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WASTE



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**WORKING
TOWARD
Austin
WITHOUT
Waste**



2023 COMPREHENSIVE PLAN

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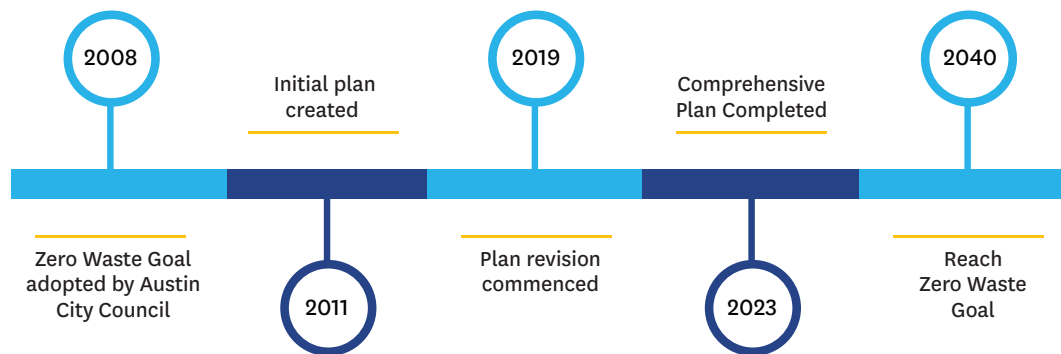
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A letter from the Director of Austin Resource Recovery



Dear Austin,

I am pleased to present the 2023 Austin Resource Recovery (ARR) Comprehensive Plan. This plan updates the 2011 Master Plan and further guides Austin toward its goal of zero waste by 2040. The Zero Waste Goal specifies that only items ineligible for recycling, composting, reuse, repair, or donation reach our landfills.



As a result of the projects and programs from the 2011 plan, Austin’s recycling levels are 36% higher than the national average and organic material diversion from landfills reached over 20,000 tons per year. Since 2011, Austin increased the capability of the drop-off center for household hazardous waste and hard-to-recycle items such as Styrofoam™ and electronics. In addition to recycling services, the center also serves as a community supply hub where residents can pick up items such as re-blended paint and usable cleaning products at no charge. Expanding beyond the residential customer base, ARR established the Universal Recycling Ordinance requiring recycling at all commercial and multifamily properties and organic diversion at food-based businesses.

In 2019, ARR began crafting an updated strategic roadmap for Austin to achieve the Zero Waste Goal. Towards this effort, ARR:

- Benchmarked cities across the nation with similar zero-waste goals,
- Analyzed zero waste options including facilities and infrastructure upgrades, enhanced diversion processes and affordability,
- Invited residents, businesses, and organizations to share their ideas, expertise, and feedback,
- Made a commitment to equitable program outcomes.

Through public outreach efforts, ARR learned Austin residents prioritize residential and commercial incentives, policies, enforcement, and clear messaging. These community values have been incorporated into programs throughout the updated plan.

To reach the 2040 Zero Waste Goal, ARR must concentrate on gathering and analyzing data, continuously measuring progress against expectations, and adjusting programs as needed to prevent waste. These efforts represent a sustained cycle of continuous improvement that will benefit our entire ecosystem. As discarded and surplus materials are diverted from landfills and turned into useful resources, people within and beyond the borders of Austin and Central Texas will enjoy cleaner and more sustainable communities.

Austin is a beautiful city that is known globally for its green spaces, trails, water and clean air. As it grows and evolves, we must seek, embrace, and deploy the necessary tools to protect our precious city. The City of Austin’s Zero Waste goal is a tool that will guide our future decisions as we work to protect people and our planet for generations to come.


Richard McHale
Austin Resource Recovery Director



Chapter 1 Introduction

In 2011, Austin's City Council adopted a Zero Waste Goal that challenges our city to divert 90% of material away from the landfill by 2040. Our work at Austin Resource Recovery (ARR) revolves around meeting this goal, while providing necessary services to keep our community clean.

Reducing the amount of material sent to the landfill is important because landfills produce methane emissions, which contribute to climate change. Less material in the landfill means reduced methane emissions. Source reduction, such as reuse and repair, and diversion pathways like recycling and composting, can also reduce the use of virgin materials in manufacturing and create green jobs, in addition to addressing environmental justice issues often associated with landfills, litter, and illegal dumping.

In this way, the programming ARR provides to individuals and businesses can have environmental, social, and economic impacts that benefit our community.

Conducting this work is not without its difficulties. A spectrum of challenges exists, from the micro to the macro level. Broadly speaking, ARR faces three main challenges. First, Austin's population has grown more than 20% in the last decade. A growing population increases the number of households ARR serves and requires ARR to educate newcomers about Austin's recycling, composting, and other diversion practices. Secondly, Austin has experienced multiple abnormal weather episodes in recent years, and as our global climate continues to change, Austin is expected to continue seeing extreme weather episodes. These sorts of weather events can prevent ARR from delivering its services as expected. Finally, Austin's current waste management landscape does not allow ARR to accurately measure progress toward its Zero Waste Goal. Private companies collect 85% of the waste generated in Austin. Therefore, ARR cannot fully capture the data accompanying this waste stream.

We intend for this plan to help Austin meet these challenges. Through educational programs, ARR aims to inform new and long-time residents about opportunities to divert material and grow Austin into a circular economy where waste is reintegrated into the life cycle of a new product. Recognizing Austin’s densification trend, educational programs and other initiatives will be designed to reach all Austinites, including those in large multifamily apartment buildings that do not receive curbside service from ARR. ARR also acknowledges a need to build and maintain resilient services to be a reliable resource for the community, and the Department will work toward strengthening operational planning for this purpose. Improved insights on our city’s waste stream can be uncovered by updating policies related to the collection of material.

ARR also recognizes the growing disparities across our community. We see the need to apply an equity lens to the programs and services we offer. Throughout this Comprehensive Plan, we provide information on how the Department is putting plans into action to equitably support a diverse Austin.



Chapter 2 Department Structure

2.1 Department Structure Overview

The City of Austin’s vision is to make Austin the most livable city in the country. The City’s mission is to be the best managed city in the country. Additionally, a set of values are shared across the organization. These values are:

- Public service and engagement
- Responsibility and accountability
- Innovation and sustainability
- Diversity and inclusion
- Ethics and integrity

Austin Resource Recovery (ARR) is a department within the City of Austin. ARR employs approximately 500 people and has its own mission, vision, and departmental culture.

2.2 Department Mission and Vision

As the City strives to be the most livable and best managed city in the country, ARR embraces the following mission and vision statements.

Mission: We provide essential services that protect people and our planet.

Vision: Driving the global transformation of traditional waste management to sustainable resource recovery.

2.2a Core Values

- Teamwork:** Together we can build a world without waste.
- Safety:** We provide resources and services to protect employees and the community.
- Excellence:** We are a highly skilled workforce that strive to exceed expectations.
- Accountability:** We deliver work with integrity and hold ourselves accountable.
- Innovation:** Working towards a world with zero waste through local innovation.
- Diversity, Equity & Inclusion:** We work to constantly improve our cultural competence and seek input from underrepresented voices.

2.2b Department Commitment to Racial Equity

ARR has developed a racial equity tool to apply on all new, public-facing departmental initiatives. The Department’s leadership team also envisions future tools being developed to address other procedures and initiatives within ARR. As part of the Department’s prioritization of racial equity, it plans to provide all staff involved in the use of this tool (and future comparable tools) with appropriate training on the topic. Simultaneously, the Department will work on securing funding to bring on full-time staff dedicated to leading the Department’s racial equity work, which includes the effective implementation of this tool and subsequent tools.

2.3 Departmental Organization

The Department is divided into nine divisions. Of those divisions, four relate to operational functions, and five relate to administrative functions. ARR’s divisions, in alphabetical order, are:

2.3a Collection Services

The Collection Services Division is responsible for trash and recycling collection. The ARR trash collection unit is responsible for the daily collection of residential garbage from the fee paying residents of Austin. The ARR recycling collection unit is responsible for the biweekly collection of residential recycling from the fee paying residents of Austin. The Division’s goals are to provide timely, efficient, and excellent customer service through our curbside collection programs. In addition, the Division strives to educate the customers on the benefits of diversion to help us achieve our Zero Waste Goal.

2.3b Customer Service

The Customer Service Division is responsible for providing customer service support and processing citizen requests. The Division includes three business units: customer service, billing/ revenue recovery, and cart maintenance.

The Customer Service Division provides administrative support to ARR by offering services related to revenue recovery, cart maintenance and delivery, mail services, dispatch support, and customer call resolution. The Customer Service Division’s mission is to meet or exceed customer expectations consistently by providing knowledgeable, best-in-class services.

2.3c Diversion Facilities

The Diversion Facilities Division works toward the City’s Zero Waste Goal through the Recycle & Reuse Drop-off Center (RRDOC), the City’s FM812 Landfill Post-Closure Care, the Hornsby Bend brush grinding operations, and the Austin Brownfields Revitalization Office. The RRDOC provides a drop-off location for unwanted household hazardous waste products, ensuring they are safely removed from the waste stream to reduce environmental and health hazards. The RRDOC also accepts white goods, large rigid plastics, electronics, expanded polystyrene, and other hard-to-recycle materials. Brush and other yard waste is received at Austin Water’s Hornsby Bend Biosolids Plant. ARR staff grind the material into mulch, where it is used by the Austin Water Department to produce a commercial compost. The FM812 landfill is in the 30-year post-closure care, where monitoring takes place to ensure no adverse impacts occur from municipal solid waste, methane, or leachate. The Austin Brownfields Revitalization Office assesses environmental concerns, enabling properties and structures previously thought to be polluted or contaminated to be reused and turned into community assets.

2.3d Finance

The Finance Division operates in compliance with City of Austin financial policies and procedures and includes three business units: accounting, contract management and procurement, and budget and contract development.

The Finance Division provides financial support to ARR by offering services related to and including accounting, accounts payable, accounts receivable, financial analysis, reporting, purchasing, budgeting, managing contracts and training. The Division aims to provide excellent and reliable customer service with a focus on integrity and fiscal responsibility. The team strives to produce high-quality work and provide reliable and timely information to ensure the Department’s financial stability while maintaining rate equity for Austin citizens.

2.3e Human Resources

The Human Resources (HR) Division provides advice, consultation, interpretation, problem-solving, and oversight regarding employees, policies, and programs. The core responsibilities of HR include employment and hiring, employee relations, leave management, organizational development, and training.

The HR Division is made up of subject matter experts who partner with other ARR divisions on employee development initiatives, performance management, performance measures, and the composition of Department-wide standard operating procedures. HR's goal is to ensure that employee programs and policies are in alignment with the goals and objectives of the Department and the City.

2.3f Litter Abatement

The Litter Abatement Division is responsible for a comprehensive set of programs to support the City of Austin in achieving its Zero Waste goals. The Litter Abatement Division programs include Curbside Compost, Bulk and Brush Collection, Residential, Boulevard and Bike Lane Cleaning, Special Event Cleanups, Dead Animal Collection, Litter Control, Alley/Street Flushing, the Encampment Cleanup Program and the Clean Creeks Program. The division strives to deliver excellent customer service and empowers community participation to provide a healthier, cleaner Austin.

2.3g Quality Assurance

The Quality Assurance (QA) Division is responsible for fostering an environment of continuous improvement within ARR. The Division includes three business units: commercial compliance, information technology/Geographic Information System (GIS), and residential quality services.

QA provides operational support to ARR through quality management, data maintenance and analytics, cartography, application management, and ordinance enforcement. The Division strives to promote innovative practices and data-driven decision making within the Department while mitigating risk and improving efficiency.

2.3h Strategic Initiatives

The Strategic Initiatives (SI) Division is responsible for developing and implementing zero waste policies and programs and educating the public to encourage sustainable practices by individuals, groups, and businesses. The Division includes four business units: policy and program, business outreach, the circular economy program, and public information office.

The SI Division focuses on recycling economic development, zero waste policy and program development, business outreach, public education, and marketing. By fostering innovative community-wide partnerships to advance zero waste, this work supports the necessary infrastructure for a resilient circular economy in Central Texas.

2.3i Support Services

Support Services consists of three business units: Operations Support, Safety and Training. Operations Support is responsible for maintaining all ARR buildings and properties. The vehicle coordinators are responsible for the acquisition, allocation, maintenance, and disposition of all ARR vehicles and equipment. The Safety Store is responsible for the acquisition and distribution of Personal Protective Equipment to ARR operators. The Safety team is responsible for providing resources, coaching and guidance for the development and implementation of ARR Safety Programs, accident/incident investigation and recommendation of corrective actions to provide an overall reduction in safety incidents, periodic workplace inspections, field evaluations/routine observations of drivers/operators for use in analysis of incident trends and Job Hazard Analyses of new operations, revised operations or new equipment introduced to the workplace. The Training team is responsible for all regulatory training, operational process training and equipment training provided to ARR employees. The Unit is also responsible for ARR's Commercial Driver License Entry Level Driver Training program and a Third-Party Skills Testing program.

2.4 Department Culture

2.4a Workplace Culture

Department leaders conducted a workplace culture assessment in January 2022 to identify cultural strengths and areas that need development. ARR asked 97 department leaders, including the executive team, division managers, assistant division managers, supervisors, and crew leaders, "What are the needs of your team in terms of workplace culture?" The Department hosted three focus groups for crew leaders in March and April 2022 and scheduled individual interviews with the remaining members of leadership. The assessment also utilized quantitative observations from leadership and the Organization Development team and responses from the biannual "Listening to the Workforce" survey conducted by the City's Human Resources Department. The survey consisted of 38 questions covering six key areas: Employee Engagement, Leadership and Organizational Culture, Self, City Equity Measures, Strategic Direction 2023, and About You.

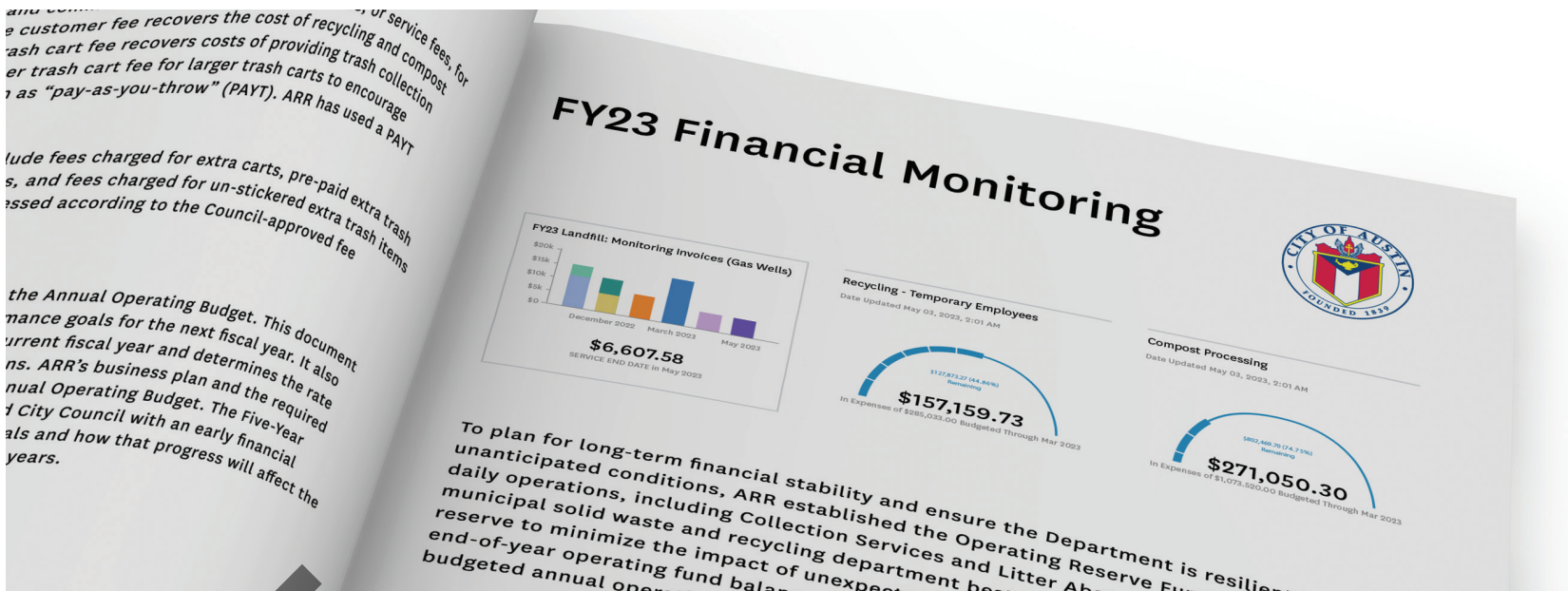
ARR used the combined results of these data gathering methods to assemble the following cultural summary.

Department employees work across multiple locations, including the FM 812 Landfill, the Kenneth Gardner Service Center, the Recycling and Reuse Drop-Off Center, the Rutherford Lane Campus, and remote worksites.

The assessment uncovered a cultural dichotomy at ARR between the operations and administrative teams. The cultural experience of both groups is influenced by the nature of the business needs of each team.

Five key attributes characterize the ARR culture profile: Appreciation, Learning, Safe and Risk-Conscious, Results-Oriented, and Purpose-Driven.

Figure 2-1: The Five Key Attributes of ARR’s Culture



Chapter 3 Financial Responsibility

3.1 Overview

The Austin Resource Recovery (ARR) Financial Services Division provides financial planning and monitoring for all activities and functions of ARR, including the new programs outlined in the Comprehensive Plan. This chapter describes ARR’s financial management: accounting and funding, financial planning and budgeting, revenues, expenditures, and maintenance of reserve funds.

3.2 Accounting and Funding

As a business enterprise of the City, ARR generates its own revenue without support of tax revenue and sets its budget accordingly. ARR manages its finances in an enterprise fund, a type of self-supporting revenue fund used to account for fee-based services provided to the public. An advantage of an enterprise fund is that all revenues are dedicated toward funding costs of the delivered service. This enables ARR to independently finance these additions, with the goal of providing enhanced zero waste programming to Austin residents.

Programs described in the ARR Comprehensive Plan will predominantly be funded through monthly fees charged to residents, including projects that are capital intensive.

3.3 Financial Planning and Budgeting

ARR’s Financial Services Division produces the Annual Operating Budget. This document details organizational, financial, and performance goals for the next fiscal year. It also projects expenditures and revenues for the current fiscal year and determines the rate structure necessary to support ARR’s operations.¹ ARR’s business plan and the required Five-Year Financial Forecast both inform the Annual Operating Budget. The Five-Year Financial Forecast provides the City Manager and City Council with an early financial picture of ARR’s progress toward its long-term goals and how that progress will affect the Department’s financial structure over the next five years.

3.4 Revenue

3.4a Collection Fees

ARR charges all residential and commercial customers collection fees, or service fees, for curbside collection. The base customer fee recovers the cost of recycling and compost collection services, and the trash cart fee recovers costs of providing trash collection services. Customers pay a higher trash cart fee for larger trash carts to encourage diversion. This strategy is known as “pay-as-you-throw” (PAYT). ARR has used a PAYT system for more than 30 years.

Additional revenue components include fees charged for extra carts, pre-paid extra trash bag stickers sold at local retail stores, and fees charged for un-stickered extra trash items collected at the curb. All fees are assessed according to the Council-approved fee schedule.

3.4b Clean Community Fee

The residential Clean Community Fee (CCF) is assessed to any residence that has an active utility account, regardless of occupancy. This includes all multifamily units. ARR and the Development Services Department share revenue from the CCF.

ARR uses its portion to fund:

- Street cleaning
- Special event cleaning
- Dead animal collection
- Litter control
- The Recycle and Reuse Drop-Off Center (RRDOC) and household hazardous waste (HHW) disposal services

¹ Current and historical budget information may be viewed online at financeonline.austintexas.gov/afo/finance/index.cfm

- Homeless encampment cleanup services
- Zero waste program development
- Brownfields remediation
- Circular economy programming
- Commercial compliance
- Clean Creeks program
- Landfill post-closure care

The commercial CCF is assessed to commercial utility accounts. ARR uses its portion to fund the services and programs listed above (with the exception of HHW disposal services) as well as:

- Commercial compliance
- Business outreach efforts to support the Universal Recycling Ordinance (URO)

3.4c Other Revenue

Single-stream recycling revenue. ARR contracts with outside vendors to process and sell material collected from residential single-stream recycling. The current contracts provide for the City to share in that revenue stream.

Service initiation fees. Service initiation fees include an activation fee for new accounts that are active for 10 days or longer.

Other revenue. This includes interest income and revenues collected to cover disposal of HHW. Auction sales from old equipment and revenue from interlocal or interdepartmental agreements are also categorized as other revenue.

3.5 Expenditures

The Annual Operating Budget identifies three expenditure categories: program requirements, transfers out, and other requirements. Each of these categories is described in this section.

3.5a Program Requirements

This category includes expenditures necessary to support the policies, plans, and infrastructure required for daily operations. Current programs are:

Collection services. Collection services include expenses for operations and maintenance, including employees and equipment for trash, recycling, and composting collection, in addition to brush and bulk collection, including processing costs for all activities.

Litter abatement. Litter abatement includes expenses for litter control, alley and street flushing, street sweeping, dead animal collection, brush and bulk collection, clean creeks, and cleanups related to homeless encampments.

Waste diversion. The waste diversion program includes expenditures for the following: zero waste program development, business outreach, circular economy, commercial compliance, and the RRDOC. This also includes expenditures related to the URO and the new policies, programs, and infrastructure for programs described in this Plan.

Operations support. Operations support includes expenses for geospatial information and technology services, driver training and safety services, cart and container maintenance, customer services, and contracted services with private haulers.

Remediation. Expenses for brownfields remediation are included in this category. The EPA defines brownfields as piece of land where reuse or redevelopment is “complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant.” Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off green spaces and working lands. This category also includes funding to support the post-closure needs for the FM 812 landfill.

Support services. Support services include expenses related to financial and administrative management, information technology support, human resources, facilities, public information, utility billing, and quality assurance.

3.5b Transfers Out

Transfers out include, but are not limited to, the following:

- General Obligation Debt Service Fund
- Capital Improvement Projects Fund (includes landfill closure and post-closure)
- Communications and Technology Management Fund
- Utility billing system support
- Citywide administrative support
- Workers’ compensation
- Economic development

3.5c Other Requirements

This category includes, but is not limited to, the following:

- Bad debt expense
- 3-1-1 system support

3.6 Reserve Funds

To plan for long-term financial stability and ensure the Department is resilient in unanticipated conditions, ARR established the Operating Reserve Fund to cover department operations in times of emergency, including Collection Services and Litter Abatement programs. It is a municipal solid waste and recycling department best practice to establish an operating reserve to minimize the impact of unexpected expenses or cash-flow shortages. ARR’s end-of-year operating fund balance is maintained at the equivalent of 30 days of budgeted annual operations and maintenance expenses.

Additionally, ARR will establish and maintain a Capital Improvement and Equipment Replacement Reserve Fund to support capital improvement projects and to replace vehicles and equipment. Funds will be set aside annually from rate revenue to pay for these replacements.



Chapter 4 Sustainability

4.1 Overview

Material consumption is carbon intensive. Product manufacturing supply chains require energy to mine, extract, harvest, process, store, transport, and distribute raw materials. Greenhouse gases (GHGs) emitted due to consumption directly contribute to global climate change, which increases the likelihood of natural disasters, extreme heat, droughts, floods, and wildfires. Hauling discarded products to facilities for disposal or processing also requires energy.

4.2 Interdepartmental Collaboration

Austin Resource Recovery (ARR) collaborates with the Office of Sustainability and other departments on initiatives that promote sustainability in the community and within City government.

4.2a Austin Green Business Leaders

The Austin Green Business Leaders Program recognizes businesses for their sustainability initiatives. The program consists of six primary focuses: energy conservation, water conservation, waste reduction, water quality protection, transportation, and social responsibility. Participating businesses can consider a menu of options within each focus area and adopt the initiatives that are appropriate for their situation. The City supports many of the core sustainability initiatives through financial incentives, rebates, and technical consulting by City staff. Each focus area contains performance measures.

The Office of Sustainability leads the Austin Green Business Leaders program along with the participation of several key departments.

Businesses are encouraged to complete a free, on-site waste assessment through ARR's Business Outreach Team. Waste assessments can show businesses ways to enact or expand recycling or composting, reduce waste, reduce costs, and benefit the environment. ARR will continue to collaborate with the Office of Sustainability to improve the participation and effectiveness of this program.

4.2b Bright Green Futures Grant

Bright Green Futures is an educational grant competition for schools in Austin and surrounding cities. Multiple City of Austin departments, including ARR, fund the competition, and it is managed by the City's Office of Sustainability. Schools apply for a grant of up to \$3,000 to implement a project focused on sustainability. In 2021, more than 40 Austin area schools received grants for implementation of sustainability projects, including projects to develop recycling and composting programs for students.¹

4.2c Green Teams

ARR's Green Team is a group of City employees who voluntarily create zero waste and sustainability programming to encourage fellow employees to practice sustainability year-round. The Green Team uses community-based social marketing techniques to identify strategies for resource reduction and shares them with fellow ARR employees. The Green Team's leadership helped create a Citywide Green Team, which is a collective of employees from all departments who share and collaborate on sustainability programming and resources.

4.2d Administrative Policies on Sustainable Purchasing

The City has prohibited the use of City funds for single-use plastic water bottles, in non-emergency situations. The City also requires double-sided printing and recycled content in office paper. The City of Austin has a Sustainable Procurement Program that includes sustainability standards for furniture, janitorial supplies, and other miscellaneous supplies. ARR staff are working with the Office of Sustainability through the Circular City Program to continue to improve the City's Sustainable Purchasing Program and create new resources for departments.

¹ City of Austin. (2021) Bright Green Future Grants Awarded to 41 Austin-area Schools. Retrieved from: austintexas.gov/news/bright-green-future-grants-awarded-41-austin-area-schools.

4.3 Alignment with Austin Climate Equity Plan

Since 2007, Austin has planned for climate resilience and reduction in GHGs. In September 2021, Austin City Council adopted the Austin Climate Equity Plan following a two-year planning period. This plan established a new goal for Austin to achieve net-zero community-wide GHG emissions by 2040. Given that sustainable material management is a key part of addressing climate change, ARR has a significant role to play in pursuit of the goals and execution of the strategies laid out in the Climate Equity Plan. Below, we’ve highlighted some goals and strategies from the Climate Equity Plan which directly apply to ARR, and we have provided additional details as to how the Department plans to contribute to their achievement.

4.3a Transportation Electrification

Goal 1: By 2030, 40% of total vehicle miles traveled in Austin are electrified, and electric vehicle ownership is culturally, geographically, and economically diverse. This translates to approximately 460,000 electric vehicles on the road.

- Strategy 5:** Electrify public sector fleet vehicles
- North Austin transfer station (Chapter 8.0 / Facilities and Infrastructure)
 - Install additional electric vehicle charging stations at ARR facilities

4.3b Food and Product Consumption

Goal 1: By 2030, ensure all Austinites can access a food system that is community-driven, addresses food insecurity, prioritizes regenerative agriculture, supports dietary and health agency, promotes plant-based foods, and minimizes food waste.

- Strategy 4:** Conduct a food waste root cause analysis
- Work with the Office of Sustainability to conduct a food waste root cause analysis.

Goal 2: By 2030, reduce greenhouse gas emissions from institutional, commercial, and government purchasing by at least 50%.

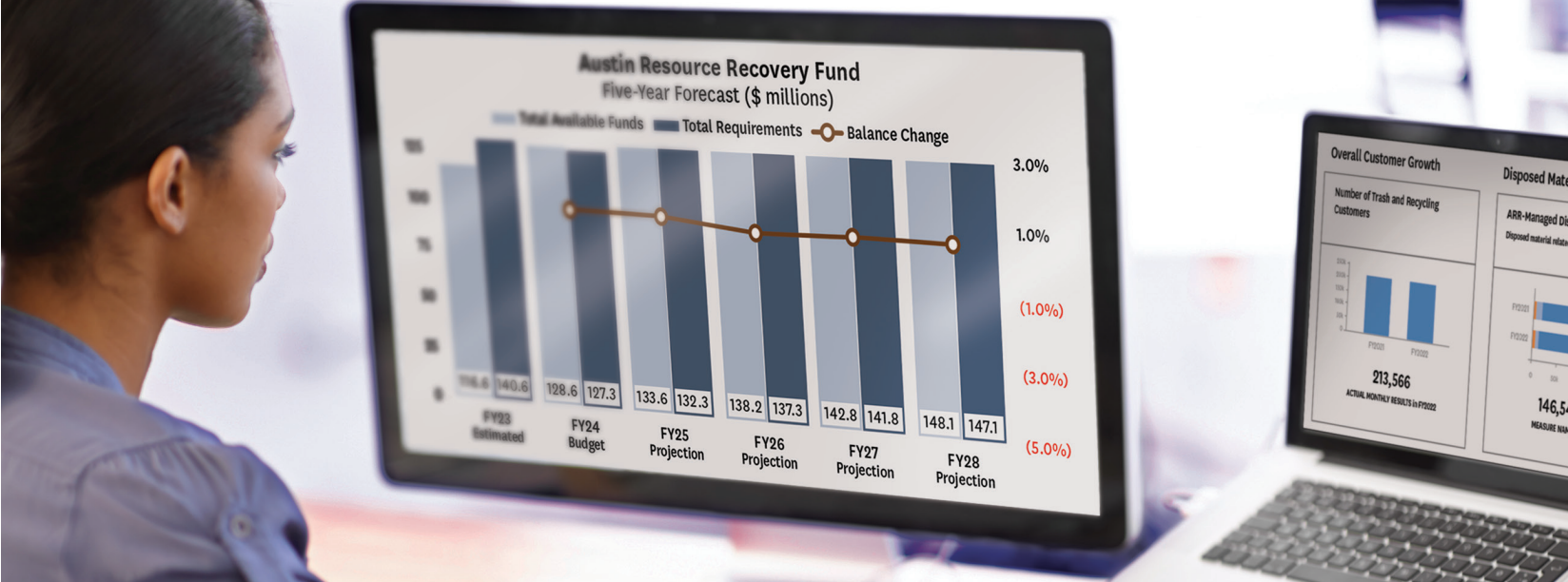
- Strategy 2:** Strengthen the City’s sustainable purchasing program
- Circular City Program (Chapter 6.0 / Circular Economy)
 - Environmentally Preferable Purchasing Program Guide
- Strategy 4:** Expand the City’s Circular Economy Program (Chapter 6.0 / Circular Economy)
- Circular City Program
 - Expand public tools for donation and reuse

- Expand [Re]Verse Pitch to include Circular Showcase
- Support traditional businesses in adopting circular business models
- Sustainable Innovation Demonstration Program

Goal 3: Aggressively pursue waste reduction, organics composting, and recycling to achieve a new zero waste goal following adoption of the new Austin Resource Recovery Zero Waste Plan.

- Strategy 1:** Promote waste reduction and reuse
- Launch a zero waste awareness campaign (Chapter 7.0 / Engagement)

- Strategy 5:** Retool the bulk pick-up collection program
- Expand the on-call bulk collection pilot (Chapter 11.0 / Community Services)
 - Develop a furniture reuse bank (Chapter 6.0 / Circular Economy)



Chapter 5

Metrics and Measurements

NEAR-TERM GOALS (0-5 YEARS)	
Conduct routine measurement of per capita disposal rate and capture rate, and track over time, aiming for continual improvement	
Require accurate data measurements in all waste collection contracts	
Continue to track diversion rate as a measure toward zero waste	

5.1 Overview

The City of Austin primarily measures progress towards its Zero Waste Goal by calculating diversion rate. The City also collects data on residential recycling, composting, and trash through contracts with private processors. Data collected for Austin’s commercial and multifamily waste stream is reliant on periodic third-party studies or self-reported data from the property’s responsible party.

5.2 Metrics for Measuring and Tracking Waste

5.2a Disposal Data Sources

The City of Austin collects accurate and consistent data for the residential services it provides because sharing this information is contractually required of the hauler and/or processor. This is not the case for most of the City’s waste stream which is collected by private haulers in an open market. Private haulers hold proprietary data that many companies are reluctant to share with government officials, as this data may become public record and be used by competing hauling companies. As a result, the City of Austin’s ability to collect consistent and accurate data on the commercial and multifamily waste streams is limited to three current systems.

- **Contracted third-party studies.** Studies contracted by the City take random samples of material and extrapolate findings citywide. These studies provide valuable data to the City but happen infrequently due to the significant cost, voluntary cooperation by private processors for site access, and impact to staff managing these studies and contracts.
- **Self-reported data from multifamily and commercial properties.** Business and property owners provide information (e.g. dumpster size) to the City annually to show how they are meeting ordinance requirements. The City does not alter this self-reported data and can only seek correction or enforcement on incorrectly reported data. Given the large number of properties in Austin and limited Department staff size, full annual audits are not currently possible.
- **Licensed hauler self-reporting.** This program places minimum requirements on private haulers to obtain an annual license to operate in the city, including providing semiannual tonnage reports to the City.¹ As with other self-reported data, this information is not verifiable and not always accurate. Additionally, private haulers’ service areas commonly span across city limits. This makes it difficult to determine how much of the tonnage hauled by private entities originated in Austin, as opposed to a neighboring city.

¹ In addition to semiannual tonnage reports, licensing requirements for private haulers include insurance certification, vehicle inspection certificates for each vehicle, and an annual vehicle license fee of \$395 per vehicle.

5.2b Diversion rate

Diversion rate reflects the percent of waste diverted away from landfills for a higher and better use. Diversion rate was the prevalent method of zero waste measurement in 2011, but the industry has grown, and methods of measurement have become more sophisticated in the past decade. Austin has a diversion rate comparable to other high performing cities in the U.S. with zero waste goals (Table 5-1). A comparison of zero waste diversion rates is useful for broadly assessing the relative progress of cities; however, the degree of comparison among cities’ diversion rates is limited due to differences in:

Material types and factors considered. When calculating diversion rates, the material types considered vary significantly among benchmark cities. Use of waste source reduction within a diversion rate is not universal among peer cities; only three of the cities — Austin, Los Angeles, and Seattle — estimate source reduction within their diversion rate calculations.

Generators considered. Not all benchmark cities’ diversion rates include the same generators. Among the cities with the highest diversion rates, diversion rate calculations considered at least two of the following sectors: commercial, multifamily, and construction and demolition. Encouraging or requiring residents and businesses to participate in the same or similar diversion practices at home and work can make an impact in improving diversion rates.²

Methodology and policy. There is variation among cities in how diversion rate is calculated. Outside policies, such as enforced mandatory recycling or material disposal bans, impact diversion rate. Benchmark cities with diversion rates greater than 50% enforce mandatory recycling.

Number of years of commitment to zero waste. How long ago a city adopted a culture of zero waste correlates with its diversion rate. As an example, California’s State Legislature set forth diversion goals for its cities in 1986, establishing a culture of zero waste for cities like Los Angeles, San Diego, and San Francisco more than 35 years ago. By comparison, cities like Austin, Minneapolis, Phoenix, and San Antonio have pursued zero waste for fewer than 20 years.

Table 5-1: Benchmark City Diversion Rates

City	Published Diversion Rate	
	Percent	Year ¹
Los Angeles	76%	2011
Portland	70%	2015
San Diego	65%	2018
Seattle	57%	2018
Austin	37%	2020
Minneapolis	37%	2016
Phoenix	36%	2019
San Antonio	36%	2019
Fort Worth	30%	2018
Denver	23%	2019
Boston	21%	2019
Dallas	21%	2016
San Francisco	City does not use diversion rate ²	N/A

1 .Published diversion rates represent each city’s most recently published rate as of Spring 2019.
2. San Francisco has discontinued use of diversion rates as a means of measuring diversion and progress towards zero waste. The City tracks total waste generated and the proportion landfilled and incinerated with the goal of 15% source reduction and 50% disposal or incineration by 2030.

Table 5-2: 2020 Diversion Rate

2020 Waste Generation in Austin (tons)		
	ARR Collected	Citywide
Total Generation (tons)	265,042	2,448,143
Total Disposal (tons)	159,560	1,527,621
Total Diversion (tons)	105,482	920,522
Diversion Rate	39.80%	37.60%

² Communicating a consistent zero waste message citywide is a key tactic that ARR will emphasize in the near term. Further discussion of ARR’s messaging campaigns is provided in Chapter 7.0 / Engagement.

Table 5-3: ARR Managed Diversion Rate

2020 ARR Managed Materials	
Disposal	
ARR Residential Trash	140,546.00
Recycling Residue	12,576.65
Organics Residue	931.29
Bulky Collected	5,506.00
Recycling	
ARR Curbside Recycling	65,164.00
Residue (19.3% of ARR residential Rec.)	-12,576.65
ARR RRDOC Total Tonnage	1,809.89
Organics	
ARR Residential Organics	50,340.00
Organics Residue (1.85% of Organics)	-931.29
Brush	1,676.00
ARR Diversion Subtotal	105,481.94
Total Generation	265,041.89
Diversion Rate	39.80%

5.2c Capture Rate

Capture rate is defined as the percent of diversion program materials (i.e., recycling and composting) within a sector that are successfully diverted from landfill. A capture rate provides insight on the program’s ability to target key recyclable or compostable materials. Using the capture rate of individual materials, the City can identify materials to focus on in education and outreach efforts and directly measure the success of such campaigns. This might include cart audits and contamination notices. Cities including Denver and Atlanta have used capture rates to measure the success of educational campaigns and reduce contamination.

As shown in Tables 5-2 and 5-3, Austin’s residential curbside program captured approximately 65% of accepted recyclable material from its curbside recycling program in 2020, corresponding with a 39.3% residential diversion rate. Materials with the highest capture rates were corrugated cardboard (92%) and mixed paper (78%). The materials with the lowest capture rates were fats and oils (0%) and meats (6%).

Table 5-4: 2020 Residential Capture Rate of Accepted Items
(Tons Per Year Collected)

2020 Recyclable Materials Capture Rate					
Recyclable Material Categories (tons/year collected)					
Accepted Recycling Material	Trash Generation	Recycling Generation	Compost Generation	Total Generation	Capture Rate
Mixed Paper	1,803	6,338	25	8,166	78%
Corrugated Cardboard	1,898	24,306	170	26,375	92%
Other Paper	9,415	11,218	1,295	21,928	51%
Paper Subtotal	13,117	41,861	1,491	56,469	74%
PET #1	2,703	2,933	17	5,653	52%
HDPE #2	1,130	1,270	1	2,401	53%
LDPE #5	16	33	0	49	67%
Rigid Plastic (#3 & #5)	2,065	679	24	2,768	25%
Other Plastics (#7)	357	114	3	473	24%
Plastics Subtotal	6,270	5,030	44	11,344	44%
Aluminum	2,275	1,588	3	3,867	41%
Ferrous Metal	803	601	1	1,404	43%
Other Metal	2,738	610	3	3,351	18%
Metal Subtotal	5,816	2,799	7	8,622	32%
Glass Jars and Bottles	2,943	7,033	11	9,988	70%
Other Glass and Ceramics	215	45	3	264	17%
Glass Subtotal	3,158	7,079	15	10,252	69%
Recyclable Materials Total	28,362	56,768	1,558	86,688	65%
Compostable Material Categories (tons/year collected)					
Meats	835	22	52	909	6%
Fruits and Vegetables	946	0	263	1,209	22%
Fats and Oils	41	0	0	41	0%
Unpackaged Food Wastes	16,835	105	2,223	19,163	12%
Food Subtotal	18,657	126	2,538	21,322	12%
Compostable Paper	14,150	1,175	1,275	16,599	8%
Yard Wastes	2,794	135	42,895	45,824	94%
Compostable Wood	1,478	179	1,088	2,745	40%
Other Organics/ Combustibles	404	9	176	589	30%
Compostable Materials Total	37,483	1,624	47,972	87,079	55.10%

Table 5-5: 2022 Residential Composition of Curbside Organics Collection

Material	Percentage of Total
Yard Trimmings	86%
Food Waste	9.38%
Soiled Paper/Cardboard	3.18%
Compostable Subtotal	98.56%
Total Contaminants	1.44%
Total	100%

5.2d Per Capita Disposal Rate

Evaluating disposal on a per capita basis allows a city to compare its waste reduction progress over time. Even as the total tonnage of trash generated by residents changes due to increases or decreases in the population, a city would be able to compare its progress year-over-year by measuring per capita disposal.

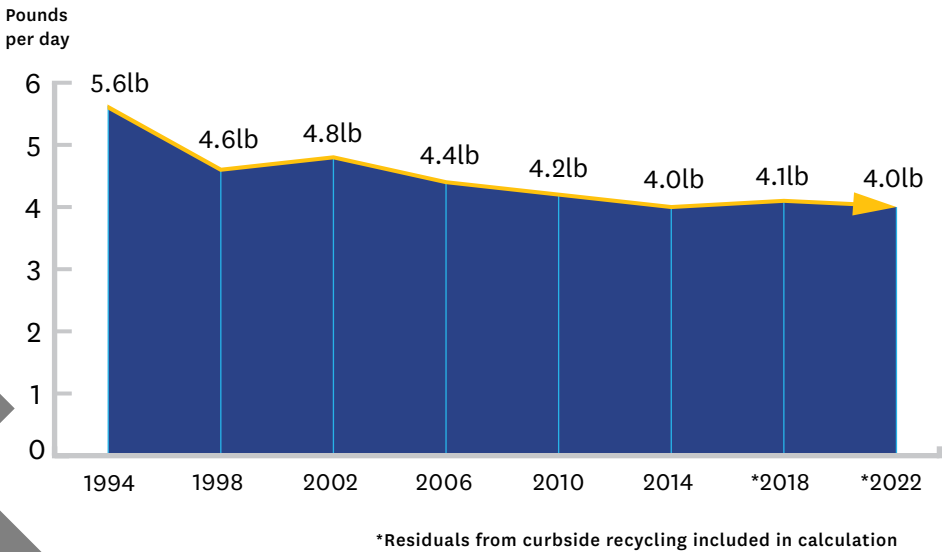
Government counterparts at the state and federal level, namely the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA), have been tracking per capita disposal rates for decades. TCEQ includes construction and demolition waste, while the EPA excludes construction and demolition waste from their respective calculations. As a result of this difference in calculations, the federal level shows much lower per capita disposal rates. For example, for 2018, the national average per capita disposal rate reported by the EPA was 2.4 pounds disposed/person/day, while Texas reported a state rate of 7.2 pounds disposed/person/day.

TCEQ has seen an upward trend in the state’s per capita disposal rate since the mid 1980s, and the EPA’s national per capita disposal rate has remained relatively unchanged since 2000. It is worth noting that data at the national level may not be able to depict accurately the trends happening at the state, regional and local levels.

ARR will commission for a waste characterization study to measure Austin’s citywide per capita disposal rate every 3 years to measure progress and set appropriate goals related to disposal. Data is not readily available for ARR to conduct this type of study on a more regular basis. This limitation is due to the fact that landfills in the surrounding region do not take waste exclusively from Austin; therefore, raw tonnages from these landfills do not accurately represent the disposal of Austin. Dedicated studies would be able to separate the sources of material and provide accurate data for our community.

The data that is readily available is ARR’s curbside services tonnages. Using data from ARR-serviced households, we see an overall downward trend in the per capita disposal rate since 1994.

Figure 5-1: Per Capita Disposal Rates for ARR-hauled material



ARR will continue to track the per capita disposal rate of its customers on a yearly basis to make programmatic decisions based on trends observed. ARR will aim to maintain a per capita disposal rate of 4 pounds disposed per ARR-serviced household per day. A long-term visionary goal of 1 pound disposed per ARR-serviced household per day is the ideal. Trends in packaging design that increase the use of disposable non-recyclable plastics make maintaining the disposal rate challenging. Building awareness with the public of the magnitude of the plastic packaging problem is a priority for the department to tackle this problem. The state of California has never had a disposal rate lower than 4.3 pounds per resident.

Per capita disposal is deeply connected to consumption, which has increased at unprecedented rates in recent decades at the local, state and national level. To maintain this per capita disposal rate, ARR will need to counteract the current consumption culture, which is no small task.

Table 5-6: Alignment of Alternative Metrics to the City’s Zero Waste Components

Zero Waste Component	Metric for Evaluation	Calculation Method¹	Indicators of Progress
Reducing the generation of wasted materials at the source	Per capita diversion and disposal (generation) rate²	$\frac{(\text{Total Diverted} + \text{Total Disposed})}{\text{Population Served}}$	Decreasing trend in per capita generation rate
Maximizing diversion methods	Capture rate	For each recyclable material (e.g., aluminum cans): $\frac{\text{Amount Recovered}}{(\text{Amount Recovered} + \text{Amount Disposed})}$	Capture rate approaching 90 – 100%³ suggesting recycling is <u>maximized</u>
Avoiding landfill and incinerators	Per capita waste disposal rate	$\frac{\text{Total Disposed}}{\text{Population Served}}$	Decreasing per capita disposal rate⁴

1. For population-based calculations, the population served should be equivalent to the population represented by the tonnage of material in the numerator (e.g., tons disposed, tons diverted).

2. The City’s per capita generation rate can be determined using data calculated from diversion and per capita disposal rates.

3. In current practice, capture rates of 100% are likely unattainable due to contamination and inefficiencies during product use and within the recovery system (e.g., incorrect sorting by residents, limits to equipment, food-soiled materials).

4. Based on current societal activity and product/packaging manufacturing, there will continue to be a portion of the waste stream that is not recyclable. As a result, landfills or incinerators will have a role in safely managing society’s waste in the near-term, while continually increasing the extent to which landfill and incinerators can be avoided. Currently, nationwide analysis suggests the maximum achievable residential and commercial diversion rate is 84% due to waste composition, lower than the +90% diversion rate requirement for zero waste. This analysis comes from the EREF presentation “Using Waste Characterization and Reporting Data to Assess State Goalsetting”: nyfederation.org/wp-content/uploads/2018/pdf2018/34%20KantnerD.pdf.

5.3 Challenges

- **Limited usefulness of diversion rate.** As detailed above, diversion rate has limited usefulness due to variations in how the metric is calculated. The industry and many municipalities are moving toward capture rate and per capita disposal rate to track zero waste progress because of these challenges.
- **Lack of accurate data from commercial and multifamily properties.** The City receives incomplete data from commercial and multifamily properties serviced by private haulers. This leaves significant margins of error in calculation of disposal behavior.

5.4 Near-Term Goals

- **Conduct routine measurement of per capita disposal rate and capture rate, and track over time, aiming for continual improvement.** Develop a system to calculate and track capture rates for specific routes and regions to allow for equitable education and response to residents and businesses.
- **Require accurate data measurements in all waste collection contracts.** Adopt contract language in all current and future waste management contracts that emphasizes requirements around accurate data measurements in order to address partly the current lack of accurate commercial and multifamily data.
- **Continue to track diversion rate as a measure toward zero waste.** Maintain consistent public messaging, including the goal to reach zero waste by the year 2040.



Chapter 6 Circular Economy

NEAR-TERM GOALS (0-5 YEARS)
Engage businesses, restaurants, and multifamily properties on the topics of circular economy, economic development, and City code
Research the ability of the City to manage a furniture reuse & recycling warehouse
Expand digital public tools for locating donation and reuse opportunities

LONG-TERM GOALS (5+ YEARS)
Research regional opportunities for business recruitment, expansion, and partnerships
Develop sustainable innovations demonstration project
Maintain City goals in alignment with commitments to the U.S. Plastics Pact and Ellen MacArthur New Plastic Economy
Expand zero waste programming at City facilities

6.1 Overview

In our current linear manufacturing system, virgin resources are extracted from nature, made into something, and eventually thrown away. This linear system negatively impacts natural ecosystems and human health, particularly in communities harmed by decades of environmental injustices.

In a circular economy, on the other hand, goods are designed to be reused, repaired, shared, recycled, and remade. Waste is designed out of the system. A circular economy aims to maximize the use of resources and goods, so that all people benefit. This way of doing business creates jobs by cultivating and using existing resources, retaining the value of materials that have already been extracted. Products are mindfully designed to maximize reuse, enable repair, or simplify recycling. With the proper support, waste (typically seen as an economic burden) can become an economic engine. A Texas Commission on Environmental Quality (TCEQ) study found the overall impact of recycling on the Texas economy exceeded \$4.8 billion in 2019.¹ A second study focused on Austin found that recycling and reuse-related businesses generated more than \$1 billion in local economic activity and approximately 6,300 permanent jobs in 2020.²

6.2 Circular Economy Program

Through a partnership between Austin Resource Recovery and Economic Development, The City of Austin offers multiple services to directly support the growth of circular economy businesses. These services aim to drive market demand, support job creation and local business growth, and attract regional investment within the circular economy industries. These efforts align with the City’s focus on attracting jobs for the hard-to-employ, supporting small business success, growing the manufacturing sector, and creating equitable economic opportunity for all Austin residents.

Austin's Circular Economy program relies on a network of community partners. Local workforce development, small business support, chambers of commerce, universities, and nonprofits are instrumental in the program’s success. Partnerships with incubators and accelerators have been particularly important as circular economy activity is increasingly prioritized.

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¹ Texas Commission on Environmental Quality. (2021) Recycling Market Development Plan. Retrieved from tceq.texas.gov/assets/public/assistance/P2Recycle/Recyclable-Materials/2021%20Recycling%20Market%20Development%20Plan.pdf.

² TXP, Inc. (2020) The Recycling & Reuse-Related Economy of Austin: An Update to the 2015 Austin Recycling Economic Impact Study. Retrieved from austintexas.gov/sites/default/files/files/TXP%20Austin%20Circular%20Economy%20Report%20July%202020_Final.pdf.

Austin uses six principles to define a circular business model. To be considered circular, a business must embody at least one of the first five principles listed below. The sixth principle, social impact, while extremely important, does not alone qualify a business as circular.

1. Product as a service: Renting, sharing, or leasing products to replace single-user ownership.
2. Product life extension: Using repair, refurbishment, donation, or other reuse methods to maintain products or find a second product user.
3. Waste as a resource: Using recovered materials as feedstock or processing recovered materials like recyclables or organic waste.
4. Circular design: Designing products for disassembly using modular and flexible design; designing out waste; redesigning supply chains or using the cradle-to-cradle model of material use.
5. Sustainable material innovation: Creating materials that are easier to recover by (1) increasing the product's durability (made-to-last), (2) using inputs that make items easier to recycle or compost, and/or (3) reducing or eliminating material toxicity.
6. Social impact: Supporting the social well-being and economic opportunity employees, supply chain partner's employees, or other Austinites, particularly those in underserved, marginalized, and historically disenfranchised communities, by (1) providing training or upskilling opportunities that support circular business practices; (2) teaching skills that reduce dependence on material consumption and empower citizens to conserve resources; and/or (3) removing or reducing barriers for clients or employees to participate in circular practices.

6.3 Austin's Existing Circular Economy Initiatives

6.3a Business recruitment and expansion

The State of Texas Local Government Code authorizes municipalities to offer incentives designed to promote economic development. The City of Austin uses this authority to recruit or expand businesses that fill a need in the regional circular economy. This could be a material processor, manufacturer using recycled commodities, or a business providing reusable takeout infrastructure. Incentive benefits can include wages and property tax reimbursement. Using this program has historically been difficult because it requires the business to site inside

city limits. Currently, there is no program to assist regional development that would bolster Austin's efforts and resiliency.

6.3b Business Retention and Engagement Services

Austin helps businesses looking to grow their circular models. This is done through no-cost, one-on-one consultations in navigating business incentives, workforce and talent, business connections, and city permitting. These consultations are different than traditional business engagements and can include identifying end markets for recycled or reused materials. The program features an in-depth interview with local businesses, exploring the unique challenges and opportunities in their company and industry.

6.3c [RE]verse Pitch Competition

An innovative annual competition focused on turning raw materials slated to become waste into the foundation of new business ventures. Local institutions and organizations pitch their mostly landfill-bound raw materials to entrepreneurs who compete to create a business idea that would repurpose one or more of the materials. Competitors are paired with mentors and have six weeks to rapidly prototype their concept before judges score their final submissions. The top four teams enter the Innovation Fellow Accelerator to receive a cash stipend for participating in specialized educational content and submitting deliverables on topics like market validation, business model, goal setting, and pitch prep. At the end of the Accelerator, the fellows receive entry into the Circular Austin Showcase to compete for additional prize money.

6.3d Circular Austin Showcase

This event connects circular economy businesses and entrepreneurs with potential investors in the region. Entrepreneurs and business owners pitch circular business ideas and meet with investors to grow their business. A panel of judges selects a winner who receives prize money to continue funding the business.

6.3e Circular Education

The program hosts industry round tables and workshops to provide networking opportunities and educational opportunities. The program also curates a monthly newsletter and an online resource guide for businesses and entrepreneurs. The team also hosts workshops in partnership with local incubators, accelerators, and university programs.

6.3f MoveOutATX

A program that brings convenient donation stations to students living off-campus near the University of Texas at Austin each summer during student move-out. Each year, thousands of pounds of material that would have been thrown into dumpsters or left at the curb are provided to local thrift stores and reuse organizations to be resold or given directly to clients and put back into productive use in the economy. This program is currently focused on the material created by students living off-campus near UT primarily given the density of students in the targeted areas, which staff research finds unparalleled compared to other higher education institutions in Austin. Additionally, most of the area’s leases historically have ended at the same time for all tenants, resulting in an annual public safety hazard that City staff would spend substantial resources addressing on a yearly basis. ARR is also open to advising other institutions that are interested in implementing their own student move out event using their volunteer network.

6.3g Fix-It Austin

A program designed to help residents repair everyday items at events called Fix-it Clinics. At Fix-It Clinics, residents reserve time with local repair experts to fix broken or damaged clothes, tools, appliances, and more. By repairing broken items instead of replacing them, Austinites can build confidence in future repair endeavors, save money, and learn new skills.

6.3h Circular City Program

A program established to increase circularity in City operations, including how the city purchases, uses, and handles items at end-of-life. The program aims to make changes to citywide policies and procedures and pilot projects to make progress in identified opportunity areas. It provides circular economy education to city staff and encourages sustainable purchasing. The program also includes and implementing minimum zero waste standards for City facilities.

6.3i Austin Reuse Directory

An online directory to help residents and businesses find outlets to donate, resell, rent, and repair items, while supporting Austin's reuse economy.

6.3j Global Plastics Commitments

The City has committed to national and global collaborative commitments to reduce plastic use, including the Ellen MacArthur Foundation’s New Plastics Economy and the US Plastics Pact.

6.4 Challenges

- **Business recruitment restricted to city limits.** The economy does not begin and end at the city limits. Therefore, regional support is needed for a circular economy. The rising costs of real estate in Austin can result in increased startup and operational costs for a processor or manufacturer. Austin’s Economic Development program is led by the City's Economic Development Department and is restricted to operation within the city limits. Developing end markets for recyclable commodities provides a regional benefit, but economic development collaborative support has historically been limited.
- **Limited public understanding of the circular economy.** For companies already in operation within Austin, it is common for existing circular economy practices to go unrecognized. Education and networking are key to expand a broader understanding of the circular economy definition and provide opportunity for networking to make meaningful connections among these businesses to help them succeed.

6.5 Near-Term Goals

- **Engage businesses, restaurants, and multifamily properties on the topics of circular economy, economic development, and City code.** Use outreach opportunities to provide an inclusive experience that reflects the full scope of City resources, minimum code standards, economic development opportunities, and recommendations on how to participate in a circular economy.
- **Research the ability of the City to manage a furniture reuse and recycling warehouse.** ARR staff have observed challenges that thrift organizations experience accepting donated furniture given the amount of floor space needed, and furniture historically is slow to sell meaning it takes up floor space longer. These factors influenced the creation of the Free Furniture Market as part of the 2022 MoveOutATX program, which successfully rehomed over 500 pieces of furniture at no-cost to residents in 4 days. The City of Houston runs a building materials reuse warehouse which offers donated building supplies to nonprofits in the region at no cost. ARR is exploring this concept for a furniture reuse warehouse to help fill this gap and keep large amounts of still usable material out of the landfill. Determine the staffing, resource, site placement, and economic impacts of implementing a furniture reuse warehouse that would accept used furniture from the community for reuse or recycling and create job opportunities for those facing barriers to employment or reentry into the workforce.³

³ A similar program exists in Houston. For more information, visit: houstonfurniturebank.org.

- **Expand digital public tools for locating donation and reuse opportunities.** Improve technical functionality of the Austin Reuse Directory (an online directory for donation, rental, repair, and resale options) and Austin’s Circular Economy Story Map (a visualization of businesses and organizations that participate in Austin’s circular economy). Optimize resources for mobile users. Perform ongoing maintenance and updates to keep information current and accurate. Spotlight online and mobile resources in outreach.

6.6 Long-Term Goals

- **Research regional opportunities for business recruitment, expansion, and partnerships.** Explore opportunities with the Austin Economic Development Corporation, Capital Area Council of Governments or other regional entities to collaborate or partner on business recruitment and expansion within the region.
- **Develop sustainable innovations demonstration project.** Create a streamlined process for the City to work with circular start-ups to demonstrate sustainable technologies through proof-of-concept projects that advance a zero waste goal. Look to Austin Transportation’s Smart Mobility division⁴ and the Vancouver Green and Digital Demonstration Project⁵ as models.
- **Maintain City goals in alignment with commitments to the U.S. Plastics Pact and Ellen MacArthur New Plastic Economy.**⁶ Submit annual reports tracking progress with long-term goals, including minimizing plastic packaging and developing sustainable plastics procurement practices.
- **Expand zero waste programming at City facilities.** Develop pilot projects to manage materials that could be reduced or put to higher and better use than the landfill. These projects can drive change in how the City operates, manages, and purchases materials and serve as a demonstration of best practices.

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⁴ For more information, visit: austintexas.gov/department/smart-mobility.

⁵ For more information, visit: vancouvereconomic.com/gddp/.

⁶ Austin joined the U.S. Plastics Pact and New Plastic Economy in 2021. For more information, visit: usplasticspact.org and: ellenmacarthurfoundation.org/the-new-plastics-economy-rethinking-the-future-of-plastics.



Chapter 7
Engagement

NEAR-TERM GOALS (0-5 YEARS)
Develop annual campaigns focused on building specific zero waste behaviors
Conduct outreach aimed at increasing the community’s understanding of zero waste
Launch additional social media platforms
LONG-TERM GOALS (5+ YEARS)
Expand community engagement to support multifamily residents
Grow engagement with limited English proficiency communities
Create route-specific, material-specific messaging
Collaborate with area governments on regional messaging
Build department brand recognition through a comprehensive public awareness campaign

7.1 Overview

For the City to reach its Zero Waste Goal, it must develop a clear, accessible, and engaging message on zero waste. As Austin Resource Recovery (ARR) develops new tactics and programs, the Department will need to adapt its messaging to ensure it educates Austinites on current best practices and available opportunities.

This chapter details ARR’s current engagement programs, including its messaging materials, branding guidelines, social media, Austin Recycles App, Zero Waste Block Leaders program, community engagement, and Customer Service Pro Center. It also describes next steps the Department plans to take to improve awareness of the City’s Zero Waste Goal and teach Austinites how they can help achieve this goal.

7.2 Current Programs

Messaging Materials

Using digital and print messaging materials, ARR’s Public Information Office (PIO) provides information in multiple languages to the community related to ARR’s collection schedule and facility hours, policies, curbside program materials, Circular Economy Program workshops, and other key details. Table 7-1 provides some examples of the messaging materials that ARR PIO has produced, organized by service category.

TABLE 7-1: MESSAGING MATERIALS

Messaging Category	Service Examples¹	Messaging Materials
Residential Curbside Collection Services	<ul style="list-style-type: none">RecyclingCompostingTrashBulkClothing and housewares	<ul style="list-style-type: none">Brochures describing collection schedules and acceptable cart materialsVideos communicating the benefits of recycling and compostingAustin Recycles App, which provides schedule and acceptable cart materials
Recycle & Reuse Drop Off Center (RRDOC)	<ul style="list-style-type: none">Household hazardous wasteElectronics and appliancesReUse StoreReBlend PaintPlastic bags, film, and foam	<ul style="list-style-type: none">Brochures with detailed information on what can be dropped off and picked up at the RRDOC and information on Austin ReBlend PaintRRDOC web page with information on services
Ordinances, Rebates, and Other ARR Services	<ul style="list-style-type: none">Universal Recycling OrdinanceConstruction & Demolition OrdinanceSpecial Events OrdinanceZero Waste Events OrdinanceCentral Business District recycling	<ul style="list-style-type: none">Fact sheets, postcards, and signsPostcards with instructions on how to get information in SpanishBrochures with detailed information on the C&D Ordinance
Circular Economy and Public Education Programs	<ul style="list-style-type: none">Fix-It ClinicsMoveOutATXBrownfields Revitalization[Re]Verse Pitch CompetitionGive a Great Story Campaign	<ul style="list-style-type: none">Circular Economy Story (interactive map of Austin’s Circular Economy)Enterprise Resource GuideInformational video on the Brownfields Revitalization Office

¹ Service examples provided do not represent all ARR services. Full descriptions of each of ARR’s services are provided throughout this Plan.

7.2a Brand Guidelines

In 2021, ARR Public Information Office developed brand guidelines to improve recognition of the Department, increase awareness of zero waste initiatives, and communicate messaging best practices internally. The branding guidelines strive to make ARR recognizable as more than a public utility.

Figure 7-1 and Figure 7-2 provide samples of messaging material meeting ARR’s brand standards, including consistent fonts and colors, high-quality photos, and standard use of logos. Figure 7-3 shows the brand pattern, including various design elements that ARR developed to speak to the experience of living in Austin and being part of the resource recovery movement.

Figure 7-1
ARR Messaging
Example
(Circular Meet-Ups)



Figure 7-2
ARR Messaging
Example (URO)

In addition to creating standards for illustrations and photos, the branding guidelines catalog approved logos, fonts, and colors provide best practices for internal communications and branded promotional products.



Figure 7-3 ARR Pattern and Design Sample

7.2b Social Media

ARR uses social media to promote waste reduction and increase diversion in pursuit of the City’s Zero Waste Goal. With more than 11,900 followers, the @austinrecycles Facebook page and Instagram account informs and engages Austinites through helpful reminders, event postings, service information, videos, and zero waste news. ARR also uses Nextdoor on a limited basis to communicate service changes and other important information. In an effort to grow its social media following and increase engagement, ARR is hiring a full-time staff member who will be dedicated to its social media communications.

7.2c Austin Recycles App

Available on the Apple App Store and Google Play, the Austin Recycles App allows customers to receive reminders about their curbside services, as well as alerts about collection delays or interruptions. Customers can also use the app to schedule appointments at the Recycling & Reuse Drop-Off Center and on-call bulk collection, and learn how and where to properly dispose of various types of unwanted items. The app currently has over 29,000 downloads. ARR will try to grow the app to be more fully encompassing of ARR services.

7.2d Zero Waste Block Leaders

Zero Waste Block Leaders (ZWBL), resident volunteers who are passionate about sustainability and zero waste, offer their time and knowledge to friends, families, and neighbors. They share information about recycling, composting, repurposing, and repairing. Block Leaders support staff at community engagement events to share information about Department services and to build zero waste awareness. More than 250 participants have attended a Zero Waste Block Leader orientation, which provides an overview of ARR services, accepted materials, and general zero waste knowledge. The ZWBL program currently has 307 active participants spread throughout all 10 City Council districts. The number of active participants has grown by nearly 9% within the current fiscal year. A few examples of participation accomplishments include contributions to community newsletters highlighting ARR messaging, the creation of a “Bin Buddies” program

encouraging composting by connecting those without compost with those willing to take their compost, assisting at ARR-led events, and participating in community events in their own neighborhoods. Through proposed improvements to the program, such as creating a volunteer log and implementing volunteer planning committees, ARR staff will be able to better monitor the needs of the program participants and adjust the program based on those needs.

7.2e Customer Service

ARR’s Customer Service Pro Center staff support residents by providing them with accurate information. The ARR Customer Service team members also support ARR’s operations staff as liaisons for ARR service-related issues and requests residents call in to the 3-1-1 call center. Team members assist the operations supervisors and leads by accurately dispersing escalated service requests according to service section (garbage, recycling, bulk/brush, etc.). The Pro Center also responds to citizen emails and service requests. The ARR cart crew and 3-1-1 staff depend on the Pro Center staff to accurately update or cancel customers’ requests.

7.3 Near-Term Goals

- **Develop annual campaigns focused on building specific zero waste behaviors.** Select target behaviors based on observed education needs in the community. Use data from audits and studies to inform messaging. Focus on a new behavior each year.
- **Conduct outreach aimed at increasing the community’s understanding of zero waste.** Build awareness of the concept of zero waste and its applications at the city and household levels. Make the term and concept of zero waste well understood by most people in the community.
- **Launch additional social media platforms.** Expand ARR’s social media presence to additional platforms. Assess effectiveness of new social media platforms using engagement data, including followers and user interaction with posts. Obtain approval from the City of Austin’s social media governing board for any additional platforms.

7.4 Long-Term Goals

- **Expand community engagement to support multifamily residents.** Create a program that recruits volunteer residents to provide recycling education to their neighbors, similar to the Zero Waste Block Leaders, with the aim of supporting and educating multifamily residents. Pair the program with efforts to encourage or require multifamily property managers to support diversion education and activities for their tenants.

- **Engage limited English proficiency communities.** Translate all messaging materials into the community relevant spoken languages in Austin. Follow up with targeted outreach to the communities where these languages are spoken using a comprehensive approach to focus on one specific community at a time. Engage with residents to better understand what channels are most effective and build trust and awareness. Add community engagement staff to achieve this goal.
- **Create route-specific, material-specific messaging.** ARR customers on collection routes with higher contamination rates will receive additional communication to educate and inform them about which items are accepted in the contaminated waste stream in an effort to minimize contamination. Information gathered from ARR’s annual material audits will be used to identify these areas. Additionally, capture rate data can offer insights into specific material types on specific routes that can be supported with education. Messaging can include mailed communications, cart tags, social media and more.
- **Collaborate with area governments on regional messaging.** Work with area governments in the Capital Area Council of Governments region to exchange and standardize messaging related to waste diversion. Create a consistent message across city and county lines to make recycling less confusing to people who may live, work, and travel in different cities in the area.
- **Build department brand recognition through a comprehensive public awareness campaign.** Develop an ongoing campaign to increase awareness of goals and programs centered around sustainability. Focus on under-utilized services and programs.

Consideration of municipal solid waste (MSW) disposal and processing facilities and infrastructure on both a regional and local level is essential for the future of material management for Austin.

8.2 City of Austin Resource Recovery Facilities

8.2a Closed FM 812 Landfill Management

The 360-acre FM 812 landfill is no longer accepting waste. Austin Resource Recovery (ARR) began a 30-year post-closure care effort in 2021 to meet the landfill site care and maintenance requirements of the Resource Conservation and Recovery Act (RCRA) Subtitle D.¹ This helps ensure that the FM 812 Landfill remains environmentally secure and that no adverse impact occurs from MSW, methane, or leachate. The 30-year post-closure requirements include:

- Maintaining the right of entry and rights of way
- Maintaining leachate collection system
- Maintaining methane collection system
- Conducting periodic maintenance to ensure integrity and effectiveness of final cover, fill area liner, facility vegetation, and drainage control systems

8.2b Rutherford Lane Campus (RLC)

ARR's Rutherford Lane Campus is in North Austin and houses the administrative divisions of ARR, including Finance, Human Resources, Quality Assurance, Customer Service, Strategic Initiatives, and the Offices of the Director and Assistant Director.

8.2c Kenneth Gardner Service Center and Service Center 12

The Kenneth Gardner Service Center (KGSC) is an ARR service center located in South Austin. The KGSC hosts operations staff, management, and support staff and provides parking and fueling for operations vehicles. The KGSC also includes Fleet Service Center 12, which provides maintenance to a portion of ARR vehicles and equipment. The KGSC is currently over capacity with no land area available for expansion.

8.2d Recycle and Reuse Drop-Off Center

ARR owns a seven acre parcel at 3810 Todd Lane. Facilities on this land were originally developed as a transfer station, then used as a material recovery facility (MRF). As a MRF it processed recyclables from a dual-stream collection system before ARR established a commingled single-

¹ Code of Federal Regulations. (1976) *Resource Conservation and Recovery Act (RCRA): Subtitle D - Nonhazardous Waste*

Chapter 8 Facilities and Infrastructure

NEAR-TERM GOALS

Conduct a planning and budget assessment to construct transfer stations

Develop a North Austin Recycle and Reuse Drop-Off facility

LONG-TERM GOALS

Identify alternative uses for the FM 812 Landfill

Develop necessary infrastructure to support electrifying the fleet

Develop a North Austin Service Center

8.1 Overview

Zero waste means reducing the generation of discarded materials at the source and maximizing diversion methods to avoid disposal via landfills and incinerators. Although disposal will decrease as new diversion programs are deployed, there is still a need to plan for disposal of material that cannot be reused, recycled, or composted.

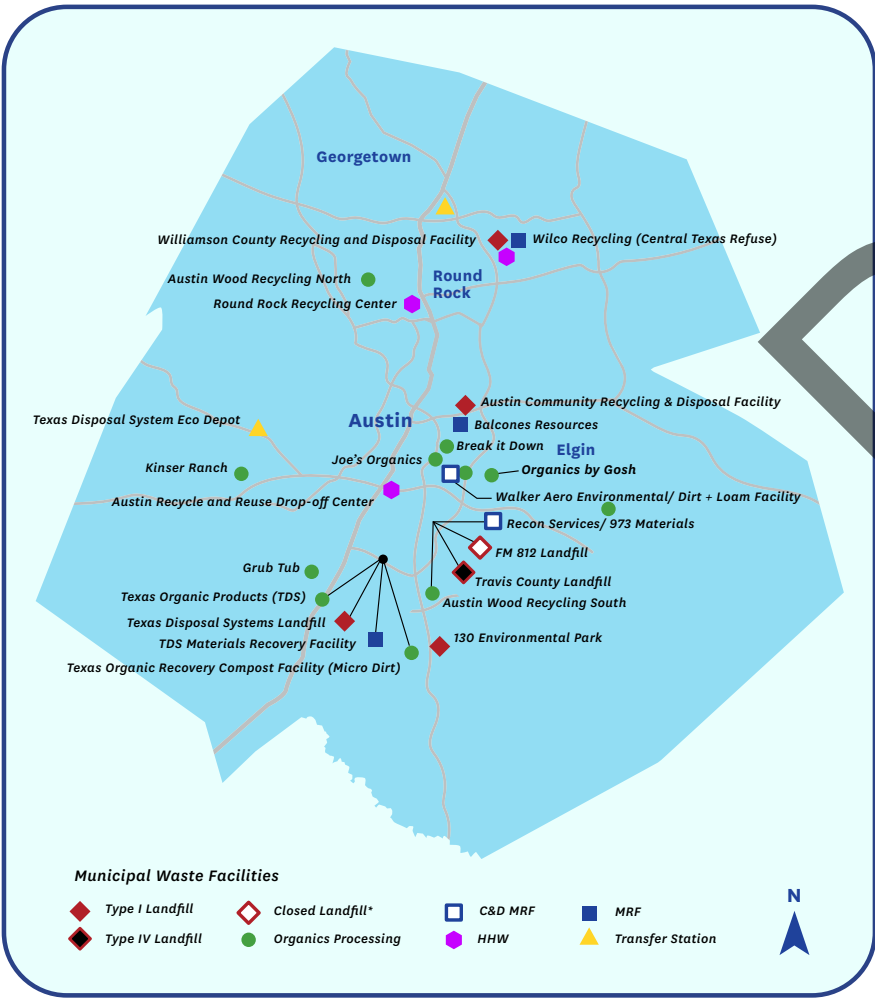
stream collection system in 2008. Following the transition to single-stream, the Todd Lane site was used to route vehicles and transfer material to a processing facility in San Antonio. In 2010, ARR began hauling material directly from collection routes to two MRFs and no longer used the Todd Lane site to transfer or process material. Today it serves as space for staff.

The Recycle and Reuse Drop-Off Center (RRDOC) is also located at Todd Lane. The RRDOC provides residents of Travis County and Austin proper disposal avenues for hard-to-recycle materials and household hazardous waste (HHW). Residents can drop of items for safe disposal, recycling, and reuse at this site.

8.2e Privately Owned Landfills and Processing Facilities

The City of Austin does not own an active landfill or processing facilities for recyclables. Hornsby Bend is the only City facility that processes organics. The City contracts with private companies to provide disposal and materials recovery services. At present, all trash collected by ARR is hauled to the Texas Disposal Systems (TDS) Landfill in Creedmoor, Texas. Recyclables are hauled to Balcones Resources in Austin and the TDS MRF in Creedmoor, and organics are hauled to and processed by Organics by Gosh, located in Elgin, Texas.

Figure 8-1: Map of Municipal Solid Waste Facilities in the Austin Area.



Landfill and recycling capacity in the region is sufficient to meet Austin’s needs at this time. However, the future is uncertain, and conditions change quickly depending on landfill expansion plans, population changes, and other factors. The Capital Area Council of Governments (CAPCOG) region, which includes Travis and nine other Central Texas counties, has 24 years of remaining landfill capacity. This is the second lowest in the state, despite being the fourth largest region by population. Development of a local transfer station, which will be discussed in the following section, could make accessible additional disposal options within and outside of the CAPCOG region.

8.3 Regional Transfer Stations

A transfer station is a facility where trash, recycling, and/or organic (compostable) materials are temporarily held and consolidated to haul to a landfill or processor by truck, train, or barge. The City of Austin does not currently utilize a transfer station; however, there are 2 transfer stations in Williamson County and one in Travis County (Table 8-1). Transfer stations are also common elsewhere in Texas: Houston/Harris County has 19, San Antonio has two, and the Dallas-Fort Worth metroplex has 17.

Table 8-1: TCEQ-Identified CAPCOG MSW Transfer Stations (2020)

Permit	Permit Holder/Site Name	County
119B	Texas Disposal System Eco Depot	Travis
40243	River City Rolloffs	Travis
466A	City of Georgetown Transfer Station (owned by the City of Georgetown / operated by TDS)	Williamson
2398	Lealco, Inc.	Williamson
40035	Burnet Transfer Station	Burnet
2300	Blanco County Transfer Station	Blanco
1787	Hays County Transfer Station	Hays

The City of Georgetown’s transfer station is owned by the city and managed by Texas Disposal Systems. The Lealco, Inc. transfer station is adjacent to the existing Waste Management Williamson County Landfill. There are other transfer stations in the area under various stages of planning and permitting, including a facility at the Austin Community Landfill owned by Waste Management. The scope of material these facilities would be able or willing to accept from Austin in the future is not known.

According to research conducted by the EPA, a transfer station becomes economically viable when the distance from collection to the disposal facility is more than 15 or 20 miles.² ARR currently delivers trash to the TDS Landfill in Creedmoor, Texas, which is south of Austin and approximately 30 road miles from the northern parts of the city. As our region continues to grow and volumes of trash, recycling, and organics increase, the development of a transfer station that can manage multiple material streams will become critically important to ARR’s ability to offer competitive service rates to residents.

By utilizing a transfer station, ARR will have flexibility to decide which disposal and processing facilities to use and would not be limited to using only those that are within direct-hauling distance of the collection operation. Without a transfer station, ARR will have limited disposal options when the current disposal agreement with TDS ends in 2030.

Developing a transfer station would also allow ARR to reduce travel times of its collection vehicles and therefore increase the lifespan of the collection fleet, minimize wear and tear on city roadways, and reduce the department’s carbon footprint. In the long-term, this could lead to a reduction in the number of collection vehicles, routes, and operational costs. Reduced travel distances could also facilitate the electrification of ARR’s fleet of collection vehicles — presently, the distances ARR’s collection vehicles travel are too far for existing electric trucks to manage.

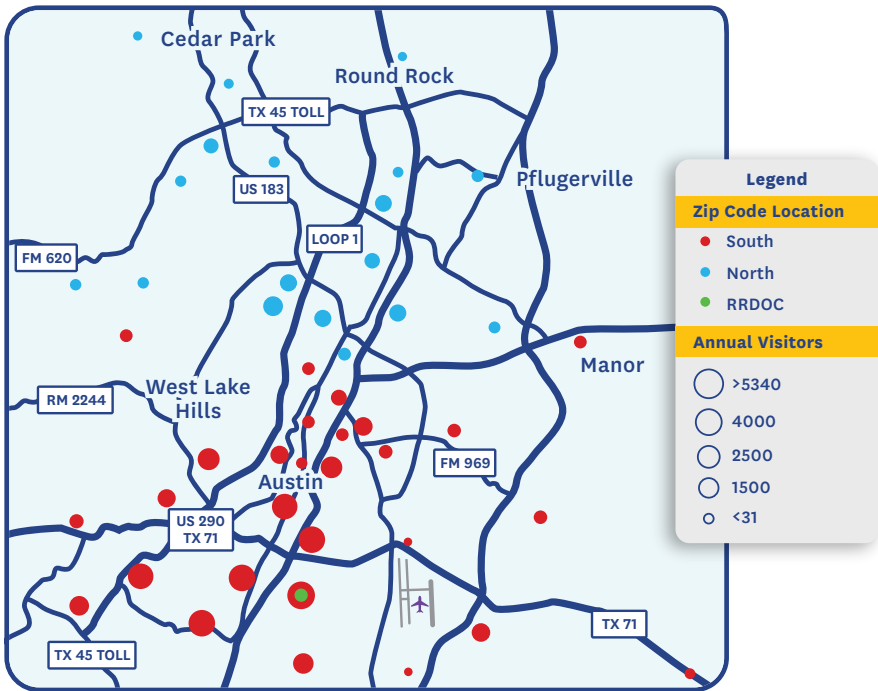
8.4 Challenges

- **Long travel distances from collection routes in North and West Austin to disposal.** Most landfills in the Austin area are located to the south and east of the city, meaning collection vehicles must travel long distances from their collection routes in North and West Austin to the landfill. These long distances increase fuel use and frequency of vehicle maintenance, in addition to putting more strain on the city’s roads. Long distances also limit the feasibility of electrifying the ARR fleet.
- **Geographic location of the Recycle and Reuse Drop Off Center limits its reach and effectiveness.** The RRDOC is located in South Austin. Given Austin’s overall size and population growth in the north and northwest regions, this location does not offer citywide convenience. As shown in Figure 8-2, although the RRDOC serves residents throughout Austin and Travis County, visitors are concentrated in South Austin. Of the 57 zip codes reported by RRDOC users in 2019, one-third of RRDOC visitors were from the four zip codes nearest to the facility, underscoring the role convenience plays in the willingness of residents to use the RRDOC for proper material management. As shown in Figure 8-2 and in Table 8-2, the overall RRDOC participation rate for households in the southern neighborhoods of Austin is

² U.S. Environmental Protection Agency. (2002) Waste Transfer Stations: A Manual for Decision-Making. Retrieved from: epa.gov/sites/default/files/2016-03/documents/ro2002.pdf.

three times higher than that of those in northern parts of Austin. This pronounced difference suggests that recovery of HHW and hard-to-recycle materials are more challenging in the north, likely due to the inconvenience these residents face in bringing materials to the RRDOC for proper handling or recycling.

Figure 8-2: Heat Map of RRDOC Customer Participation¹



1. Circle size indicates relative number of RRDOC visitors, by zip code

Table 8-2: Participation Rates for RRDOC Services (Percent of Households)

	Participation Rate (% of Households)	
	All RRDOC Services	Household Hazardous Waste (HHW) Service Only ¹
North Austin ²	9.6%	4.7%
South Austin ²	28.8%	8.5%
Citywide Total	20.8%	6.9%
Travis County Total	16.8%	6.0%

- 1. A typical household participation rate for HHW programs is 3.2%
- 2. For this analysis, North Austin and South Austin were defined based on an approximate 8-mile distance from the RRDOC, with Manor Expressway / Koenig Lane / RM 2222 used as the North-South boundary. This boundary is specific to this RRDOC location and differs from the traditional boundary used for ARR operations overall.

8.5 Near-Term Goals

- **Conduct a planning and budget assessment to construct transfer stations.** Determine the full costs and resources needed to build, maintain and operate transfer stations. Consider budget limitations that are likely in the future, and develop a plan to address the barriers.
- **Develop a North Austin Recycle and Reuse Drop-Off facility.** Provide residents in the northern parts of the city with a convenient HHW and hard-to-recycle drop-off facility with operations similar to the RRDOC. Explore capacity for additional diversion opportunities, especially reuse.

8.6 Long-Term Goals

- **Identify alternative uses for the FM 812 Landfill.** Research development options, including recreational uses (e.g., golf courses, nature parks, fields, and walking/biking trails), renewable energy generation, or zero waste research and education. Conduct a risk assessment to evaluate the site for safety of the proposed development. Seek local and state approval for redevelopment. Use the land or the funds from the land to benefit the City’s Zero Waste Goal.
- **Develop necessary infrastructure to support electrifying the fleet.** The department has interest in switching as many vehicles as possible in its fleet to run on electric power. In addition to larger facility needs, one specific need will be to build electric charging stations, perhaps in ARR facilities.
- **Develop North Austin Service Center.** Provide office and fleet space in north Austin for City staff similar to the south location at Kenneth Gardner Service Center. This facility should seek sustainable development and community benefit.



Chapter 9 Curbside Services

NEAR-TERM GOALS (0-5 YEARS)

- Optimize service efficiencies by expanding or improving on-board vehicle technologies, including routing software and global positioning system tracking
- Develop standards of service for multifamily properties with up to four units
- Expand on-call, door-to-door collection of household hazardous waste
- Conduct a pilot of on-call collection of large brush
- Conduct a resiliency assessment
- Expand on-call bulk collection

LONG-TERM GOALS (5+ YEARS)

- Assess container selection and collection vehicle designs
- Consider assessing fees for contamination

9.1 Overview

Austin Resource Recovery (ARR) provides the following curbside collection services for single-family homes and multifamily properties with four units or fewer:

- Trash (weekly)
- Composting (weekly)
- Recycling (every other week)
- Large brush (twice per year)
- Bulk items (twice per year and on-call)
- Clothing and housewares (on-call)
- Household hazardous waste (HHW) (on-call)

ARR will modify its current operating procedures to prevent fluidity in staffing from affecting service. Each supervisor will oversee their own geographic district or area, covering all waste streams.

9.1a Trash

The Department utilizes a pay-as-you-throw (PAYT), or variable-rate, fee structure for services based on the size of a household’s trash cart, with small carts costing less than the larger carts. ARR trash carts range from 24 gallons to 96 gallons (small, medium, large, and extra large).

9.1b Recycling

ARR collects single-stream recyclables (paper, cardboard, metals, glass, and hard plastics) from its curbside customers every other week. ARR provides customers with 96-gallon carts for recyclables.

9.1c Composting

ARR launched weekly curbside composting as a 14,000-household pilot in 2013. As of early 2021, the service is provided to every one of the more than 200,000 households the Department services. ARR’s curbside composting collection accepts food scraps, food-soiled paper, yard trimmings, and natural fibers. ARR provides customers with 32-gallon carts for compostable material.

9.1d Large brush

The curbside brush collection program provides City of Austin residential customers with a convenient and cost-effective way to dispose of and compost large brush, tree limbs, and trees. The program also helps to prevent illegal dumping. ARR takes collected items to the Austin

Water Utility’s Hornsby Bend Facility where they are used as a primary feedstock in Dillo Dirt. The Department also provides out-of-cycle brush collection for a fee to customers who may need immediate assistance in addition to the regularly scheduled twice-annual collections. Fees depend on the amount of brush set out. Alternatively, Austin and Travis County residents can drop off brush at the Hornsby Bend Biosolids Management Plant, free of charge.

9.1e Bulk items

The bulk collection program provides a convenient and cost-effective way for residents of Austin to dispose items too large for trash and recycling collection, such as appliances, furniture, lawn mowers, scrap metal, and tires. ARR is only able to divert tires from the bulk routes as most items are scavenged before crews can collect. By removing unwanted items, this service prevents illegal dumping and reduces the proliferation of disease-carrying pests, such as mosquitos and rodents. Customers needing immediate assistance outside of the regularly scheduled twice-annual bulk collections can schedule an additional on-call collection for a fee. Fees vary depending on the number of bulk items set out.

In 2018, ARR began an on-call bulk collection pilot program on two routes, temporarily removing these customers from the twice-yearly bulk collection service and instead offering each household three on-call collections of bulk materials per year. When a resident calls to schedule a collection, ARR requests information regarding the setout, with a minimum of two items per collection. Based on the response, ARR determines whether items in the setout can be diverted. Results of the pilot to date have demonstrated increased collection efficiency and more opportunities for material diversion. ARR is currently able to divert tires, some appliances, metals, and some electronics through the on-call program. Additional materials could be diverted in the future if outlets become available.

For both large brush and bulk collection, the Department sends direct mail postcards to notify customers in advance of the scheduled collection week and provide setout requirements. Collection dates are available on ARR’s website using the My Schedule feature.

9.1f Clothing and housewares

ARR offers on-call curbside collection of housewares, such as clothing, shoes, accessories, toys, and linens, through a contracted partnership with a nonprofit organization. A customer can schedule a pickup online and a collection bag will be mailed to them. The collection bag should then be set out on the scheduled collection day.

9.1g Household Hazardous Waste (HHW)

ARR provides on-call, door-to-door collection of HHW to seniors and disabled residents who may have difficulty accessing the Recycle and Reuse Drop-Off Center (RRDOC). ARR temporarily

expanded on-call, door-to-door collection service to all residents from December 2020 to March 2021 when the RRDOC was closed due to Austin being under Stage 5 COVID-19 risk-based guidelines. For more on HHW management, see Chapter 10.0 / Drop-Off and Reuse Services.

9.2 Challenges

- **Inadequate data collection.** Vehicle technology improvements are needed to support data collection. This will increase ARR’s ability to conduct data analyses, inform process improvements, and provide education.
- **Increased densification.** Austin has seen rapid development of multifamily and mixed-used properties. The increase in the number of residential units requiring carts that line the street on collection day, cars parked on the street, and narrowing of streets has resulted in increased collection challenges for the Department and staff.¹
- **Lack of standardization in service provided to multifamily properties with fewer than five units.** These properties are currently serviced by ARR or a private hauler contracted by the City. Variation exists in how service is provided to these properties, including the frequency of bulk pickup and access to landfill diversion.
- **Contamination.** ARR customers sometimes dispose of trash in their recycling or compost carts, contaminating those materials. Contamination can lead to higher costs for processing and result in compostable or recyclable material ending up in the landfill.
- **Scheduled biannual collections are inefficient.** Customers have indicated that they would prefer more than two bulk collections per year. The current system does not allow customers to dispose of large bulk items when necessary. Additionally, this process does not give ARR prior knowledge of what materials will be collected. ARR is only able to divert tires from the bulk routes as valuable items are typically scavenged before crews can collect. Without prior knowledge of what materials will be collected, ARR can’t plan for proper diversion of such a wide variety of materials. The on-call bulk pilot sought to find a solution to these problems and has been successful.

9.3 Near-Term Goals

- **Optimize service efficiencies by expanding or improving on-board vehicle technologies, including routing software and global positioning system tracking.** Consider adding cameras, mobile data tracking and telematics, scales, and fill-level

¹ See 11.4 for the goal that addresses this challenge.

sensors that monitor in real-time the location and amount of material present. Track individual resident or route information in a streamlined and convenient way. Use data collected to establish fuel-efficient routes.

- **Develop standards of service for multifamily properties with up to four units.** Update administrative policy and establish clear levels and types of service for these properties.
- **Expand on-call, door-to-door collection of HHW. Build on HHW on-call collection piloted in 2020/21.** Pilot curbside collection in two council districts for an initial term of two years. Evaluate the demand, cost-effectiveness, and potential fee structure of such a program.
- **Expand on-call collection of brush.** Assess the efficiency of an on-call collection model for large brush. Provide customers with flexibility by allowing them to set a collection date (for instance, customers in areas prone to wildfires could schedule brush collection ahead of wildfire season). Analyze the results of the pilot. Consider expanding the program citywide.
- **Conduct a resiliency assessment.** Determine what is needed to ensure the Department can provide service through severe weather and climate shifts. Take stock of preparedness and address any gaps.
- **Establish on-call bulk collection.** Expand existing pilot to a citywide program to increase convenience and diversion of materials.

9.4 Long-Term Goals

- **Assess container selection and collection vehicle design.** Consider adopting alternate containers to help proactively address contamination of recycling and compost in high-traffic areas (e.g., Central Business District). Evaluate collection vehicle designs that could accommodate narrow streets.
- **Consider assessing fees for contamination.** Research similar policies and programs in peer cities, including methods of identifying contamination. Determine whether it would be beneficial to implement fees for customers who repeatedly contaminate, i.e., place trash in their recycling or composting carts.



Chapter 10
Drop-off and Reuse Services

NEAR-TERM GOALS (0-5 YEARS)
Expand community collection sites
Explore additional collaboration opportunities with City departments for collection of household hazardous waste
LONG-TERM GOALS (5+ YEARS)
Explore regional household hazardous waste partnerships
Explore collaboration opportunities with private companies to improve management of hard-to-recycle materials and household hazardous waste

10.1 Overview

Hard-to-recycle materials include packaging foams and expanded polystyrene (EPS, colloquially referred to as “Styrofoam”), plastic film, textiles, and household hazardous waste (HHW), which further includes leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients such as paints, cleaners, oils, batteries, and pesticides. These materials require additional effort to properly dispose and recycle due to their toxic properties, specialized processing needs, and/or limited recycling markets. If improperly disposed, HHW carries significant risks associated with negative human health effects, landfill containment issues,

environmental issues, and contamination.

Austin Resource Recovery (ARR) collects and processes HHW through the HHW Facility at the Recycle and Reuse Drop-Off Center (RRDOC) and through a limited door-to-door collection program. Across Austin, more than 80 additional locations such as retailers, churches, schools, and libraries serve as drop-off points for hard-to-recycle materials like plastic film and batteries.¹ ARR also supports take-back programs provided by local businesses at 30 locations, primarily collecting batteries. The U.S. Environmental Protection Agency regulates hazardous materials generated by commercial businesses,² and private sector hazardous material haulers provide proper handling and managing of these materials.

10.1a Recycling and Reuse Drop-Off Center Operations

The RRDOC houses the HHW facility and serves residents of Austin and Travis County. The HHW Facility provides proper disposal and technical assistance to residents in order to ensure environmentally safe removal of hard-to-recycle materials and HHW from the waste stream. Residents can bring their unwanted HHW to the HHW Facility and safely dispose of or recycle them. HHW programs provide an avenue for the community to reduce the environmental and health hazards associated with hazardous wastes, pollutants, and contaminants and therefore protect the quality of air, land, and water.³ The RRC provides Austin and Travis County residents with drop-off services for hard-to-recycle materials.

The RRDOC, which is located in South Austin, received more than 58,000 visits in fiscal year (FY) 2022, with 53% of visitors using HHW services and 75% using RRC services. In the same fiscal year, over 2,600 total tons of material were dropped off at the RRDOC, including nearly 1,000 tons of HHW diverted for safe disposal. If the furniture bank becomes a reality, it’ll be managed by the Recycling and Reuse Drop-Off Center team.

¹ These additional drop-off locations include those that are not connected with ARR.

² Code of Federal Regulations. (1976) Resource Conservation and Recovery Act (RCRA): Subtitle C - Hazardous Waste.

³ The legal mandates for this activity are as follows: Texas Constitution Article XI, Section 5; City Code Chapter 15-6-1 and 15-6-47; National Pollutant Discharge Elimination System (NPDES) and Texas Pollutant Discharge Elimination System (TPDES) permits; and Texas Administrative Code 30 TAC 335 Subchapter N.

Table 10-1 lists those items accepted at the RRDOC


Table 10-1: Material Types Accepted at the RRDOC


Accepted items at RRDOC		
✓ Electronics, including computers and other appliances	✓ Batteries (car and household)	✓ Automotive products, including oil filters
✓ Fluorescent light bulbs	✓ Photographic chemicals	✓ Paint and thinners
✓ Pesticides and herbicides	✓ Pool chemicals	✓ Aerosol cans
✓ Household cleaning products	✓ Cooking oil	✓ BBQ and camping propane cylinders
✓ Cell phones	✓ Tires	


In 2021, ARR embedded a new scheduling tool on the ARR website and in its mobile app to allow residents to schedule drop-off appointments at the RRDOC. This tool allows residents to inform staff what items they will be dropping off and controls traffic through the facility.


Recycle & Reuse Drop-off


EnglishShare


Calendar


What do I do with...

Bulk pilot

Drop off

HHW

Brush pilot

Game

Please type your home address:

Search

10.2 Additional Hard-to-Recycle Material Collection Pathways

Austin offers the following collection pathways for residents to recycle hard-to-recycle materials, either through ARR, a community organization, or a company:

Expanded polystyrene/packaging foam (“Styrofoam”). Drop off at the RRDOC. Additional opportunities found in the Austin Reuse Directory.⁴

- **Plastic film.** Drop off at the RRDOC and more than 55 grocery and retail locations.
- **Batteries.** Drop off at the RRDOC and more than 80 libraries, retailers, churches, schools, City buildings, offices, and retirement homes.
- **Electronics.** Drop off at the RRDOC, twice-annual bulk collection, on-call bulk collection, and extended producer responsibility for TVs and computers. Additional opportunities found in the Austin Reuse Directory.
- **Paint.** Drop off at the RRDOC. Additional opportunities found in the Austin Reuse Directory.
- **Textiles.** Drop off at the RRDOC, **scheduled curbside collection.** Additional opportunities found in the Austin Reuse Directory.

ARR also provides on-call door-to-door collection of HHW for seniors and disabled residents that may have trouble accessing the RRDOC. See Chapter 9.0 / Curbside Services for more information on this service.

10.2a Reuse Services

The RRDOC provides free products (e.g., cleaners, paint, gardening products, usable household supplies) for the public to pick up. In FY 2019, over 400 tons of free material were picked up, including ReBlend Paint (latex paint that is re-blended on site), mulch, and items at the ReUse Store.

10.2b Austin ReBlend Paint

Up to 70% of the material collected annually by the RRDOC is unused paint, and approximately 70% of this unused paint is latex paint. RRDOC staff blend most of this paint to create a product called Austin ReBlend, a 100% post-consumer, low volatile organic compound (VOC) latex paint. ARR staff inspect the paint before it is chosen to be used in Austin ReBlend. Trained personnel then consolidate, blend, filter, and pack the paint on site to ensure a quality product. In FY 2022, the RRDOC collected over 258,000 pounds, or about 26,000 gallons, of unused latex paint for the ReBlend program.

⁴ Further detail on the Austin Reuse Directory is provided in Chapter 6.o / Circular Economy.

Austin ReBlend Paint is available in multiple colors. Austin ReBlend is available at no cost to other City departments and for residential or nonprofit use.

Austin ReBlend is a sustainable choice for the following reasons:

- Keeps leftover paint out of landfills
- Conserves water that would otherwise be used to make new paint
- Prevents pollution from the mining and extraction of raw materials
- Moves Austin further toward its Zero Waste Goal

10.2c ReUse Store

Many of the products received at the RRDOC, including unused HHW and other more durable goods, are in good, usable condition. Rather than pay to recycle or dispose of these items, ARR places them in the ReUse Store on site. This gives these products a second life and offers significant savings to the Department and the customers who frequent the ReUse Store.

10.3 Near-Term Goals

- **Expand community collection sites.** Make the proper management of various material types more convenient by increasing volumes and types of materials collected at existing or new drop-off sites. Designate areas and bins for collection of expanded polystyrene and foam, plastic film, and/or textiles. Prioritize visibility to increase public awareness of new and existing sites and decrease contamination.
- **Explore additional collaboration opportunities with City departments for collection of HHW.** Advise other City departments, as part of the Circular City Program and City of Austin Zero Waste Administrative Bulletin, on how to improve management of hard-to-recycle materials. Identify ways additional City facilities may become drop-off sites or expand their collection of hard-to-recycle materials.⁵

⁵ As a part of the Circular City Program and City of Austin Zero Waste Administrative Bulletin, ARR will also assist other City departments with initiatives related to material reuse and circularity. Additional detail related to these initiatives is described in Chapter 6.0 / Circular Economy.

10.4 Long-Term Goals

- **Explore regional HHW partnerships.** Work with governmental peers at the county, city, and state level to establish a regional approach to providing HHW services. Develop an HHW task force. Study the gaps in access to HHW facilities. Collaborate on solutions to improve access from a regional perspective.
- **Explore collaboration opportunities with private companies to improve management of hard-to-recycle materials and HHW.** Reference Austin Transportation Department’s Smart Mobility Office’s public-private-partnership (P3) model that focuses on testing technology in real-world applications. Investigate technologies for management of hard-to-recycle materials and HHW, including recycling of new material types, improved storage and reuse of materials, and source reduction through technology and innovation.

because in addition to serving the City of Austin, the Division provides services to some additional communities paying the Clean Community Fee.

To better prepare for uncertain events and improve citywide diversion, ARR has implemented the following plans and programs within the past five years:

- Storm Debris Management Plan
- Public recycling collection
- On-call bulk collection

This chapter describes the current and planned programs, policies, and infrastructure related to Litter Abatement.

11.1a Litter Control

Litter Control services include litter removal, litter container management, and illegal dumpsite cleanups. These services ensure cleaner streets, limit discarded materials from entering stormwater systems, and present a cleaner image of the city to its millions of annual visitors.

The Litter Control program provides services in the Central Business District each morning, 364 days per year, with no activity on Christmas Day. Litter crews use backpack blowers to remove litter from sidewalks and remove trash and recycling from more than 600 public right-of-way trash and recycle containers. After servicing the Central Business District area, the crews contribute to the cleanup of illegal dumpsites, public rights of way, and special projects. ARR will add a day time litter control team to maintain litter bins in the downtown area, monitor alleys for debris, and help address illegally dumped items around Austin.

11.1b Street, Boulevard, and Protected Bike Lane Cleaning

The Street Cleaning unit provides frequent street, boulevard, and bike lane sweeping throughout the city. The street sweeping system cleans the gutters and limits contaminants from polluting Austin’s creeks and drainage ways. Street sweeping removes discarded materials, litter, and dirt from streets and roadways for health, safety, aesthetic, and water-quality reasons. This unit cleans streets up to six times per year; thoroughfares, boulevards, and bike lanes twice per month; and streets in the Central Business District nightly.

11.1c Alley and Street Cleaning

ARR provides alley and street flushing services to wash contaminants from roadways in the Central Business District. This service limits the amount of discarded material entering stormwater systems, reduces disease transmission, helps with odor and pest issues, and provides a cleaner environment for those utilizing the Central Business District.

Chapter 11
Community Services

NEAR-TERM GOALS (0-5 YEARS)
Expand litter control services footprint
Consider establishing additional waste management districts
Develop a long-term operational strategy for encampment cleanups

LONG-TERM GOALS (5+ YEARS)
Develop a parking ordinance to clear roads for cleaning
Require composting of dead animals in contract for disposal
Identify and research emerging technologies that identify areas of litter concern
Conduct an autonomous sweeper pilot

11.1 Overview

The Austin Resource Recovery (ARR) Litter Abatement Division provides numerous services, including litter control, alley and street flushing, street/boulevard cleaning, dead animal collection, bulk collection, brush collection, Clean Creeks, and encampment cleanups. These daily services improve Austin residents’ quality of life by creating a cleaner community. The Litter Abatement Division services a larger customer base than the residential collection program



11.1d Dead Animal Collection

The City provides daily dead animal collection on public rights of way and from the Austin Animal Center. Additionally, residents can request ARR to collect dead animals from their private residential property after completing a consent form.

Any Austin resident may call 3-1-1 or use the 3-1-1 mobile app to request collection of a dead animal on an Austin public right-of-way. Dead animals can be placed at the curb in a bag or box for collection but should not be placed in the trash cart. ARR also works with other departments to remove dead animals in creeks, streams, rights of way, and parks. Dead animals are collected in a hermetically sealed vehicle and are taken to an area landfill for disposal.

Any identifying tags are removed from the animal and returned to the owner if possible. Also, a pet search option is available to assist residents in locating a lost animal.

11.1e Bulk Items Collection

The curbside bulk collection program provides a convenient and cost-effective way for residents of Austin and annexed areas to dispose of items too large for trash and recycling collection, such as lumber, appliances, furniture, lawn mowers, scrap metal, and tires. For more information on bulk collection, see Chapter 9.0 / Curbside Services.

11.1f Large Brush Collection

The curbside brush collection program provides City of Austin residential customers with a convenient and cost-effective way to dispose and compost large brush, tree limbs, and tree trunks. For more information on large brush collection, see Chapter 9.0 / Curbside Services.

11.1g Clean Creeks Program

City Council created the Clean Creeks program in a 2020 budget amendment to address growing concerns about litter in creeks. A study prepared by several City departments found that trash in Austin’s waterways comes primarily from littering, illegal dumping, large events, and homeless encampments. ARR collaborates with Watershed Protection to identify and prioritize sites for cleaning and maximize environmental protection, sharing best practices and data. Information from reports, field observations, and complaints helps determine new locations for the program.

11.1h Clean City Strategy

The City of Austin launched the Clean City Strategy in 2019 to address health and safety concerns for people experiencing homelessness. ARR partners with other City departments, including Public Works, Parks and Recreation, and Watershed Protection, to remove trash from encampments and maintain clean, hygienic public spaces.

The Clean City Strategy also includes the innovative interdepartmental strategies known as the Violet Bag program and the Violet KeepSafe Storage program. The Violet Bag program began as a pilot providing bags for trash accumulated at encampments. After policy changes made these encampments illegal, the number of Violet Bag stations was reduced. The Violet KeepSafe Storage program provides people experiencing homelessness with a safe place to store their belongings. ARR provided purple carts for the program, which is now managed by the Downtown Austin Community Court.

11.2 Challenges

- **Community growth and increased density.** Austin’s growth in population and density means more litter in public spaces. As such, the Department will need to increase litter abatement programming and use existing resources more efficiently.
- **Obstacles preventing operations staff from completing service.** Staff encounter challenges completing street cleaning and flushing services when parked cars block operations vehicles. Dumpsters, delivery trucks, potholes, and the presence of individuals experiencing homelessness can also prevent ARR crews from completing these tasks. Austin does not have an ordinance addressing parked cars on scheduled street cleaning days.

11.3 Near-Term Goals

- **Expand litter control services footprint.** Assess the need to expand the litter control container footprint to new areas with high foot traffic. Analyze the locations of current litter control containers to identify opportunities for more equitable distribution of resources. Partner with other City departments to determine where new containers would be most beneficial.
- **Consider establishing additional waste management districts in parts of Austin where density is increasing and waste collection has historically been challenging.** Research the establishment of waste management districts in areas of the city with specialized collection needs. Examples could include West Campus or Rainey Street.

- **Develop a long-term operational strategy for encampment cleanups.** Partner with other City departments to streamline and prioritize requests for encampment debris removal. Explore opportunities with community organizations to assist with abandoned encampment cleanups.

11.4 Long-Term Goals

- **Develop a parking ordinance to clear roads for cleaning.** Work with stakeholders to develop an ordinance prohibiting street parking during neighborhood sweep cycles and curbside collection. Partner with internal City stakeholder departments such as Transportation, Public Works, Police, and Code on an implementation and enforcement plan.
- **Require composting of dead animals in contract for disposal.** When going out for bid on the contract for dead animal disposal, include language that requires animals be composted in a facility permitted for composting animal remains.
- **Identify and research emerging technologies that identify areas of litter concern.** Partner with the private sector to identify applicable emerging technologies that can be used to pinpoint areas of litter concentrations.
- **Conduct an autonomous sweeper pilot.** Explore opportunities to utilize technologies that would allow for unmanned sweeping within protected bike lanes, parks, or rights of way.



Chapter 12
Universal Recycling Ordinance

NEAR-TERM GOALS (0-5 YEARS)
Explore implementation of a multifamily composting policy
Address valet collection services and diversion requirements
Increase URO compliance and enforcement resources

LONG-TERM GOALS (5+ YEARS)
Develop tiered URO service and diversion requirements
Investigate policy revisions that could allow commercial entities generating large amounts of organic waste to process food waste on site
Evaluate front-of-house diversion requirements

12.1 Overview

The Universal Recycling Ordinance (URO) allows the City to influence diversion of Austin’s commercial and multifamily waste streams. These waste streams are not directly handled by Austin Resource Recovery (ARR) and represent a significant proportion of the waste generated in Austin. The URO has played an integral part in improving diversion in sectors from which ARR

does not directly collect material. It has also played a role in normalizing diversion activities for businesses and multifamily buildings that may not otherwise have provided these services for their residents or staff. When developing and amending policy, including the URO, the City engages with community stakeholders to facilitate implementation and participation.

History

City Council adopted the URO (Ordinance 20101104-018) in 2010, with the first set of requirements going into effect October 1, 2012. ARR tiered the implementation of requirements based on the square footage of a business, with larger businesses being subject to requirements earlier than smaller businesses. Although Austin adopted the URO a decade ago, it did not reach its current state until 2018, following a period of phased-in organics diversion requirements for food-permitted businesses between 2014 and 2018.

Overview of Food Recovery

Organic material is material that will decompose naturally, such as yard trimmings, food scraps, food-soiled paper, and untreated wood. Organic material makes up the largest fraction of the waste stream at the national and local level. Nationally, organics make up about 31% of material going to landfills.¹ In Austin, approximately 37% of material going to landfill is organic.² When buried in a landfill, organic material does not break down as it would in nature or in a compost pile. Instead, it decomposes anaerobically (i.e., without oxygen) and becomes the main source of human-caused methane in the atmosphere.

Food can be diverted from the landfills to several outlets, depending on its state. ARR promotes the use of the Food Recovery Hierarchy developed by the U.S. Environmental Protection Agency to make the most out of surplus food. The Food Recovery Hierarchy, from most to least preferred, includes the following activities:

- Source reduction: Reduce the volume of surplus food generated.
- Feed hungry people: Donate extra food to food banks, community kitchens, and shelters.
- Feed animals: Divert food scraps to animal food.
- Industrial uses: Provide waste oils for rendering.
- Composting: Create a nutrient-rich soil amendment.
- Landfill/Incineration: Last resort for disposal.

¹ U.S. Environmental Protection Agency. (2020) Advancing Sustainable Materials Management: 2018 Tables and Figures. Retrieved from: epa.gov/facts-and-figures-about-materials-waste-and-recycling/advancing-sustainable-materials-management.

² Austin Resource Recovery. (2016) Austin’s 2015 Community Diversion Study. Retrieved from: austintexas.gov/diversion.

In addition to advancing Austin’s Zero Waste Goal, benefits of diverting organic material include:

- Reducing GHG emissions: By preventing organic material from ending up in landfills, we can achieve a reduction in methane emissions and decrease our carbon footprint. Source reduction of one ton of food waste provides 4.22 metric tons of carbon dioxide equivalent per ton (MTCO₂e /ton) of carbon mitigation.³
- Creating jobs: Zero waste and circular economy initiatives can generate a variety of jobs, from operational positions at a processing facility to entrepreneurial opportunities at an upcycling startup.
- Improving food security: The organic material that goes to landfills includes edible food that can sustain and nourish members of our community who are food insecure (meaning they do not know where they will obtain their next meal).

12.2 Current Requirements

The URO supports the City’s Zero Waste Goal by requiring affected premises to provide a minimum level of access to recycling, food donation, and composting options for residents and employees. The URO requires the following for:

- Multifamily properties with five or more dwelling units
 - Submit a recycling plan annually
 - Meet the minimum recycling capacity standard
 - Provide convenient access
 - Post landfill diversion signs
 - Educate employees and residents
- Commercial properties
 - Submit a recycling plan annually
 - Submit an organics plan annually, if business has a food permit
 - Meet the minimum recycling capacity standard
 - Offer food donation or composting to employees, if business has a food permit
 - Provide convenient access
 - Post landfill diversion signs
 - Educate employees

³ U.S. Environmental Protection Agency Office of Resource Conservation and Recovery. (2020) Waste Reduction Model (WARM), Version 15. Retrieved from epa.gov/warm

12.3 Progress

The URO has driven an increase in diversion activities within Austin’s commercial and multifamily sectors and has supported progress toward the City’s Zero Waste Goal. By requiring businesses to provide access to diversion opportunities and increasing education, understanding, and awareness of the City’s diversion goals and available diversion options, the URO has cultivated a diversion-focused culture at individual businesses and among the business community.

ARR evaluates the progress of the URO by measuring compliance with the URO service capacity requirements (i.e., affected premises providing minimum access to diversion options) and by measuring actual diversion rates for the commercial and multifamily sector.

ARR uses data from generators and haulers to track the impact and progress of the URO. The following subsections provide further detail related to those two data sources.

12.4 Generator-Provided Data

Annual Diversion Plans and Organics Diversion Plans provide ARR with data to assess compliance with the URO and analyze the types and extent of diversion activities practiced by the commercial and multifamily sector. Insights gained from these annual reports support ARR’s strategic planning efforts, including resource allocation related to the URO and commercial sector diversion activities. It is important to note that URO Annual Diversion Plans and Organics Diversion Plans provided by commercial and multifamily entities (generator-provided data) generally do not include material quantity data. Generators typically lack the ability or resources to provide tonnage data.

In fiscal year (FY) 2022, the submittal rate for Annual Diversion Plans was 85%.⁴ Ninety-nine percent of properties that submitted diversion plans reported recycling activity by volume, rather than by weight.⁵ Of the reporting properties, 98% met or exceeded the service capacity requirement for material diversion (50% by volume for commercial properties or a minimum of 24 gallons per unit per week for multifamily properties). The average diversion service capacity reported was 50.45%. In addition, 90.4% of food-permitted businesses reported compliance with URO requirements by providing one or more food waste diversion options to their employees.

⁴ Exact submittal rate of Annual Diversion Plans is difficult for ARR to calculate. The number of affected properties and the number of Annual Diversion Plans required is not a 1:1 ratio. For example, a property with a single Property ID may contain multiple businesses that are required to submit an Annual Diversion Plan, and therefore a single Property ID may be associated with multiple Annual Diversion Plans.

⁵ It is often a challenge for generators to measure generation or diversion by weight and weight-based data. Where weight-based data was reported, the data source was weight tickets obtained from contracted haulers. Due to the small number of generators providing weight-based data, compliance was not further evaluated for these businesses.

12.5 Hauler-Provided Data

The City estimates that the commercial sector produces 85% of trash, recycling, and organics generated within the city. Commercial and multifamily entities primarily obtain collection services through an open-market system in which entities contract directly with a private hauler. All private haulers must be licensed by the City, and the licensing program requires haulers to provide semiannual tonnage reports to the City. Private haulers must report tons of material they deliver to landfills, materials recovery facilities (MRFs), and organics processing facilities. Austin Code Department manages the licensing program, and Austin Police Department enforces it. ARR supports these departments by tracking reported tonnages. Education guidance has been developed for haulers to support their customers in complying with the URO, but there is no ordinance requiring haulers to develop and distribute education to their customers. More than 90 licensed haulers are active in the Austin market, with 11 companies currently hauling from URO properties.^{6,7}

Table 12-1 presents a summary of commercial and multifamily generation and diversion quantities, based on hauler-reported data from 2021. This data does not include material disposed or diverted by means other than hauler collection, including but not limited to self-hauled material and food donations.

Table 12-1: Commercial and Multifamily MSW Hauler Tonnage (2021)

Material Stream	Tons Collected	Percent of Total Collected
Landfill Trash	1,558,819	73.3%
Recyclables	471,492	22.2%
Organics (Total)	95,840	4.5%
Total Material Collected	2,126,151	100%

Hauler-provided data indicates Austin still needs to make significant progress to reach its Zero Waste Goal.

⁶ Based on the City’s list of licensed haulers as of September 2020 (austintexas.gov/page/licensed-haulers), there are more than 120 private haulers of varying size that provide landfill, recycling, and/or organics hauling services in Austin.

⁷ Eleven of the 120 licensed haulers have voluntarily shared details of their hauling services with the City (austintexas.gov/urohaulers).

12.6 Commercial Compliance Unit (CCU)

ARR hired two Code Compliance Officers for its Commercial Compliance Unit (CCU) in 2020. Officers contact responsible parties and conduct site visits to properties or permit holders identified as noncompliant by City staff or complaints. The goal of the CCU is to support ongoing public education and, when necessary, hold noncompliant businesses and permit holders accountable in municipal court.

CCU spent much of its first year creating internal procedures, developing a software system, and contacting potentially noncompliant properties. Prior to 2020, the City had limited opportunity to provide on-site visits from Code Compliance Officers, relying upon education alone to seek compliance.

CCU began URO inspections in early FY 21. As of December 2021, CCU had conducted 742 site visits, responded to five complaints, and followed up on 86 denied waivers.

12.7 Challenges

- **Variety in entities.** Commercial and multifamily properties of different types and sizes have unique needs and access to resources. In particular, food-permitted businesses affected by the organics diversion requirements of the ordinance vary significantly in terms of their size, resources, priorities, and the types of organic material they handle. Mobile food vendors, for example, may be difficult to track and require greater resources to ensure compliance. Given these variables, creating solutions that work for the greatest number of organic waste sources is challenging, and a uniform approach to URO requirements, reporting, education, and enforcement will likely not be effective for all businesses.
- **Unreliable data.** Unlike the residential sector, which ARR services, the City does not have direct access to tonnage data for the commercial and multifamily sectors. Each year, property owners and managers are required to submit plans showing how they are meeting ordinance requirements, and licensed haulers are required to submit tonnage reports. This data is self-reported by the party and unverified. The level of engagement and understanding of ordinance requirements varies and results in inconsistent reporting and reporting errors.⁸

⁸ For example, reporting forms for multifamily properties differ from reporting forms for commercial properties. In 2019, approximately 15% of multifamily properties submitted a commercial property reporting form, resulting in City staff being unable to calculate service capacity compliance for those properties.

Obtaining more accurate and consistent data would allow ARR to better evaluate the URO’s effectiveness. This data could also help to develop support for specific customers and targeted expansion of diversion efforts or requirements (e.g., non-food organics).

- **Code compliance beyond education.** ARR is responsible for conducting outreach, ensuring compliance with URO reporting requirements, and processing data from 17,000 properties every year. The City works year-round to identify and contact each of the responsible parties through multiple communication channels. To date, the Department has largely relied on education to seek compliance. Austin Code supported enforcement of the ordinance but was restricted in effectiveness due to limited resources. In 2020, ARR began hiring internal enforcement staff to support ordinance compliance.

12.8 Near-Term Goals

- **Explore implementation of multifamily composting policy.** Use the results of the multifamily composting pilot⁹, research from peer cities, and input from stakeholders to implement policies and/or programs that increase access to organics diversion for multifamily residents.
- **Address valet collection services and diversion requirements.** Update policy to reflect the lessons learned since ordinance adoption regarding multifamily valet collection. Require valet recycling where valet trash is provided.
- **Increase URO compliance and enforcement resources.** Continue efforts already in progress to increase enforcement resources, including staff and technology via the Commercial Compliance Unit. Consider changes to administrative processes to improve efficiency of enforcement.

12.9 Long-Term Goals

- **Develop tiered URO service and diversion requirements.** Establish base-level service and diversion activity requirements for all businesses. Require additional, tiered requirements for both recycling and organics based on criteria to be established by ARR — for example, type of business, size of business, and material generation rates. Consider special or alternative requirements for nonstandard business types, such as actively mobile food vendors. Consider adding organics diversion requirements for businesses that

⁹ From March 2021 to February 2022, ARR led an 8-property pilot testing composting at multifamily communities. Staff collected data on contamination, resident participation, costs, and best practices to inform future policy.

generate organic waste but do not have food permits.

- **Investigate policy revisions that could allow commercial entities generating large amounts of organic waste to process food waste on-site.** Consult with Austin Water to determine whether pulpers, liquefaction, or grinders could be used to divert food waste from the landfill without significantly impacting wastewater treatment operations.
- **Evaluate front-of-house diversion requirements.** Consider adding diversion access requirements for customers at commercial properties, in addition to existing back-of-house diversion access requirements for employees. Conduct research into the effectiveness of adding customer access to diversion streams and identify best practices for customer education and contamination reduction.



Chapter 13

Construction & Demolition

DRAFT

NEAR-TERM GOALS (0-5 YEARS)
Expand enforcement of the Construction & Demolition Ordinance
Consider requiring recycling of specific materials that have strong local end markets
Assess potential changes to the Qualified Processor rules
LONG-TERM GOALS (5+ YEARS)
Consider options for additional facilities that could improve hauler access to processing facilities
Explore deconstruction workforce development

13.1 Overview

Construction and demolition material (C&D) is the by-product of construction, renovation, deconstruction, and demolition projects. Development in Austin has grown significantly as the population and business community has expanded over the past decade.¹ As a result, the volume

¹ Between 2010 and 2020, Austin’s population grew by 21%, adding over 171,000 residents, according to U.S. Census Bureau. Additionally, the number of development permits issued by the City for single-family, multifamily, and commercial developments grew from 1,512 in 2017 to 2,183 in 2019.

of C&D material generated has increased correspondingly¹ and is a high diversion priority in order to make progress towards the City’s Zero Waste Goal.

History

Since 2007, Austin Energy has tracked C&D material diversion for commercial and multifamily properties that are part of the Austin Green Building (AEGB) program. Following City Council direction for investigation of incentives and requirements for C&D project diversion in 2010 and adoption of the Austin Resource Recovery (ARR) Master Plan in 2011, ARR conducted stakeholder engagement and research related to C&D projects and material markets. In 2016, ARR implemented the C&D Ordinance (Ordinance No. 20151119-098) and began tracking the diversion of construction projects in Austin over 5,000 square feet.

Commercial and multifamily projects requiring a demolition permit must also comply with the ordinance.

Construction projects with footprints of 5,000 square feet or smaller were chosen to not be subject to the C&D Ordinance requirements, as an analysis completed by ARR found that smaller projects saw diminishing returns on diversion.

13.2 C&D Materials Generation

In 2020, 21% of the material disposed in Texas landfills was C&D debris.² As population and development in Austin continue to grow, so does waste from C&D projects. This material is handled differently than municipal solid waste and solutions for diverting the material from landfill must also be unique.

The best practice for handling C&D debris is to separate individual recyclable materials into multiple roll-off containers. Most job sites that separate and recycle material have two containers, one for commingled recyclable C&D material and one for disposal. Most projects that are 5,000 square feet or less, which are currently not required by the C&D Ordinance to recycle C&D material, only separate and recycle high-value materials (e.g., scrap metal).

Demolition debris is typically heavier and requires more frequent hauls than debris generated as part of the construction phase of projects. The waste stream from demolitions contains more

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¹ Based on hauler-reported data submitted to the City, the estimated volume of C&D material generated increased from 144,427 tons in 2013 to 286,706 tons in 2018.

² Texas Commission on Environmental Quality. (2020) Municipal Solid Waste in Texas: A Year in Review. Retrieved from tceq.texas.gov/downloads/permitting/waste-permits/publications/187-21.pdf.

aggregate, hard-to-recycle materials (e.g., treated lumber, insulation), and hazardous materials (e.g., asbestos, lead), although exactly what materials will be present depends on the type of demolition required.

Recyclable materials from demolitions typically include:

- **Aggregate.** Inert materials such as concrete, rock, brick, and rubble.
- **Asphalt.** Mineral pitch used for flooring and roofing.
- **Untreated wood.** Wood from framing, concrete forms, crates, excess hardwood flooring, or used pallets. Treated wood is not recyclable.
- **Metal.** Copper, sheet metal, and steel. Often used for roofing, piping, cladding, and wiring.

Construction projects typically create less debris than demolitions. The waste stream of construction projects often includes additional potentially recyclable materials, such as:

- **Clean gypsum.** Gypsum board, also known as drywall, plasterboard, or wallboard. Used to form panels as partitions and linings of walls, ceilings, and roofs.
- **Cardboard.** Corrugated cardboard or similar fibrous material (e.g., kraft paper).
- **Plastic.** Plastic sheeting, tarping, wrap, and bulky plastics (e.g., crates).

These materials may also be produced by demolitions but are typically less recoverable due to contamination (e.g., painted drywall).

13.3 Processing Facilities

There are several facilities that accept C&D material for processing and disposal in Austin. Facilities process material either through a combination of hand-picking and automated sorting or using rolling stock (e.g., grapple truck, skid steer, etc.) to manually separate recyclables. Minimizing contamination in a commingled recycling container is critical for processors due to the increased labor and cost required to separate, transport, and dispose of contamination. Table 13-1 shows local processors of C&D, identifying if they are a Qualified Processor, if they accept third-party material, and describing the level of processing available (e.g., automated or manual). Facilities that are considered Qualified Processors are certified by the Recycling Certification Institute (RCI) or have a Registered Evaluator validate average diversion rates indicating they can consistently and reliably produce documentation regarding facility-wide

diversion rate. Qualified Processors report recycling figures for C&D projects monthly rather than on a load-by-load basis, as these figures are verified by a third party. Monthly reporting reduces the time project managers need to spend on data tracking, analysis, and reporting. At this time, Austin does not have any City-approved Registered Evaluators, and no Qualified Processors are registered. Facilities that are not considered Qualified Processors do not report to the City and do not have diversion rates validated by a third party.

Table 13-1: C&D Debris Processors in the Region

Processor	Qualified Processor	Accepts Third-Party Material	Description
River City Rolloffs & Recycling	No	No	River City Rolloffs & Recycling hauls to its facility and runs material through its automated processing line.
Texas Disposal Systems (TDS)	No	No	TDS hauls to its facility and manually separates recyclable material at its campus.
Waste Management	No	No	Waste Management hauls to its landfill where material is manually separated and recycled.
Waste Connections	No	Yes	Waste Connections operates a C&D landfill but also separates and recycles materials on site. In the past, Waste Connections used an automated processing line, but it currently utilizes a manual process using equipment and personnel.
Walker Aero Environmental/ JV Dirt	No	Limited	Walker Aero Environmental / JV Dirt operates an automated processing line and composting facility.

13.4 Deconstruction

Deconstruction projects, or “soft strips,” salvage materials from properties for reuse and resale. This approach presents a significant opportunity to minimize waste generated in the C&D material stream. Contractors and other organizations (e.g., nonprofits, nongovernmental organizations) sometimes carry out deconstruction projects prior to demolition. Soft strips may be conducted by contractors if salvage values justify the labor and transportation of material to reuse outlets.

The amount and value of material salvaged from individual deconstruction projects depend on the type of structure and zoning. For example, historically zoned structures may generate more material with salvage value such as antique bricks or items with historical significance. In the long term, ARR plans to encourage design and use of buildings and structures in Austin that facilitate deconstruction, material salvaging, and reduce the chance of end-of-life demolition.

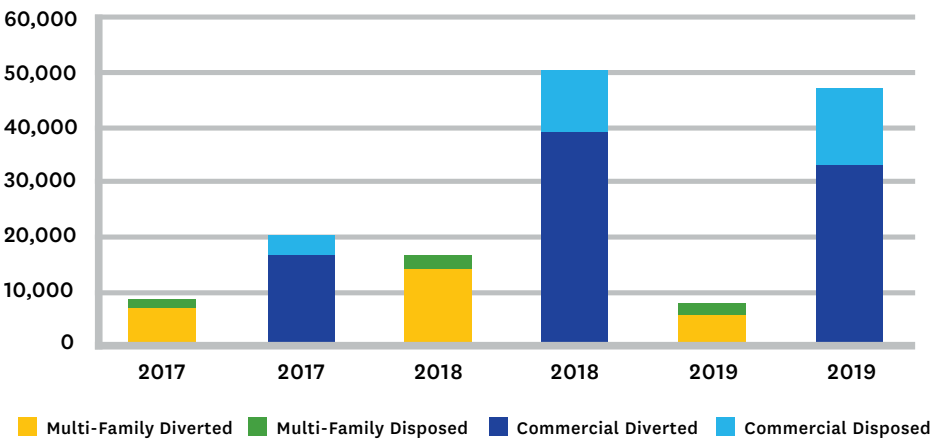
13.5 Current Requirements

Projects subject to the C&D Ordinance are required to meet a minimum diversion of 50% or maximum disposal of 2.5 pounds per square foot.

Projects that are affected by the C&D Ordinance are also required to submit a form online when a final inspection is requested. ARR staff collects and analyzes project information to understand if projects are complying with the requirements.

Progress
Progress related to the C&D Ordinance has, to date, relied primarily on voluntary compliance from affected projects. Figure 13-1 provides diversion rates for reported commercial and multifamily projects in 2017, 2018, and 2019. Single-family home projects account for less than 1% of total C&D tons generated in Austin and are therefore not included in the figure.

Figure 13-1: Commercial and Multifamily C&D Diversion



As shown, the average diversion rate from projects tracked by the City ranges from 70% to 85%, exceeding the current 50% requirement. However, these rates may be artificially high due to low (estimated 10%) reporting rates among affected projects during these years. The number of projects reporting under the C&D Ordinance has declined from 182 in 2017 to 73 in 2019. ARR is working proactively to support enforcement for non-reporting projects that may not meet diversion requirement to ensure that diversion figures are reflective of diversion performance. The data that ARR receives as a part of the C&D Ordinance represents about 23% of the total C&D material generated from permitted hauler reports.

Based on the total C&D material generated as reported by permitted haulers, the citywide diversion rate of this material was 36% in 2018. In October 2019, the C&D Ordinance was expanded to include requirements for demolition projects, for which diversion data is currently being assessed.

13.6 Challenges

- **Haulers have limited access to processing facilities.** Processing capacity meets the current and projected needs for demolition and construction projects in the city, and markets can accept more material for recycling; however, there are barriers to access for third-party haulers that do not own their own facilities.³ Facilities that operate automated processes often have hauling operations and only accept material from their own haulers or from limited contract customers. With only four of the more than 50 permitted haulers that manage C&D material in Austin operating processing facilities, the remaining haulers face a challenge in an open market to deliver materials to locations that have the equipment, staffing, and capacity to separate and recycle commingled material. This leaves smaller, third-party haulers at a disadvantage to provide these services given the limited number of outlets where they can deliver material to be processed and recycled.
- **Processors not participating in Qualified Processor program.** One processor in the Austin area completed RCI certification to earn Qualified Processors designation by the City. Since that time the City application has not been renewed. The program is designed to reduce the reporting burden on general contractors and allow direct diversion rate reporting from processors. But with no processors qualified, the program is reliant on contractor reported data provided by haulers and processors to the City.
- **Enforcement resources needed.** Staff have worked to educate and build awareness of the C&D Ordinance among contractors, including notifying contractors about outstanding or

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³ As part of the Economic Impact Study on C&D Diversion Requirements, active C&D processing facility operators were interviewed to better understand the processing capacity for C&D recycling and strategies to increase C&D diversion. To read the Economic Impact Study on C&D Diversion Requirements, visit austintexas.gov/sites/default/files/files/FINAL%20Economic%20Impact%20Study%20on%20C%26D%20Diversion%20Requirements_06-02-20.pdf.

noncompliant reports; however, staff resources to issue citations has been limited. As of 2022, no cases have been taken to municipal court. This lack of enforcement has impacted the ability of staff to accurately measure the impacts of the ordinance on submission rate, diversion rate, and the financial impact to general contractors.

- **Limited markets exist locally for key materials.** End markets have high demand for uncontaminated concrete/aggregate, cardboard, plastic, and metals, but there are limited end markets for gypsum and wood, other than using the material in an on-site composting operation or repurposing the material (e.g., using ground wood as cover for landfills). Austin recently had a market for recycling shingles for use in asphalt, but that market has since diminished. Facilities with remaining inventories of shingles are working to sell them as opportunities arise.

13.7 Near-Term Goals

- **Expand enforcement of the C&D Ordinance.** Add staff to the Commercial Compliance Unit (CCU). Develop enforcement procedures for the C&D Ordinance. Investigate noncompliant projects and transfer cases to municipal court.
- **Consider requiring recycling of specific materials that have strong local end markets.** Conduct research and work with stakeholders to identify these materials. Consider targeting materials such as concrete, untreated wood, metal, asphalt, bricks, new construction gypsum scrap, and cardboard.
- **Assess potential changes to the Qualified Processor rules.** Consider requiring all projects to use a Qualified Processor to improve accuracy of contractor reports and incentivize processors to increase diversion rates. Consider policy changes to remove material that is burned from diversion calculations. Align Qualified Processor rules with any changes made to the C&D Ordinance diversion requirements.

13.8 Long-Term Goals

- **Consider options for additional facilities that could improve hauler access to processing facilities.** Explore City-owned or public-private partnership options.
- **Explore deconstruction workforce development.** Collaborate with Economic Development Department and local organizations to encourage the development of the deconstruction workforce in Austin. Consider programs that support reuse outlets and expand the market for recovered materials generated by deconstructions.



Chapter 14 Special Events

NEAR-TERM GOALS (0-5 YEARS)
Offer compost collection service to all events co-sponsored by the City of Austin
Develop education for event organizers on their requirements under the Special Events Ordinance
Develop an intradepartmental plan to coordinate and provide waste management services at City co-sponsored events
LONG-TERM GOALS (5+ YEARS)
Identify enforcement improvement opportunities regarding the Special Events Ordinance

14.1 Overview

As the Live Music Capital of the World, events are an important part of Austin’s identity. Austin plays host to a wide variety of festivals, street fairs, and concerts, as well as races, walks, and other athletic events. The City of Austin supports event organizers through the Austin Center for Events (ACE), a collaboration among multiple City departments — including Austin Resource Recovery (ARR) — designed to streamline special event permitting on public and private property. ARR engages with event organizers by way of policy, incentives, and services.

14.2 Current ARR Initiatives

14.2a Special Events Ordinance

In 2018, City Council adopted the Special Events Ordinance (SEO) to improve safety, coordination, and cleanliness of Austin’s special events, defined as any event that impacts Austin’s streets, sidewalks, walkways, or public right-of-way. The SEO went into effect in 2019 and includes requirements from a variety of City departments, including Transportation - Public Works, Parks and Recreation, Police, Fire, Watershed Protection, EMS, Economic Development, Development Services - Austin Code, and ARR.

Per the SEO, an event organizer must submit a special event permit application to ACE. ACE then categorizes the event into one of four tiers based on the information provided in the application.

Tier 1 events do not include the consumption of alcohol and meet one of the following criteria:

- Are stationary, impact only one block of a sidewalk or a public right-of-way that is not a street, and only need a specific type of City event permit
- Are moving and consist exclusively of people in a police-escorted bubble
- Are an assembly at a City facility, last less than five hours, and do not include food or beverages or a request to increase the permanent occupancy limit

Tier 2 events meet one of the following criteria:

- Are an assembly at a City facility that estimates attendance at less than 2,500 daily attendees
- Are an assembly lasting four days or less, held primarily on private property, and estimate attendance at less than 2,500 daily attendees
- Are stationary and impact up to two blocks of a street, sidewalk, or public right-of-way

Tier 3 events are events that are not covered by Tiers 1, 2 and 4.

Tier 4 events meet one of the following criteria:

- Are an assembly at two or more City facilities and include the use of streets, sidewalks, or public rights-of-way
 - Have an estimated need of \$100,000 or more in City services, staff time, and equipment
- ARR’s requirements include general measures for all event organizers and specific responsibilities for events categorized as Tier 2-4.

The requirements set by ARR for all event organizers are:

- Complete the waste management section of the ACE special event permit application
- Include the location of waste collection containers (e.g., dumpsters) in site plans submitted as part of their ACE special event permit application
- Clean and restore event area to the same condition it was in prior to the event
- Not distribute styrofoam or glass containers at events held on a city street, sidewalk, or facility

In addition, Tier 2-4 events must:

- Submit a Waste Reduction and Diversion Plan to ARR
- Provide the same capacity for recycling as landfill trash (1:1 ratio)
- Recycle all aluminum, plastics, and cardboard
- Educate event staff and vendors on the availability and location of dumpsters
- Group, label, and regularly maintain all collection bins
- Store and maintain dumpsters to prevent overflow and leaking and to deter wildlife or illegal dumping
- After the event, provide proof of waste management services through copies of invoices, receipts, or weight tickets

14.2b Zero Waste Event Rebate

In 2011, ARR started the Zero Waste Event Rebate program. The goal of this incentive program is for event organizers to increase diversion at their outdoor events. Prior to the SEO, eligible events could use the rebate for recycling services. Since the enactment of the SEO, the eligible expenses changed to include only compost service, compost equipment, diversion bin maintenance, or on-site material sorting by a litter crew.

Since the start of the program, ARR has distributed 85 rebates, totaling \$54,750 in funding. Between fiscal year (FY) 2016 and 2019, 62 events received a rebate, and the average diversion rate for that group was more than 45%.

14.2c City Co-Sponsored Events

In 2009, City Council passed a resolution directing the City Manager to implement recycling at all City-sponsored and City co-sponsored events. ARR has since provided waste management services, including recycling, to numerous City co-sponsored events. Staff from both operational and administrative teams collaborate to provide a menu of services to City co-sponsored events. Staff connects with event organizers to discuss needs and availability. As a result, each event’s service is optimized to meet the goals of the event. The department averages 11 co-sponsored events annually, and their service needs varied from simple litter cleanup to having multiple dumpsters on site for trash and recycling.

14.2d Guidance for Event Organizers

ARR provides technical assistance to event organizers using a variety of channels. ARR collaborated with other departments to develop the Green Events Guidebook, which includes pre-event, event day, and tear-down checklists to prepare event organizers for hosting events with minimal waste. Additionally, ARR staff provides phone, email, and in-person consultations to interested event organizers regarding event diversion.

14.3 Challenges

- **COVID-19 impacted awareness-building among organizers.** The SEO took effect in 2019 and special events stopped in early 2020 due to the pandemic. Therefore, many event organizers now actively planning events are not aware of the SEO requirements or how to achieve compliance.
- **No requirements for organics diversion at events.** The SEO requires some events to provide recycling, but no events are required to provide organics diversion. Few events voluntarily offer organics diversion options, which results in the majority of food waste generated at special events being landfilled.
- **Difficulties providing service at large-scale City co-sponsored events.** For City co-sponsored events that ARR supports, one challenge is the complexity of providing services to large-scale events. Proper planning and coordination are required to implement changes at events effectively.

14.4 Near-Term Goals

- **Offer compost collection service to all events co-sponsored by the City of Austin.** Start familiarizing event organizers with compost service in order to increase the number of City co-sponsored events that provide composting.
- **Develop education for event organizers on their requirements under the Special Events Ordinance.** Reeducate and inform event organizers prior to their event about the requirements of the SEO and how they can best meet those requirements. Add staff to adequately manage the large number of events in Austin.
- **Develop an intradepartmental plan to coordinate and provide waste management services at City co-sponsored events.** Improve the internal processes and agreements related to services provided at City co-sponsored events. Clarify appropriate roles and responsibilities.

14.5 Long-Term Goals

- **Identify enforcement improvement opportunities regarding the Special Events Ordinance.** Use the Department’s experience implementing the SEO to discover what is needed to expand beyond collecting and reviewing forms and providing education to enforcing the ordinance’s requirements. Multi-department coordination will be needed for policy amendments or operational revisions.

DRAFT

Appendix:

Summary of Benchmark City Comparison

Executive Summary

To compare Austin’s diversion methodology and goals to those of its peers, Burns & McDonnell collected data from 13 benchmark cities regarding diversion calculation methods, recyclables processing contract terms, and policy implementation. Based on analysis on this compiled data, Burns & McDonnell determined various key findings based on a preliminary comparison, and comparisons of diversion material type considerations, methodology and policy considerations, and effective programming. The following represents select key findings:

- Cities with high diversion rates share long-term commitment to Zero Waste principles.
- Austin’s inclusion of source reduction in its diversion rate aligns with other cities with long-term commitments to Zero Waste principles.
- Cities with high diversion rates enforce mandatory recycling participation.

Introduction

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) is pleased to present the results of the Benchmark City Comparison for the City of Austin Resource Recovery (ARR)’s Zero Waste Master Plan Update. To further understand how Austin’s diversion methodology and goals compare to those of similar communities, Austin Resource Recovery (ARR) asked Burns & McDonnell to assist in a benchmarking effort to collect data regarding diversion calculation methods, recyclables processing contract terms, and policy implementation for a number of cities. The following 13 U.S. cities were identified by ARR for comparison due to their Zero Waste or waste diversion goals and/or comparable size to Austin¹ :

- | | | | |
|--------------|---------------|---------------|-----------------|
| • Austin | • Boston | • Dallas | • Denver |
| • Fort Worth | • Los Angeles | • Minneapolis | • Phoenix |
| • Portland | • San Antonio | • San Diego | • San Francisco |
| • Seattle | | | |

Burns & McDonnell analyzed the similarities and differences among benchmark cities in how data is collected, how diversion rates are calculated, how key recycling contract terms are defined, and which programs have been most effective in improving diversion rates.

Diversion rates were requested from cities, rather than recycling rates², in order to determine whether cities consider diversion practices in addition to recycling and composting, including source reduction, reuse, and alternative technologies like waste to energy. Along with this technical memo, Burns & McDonnell also provides ARR with a reference matrix detailing responses provided by benchmark cities (Appendix A). Burns & McDonnell will also provide ARR with a separate technical memo summarizing key findings and recommendations from recycling contract benchmarking.

Preliminary Comparison

In order to best compare Austin’s diversion practices to those of the benchmark cities, Burns & McDonnell asked each city which generator types are considered in measuring its diversion rate. Table 1 presents each benchmark cities’ initial year of adoption for a Zero Waste vision, the most recently published diversion rate, and a summary of the types of generators included in diversion rate calculations. Further detail on answers to preliminary questions from benchmark cities is provided in Appendix A.

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¹ Burns & McDonnell did not receive responses to benchmark questions from the City of Boulder.

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² A recycling rate considers material that is returned to the economic mainstream as raw material. A recycling rate does not include source reduction, reuse, and waste to energy conversion. Discussion of alternative methods of measuring diversion will be provided in a separate technical memo—Diversion, Disposal and Reuse Rates/Methods.

Table 1: Waste Generators Considered in Diversion Rate

City	Year when City Adopted Zero Waste Vision	Recently Published Diversion Rate		Waste Generators Considered			
		Percent	Year	Single-Family	Commercial	Multi-Family	Construction & Demolition (C&D)
Los Angeles	2008 ^{1,2}	76%	2011	✓	✓	✓	✓
Portland	2008 ³	70%	2015	✓	✓	✓	
San Diego	2013 ^{2, 4}	65%	2018	✓	✓	✓	✓
Seattle	1998 ⁵	57%	2018	✓	✓	✓	✓
Austin	2005 ⁶	42%	2015	✓	✓	✓	✓
Minneapolis	2015 ⁷	37%	2016	✓			
Phoenix	2012 ⁸	36%	2019	✓			
San Antonio	2010 ⁹	36%	2019	✓			
Fort Worth	N/A ¹⁰	30%	2018	✓	✓	✓	✓
Denver	N/A ¹⁰	23%	2019	✓			
Boston	2014 ¹¹	21%	2019	✓			
Dallas	2013 ¹²	21%	2016	✓			
San Francisco	2009 ¹³	City does not use diversion rate ¹⁴	N/A	✓	✓	✓	✓

1. Source: Fact Sheet: The City’s Solid Waste Policies and Programs p2. https://planning.lacity.org/eir/8150Sunset/References/4.K.3.%20Solid%20Waste/SW.03_SWIRP%20Policy%20and%20Programs%20Fact%20Sheet_3.20.09.pdf

2. The state of California’s State Integrated Waste Management Act of 1989 (ABA 393) had set a goal for cities to reach 50% diversion by 2000. Source: <https://www.calrecycle.ca.gov/lea/advisories/50>

3. Source: Regional Solid Waste Management Plan p94. https://www.oregonmetro.gov/sites/default/files/2017/04/19/Regional_Solid_Waste_Management_Plan_2008-2018.pdf

4. Source: City of San Diego Zero Waste Plan p4. <https://www.sandiego.gov/sites/default/files/legacy/mayor/pdf/2015/ZeroWastePlan.pdf>

5. Source: Seattle Public Utilities. Zero Waste. <https://www.seattle.gov/utilities/documents/plans/solid-waste-mgmt-plan/zero-waste>

6. Source: Austin Resource Recovery Master Plan p15. https://austintexas.gov/sites/default/files/files/Trash_and_Recycling/MasterPlan_Final_12.30.pdf

7. Source: Minneapolis 2017 Zero Waste Plan p9. https://lims.minneapolismn.gov/Download/RCA/2885/24-Zero%20Waste%20Plan_November%202017_clean.pdf

8. The City of Phoenix committed to reaching a 40 percent recycling rate by 2020.

9. Source: City of San Antonio Solid Waste Management Recycling and Resource Recovery Plan 2013 Update p5. <https://www.sanantonio.gov/Portals/o/Files/SWMD/About/RecyclingResourceRecoveryPlan.pdf>

10. Denver and Fort Worth have not formally introduced the concept of Zero Waste as a guiding principle.

11. Source: Zero Waste Boston: Recommendations of Boston’s Zero Waste Advisory Committee p5. https://www.boston.gov/sites/default/files/embed/file/2019-06/zero_waste_bos_recs_final.pdf

12. Source: <http://www.dallascitynews.net/sanitation-services-working-toward-zero-waste-by-2040>

13. Source: Zero Waste - Frequently Asked Questions (FAQs). <https://sfenvironment.org/zero-waste-faqs>

San Francisco has discontinued use of diversion rates as a means of measuring diversion and progress towards Zero Waste. The City tracks total waste generated and the proportion landfilled and incinerated with the goal of 15% source reduction and 50% disposal or incineration by 2030.

Material Type Considerations

Benchmark communities provided details regarding their diversion rate calculation methodology, including which material types were included in diversion rate calculations and whether source reduction was considered. Table 2 summarizes each benchmark cities’ responses and further details are provided in Appendix A.

Table 2: Material Types and Factors Considered in Diversion Rate Calculations

City	Recently Published Diversion Rate	Materials and Factors Considered						
		Recycling	Composting	Source Reduction	White Goods & Appliances	Diverted C&D	HHW	Other
Los Angeles	76%	✓	✓	✓		✓		
Portland	70%	✓	✓		✓	✓	✓	Anaerobic digestion
San Diego	65%	✓	✓			✓		Biosolids
Seattle	57%	✓	✓	✓				
Austin	42%	✓	✓	✓	✓	✓	✓	Food donation, tires, pallets
Minneapolis	37%	✓	✓					
Phoenix	36%	✓	✓ ¹		✓		✓	Dropped-off metal
San Antonio	36%	✓	✓				✓	Bulk items
Fort Worth	30%	✓	✓ ²			✓		Biosolids
Boston	21%	✓	✓ ³		✓		✓	Tires, textiles
Dallas	21%	✓	✓ ³					
Denver	22%	✓	✓ ²					
San Francisco ⁴	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

1. Phoenix’s green organics collection includes leaves and brush but does not include food scraps.

2. Fort Worth and Denver currently have yard waste collection and are piloting an organics collection program that will include food scraps.

3. Dallas and Boston collect yard waste from residents for composting, but do not collect other organics.

4. San Francisco has discontinued use of diversion rates as a means of measuring diversion and progress towards Zero Waste. The City tracks total waste generated and the proportion landfilled and incinerated with the goal of 15% source reduction and 50% disposal or incineration by 2030.

Methodology and Policy Considerations

Just as there are differences between the waste generators and material types considered in diversion rate calculations, calculation methodology varies among cities as well. Each city must determine whether and how to address material double-counting and potential data gaps for materials that are not captured in data tracking systems (e.g., backyard composting, reuse). Cities also vary on whether upstream waste reduction is included in their calculations and how to account for contaminated recyclables in their methodology.

Diversion rate calculations are influenced by a city’s approach to recycling participation (i.e., mandatory, incentivized, or voluntary). A city with fee-enforced mandatory recycling will have higher participation rate than a city with an opt-in program. Table 3 summarizes each benchmark city’s diversion rate calculation methodology and whether diversion practices are mandatory or voluntary for customers. Because cities vary on how they define recycling when mandating diversion practices, Burns & McDonnell asked each city to provide a definition of recycling. Further detail on each city’s methodology for calculating diversion rates is provided in Appendix A.

Table 3: Methodology and Policy Considerations for Diversion Rate

City	Methodology Considerations				Policy Considerations	
	Upstream Waste Reduction	Addressing Double-counting	Addressing Data Gaps	Contamination	Recycling Definition	Enforcement
Austin	Estimated and included	Manual review	Plans to automate data collection	Considered disposed waste	Waste that can be converted to raw material	Voluntary
Boston	Not included	City calculates total tonnage	Not currently addressed; City is exploring options to address gaps such as backyard composting and reuse quantities	Removed from setouts and collected as refuse	All diverted materials	Voluntary ¹
Dallas	Not included	City calculates total tonnage	Response not received	Considered disposed waste	Single-stream collected in City-issued recycling roll cart	Voluntary
Denver	Not included	Not addressed – City does not consider this an issue	Not currently addressed; policy mechanism for obtaining commercial data is currently under consideration	Not accounted for when calculating diversion	Single-stream materials collected, plus special waste	The City is working on how to enforce recycling
Fort Worth	Not included	Manual review	City reaches out to commercial generators individually for data estimates	Considered disposed waste at MRF	Single-stream materials processed at MRF	Voluntary
Los Angeles	Estimated and included	Response not received	Recently implemented policy to receive commercial data	Considered disposed waste	Single-stream materials processed at MRF	Mandatory
Minneapolis	Not included	There is implementation plan for streamlining data collection ²	City is looking to conduct regular waste sorts	Considered disposed waste	Material that is separated for use in manufacturing processes ³	Voluntary
Phoenix	Not included	Response not received	Not addressed	Response not received	Single-stream materials processed at MRF	Voluntary

1. Ticketing is enforced for contaminated recycling carts.
2. Minnesota compiles its counties’ reporting data to determine diversion rates.
3. City follows Minnesota statute 115A.551. <https://www.revisor.mn.gov/statutes/cite/115A.551>.

Table 3 (continued): Methodology and Policy Considerations for Diversion Rate

City	Methodology Considerations				Policy Considerations	
	Upstream Waste Reduction	Addressing Double-counting	Addressing Data Gaps	Contamination	Recycling Definition	Enforcement
Portland	Not included	Not addressed in Recycling Program Summary	Response not received	Considered disposed waste	Single-stream materials processed at MRF	Mandatory for commercial customers ⁴
San Antonio	Not included	City calculates total tonnage	Not currently addressed; City is considering methods to address data gaps, such as capture rate and alternative metrics	Retroactively removed from diverted material count after MRF audits	All diverted materials	Voluntary
San Diego	Not included	Not addressed	Not addressed	Considered disposed waste	Material diverted as recycled or diverted for beneficial use	Mandatory
San Francisco	Not included	City does not calculate diversion rates	City does not calculate diversion rates	Considered disposed waste	Collected material returned to economic mainstream as raw material ⁵	Mandatory
Seattle	Estimated and included	Manual review	City estimates commercial data that is not reported ⁶	Considered disposed waste	Single-stream recyclables, compostables, reused materials, and certain waste prevention	Mandatory

4. Portland also provides single-family customers with a right-to-recycle policy and is strengthening this program for multi-family residents.

5. San Francisco cites the Cal Recycle definition provided in California Public Resources Code section 40180.

6. Seattle Public Utilities asks commercial entities to provide reports of recycling and reuse. Fines are being considered for entities that fail to report.

Effective Diversion Programming

Burns & McDonnell asked benchmarking cities to identify diversion programs that have been most effective in improving diversion rates. Table 4 shows the five most cited diversion programs and specific examples cited. Further detail on benchmark cities’ diversion programs is provided in Appendix A.

Table 4: Methodology and Policy Considerations for Diversion Rate

Program	Number of Replies	Examples
Recycling Collection	7	Fort Worth and Phoenix cite recycling cart auditing as effective in increasing diversion. Denver, Fort Worth, Los Angeles, Minneapolis, Portland, and San Antonio also cited recycling collection as an effective program.
Organics Collection	6	Seattle added food waste to organics collection in 2005. Denver, Minneapolis, Phoenix, Portland, and San Antonio also cited organics collection as an effective program.
Drop-off Stations	5	Fort Worth plans to add Goodwill donation centers to each of its four/five drop-off stations. Dallas, Denver, Minneapolis and San Antonio also cited drop-off stations as impactful programs.
Education	4	Phoenix has a recycling education program called “Top 10 in the Bin.” Minneapolis promotes residential reuse. San Antonio and San Francisco also cited diversion education as effective.
Difficult to Handle Material/HHW Collection Centers and Events	4	Boston has swap shops for reusing paint. Los Angeles cites mattress and tire recycling programs. Minneapolis and San Antonio cited events and centers for difficult-to-handle material as effective.

Key Findings and Recommendations

Based on the comparisons presented above for diversion rates, waste streams considered, diversion methodology, and effective programming of Austin and benchmark cities, Burns & McDonnell presents the following key findings on Austin’s approach to diversion and recommendations on how to improve its diversion rate.

Preliminary Comparison

- **Cities with high diversion rates share long-term commitment to Zero Waste principles.** Among the 12 benchmark cities that calculate diversion rates, Austin has the fifth highest rate, only behind four west coast cities. West coast cities generally have higher diversion rates due to earlier adoption of Zero Waste principles and/or recycling mandates. Since 1986, California’s state legislature has set forth requirements for its cities to meet diversion goals, establishing a culture of Zero Waste early on for cities like Los Angeles, San Diego, and San Francisco. Seattle also has considered Zero Waste as a principle for over 20 years. While Portland defined Zero Waste more recently, it has mandated recycling for its commercial sector since 1996³. As diversion rates are correlated with time dedicated to Zero Waste principles, Austin can expect its diversion rate to increase as it continues to expand its diversion programs and foster citywide Zero Waste culture over the coming decades.
- **Austin should continue considering multiple generator types in diversion calculations, as cities that consider more types generally have higher diversion rates.** Cities that consider multi-family, commercial, and C&D waste streams, in addition to single-family, are more likely to have higher diversion rates. These cities typically have greater influence over non-residential waste streams and have systems in place to receive reliable data for multiple generators. It is also the opinion of Burns & McDonnell that having Zero Waste programs in place across multiple generators⁴ provides the opportunity to create a comprehensive and unified citywide diversion approach. In other words, providing residents and businesses to participate in the same or similar recycling efforts whether at home, at work or out in the community can make a meaningful impact in driving diversion efforts.

Material Type Considerations

- **Recycling and yard waste are universally considered in diversion rates.** All benchmark cities included both recycling and yard waste and/or organics in their diversion rate calculations. Of the cities that do not have residential organics collection, Dallas and Boston collect and divert yard waste, and Denver and Fort Worth currently have pilot programs to collect food scraps and other organics. Austin’s addition of organics collection in 2019 is a strong example among peer cities of expanding the material types considered in diversion rates.

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³ History of Portland’s Garbage and Recycling System. <https://www.portlandoregon.gov/bps/article/109782>

⁴ Seattle and Los Angeles contract commercial collection to dedicated zones. Portland allows commercial entities to select a service provider from a list of permitted haulers.

- **Materials that are more difficult to handle or process for diversion are less commonly included in diversion calculations among benchmark cities.** Materials such as white goods, HHW, and C&D debris, which are more difficult to handle or are more resource-intensive to divert, are less commonly included in diversion rate calculations, each being considered by four or five benchmark cities. Inclusion of these material types in diversion rates do not strongly correlate with higher diversion rates, potentially indicating that they are not a significant percentage of the waste stream (with C&D being an exception to this statement), or only a small proportion of these material types that are generated are diverted from disposal. Austin considers each of the six most cited material types and should research how much waste of each type is diverted relative to how much is generated.
- **Austin’s inclusion of source reduction in its diversion rate aligns with other cities with long-term commitments to Zero Waste principles.** Source reduction is difficult to calculate consistently or comprehensively. Only Austin and two benchmark cities, Seattle and Los Angeles, explicitly identify waste reduction when determining their diversion rates. San Francisco, which no longer considers diversion rate as an effective tool to measure progress towards Zero Waste, has begun to track source reduction as an alternative metric. These cities each have long-term commitments to solid waste principles, leading to higher diversion rates. Austin should continue to explore how to measure source reduction, which could be addressed via a per capita or employee disposal rate analysis.
- **A higher number of categories considered in diversion rates does not lead to higher rates.** San Diego and Seattle, which have among the highest diversion rates, consider no more than three of the most-cited diversion material types among the benchmark responses. Austin includes all the most-cited material types in its diversion rate, and the City should continue to study the level of diversion for each material type.
- **Additional categories considered in diversion calculations are varied.** Individual benchmark cities consider varied diverted materials when calculating their diversion rates, including, but not limited to, backyard composting, biosolids, anaerobic digestion of organics, dropped-off metal, and textile recycling.

Methodology and Policy Considerations

- **Cities with high diversion rates enforce mandatory recycling participation.** Benchmark cities with diversion rates greater than 50 percent have and enforce mandatory recycling. California Assembly Bill 341 mandated commercial recycling in 2012⁵. Seattle⁶ and Portland⁷ both mandated diversion programs for the commercial sector. If Austin does not shift to citywide recycling enforcement for its waste generators, it may not achieve as high of a recycling rate as peer west coast cities. Recommendations on how Austin can look into enforcement based on case study examples are provided in the Policy and Program Development technical memo.

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⁵ CalRecycle Frequently Asked Questions. <https://www.calrecycle.ca.gov/Recycle/Commercial/FAQ/>

⁶ EPA – Managing and Transforming Waste Streams—A Tool for Communities. Zero Waste Case Study: Seattle. <https://www.epa.gov/transforming-waste-tool/zero-waste-case-study-seattle>

⁷ Business Recycling Requirements. <https://www.portlandoregon.gov/bps/article/402792>

- Few cities include upstream waste reduction in diversion calculation methodology. Cities that consider upstream reduction as diverted material include Austin, Los Angeles, and Seattle. These cities are in the mid- or upper-range of diversion rates. Many cities may omit upstream waste reduction from diversion calculations due to the challenges associated with tracking waste reduction quantities.
- Austin’s lack of detail on commercial waste generation is a common data gap. Commercial waste generation was noted by four benchmark cities as a data gap. Implemented or planned methods for obtaining commercial data vary among cities and include mandated reporting and outreach. Further discussion on how Austin can address these data gaps from a technology and policy perspective is provided in two separate technical memos—Data & Technology, and Policy and Program Development.
- Most benchmark cities accurately exclude recycling contamination when calculating diversion rates. Nearly all benchmark cities exclude contamination from diverted materials when calculating diversion rates
- Double-counting is not widely addressed when calculating diversion. While some benchmark cities (Austin, Fort Worth, and Seattle) perform manual reviews of input data to address double-counting, most cities use internal tonnage calculations without explicitly screening for potentially double-counted material. Burns & McDonnell would mention that double counting is frequently more of an issue when calculating diversion rates at a state level, so it is not too concerning that many of the benchmarked cities do not have an explicit process to address double-counting.
- Among benchmark cities, the definition of recycling is varied. Benchmark cities vary on whether to define recycling as single-stream materials processed at a MRF, or any material diverted. When considering recycling enforcement policy, Austin should determine which recycling definition is most appropriate.

Effective Diversion Programming

- Developing collection programs is key to improving diversion rates. To improve diversion rates, cities have expanded collection programs to divert more material from residential refuse carts. Austin introduced citywide organics collection in 2019, and Denver and Fort Worth have piloted similar organics collection programs. Fort Worth and Denver recognize recycling cart auditing to be successful in their communities in targeting contamination.
- Effective education programs vary in approach. Cities that identify education as having an impact on their diversion rates focused on different aspects of diversion. Minneapolis found success in education on residential material reuse, while Phoenix notes its “Top 10 in the Bin” program as impactful on reducing contamination in residential collection.
- Cities with high diversion rates cite material bans. Seattle cites C&D, food waste, and clean paper disposal bans and Portland cites a plastic bag ban as effective policies in improving their diversion rates. Austin should continue to assess whether materials bans are feasible, understanding that the state of Texas did overturn cities’ authority to ban single-use plastic bags. Further discussion on material bans as a potential policy option is provided in the Policy and Program Development technical memo.

