jobs figures are from the City’s 2016 Draft Comprehensive Plan. The waste generation rates are based on which industrial sectors the jobs inhabit, with annual per-employee generation information sourced from the former California Integrated Waste Management Board.¹⁸ The figure shows how waste generation growth mirrors economic growth.

¹⁸ The waste generation figures compiled by the former CIWMB (now CalRecycle) and found at <http://www.calrecycle.ca.gov/WasteChar/WasteGenRates/> are the best available substitute when local actual data is unavailable.

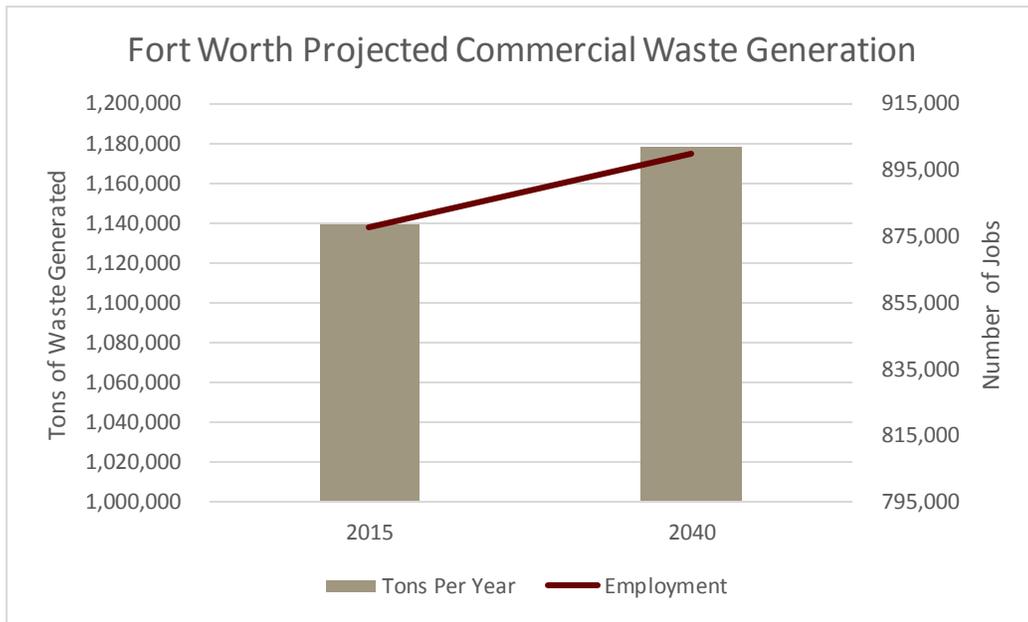


Figure 4-10 Projected Fort Worth Commercial Waste Generation

As shown in Figure 4-11 and Figure 4-12, in both the U.S. and in Fort Worth, a considerable portion of the waste sent for disposal could have been recycled. Besides the paper, metals, glass, and plastic, there are compostable organic materials like yard trimmings and food scraps. In the Fort Worth data, the “other” category includes more recyclable materials, such as electronics and construction debris.

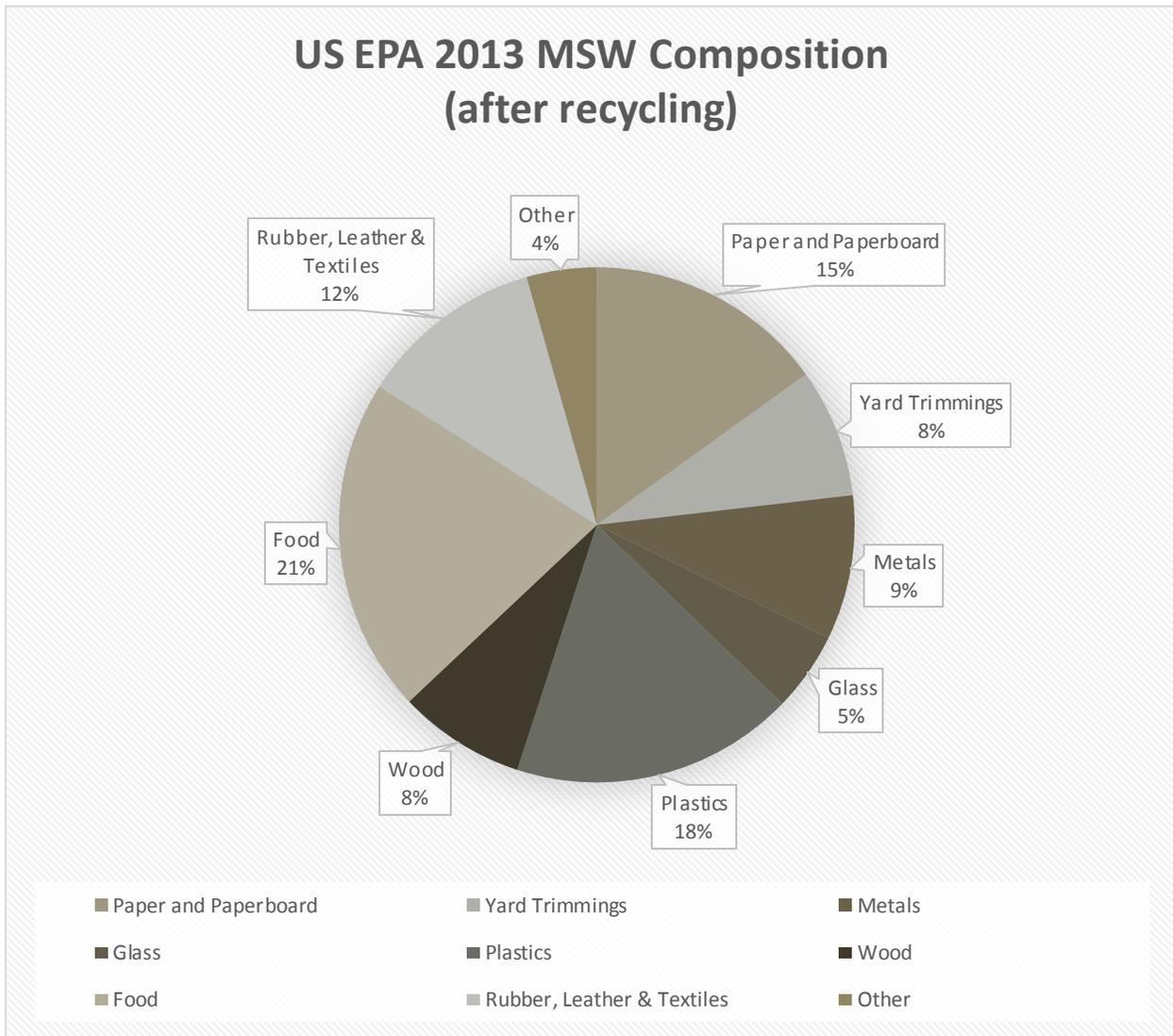


Figure 4-11 US EPA Garbage Composition (After Recycling) – *Advancing Sustainable Materials Management: Facts and Figures 2013*

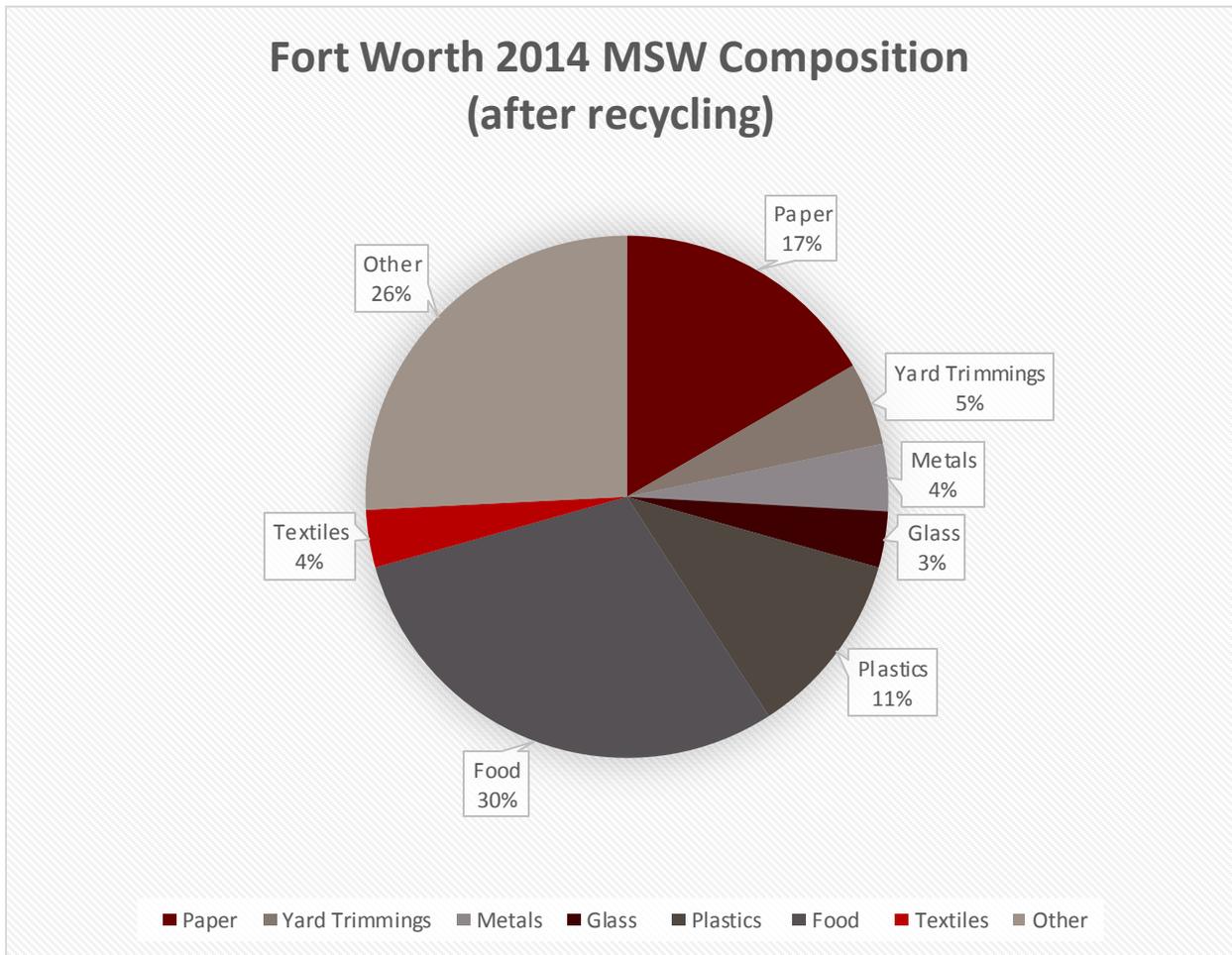


Figure 4-12 Fort Worth Garbage Composition (After Recycling) – 2014 Waste Characterization Study

5 Present and Future Resources

On the basis of the projected population growth and the characteristics of the local waste-shed, the City has the following resources available now and expects to continue to have them in the future. For greater detail about the present facilities and the operational possibilities mentioned in this chapter, please see Chapter 3, Evaluation of Program Elements, and Chapter 6, Program Recommendations.

5.1 Southeast Landfill

The City owns the Southeast Landfill (SELF) which is located at 6288 Salt Rd, Fort Worth, TX 76140. SELF is owned by the City and operated by Republic Services, Inc. under a contract with an expiration date of December 31, 2033. The projected life of the SELF has fluctuated considerably recently, even within the project period during which this CSWMP was being developed. At the start of the planning process, the SELF was estimated to have an estimated 43 years remaining capacity. Due to continued increases in commercial waste volumes, this capacity is now estimated as significantly less. In the latest report to TCEQ, the City reported 22 years remaining capacity. However, tonnages accepted continue to increase. Based on the most recent aerial survey, the landfill consumed 1.08 million cubic yards of airspace since the last annual survey. The survey also reported 24 million cubic yards of remaining airspace. At this rate of disposal, with no increases in capacity, the landfill has approximately 20 years remaining capacity. For more detail about the current status of the SELF, see the Program Evaluation Report. For more detail about the recommended actions regarding it, see the Recommendations Report.

As the North Central Texas region continues to grow, the amounts of waste disposed at the SELF could continue to increase, resulting in a reduced life of the SELF. The time to secure additional capacity ranges from 3-5 years to contract with an existing regional facility, to 5-15 years to develop alternative disposal methods. Such alternatives include developing the City's next landfill, building a dual-stream transfer station at SELF for trans-loading solid waste and recyclables by tractor trailer or railroad, or entering into a public-private landfill development. Other options include expanding the City's current landfill; enhancing recycling, waste reduction, and composting efforts; and, initiating efforts to identify a future landfill. Each of these options has risks and opportunities. Regardless of the option selected by the City, it must begin making policy decisions now regarding how to manage waste in the mid-to-long term.

5.2 Regional Landfills

Construction and demolition (C&D) waste generated in Fort Worth is disposed at either one of the several Type I landfills (MSW landfills), or the Type IV C&D landfills. There is one permitted Type IV Landfill in the area that is owned and operated by Progressive Waste. This C&D landfill is located on Dick Price Road. It currently accepts approximately 359,000 tons per year and has 10 years of remaining permitted capacity.

Table 5-1 shows other landfills, open and closed, in the Fort Worth region.

Table 5-1 Regional Landfills around Fort Worth

Landfill	Owner	Operator	Location	Disposal Tons	Remaining Capacity (years)	Remaining capacity (tons)	Disposal Rate \$/ton	Compaction Rate
City of Fort Worth	City of Fort Worth	Republic	Fort Worth	529,737	43	22,746,326	22.09	1,744
121 Regional Disposal Facility	North Texas Municipal Water District	North Texas Municipal Water District	Melissa	816,478	81	65,839,653	\$ 31.00	1,079
City of Arlington	City of Arlington	Republic	Arlington	806,545	48	38,711,044	\$ 26.00	1,454
DFW Recycling and Disposal Facility	WMI of Texas	WMI of Texas	Lewisville	1,261,273	9	10,767,554	\$ 21.00	1,780
Camelot Landfill	City of Farmers Branch		Lewisville	286,617	23	6,239,523	\$ 29.62	1,969
Charles M Hinton Jr. Regoinal Landfill	City of Garland	City of Garland	Rowlett	389,835	48	20,351,895	\$ 26.71	1,200
City of Denton Landfill	City of Denton	City of Denton	Denton	191,250	28	5,424,704	\$ 43.50	1,002
Ellis County Landfill	Pine Hill Farms Landfill TX LP	Pine Hill Farms Landfill TX LP	Ennis	57,966	519	30,061,526	\$ 29.40	1,496
City of Grand Prairie Landfill	City of Grand Prairie	City of Grand Prairie	Grand Prairie	167,971	41	6,329,584	\$ 32.00	1,030
IESI Fort Worth C & D Landfill*	IESI	IESI	Fort Worth	356,826	10	3,044,959	\$ 23.60	1,560
IESI Weatherford Landfill	IESI	IESI	Weatherford	200,856	7	1,483,999	\$ 30.00	1,300
Hunter Ferrell Landfill	City of Irving	City of Irving	Irving	162,787	67	10,591,972	\$ 40.00	1,480
Itasca Landfill	Itasca Landfill Tx LP	Itasca Landfill Tx LP	Itasca	178,213	208	44,638,073	\$ 28.63	1,821
Lewisville Landfill	Lewisville Landfill Tx LP	Lewisville Landfill Tx LP	Lewisville	187,906	94	17,710,514	\$ 18.41	2,230
Republic Maloy Landfill	Republic Waste Services of Tx LTD	Republic Waste Services of Tx LTD	Campbell	97,800	27	5	\$ 30.71	1,234
City of Dallas Mccomas Bluff Landfill	City of Dallas	City of Dallas	Dallas	1,872,789	45	65,176,330	\$ 21.50	1,415
CSC Disposal and Landfill	Republic Waste Services of Tx LTD	Republic Waste Services of Tx LTD	Avalon	659	534	36,584,539	\$ 52.78	2,362
Waste Management Skyline Landfill	WMI of Texas	WMI of Texas	Ferris	1,207,060	18	21,173,156	\$ 18.50	1,440
City of Stephenville Landfill	City of Stephenville	City of Stephenville	Stephenville	7,407	53	394,134	\$ 50.00	850
IESI Turkey Creek Landfill	IESI	IESI	Alvarado	480,789	15	7,365,831	\$ 32.00	1,460
Total				9,260,764		414,635,321		
Average				463,038	96	20,731,766	30	1,495

5.3 MSW Recycling Systems

There are ten private recycling companies serving Fort Worth,¹⁹ not including any diversion or recycling activities that occur at the landfills, nor any reuse activity of for-profit businesses and non-profit organizations like thrift shops or charities. This includes two full-service material recovery facilities (MRFs) operated by two different national firms. There are also three recycling transfer stations.

Unlike a landfill, the capacity of a recycling processing facility is not consumed over time, and with modifications and updates can expand to meet the needs of the customers, so long as the firms can continue business operations. The recycling and recovery capacity in Fort Worth is currently adequate; however, with growth in population and increased participation in recycling, additional MRF capacity would be needed. The viability of the recycling system and facilities can be better preserved and utilized by source separating recyclables properly and reducing contamination, a condition which can both cause undue stress on machinery and negatively impact business operations.

5.4 Construction and Demolition Recycling and Disposal Systems

The primary destination for commercially produced construction and demolition (C&D) material —i.e., that arising from demolition of old structures and construction of new structures—is the Progressive Landfill. This facility is nearing capacity; however, an application for expansion is pending.

¹⁹ For details, see the Program Evaluation Report.

The complicating factor in calculating C&D capacity is that while C&D is typically disposed in “Type IV” C&D landfills, on which there are less restrictive regulations than for MSW, C&D can actually be disposed in “Type I” MSW landfills. This means that, technically, the disposal capacity available for C&D in a region is the available “Type IV” C&D landfill space plus all available “Type I” MSW landfill space. Disposal of C&D in MSW landfills is not ideal, however, as it consumes the much more heavily regulated and expensive space in those facilities with material that does not require it. Therefore, advancing the development of a C&D MRF facility to recover some of the highly-recyclable materials in C&D paired with preservation (or creation) of C&D disposal capacity is preferable. The permit amendment at the Progressive Landfill may address the former, but more capacity and effort for C&D recycling would also benefit the system.

5.5 Compost and Organics Management Systems

There are six mulching and composting operations serving Fort Worth.²⁰ Like recycling facilities, they are not consumed over time and can be adjusted to meet demand, within certain limitations. At present, they are sufficient for current waste streams and have available capacity for more properly prepared material. Initialization of significant food waste diversion efforts could likely drive the need for additional available capacity, sites or capable facilities, as composting of food waste requires more operational care and infrastructure than management of landscaping waste and other similar material.

5.6 Emerging Technologies

In the U.S., there are viable technologies available to the City besides recycling and landfilling, as shown in Table 5-2. In particular, anaerobic digestion and waste-to-energy are commercially viable, both of which can pair beneficially with mixed waste processing (MWP).

Table 5-2 U.S. Waste Management Technologies and Risk
Source: GBB, 2015

Technology	Risks/Liability	Risk Summary
Mass Burn Combustion	Proven commercial technology	Low
Refuse Derived Fuel (RDF) Combustion	Proven technology; limited U.S. commercial experience	Moderate to Low
Anaerobic Digestion	Proven technology; limited U.S. commercial experience	Moderate to Low
Composting	Proven commercial technology	Low
Food & Yard Waste Composting	Previous large failures; limited large-scale plants in operation; product quality issues	Moderate to High
Pyrolysis and Gasification	Previous failures at scale; no operating experience with large -scale operations in the U.S.; full-scale demonstrations nearing operation	High
Automated Material Processing	Proven commercial technology	Low

Not included in Table 5-2 is Mixed Waste Processing (MWP). This technology remains somewhat confusing and controversial for the public, but when combined with a source-separation program and MRF processing thereof, MWP can add considerable results to diversion efforts. Hybrid systems like Mechanical Biological Treatment (MBT), which is not uncommon in Europe, can marry legacy systems and new

²⁰ For more detail, see the Program Evaluation Report.

technologies to optimize waste diversion. For example, a MWP facility can sort organics from a properly prepared waste stream and send that material to AD, while also capturing certain high-value recyclables. With a fast-growing population and great opportunity to increase diversion, the possibilities for Fort Worth to adopt new technology are vast. More information about mixed waste processing is available online at <https://plastics.americanchemistry.com/Education-Resources/Publications/The-Evolution-of-Mixed-Waste-Processing-Facilities.pdf> and at <https://plastics.americanchemistry.com/Education-Resources/Publications/The-Evolution-of-Mixed-Waste-Processing-Facilities-Technology-and-Equipment-Guide.pdf>.

DRAFT

6 Identification and Evaluation of Recommendations

During the CSWMP process, having reviewed all the programs as described in Chapter 3, and reported in Appendix D, combined with all the public, community and industry outreach input, more than 120 recommendations (i.e. action items) were developed for in each of the areas. The majority of the recommendations drew on feedback from the public, influential leader interviews, input from the City Management and staff, and our local solid waste industry professionals, including industrial best management practices.

Having reviewed the existing facilities owned or operated by the City of Fort Worth and those available from private industry, recommendations were developed regarding solid waste processing facilities, including transfer stations, landfills and all their attendant operations, material recovery facilities and other recycling facilities, mulching and composting, energy-from-waste facilities, conversion technologies, and the needed capacity for the planning horizon and focus especially on options for disposal other than landfill. For collection and drop-off services, recommendations were prepared that ensure all residents and businesses have access to recycle and properly manage as much of their waste as possible. Recommendations were also provided for how the solid waste program can help build resource-based economies to expand not only recycling but value extraction and re-manufacturing, commercialization of compost and mulch operations, support of emerging alternative fuel networks, and promotion of reuse, repair, and reclamation enterprises. There were also recommendations prepared with regards to strategic actions to best implement the CSWMP, as further discussed in Chapter 7.

The report of the recommendations is provided in its entirety as Appendix E.

7 Strategic Planning

7.1 Comprehensive Planning

7.1.1 Leadership from the City

In 2016, Fort Worth is in the process of adopting a new comprehensive plan for the City. According to the Planning Development Department:

The Comprehensive Plan is the City of Fort Worth’s official guide for making decisions about growth and development. The Plan is a summary of the goals, objectives, policies, strategies, programs, and projects that will enable the city to achieve its mission of focusing on the future, working together to build strong neighborhoods, develop a sound economy, and provide a safe community.²¹

The legal basis for having a comprehensive plan is established by Texas Local Government Code. If a city adopts such a plan, it must abide by it. Therefore, both the provisions of the comprehensive plan and the data cited within it are researched and projected with great consideration. This further makes the Comprehensive Plan the optimal source of information regarding population, housing, employment, and land use for solid waste planning purposes.

The 2016 Comprehensive Plan will incorporate this Solid Waste Management Plan as appropriate within Appendix I or more appropriate area.

7.1.2 Influences on Solid Waste Planning

The Comprehensive Plan is “a summary of the recommended policies, strategies, programs, and projects that will enable the City to achieve its mission of focusing on the future and working together to build strong neighborhoods, develop a sound economy, and provide a safe community.”²² Creation of and adherence to a comprehensive plan for solid waste management serves a similar function for that undertaking—i.e., it is a guide for making decisions about collection, source separation, processing, and disposal. It will also advise on adjunct activities like illegal dump cleanups, litter abatement, household hazardous waste collection, and outreach and education.

The demographic and employment projections created by the Comprehensive Plan are used to calculate waste generation rates, which help estimate future solid waste capacity needs. Planned and projected population growth, including numbers of households and geographic distribution, is used to evaluate collection operations and the placement of service sites ranging from recycling drop off stations to waste disposal facilities.

Other influences on solid waste planning include mandates for performance, both regulatory and aspirational. They come from state law, local ordinance, another governing document (like a Comprehensive Plan, a Sustainability Plan, a Climate Change Action Plan, or other ratified program), or agency policy. Examples include goals for recycling, diversion, or disposal rates. Service levels are another example: number of “misses” at the curb; time to answer and resolve an incoming call or work order;

²¹ <http://fortworthtexas.gov/comprehensiveplan/>, retrieved March 29, 2016.

²² 2016 Fort Worth Comprehensive Plan, “Summary,”

<http://fortworthtexas.gov/planninganddevelopment/plans/compplan/2016/00-introduction.pdf>

provision of technical assistance; field inspections and site visits; and, number of people reached by education efforts. To make these goals meaningful, they are incorporated into the plan document, along with actions to implement them and ways to evaluate their progress.

7.1.3 Impacts of Solid Waste Planning

A comprehensive solid waste management plan addresses all aspects of waste, from point of discard to the point at which it no longer exists as it was discarded — i.e., it has been buried in a landfill, it has been converted into energy, or it has been transformed into something else such as a commodity or compost. In fact, solid waste plans cover even more than that, as they include waste reduction and reuse prior to discard and provide for proper management of landfill gas and closed landfills long after disposal.

The CSWMP both empowers and requires the City to provide the integrated solid waste management system it has laid out for itself, and when decisions need to be made, it provides guidance. It provides the precedence for actions that impact other organizations and businesses. It shows that the City considers its actions carefully and thoughtfully rather than capriciously and without thought of the future.

7.2 Strategic Planning for City of Fort Worth Solid Waste Management

With regard to the City’s solid waste program activities, the CSWMP provides for the following:



The CSWMP empowers SWSD to achieve their mission of providing comprehensive and integrated solid waste management in Fort Worth.

Organization and Agency

The City of Fort Worth bears the responsibility for most solid waste services, as opposed to those borne by the private sector. The City of Fort Worth provides many solid waste services, including curbside collection to single family homes as well as managing contracts for the disposal of garbage and the processing of recyclables; drop off stations and HHW collection; regulation of private haulers; outreach and education; illegal dump cleanups, litter abatement, environmental enforcement and customer service. The way the agency is organized influences its ability to respond to the actions set for it by the CSWMP. For example, the 2016-2036 CSWMP calls for greatly increased technical assistance in the field, particularly in the ICI sector. This expanded set of duties require expert staffing working in a section of the agency dedicated to those efforts.

Customer Experience and Engagement

Overall, the solid waste program ensures that the citizens of Fort Worth have access to the best possible solid waste management system. “The best possible” means proper, safe, legal, and long-lasting disposal capacity; the opportunity to divert and recycle as much material as they can or want to; up-to-date, accurate, and accessible information; adoption of industry best practices whenever feasible; and, value for the funds expended in all of these activities.

Funding and Financial Strategies

All of the actions described in this CSWMP for implementation serve the goal of protecting soil, air, water, and people. The actions accomplish this by furthering waste reduction, recycling, proper disposal, and redirection of potentially polluting materials like household hazardous waste or illegally dumped waste. However lofty or critical, all of these actions have costs associated with them. While not as detailed as a budget document or financial model, the CSWMP necessarily describes how actions will be “paid for.” The Plan indicates if an action is paid for by user fees or taxes; if the Plan can be part of already ongoing activity or will require a new initiative or position; and, what the possible positive economic benefits will be, such as revenue or job creation.

The Solid Waste Enterprise Fund (Fund) was established to set up fiscally responsible programs and management of the City’s solid waste related activities. The City, with assistance from GBB, has developed a 5 Year Capital Improvement Plan to insure all necessary future funding needs will be covered by the program fees, Fund balance and “pay as you go” funding stream. Since the City has enjoyed stable residential rates since 2006 along with the increase solid waste volume and required future disposal capacity capital; proposed future residential rate increases would be phased in over a six (6) year period in two (2) year increments, following an established and approved timetable. The latest proposed 5 Year CIP is provided in its entirety as Appendix F.

Responding to Change, Providing for the Future

Much has changed in the City of Fort Worth since the previous CSWMP was approved, and much will continue to change during the planning horizon of this CSWMP. Although every effort was made to forecast, project, provide, and plan for the future, certain unforeseen changes will arise requiring response. For this reason, solid waste management plans are generally revisited and updated on 5- or 10-year cycles. The City of Fort Worth intends to revisit this plan document five years from its adoption. Accordingly, in Chapter 8, the actions that comprise this CSWMP are identified as being part of the immediate and short-term “5-year Action Plan” or the longer view towards the mid- and long-term. The former are items that the City will begin to work on shortly after adoption. They inherently also include the “continue to” actions, such as “continue to provide once-weekly collection of garbage, trash, and recycling,” the success of which also needs continual evaluation.

7.3 Strategic Planning Actions in the Fort Worth CSWMP

The items listed in Figure 7-1 are a subset of the actions in this CSWMP organized by a description of how they fulfill the City’s intention to employ careful and comprehensive planning in the fulfillment of agency mission. These are not specific programs, and some of them aren’t line items in a budget; they are, however, the fundamental strategies behind many of the program actions, and therefore critical to the Plan’s successful implementation.

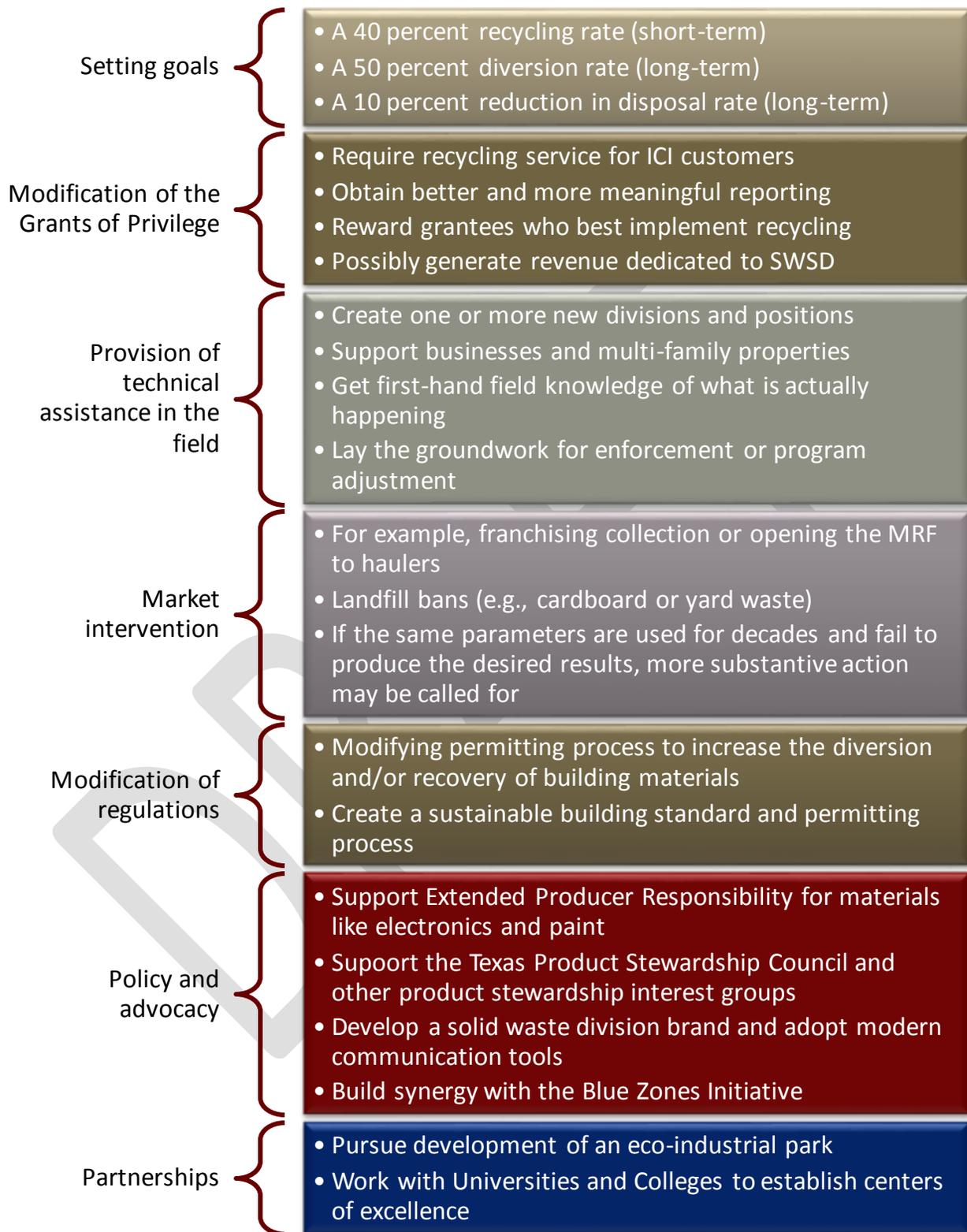


Figure 7-1 Strategic Actions in the Comprehensive Solid Waste Management Plan

From the onset of the planning process it was a goal of the CSWMP to identify and seize potential synergies with other City departments and outside agencies that benefit all and promote the common good. Advancing those potential intra and inter-agency collaborations would bring to fruition the full benefits of the CSWMP to the City.

Strategic initiatives such as the development of a Universal Recycling Ordinance; a Green-Purchasing Ordinance; of an Eco-Industrial Park (capable of absorbing locally the locally generated recycling feedstock, stabilizing the commodity market, while creating new jobs and new revenue streams); of partnerships with Universities and Colleges (as potential innovators); etc. transcends the reach of the Code Compliance Department, Solid Waste Services Division and require a full buy-in from the City for their implementation. Leadership from the City Council and City Management, and community support is crucial in carrying out these multi-party initiatives that may move Fort Worth forward in a more sustainable manner.

DRAFT

8 CSWMP Implementation

This section explains how the actions in the CSWMP will be realized, and includes how new goals or standards will be evaluated. It will also indicate if the actions will be implemented in the short-term (1-5 years), mid-term (6-10 years) or long-term (10-20 years). The information is presented in a table format; for more detail, refer back to the Recommendations for that Program Element.

8.1 5-Year Action Plan

The following action items are for implementation starting in the short-term (within the first 5 years of the planning horizon). Many of them continue into the mid-term (5 to 10 years into the planning horizon) and the long-term (10 years or more into the planning horizon). Each of the action items supports one or more of the City's initial aims and goals to be accomplished in the initial 5-Year Action Plan, and

- I. Improve Residential Services and Programs
- II. Increase Community Outreach to improve understanding, participation and compliance with programs and future enhancements
- III. Increase City's Annual Recycling Rate to 30% by end of 2022
- IV. Confirm City's Disposal Capacity Plan for 2035 to 2060
- V. Advance the Commercial Waste & Recycling Diversion Programs
- VI. Formalize Ordinances (revise existing and add: Scrap Tires, Universal Recycling and Green Purchasing)

Furthermore, the action items generally fall into one of four categories of action *type*, and are grouped accordingly in the tables below:

- **Maintaining:** the actions that will continue current programs into the new planning period, with the same or better level of service for residents;
- **Evaluating:** actions that call for studying, either formally or continually, new programs, policies, or activities related to solid waste;
- **Changing:** these are actions that will change one or more programs or policies at the City, possibly involving other agencies; and,
- **Beginning:** the actions that involve new staffing or programming which will directly benefit residents of Fort Worth and improve service provision and/or performance.

The information in the tables also includes estimated, projected, or approximate costs associated with the action; the service sector involved; and, possible impacts on waste diversion. With the exception of the "Maintaining" actions, a year by which the action should initialize is also included.

8.1.1 Evaluating: Studies and Feasibility

"Evaluating" Actions	Goal Fulfillment	Service Area	Projected One-time Cost	Cost Per Household	Waste Diversion Impact	Year to Start by
Consider removing glass from single stream collection	I	Services to Residents	\$45,000.00	\$0.21	Unclear; glass is a significant portion of recyclables by weight, and some of it will be lost to disposal. At the same time, the quality of the remaining recyclables will be improved.	2017
Evaluate bulk reuse opportunities	I, II, III	Services to Residents	\$20,000.00	\$0.09	This program may not represent significant tons of formal reuse or recycling; however, it should have a residual effect of waste reduction before items even get to the curb.	2017
Review and Modify Recyclebank partnership	I, II, III	Services to Residents	\$15,000.00	\$0.07	The simple act of modifying Recyclebank partnership is unlikely to have any impact on diversion; however, it will allow SWSD to re-direct advertising expenditures to more meaningful technical support, which definitely would increase diversion.	2017
Conduct a Landfill Gas-to-Energy Feasibility Study	VI	Solid Waste Management Facilities	\$70,000.00	\$0.33	Not applicable	2017
As the City's population increases, evaluated opening an additional one or two drop-off stations	III	Solid Waste Management Facilities	\$90,000.00	\$0.42	Proper, convenient facilities to which one can deliver recyclables will encourage participation and reinforce recycling as a City value	2017

"Evaluating" Actions	Goal Fulfillment	Service Area	Projected One-time Cost	Cost Per Household	Waste Diversion Impact	Year to Start by
Evaluate Low-volume Commercial Transfer Station	I, IV, V	Solid Waste Management Facilities	\$50,000.00	\$0.23	Not applicable, unless such facility also accepted, processed, or transferred recyclables	2017
Evaluate the potential of converting its City-owned solid waste vehicles to CNG after the infrastructure has been put in place as part of the conversion of the WM fleet	VI	Solid Waste Management Facilities	\$20,000.00	\$0.09	Not applicable	2018
Evaluate the use of TERP (Texas Emission Reduction Program) and other funds for the conversion	VI	Solid Waste Management Facilities	\$15,000.00	\$0.07	Not applicable	2018
Evaluate implementing an economic incentive for backyard composting	I, II, III, IV, VI	Solid Waste Services Division	\$10,000.00	\$0.05	People who compost at home waste less food, at-home composting reinforces other waste reduction and recycling behaviors.	2018
Initiate a siting study to identify suitable city-owned property for a new, privately-operated composting facility for yard waste, food residuals, and possible biosolids from the Village Creek Wastewater Treatment Facility	III, IV, V	Services to Industrial, Commercial, and Institutions	\$80,000.00	\$0.37	Diversion could be significant; the 2014 Waste Composition study in Fort Worth showed that more than half of discarded garbage was food, yard trimmings, and paper, a good proportion of which could be diverted for processing.	2020

"Evaluating" Actions	Goal Fulfillment	Service Area	Projected One-time Cost	Cost Per Household	Waste Diversion Impact	Year to Start by
Conduct a procurement process to contract for operation of a composting facility	III, IV, V	Services to Industrial, Commercial, and Institutions	\$ 150,000.00	\$0.70	The potential recovery of bagged grass clippings, alone, is tens of thousands of tons.	2020
Evaluate banning yard waste from disposal in the SELF	III, IV, V, VI	Solid Waste Services Division	\$50,000.00	\$0.23		2020
Evaluate Photovoltaic Solar Farm on Future Closed SELF	VI	Solid Waste Management Facilities	\$ 150,000.00	\$0.70	Not applicable	2021

DRAFT

8.1.2 Changing: Revising or Adjusting Programs

“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Encourage residential use of right-sized garbage carts	I, II, III, IV	Services to Residents	Beyond staffing, a per-cart cost to swap	Making the change to larger recycling carts at the start of a new contract would nullify any per HH cost; at present, WM charges \$5 + \$2 in fees to switch out a garbage cart for a different size.	Increasing participation from 70 percent to 90 percent of households would represent almost 14,000 additional tons and nearly 5 percentage points on the recycling rate.	2017
Reduce recyclables contamination	I, II, III	Services to Residents	Expenditures beyond staffing will vary	Industry standard is \$3.00 per household, per year, for education efforts to effect change in behavior.	If 14,000 additional tons of recyclables had been collected in FY15 through improved participation, the avoided disposal costs to the City would have been approximately \$243,000.	2017
Improve recycling participation	I, II, III, IV	Services to Residents	Expenditures beyond staffing will vary		Small changes make a difference. If each household recycled, on average, 5% more material by weight, it would be an additional 3,415 tons per year, or about 1 percentage point on the recycling rate. If each household recycled, on average, 1 pound more per week, it would be an additional 54,889 tons per year, or about 1.67 percentage points on the recycling rate.	2017
Develop targeted education and outreach	I, II, III	Services to Residents	Expenditures beyond staffing will vary		2017	



“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Include “reuse” in waste reduction messaging, including in instructional materials for curbside set-out of reusable items, in general outreach materials, and in other available outlets such as newsletters, City TV programming, etc.	I, II, III, IV	Solid Waste Services Division	Expenditures beyond staffing will vary	Industry standard is \$3.00 per household, per year, for education efforts to effect change in behavior.	Not significant; however, reuse and waste reduction are part of a larger behavior change.	2017
Set new recycling goals	I, II, III, IV	Services to Residents	Included in current operations	\$0	If the recycling rate had been 40% in FY14-15, an additional 63,633.64 tons of material would have been diverted from disposal.	2017
Increase the residential recycling rate to 30% or higher by 2021	I, II, III, IV	Services to Residents	Included in current operations	\$0		2017
Adopt goal to recycle 40% of all waste (by weight) generated in the City, including residential, commercial and ICI by 2023	I, II, III, IV, V	Services to Industrial, Commercial, and Institutions	Included in current operations	\$0		2017
Enforce no large brush or yard waste in bulk collection	I, II, III, IV, VI	Services to Residents	Expenditures beyond staffing will vary; can be added to current Blue Crew efforts	\$0	The City estimates as much as 30,000 tons of material per year is brush improperly set out as bulk	2017
Segregate Brush from Bulk Collection	I, III, IV	Services to Residents	Expenditures beyond staffing will vary	Estimate additional information efforts at \$1 per household	The City estimates as much as 30,000 tons of material per year is brush improperly set out as bulk	2017

“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Make as a condition of the Grants of Privilege that commercial haulers report on all recycling activities	III, IV, VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; Estimate that all Grants of Privilege rewriting could be \$75,000 contract for services	\$0 - \$0.35	Impacts on waste diversion of these changes will be indirect: better reporting should lead to better implementation of recycling in the ICI sector; better implementation of recycling programs should lead to more and better recycling at ICI locations.	2017
Make as a condition of the Grants of Privilege that commercial haulers report tonnages on all recycling activities	III, IV, V, VI	Services to Industrial, Commercial, and Institutions		\$0 - \$0.35		2017
Expand Master Composter Program and At-home composting	I, III	Services to Residents	Expenditures beyond staffing will vary; subsidized equipment could cost \$10 - \$50 per piece	unclear how many households might participate	Minimal	2017
Promote the availability of C&D waste processors in the area such as concrete crushers, scrap metal dealers, shingle and asphalt re-processors, and glass processors	II, III, IV, V	Services to Industrial, Commercial, and Institutions	Included in current operations	Part of outreach expenditures	Unclear	2017
Promote to residents that they have frequent and free collection for many commonly-dumped items such as appliances, tires, and furniture	I, II, III	Services to the Community	Expenditures beyond staffing will vary	Part of outreach expenditures	Unclear	2017

"Changing" Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Educate residents that computer and televisions can be recycled pursuant to the State programs	I, II, III	Services to the Community	Expenditures beyond staffing will vary	Part of outreach expenditures	Unclear, as many Americans have been hoarding electronics when uncertain what to do. The larger problem with electronics is the polluting potential.	2017
Direct residents to electronics recycling options such as the Electronic Manufacturers Recycling Management Company at www.mrmrecycling.com , www.TexasRecyclesComputers.org , and www.TexasRecyclesTVs.org .	I, II, III	Services to the Community	Expenditures beyond staffing will vary	Part of outreach expenditures		2017
Educate residents in the proper management of sharps and general medical waste	I, II	Services to the Community	Expenditures beyond staffing will vary	Part of outreach expenditures	not applicable	2017
Work with Republic Services to extend the life of the landfill through operational/contract changes that will increase in-place densities or expand the site	IV	Solid Waste Management Facilities	Included in current operations	\$0	not applicable	2017
Establish a reserve fund from rental payments or the enterprise fund as a whole to pay for future disposal capacity	IV	Solid Waste Management Facilities	Expenditures beyond staffing will vary	\$0	not applicable	2017



"Changing" Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Create a Comprehensive Outreach Plan	I, II, III	Solid Waste Services Division	Expenditures beyond staffing will vary; consulting could be \$90,000	\$0 - \$0.42	<p>If the recycling rate had been 40% in FY14-15, an additional 63,633.64 tons of material would have been diverted from disposal.</p> <p>Increasing participation from 70 percent to 90 percent of households would represent almost 14,000 additional tons and nearly 5 percentage points on the recycling rate.</p>	2017
Identify and establish priority programs and projects.	I, II, III	Solid Waste Services Division				2017
Develop a solid waste division brand	I, II, III	Solid Waste Services Division				2017
Combine outreach efforts and team members into one coordinated Solid Waste unit	I, II, III	Solid Waste Services Division				2017
Consumer Choice – Plastic Bag Campaign	I, II, III	Solid Waste Services Division				2017
Set a more aggressive, tiered goal for addressing Dead Animal Cleanup work orders	I	Solid Waste Services Division	Included in current operations	\$0	not applicable	2017
Implement program for accepting reusable items for donation at the drop-off stations	III	Solid Waste Services Division	Included in current operations	\$0	unclear	2017
Pursue the development of a Scrap Tire Ordinance	III, VI	Solid Waste Services Division	Included in current operations	\$0	The larger problem of improperly disposed tires is not simply their tons, but their potential for pollution.	2017



“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Expand efforts towards City's Comprehensive Litter Program	I, II	Services to the Community	Included in current operations	\$0	Reduce the cost of litter and illegal dumping collections, improving the community and local water sources.	2017
Working with business sector to curb improperly managed on premise trash: Overflowing dumpsters, proper screening, onsite trash cans	I, II	Services to the Community	Included in current operations	\$0	Reduce the cost of litter collections, improving the community and local water sources.	2017
Working with Chamber, Business Associations about implementing litter and trash best practices as litter prevention activities.	I, II	Services to the Community	Included in current operations	\$0		2017
Implement a pharmaceutical drug take-back or disposal program for Fort Worth residents prior to an EPR-based program	I, II	Services to the Community	Included in current operations	\$0	Reduces the volume into the landfill, accidental overdoses and abuse within the general community.	2017
Establish a 5 year Residential Recycling Processing Agreement	I, II, III, IV	Services to Residents	Included in current operations	\$0	To synchronize the time period for both the residential collection services and recycling processing agreements.	2017

"Changing" Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Transition to Larger Recycling Carts	I, III	Services to Residents	Beyond staffing, a per-cart cost to swap	Making the change to larger recycling carts at the start of a new contract would nullify any per HH cost; at present, WM charges \$5 + \$2 in fees to switch out a garbage cart for a different size.	Increasing participation from 70 percent to 90 percent of households would represent almost 14,000 additional tons and nearly 5 percentage points on the recycling rate.	2018
Evaluate Waste Minimization Program (bag-based PAYT)	I, III, IV	Services to Residents	Included in current operations; Evaluation should be \$0, as the proposing firm can provide evaluation; outside consulting service to provide opinion could be \$20,000	\$0 - \$0.94	The vendor in question claims to reduce waste tonnages by 44%, on average.	2018
Expand Grants of Privilege to recycling-only Haulers, to create a registration or Grant of Privilege for haulers that collect only recyclables	VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; Estimate that all Grants of Privilege rewriting could be \$75,000 contract for services	\$0 - \$0.35	Impacts on waste diversion of these changes will be indirect: better reporting should lead to better implementation of recycling in the ICI sector; better implementation of recycling programs should lead to more and better recycling at ICI locations.	2018

"Changing" Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Make as a condition of the Grants of Privilege that private haulers must offer recycling to all commercial establishments	III, IV, V, VI	Services to Industrial, Commercial, and Institutions				2018
Make as a condition of the Grants of Privilege that commercial haulers provide a Diversion Plan to identify the diversion (recyclables, construction and demolition debris, and/or organics) services that will be provided to commercial establishments and multi-family properties	III, IV, V, VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; Estimate that all Grants of Privilege rewriting could be \$75,000 contract for services	\$0 - \$0.35	Impacts on waste diversion of these changes will be indirect: better reporting should lead to better implementation of recycling in the ICI sector; better implementation of recycling programs should lead to more and better recycling at ICI locations.	2018
Modify the current Grant of Privilege fee charged to commercial haulers from 5 percent to a tiered system based on the overall level of recycling achieved by commercial hauler	III, IV, V, VI	Services to Industrial, Commercial, and Institutions				2018
Establish access to the City contracted MRF by private haulers	III, IV, V	Services to Residents	Expenditures beyond staffing will vary; consulting fees to re-procure the contract could be \$60,000	\$0 - \$0.28	Unclear	2018



“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Include in public education messages encouragement of smarter shopping for food and consumer goods	I, II	Solid Waste Services Division	Expenditures beyond staffing will vary	Part of outreach expenditures	If each household reduced its weekly food waste generation by just 3 pounds from FY14-15 levels, a 5% reduction in waste would be realized.	2018
Update the multifamily recycling regulation to ensure that apartment residents are provided a similar level of recycling service as single family residents, and to narrow the exemption loophole and thereby include more residents	I, III, V, VI	Solid Waste Services Division	Included in current operations	\$0	Each single family home recycles about 12 lbs. per week; multifamily could do similarly, given proper resources.	2018
Pursue the development of a Universal Recycling Ordinance	I, III, IV, V, VI	Solid Waste Services Division	Included in current operations	\$0	Austin, TX, expects its URO to help the City achieve 90% diversion by 2040.	2018
Pursue the development of a Green Purchasing Ordinance	IV, VI	Solid Waste Services Division	Included in current operations	\$0	Green Purchasing is also about waste reduction.	2018
Develop or adopt a sustainable building standard and permitting process in coordination with Planning and Development	III, V, VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; consulting fees to write a standard might be \$75,000	\$0 - \$0.35	Unclear	2019
Work with the Planning and Development Department to establish a program within the permitting process that encourages, incentivizes or fosters a means to increase	III, IV, V, VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; consulting fees to create a program could be \$85,000	\$0 - \$0.40	18 percent of all material landfilled in TX is C&D, or about 0.2 tons per capita per year.	2019



“Changing” Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
the diversion and/or recovery of building construction and demolition materials						
Waste Swap with the City of Arlington’s Landfill	IV	Solid Waste Management Facilities	Expenditures beyond staffing will vary	\$0	not applicable	2019
Amend the Zoning Ordinance to require recycling containers for use by occupants at one or more zoning category	III, V, VI	Solid Waste Services Division	Included in current operations	\$0	If the recycling rate had been 30% in FY14-15, an additional 30,648.78 tons of material would have been diverted from disposal. Proper access to systems is necessary for that goal to be realized.	2019
Require new or amended site plans for commercial properties to demonstrate suitable container storage, screening and service access to garbage and recycling management areas	III, V, VI	Services to Industrial, Commercial, and Institutions	Expenditures beyond staffing will vary; consulting to work on revising site plan review systems could be \$75,000.	\$0 - \$0.35	Unclear	2020
Set a goal of reducing per-household waste generation by 10 percent over the course of the planning period	I, II, III	Solid Waste Services Division	Included in current operations	\$0	If each household reduced its weekly waste generation by just 6 pounds from FY14-15 levels, the 10% reduction goal would be met.	2020

"Changing" Actions	Goal Fulfillment	Service Area	Projected Costs	Cost Per Household	Waste Diversion Impact	Year to Start by
Amend the Zoning Ordinance to mandate sight or walking distances for such containers from the users and occupants	III, V, VI	Solid Waste Services Division	Included in current operations	\$0	If the recycling rate had been 30% in FY14-15, an additional 30,648.78 tons of material would have been diverted from disposal. Proper access to systems is necessary for that goal to be realized.	2020
Amend the Zoning Ordinance to specify in the streetscaping burden on developers that compliant trash receptacles must be accompanied by recycling receptacles	III, V, VI	Solid Waste Services Division	Included in current operations			

DRAFT

8.1.3 Beginning: New Operations

"Beginning" Actions	Goal Fulfillment	Service Area	Waste Diversion Impact
<p>All of the actions in this table depend on creation of a commercial recycling section within the Planning Section or Solid Waste Administration to conduct field work, technical support, planning, and reporting. This action would address all of the CSWMP goals and serve all sectors. It should be started as soon as possible, ideally in FY17.</p> <p>The projected staffing cost is \$75,900 per position per year, including benefits, or \$0.353 per household, per year. Other operational costs may include a dedicated vehicle, proper personal protection equipment, training, supplies, materials to distribute, and workspace. The total cost for one position and the operations, the first year, might be \$150,000, or \$0.70 per year (\$0.06 per month).</p> <p>See impacts and service areas of individual duties assigned to this section, below.</p>			
"Beginning" Actions	Goal Fulfillment	Service Area	Waste Diversion Impact
<p>Once multi-family plans are submitted, work with the properties to make sure the plans get implemented, providing technical assistance and correcting problems</p>	<p>I, III, IV, V, VI</p>	<p>Services to Residents</p>	<p>There are about 68,250 households in buildings with 5 or more units. If each of those households recycled at the same level as the City's curbside customers, it would represent an additional 22,082 tons per year.</p>
<p>Require new or amended site plans for multi-family properties to demonstrate adequate storage of and access to garbage and recycling management areas</p>	<p>I, III, V, VI</p>	<p>Services to Residents</p>	
<p>Establish a Technical Assistance Program to assist commercial haulers with waste reduction, reuse and recycling guidance</p>	<p>III, IV, V</p>	<p>Services to Residents</p>	<p>The tons available from the ICI sector for recycling could be a hundred thousand tons or more.</p> <p>The tons available from the ICI sector for recycling could be a</p>
<p>Continue to seek other ways to work with both with commercial waste haulers and the ICI customers to explore best practices to divert materials and properly manage waste services to prevent problems like blowing litter</p>	<p>II, III, IV, V</p>	<p>Services to Industrial, Commercial, and Institutions</p>	
<p>Implement recycling collection services to the interested small business customers.</p>	<p>II, III, IV, V</p>	<p>Services to Industrial, Commercial, and Institutions</p>	

"Beginning" Actions	Goal Fulfillment	Service Area	Waste Diversion Impact
			hundred thousand tons or more.
Develop Database of Food Residuals Generators	II, III, IV, V	Services to Industrial, Commercial, and Institutions	Food waste makes up about 14 percent of the waste stream.
Expansion of "Recycle on the Go" Program, including development of a database of service providers	II, III, IV	Services to the Community	If each resident of Fort Worth recycled 3 bottles or cans on-the-go each week, it would be 124.8 million bottles each year.
Require new site plans and site plan amendments to show that all public use garbage cans at commercial buildings will be paired with a recycling bin	II, III, IV	Services to the Community	
Require Special Events (temporary gatherings of 500 or more attendees) to provide recycling (which could include organics composting) services	II, III, IV	Services to the Community	Properly prepared, event waste can be mostly recyclable and/or compostable: single serving beverages, food waste, cardboard, napkins and other paper products.
Conduct outreach to large-scale events held at venues such as Texas Motors Speedway and Panther Island to encourage implementation of effective recycling at those events, and reporting actual results following event	II, III, IV	Services to the Community	

"Beginning" Actions	Goal Fulfillment	Service Area	Waste Diversion Impact
<p>Work with TCEQ and local businesses and non-profits to identify a cost effective way to collect and recycle computers, televisions and other electronics at the City's three drop-off stations</p>	<p>III, IV, V, VI</p>	<p>Services to the Community</p>	<p>Small businesses and nonprofits face expensive management requirements from the Federal Government, unless they can find and use an appropriate recycling program.</p>
<p>Work with the recycling industry in and around Fort Worth to promote their activities and encourage private business especially to recycle materials through this industry</p>	<p>II, V</p>	<p>Solid Waste Management Facilities</p>	<p>All diversion programs rely on there being a market for materials.</p>
<p>Utilize a commercial recycling section within the Planning Section or Solid Waste Administration to support a team for the duties associated with developing an ECO Industrial Park (EIP) and the centers of excellence.</p>	<p>II, III, V</p>	<p>Solid Waste Management Facilities</p>	
<p>Build synergy with the Blue Zones Initiatives</p>	<p>I, II</p>	<p>Solid Waste Services Division</p>	<p>Unclear, but definitely a priority for Fort Worth.</p>

8.1.4 Maintaining: Continuing Programs and Actions

"Maintaining" Actions	Goal Fulfillment	Service Area	Cost or Resource Needed	Waste Diversion Impact
Continue and improve garbage and recycling collection service	I, III	Services to Residents	Included in current operations	The curbside system currently available in Fort Worth consists of many best practices, and residents with similar services in other communities achieve higher recycling rates. Greater diversion is possible if more people participate correctly.
Continue and improve bulk collection	I, II, III	Services to Residents	Included in current operations	
Continue implementation of the multi-family recycling ordinance, including collection options and expanded recycling plans	II, III, IV, V	Services to Residents	This activity would likely be assigned to a commercial recycling section; see "Beginning" actions.	The City has made great progress in engaging apartment and condo complexes, which is an achievement on which it can build to give multifamily residents greater recycling access.
Don't Bag It	I, II, III, IV	Services to Residents	Included in current operations	If successfully adopted, the "Don't Bag It" philosophy would make many tons of yard waste much more recyclable than they are in plastic bags.
Support Food Residual Generators	III, IV, V	Services to Industrial, Commercial, and Institutions	Included in current operations	With a mature recycling program in place, the next opportunity for major metros like Fort Worth to increase diversion lies in organics. It is mathematically critical to divert more organics in order to reach higher-level diversion rates.
Further the discussions with the Fort Worth Water Department regarding the feasibility of co-composting biosolids from the Village Creek Wastewater Treatment Facility	IV, V	Services to Industrial, Commercial, and Institutions	Included in current operations	
Implementation of Keep America Beautiful Best Practices	II, III	Services to the Community	Included in current operations	Keep Fort Worth is a flagship program of Keep America Beautiful. The City

“Maintaining” Actions	Goal Fulfillment	Service Area	Cost or Resource Needed	Waste Diversion Impact
Maintain and expand participation in Keep America Beautiful efforts, including the Cowtown Cleanup; adoption of KAB’s recycling messages to connect recycling with not-littering; and, adoption of a litter plan	II, III	Services to the Community	Included in current operations	can take advantage of Keep America Beautiful’s public area recycling programs to improve on-the-go access locally.
Maintain the high level of service and responsiveness to illegal dump clean-ups	II	Services to the Community	Included in current operations	While there is little chance of illegally dumped materials being recycled, there is some possibility that properly managed materials might get recycled.
Continue operation of the drop-off stations for residential use, to discourage them from dumping items or bags of trash	I, II	Services to the Community	Included in current operations	
Continue the current dead animal program	II	Services to the Community	Included in current operations	This program has no impact on waste diversion; however, it is part of the comprehensive services provided by the City.
Continue to adopt an objective of completing 100 percent processing of dead animal work orders within 48 hours of receipt	II	Services to the Community	Included in current operations	
Continue to support EPR/circular economy as a waste management technique for electronics and certain other items	II, III, IV	Services to the Community	Included in current operations	Product stewardship has great potential for diverting materials from landfill disposal to proper management, especially electronics.
Continue supporting the efforts of the Texas Product Stewardship Council	II, III, IV	Services to the Community	Included in current operations	
Continue to direct residents with fireworks or ammunition to contact the Fire Department to schedule a drop-off or arrange a pick-up of unwanted ammunition, ammunition loading supplies, fireworks, and other explosives	I, II	Services to the Community	Included in current operations	These programs do not represent significant diversion of tons from landfill disposal; however, they do divert potentially dangerous or polluting materials to proper management.

"Maintaining" Actions	Goal Fulfillment	Service Area	Cost or Resource Needed	Waste Diversion Impact
Maintain and continue the household hazardous waste (HHW) services at the Environmental Collection Center (ECC), the Mobile Collection Units (MCUs), Drop off Stations and the interlocal agreements associated with this program.	I, II, III, IV, VI	Services to the Community	Included in current operations	
Implement a pharmaceutical drug take-back or disposal program for Fort Worth residents prior to an EPR-based program	I, II, III, IV, VI	Services to the Community	\$10,000 plus \$4.58 per mail-back envelope, which covers processing	
Secure long-term disposal capacity for 2035-2060	IV	Solid Waste Management Facilities	Included in current operations	Not applicable
Continuously monitor the SELF's capacity	IV	Solid Waste Management Facilities	Included in current operations	
Continue to have operational performance goals regarding misses, incoming customer calls, and response times	I	Solid Waste Services Division	Included in current operations	Meaningful performance criteria and customer service review will ensure that SWSD provides services customers want and need, and that they can reach them appropriately.
Continuously evaluate SWSD performance and opportunities for internal improvement, as outlined in the Recommendations	I, III, IV	Solid Waste Services Division	Some included in current operations; other costs may vary	
Continue to conduct satisfaction surveys of its customers to gather opinion data regarding services	I	Solid Waste Services Division	Included in current operations	
Continue the dialogue with non-profit organizations involved in reuse or resale of materials to identify their needs and desired support by the City, if any.	I	Solid Waste Services Division	Expenditures beyond staffing will vary	These programs do not represent significant diversion of tons from landfill disposal; however, they reinforce the concepts of reuse and waste reduction, and should have a residual effect of waste reduction before items even get to the curb.

8.2 Mid- and Long-term Actions and Implementation

The following actions are for implementation in the mid-term (5 to 10 years into the planning horizon) and the long-term (10 years or more into the planning horizon).

8.2.1 Services to Residents

<i>Incentive Programs</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Consider Other Incentive Programs	Expenditures beyond staffing will vary	SW Planners, Contract Services	Mid- to Long-term

<i>Multi-family properties</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
If source separation of recyclables at multi-family properties remains insufficient, initiate evaluation of alternate routes to success, such as Alternate Collection Strategies	Expenditures beyond staffing will vary	SW Planners	Long-Term

<i>Yard and Food Waste Collection</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Evaluate Residential Food Waste Collection	Expenditures beyond staffing will vary	SW Planners, Blue Crews	Mid- to Long-term
Evaluate Banning Yard Waste from Disposal in SELF	Expenditures beyond staffing will vary	SW Planners	Mid- to Long-term

8.2.2 Services to the Community

<i>Litter Abatement and Illegal Dump Clean-ups</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Strive to pair garbage cans along pedestrian paths—sometimes referred to as “litter bins”—with recycle receptacles	Expenditures beyond staffing will vary	Public Education Program Coordinator, SW Planners	Mid-Term
Initialize an outreach campaign specifically aimed at cigarette litter and the impacts it has on water quality	Expenditures beyond staffing will vary	Public Education Program Coordinator, SW Planners	Mid-Term
Consider what low- or no-cost options it could offer to businesses to dispose of their materials properly, and also what technologies or techniques could be used to “catch” people using popular dump sites	Expenditures beyond staffing will vary	Field Operations, Customer Care Division	Mid- to Long-term

<i>HHW and pharmaceuticals</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Pursue more and more equitable options to provide easy to use and easy to understand disposal of medications	Expenditures beyond staffing will vary	Field Operations	Mid-Term
Pursue participation in product stewardship interest groups, such as the Texas Product Stewardship Council, and promotion of EPR as an alternative to government-provided collection programs for potentially polluting materials	Included in current operations	SW Planners	Mid-Term
Pursue opportunities for EPR of paint in Fort Worth or Texas as a whole.	Included in current operations	SW Planners	Mid-Term

8.2.3 Solid Waste Management Facilities

<i>Alternative Energy & Emission Standards</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Waste-to-Energy Technologies	Expenditures beyond staffing will vary	SW Planners	Mid- to Long-Term
Evaluate real estate reclamation through closed landfill mining	Expenditures beyond staffing will vary	SW Planners	Mid- to Long-Term

<i>Private sector facilities</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Pursue a long-term strategy for developing an eco-industrial park for the purpose of building up local markets for recovered feedstocks, diverting materials from disposal, and creating sustainable “green” jobs.	A commercial recycling section may need to be formed within the Planning Section or Solid Waste Administration to support this effort	TBD	Long-Term
Develop partnerships with Universities and Colleges as potential innovators to establish one or more centers of learning or excellence.	A commercial recycling section may need to be formed within the Planning Section or Solid Waste Administration to support this effort	TBD	Mid-Term

8.2.4 Solid Waste Services Division Activities

<i>Organizational Structure</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Continuously evaluate SWSD performance and opportunities for internal improvement, as outlined in the Recommendations	Some included in current operations; other costs may vary	Solid Waste Services Division	Mid- to Long-term

<i>Source Reduction</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Evaluate banning yard waste from disposal in the SELF	Expenditures beyond staffing will vary	SW Planners	Long-Term

<i>Ordinances, Rules, and Regulations</i>			
Actions	Resources needed	Responsible Party	Implementation Timeframe
Closely evaluate banning disposal of yard waste in the SELF	Expenditures beyond staffing will vary	SW Planners	Mid- to Long-term
Consider the positive and negative potential impacts on diversion of other disposal bans, such as cardboard	Expenditures beyond staffing will vary	SW Planners	Mid- to Long-term

9 Performance Assessment and Plan Updating

Change in the solid waste management arena is constant and inevitable. As described herein, there are many factors that can impact solid waste management. The CSWMP has two roles in the face of these changes: to clearly define the priorities and needs of the solid waste management system, and to measure the impact of the changes when the Plan is updated. The CSWMP lays out a timeline for actions and also the methods for evaluating the efforts. The Plan outlines measurable goals for the City to determine when the objectives of the Plan have been completed. The timeline is an important tool for monitoring objectives, and, in particular, new objectives when the Plan is reevaluated and updated. The best practice is to evaluate or update a 20-year plan every 5 or 10 years. Figure 9-1 shows some reasons for this interim update schedule.

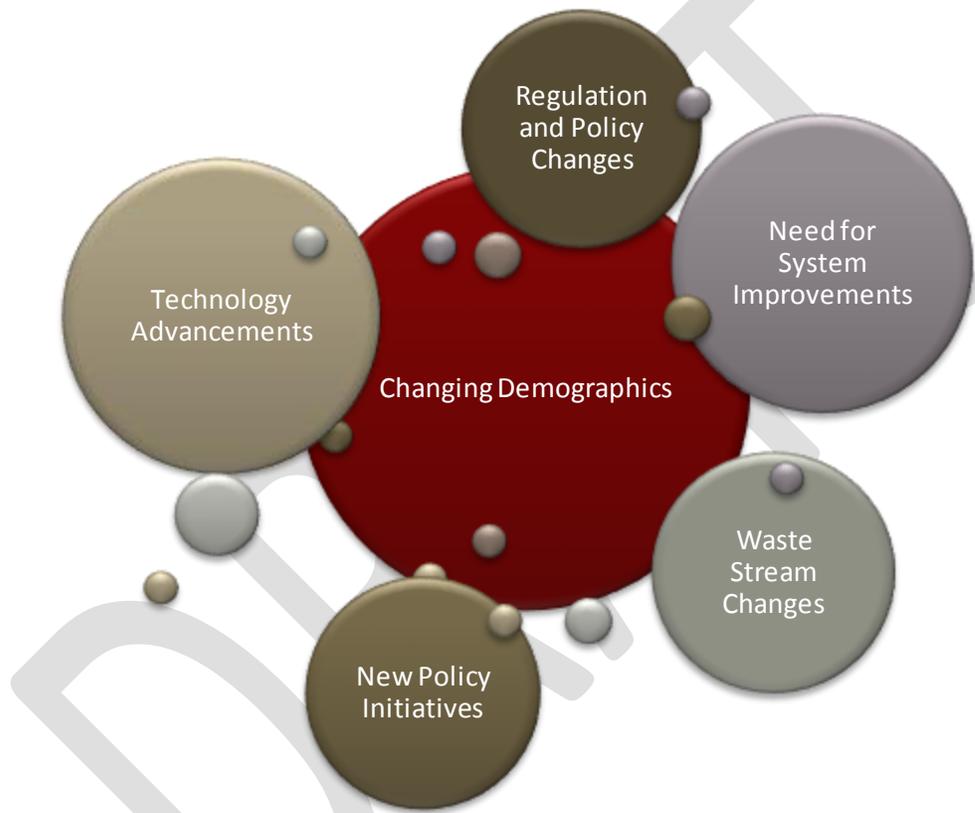


Figure 9-1 Reasons to Update a CSWMP during the Planning Period

The CSWMP is a discussion of how the City has and will impact and affect various components of the solid waste management system, and sets goals for those efforts. The City of Fort Worth intends to have positive and lasting effects via the CSWMP, including all aspects of residential collection, ICI sector services, public space recycling and waste diversion, organics, special wastes, reuse and diversion, material and energy recovery, disposal, sustainability efforts, extended producer responsibility, and public education. Therefore, when the CSWMP is updated, each of these programs must be evaluated with a goal of fulfilling the plan’s objectives compared to national best practices. City ordinances and agency policies affecting solid waste also need to be evaluated for effectiveness, best practices, and the extent to which they accurately reflect the intentions and programs the City chooses to implement. As with the previous SWMP, this CSWMP includes with each recommended action the criteria for evaluating its success in both the short and long term.

(This page intentionally left blank.)

DRAFT

Appendix A – Glossary

DRAFT

(This page intentionally left blank.)

DRAFT

Appendix B – Index

DRAFT

(This page intentionally left blank.)

DRAFT

Appendix C – Outreach Efforts

Outreach Plan

Survey instruments

Interview instruments

Print pieces and Web content

Workshop and Open House Presentations

Feedback Memo

Task 4 Interim Report

DRAFT

(This page intentionally left blank)

DRAFT

Appendix D – Program Evaluation Report

DRAFT

(This page intentionally left blank)

DRAFT

Appendix E – Recommendations Report

DRAFT

(This page intentionally left blank)

DRAFT

Appendix F – Draft 2016 5 Year Solid Waste CIP Report

DRAFT