PLANNING & DEVELOPMENT MEMORANDUM
#31-2022

DATE: Oct. 17, 2022

TO: Honorable Mayor Meredith Leighty and City Council Members

THROUGH: Heather Geyer, City Manager

FROM: Brook Svoboda, Director of Planning & Development
Rob Webber, Operations Manager
Ashley McFarland, Planner I

SUBJECT: 2020/2021 Waste Optimization Study – Final Report

PURPOSE

To provide City Council with the findings and recommendations from the Waste Optimization Study and seek direction from Council on improvements to the City's waste management system.

BACKGROUND

On Nov. 16, 2020, City Council was introduced to the Waste Optimization Study, conducted by LBA Associates. The study assessed current and future citywide residential solid waste collection. The goal is to understand feasible options for expanding current City waste services while prioritizing landfill diversion options that provide the most cost-effective and environmental benefits to the City and its residents. The information below includes recommendations from the study. Based on the extensive recommendations proposed by LBA Associates, staff determined any future system modification should be completed in a two-phased approach. Below is a brief overview of the critical components for each phase.

Phase I

Phase I would include transitioning to a volume-based fee system (also known as Pay-As-You-Throw) for residential curbside collections, implementing a buy-back program for trash carts owned by Northglenn residents, and launching a public education and outreach program.

Volume-Based Fee System for Curbside Collections – Like most other utilities, a Pay-As-You-Throw (PAYT) program is based on usage, providing multiple service levels with associated cart sizes and corresponding price differentials.

- Current City services
  - Curbside collection for single-family homes (SFUs) is a flat fee of $16 per month for both trash and recycling services regardless of the number or size of carts used. Those who use one cart effectively subsidize those who use multiple carts.
  - Residents purchase trash carts; recycling carts are provided at no additional cost.
    - 64- or 96-gallon trash carts are available (a large majority use one or more of the larger size)
    - 96-gallon recycling carts are available.
  - Ancillary services provided to single-family and other multi-family residences (MFUs) include two free landfill days, Dumpster Day, and free drop-site operations.
    - The cost of these programs is included in the flat $16 per month fee paid by single-family households.
- Future Volume Based Fee System Options and Ancillary Service Fee –
  - Every single-family unit would be given pricing options for three trash cart sizes or service levels (the middle, 64-gallon cart would be the default size). Each single-

family unit would automatically receive one 96-gallon recycling cart at no cost to the household.
- Monthly rates would be based on the size and number of trash carts chosen; the price would include both the cost of trash and recycling provided to that household.
- The cost of the same ancillary services currently provided to all residents would be assessed separately as a flat $1.20 per month fee on all single-family and multi-family residences. This would be a new fee for multi-family properties that eliminates the current single-family subsidy.

Phase I Economic Impacts to Northglenn Residents – Up to 70% of Northglenn's single-family units could reduce their monthly curbside collection fees under the Volume-Based Fee System. Northglenn's current waste management fee places a burden disproportionally on residents who throw away less. As shown below, a future PAYT program would equitably distribute the actual cost for collection services based on actual service levels.

	Estimated Number of SFUs at Each Service Level	Estimated Monthly Cost/Household (PAYT + Ancillary Service Pricing)	Cost Differential from Current $16 Flat Rate Fee
Small Trash Service	20%	$5.50 + $1.20	Savings of over $9
Medium Trash Service	50%	$11.10 + $1.20	Savings of up to $4
Large Trash Service	30%	$16.60 + $1.20	Additional cost of up to $2

The PAYT program would encourage residents to downsize trash cart number and size. At the same time, optimizing the City's ancillary services (especially drop-site collection) would provide tools and options for making this transition practical. Some residents may still need more than one trash cart, and under PAYT would be assessed an extra fee. For example, if a resident required both a 96-gallon trash cart and a 64-gallon trash at the rates shown in the table above, the monthly cost would be $28.90 ($11.10 for one 64-gallon cart, $16.60 for one 96-gallon cart, plus $1.20 for ancillary services).

Staff recognizes the need for cost exceptions to the proposed PAYT program. Implementing a Service Assistance Program for the City's most vulnerable residents would help reduce any financial burden and increase the program's equity. Recommendations for this program would be presented at a follow-up discussion with Council.

Cart Ownership and the Buy-Back Program – Under the current program, residents purchase their trash carts and are provided one 96-gallon recycling cart at no additional cost. Under the new PAYT program, the City would buy back all the existing trash carts and provide residents with a pro-rated credit on their utility bills equivalent to $6 per year remaining on a 10-year cart life. The City would retain cart ownership moving forward; cart costs are included in the PAYT pricing described above. Residents would select the new trash cart size during the transition period, and the chosen carts would be redeployed as needed.

Communications and Outreach Plan – Staff understands a robust and ongoing public outreach effort is vital to the success of the PAYT program and to the reduction of contamination in diverted recyclables and organics. Therefore, once guidance is received on the path forward, project managers would coordinate with the Communications Department to develop and present an engagement plan to Council. Engagement is expected to inform and educate residents on the

benefits of a PAYT program. Additionally, outreach would include the implementation process for the PAYT program and what residents should expect during this transition phase. Expected information may include:

- Benefits and how-tos regarding waste diversion and PAYT
- PAYT sign-up process
- Costs associated with the various trash service level options
- Optimal cart sizes for household size
- Buy-back and redeployment/deployment timelines

Phase II

Following the implementation of Phase I, staff would bring additional proposed operational changes recommended by the City of Northglenn Waste Optimization Study to Council. Phase II would include optimized drop-site scenarios and analysis, curbside compost collection, hauler reporting to track citywide disposal and diversion data, and overall environmental benefits from both phases.

Implementing Subscription-Based Curbside Compost Collection – This additional service would provide a significant, additional tool for helping residents downsize their trash service level and further promote waste diversion. Residents that participate in curbside composting can decrease their overall waste fees as they reduce the size of their trash cart. Curbside composting would follow a voluntary subscription-based fee system in which residents would incur an additional monthly fee for weekly composting services. Similar to PAYT, carts would be provided by the City and would be part of the monthly fee for the service.

The study recommends an additional funding source be identified for encouraging initial subscriptions (and could be discontinued once participation has reached a sufficient level for ongoing costs to be reasonable). This could be obtained from one of the State grant programs or through a local subsidy. The subsidy example could include assessing a $1 per month fee on all single-family households eligible for participation. The study's compost cost analysis considered a range of potential subscription levels and illustrates the need to create a participation incentive during the initial years. The pricing below reflects curbside compost collection costs only and would be added to the PAYT and ancillary service pricing discussed for Phase I:[1]

Subscription Level	Cost of Curbside Composting Without Subsidy	Estimated Cost of Curbside Composting With Subsidy
10%	$17.70	$7.70
20%	$12.60	$7.60
40%	$10.00	$7.50
80%	$9.00	$7.70

Optimized Drop-Site Scenarios and Analysis – The study recommended several options for optimizing the City drop-site operations that were in place in 2020. Since that time, the Sanitation Division has made many improvements including the closure of the Jaycee Park site; expansion of the Northwest Open Space and Maintenance & Operations sites; and oversight by City staff. Further improvements are now feasible and could easily be assessed during Phase II:

- Accept source-separated cardboard – to provide residents with an additional tool for minimizing curbside cart space (in future years, the City may also evaluate the viability of baling cardboard to reduce storage space and hauling costs)

[1] The $1.00 increase to the service fee was assessed only to SFUs in the study. It is recommended that a future discussion occurs to determine whether this fee would be assessed to MFUs.

- Accept source-separated glass – to minimize damage to City collection equipment
- Pilot the collection of residential food waste – to give residents another outlet for reducing trash cart size and test the demand for food waste collection (which could support the implementation of curbside collection)
- Accept additional hard-to-recycle materials from residents such as tires and waste oil

Environmental Benefits of All Phases – Provided all phases are implemented, the study data projects improved environmental metrics.

In Table 8-1 (page 38) of the Waste Optimization Study Final Report, LBA Associates has provided the following calculated environmental benefits for PAYT program, curbside composting and drop-site improvements:

- Residential landfill diversion rate increase from the current 12% to 25%
- Greenhouse gas reductions of 2,600 metric tons of carbon dioxide (MTCO2)
    - The City of Northglenn Greenhouse Gas Inventory calculated the total solid waste Greenhouse Gas Emissions for the year 2016 at 3,288 MTCO2.

The implementation of the proposed waste management strategies would act as a catalyst to achieving the following goals included in the following citywide plans:

- Sustainability Plan (September 2018) – Increase citywide landfill diversion rate to 20% by 2023
- An Energy Action Plan for City of Northglenn (September 2019) – By implementing a PAYT program, curbside composting and drop-site improvements would be equivalent to implementing all energy-saving measures outlined as goals of the sustainability plan.

In addition to citywide sustainability goals, the waste management operational changes recommended would contribute to the Department of Public Health and Environment Solid and Hazardous Waste Commission's Municipal Solid Waste Diversion Goals. In 2017, the commission adopted a statewide resolution specifying the following waste diversion goals for the Front Range (including Northglenn) and statewide:

Diversion Goal	2021	2026	2036
Front Range	32%	39%	51%
Statewide	28%	35%	45%

BUDGET AND TIME IMPLICATIONS

The operational changes proposed above are based on a net neutral to net positive budgeting strategy. The program is expected to be fully funded by the Sanitation Enterprise Fund and would not impact the General Fund.

The initial cost of the cart buy-back program would be covered through the assessment of credits on residents' monthly trash service bills. The credit would be assessed at $6 per year remaining on the 10-year warranty of each cart owned by a household. Further evaluation of the Sanitation Enterprise Fund would occur during the regular 2023 Budget cycle to determine if any budget amendments or appropriations need to occur.

No costs related to routing schedules and vehicles are expected to occur in the first year. Any changes would be handled by reallocating resources (employees, vehicles). The need for changes to routes or different vehicles to handle the smaller cart sizes and/or employees to cover routes would be determined in the next year's budget cycle.

Implementation of the PAYT program is expected to take between 6 and 10 months. This would allow for time to evaluate current resources and identify additional capital and non-capital expense needs. Evaluation during this time is necessary to maintain the expected high level of service provided to residents. The expected timeline is divided between two steps:

1. 4 to 6 months – Robust outreach program to inform residents of the impacts and benefits of switching to a PAYT program. Additionally, the outreach program would include details on the cart buy-back process and other fee changes.
2. 6 to 10 months – Residents would sign up for their desired level of service (number and size of carts), allowing the Sanitation Division to build the appropriate cart inventory. Implementation of the trash cart buy-back program and redeployment of carts would be the final step for residents to receive PAYT trash service.

Follow Up to Discussion
Depending on Council feedback, staff would develop recommendations for Council regarding the Service Assistance Program and a fee schedule for the purchase of additional carts for a future study session.

STAFF RECOMMENDATION
Staff is seeking initial feedback and direction from Council on whether they would like to have Staff proceed further with developing a PAYT program. The following are specific recommendations for Council's consideration:

1. Proceed with Volume Based Fee System (PAYT):
    a. Assessing an Ancillary Service Fee to all SFUs and MFUs would maintain the current ancillary services provided to residents.
    b. The City's resident-led Sustainability Committee reviewed the study and supports transitioning to a PAYT program.
2. Evaluate the potential for expanding materials accepted at the existing drop-sites including a pilot for the collection of food waste organics
3. Consider the feasibility of a new policy requiring private haulers to report the quantities of materials collected within Northglenn to allow staff to track citywide waste generation and landfill diversion progress
4. Update the cost analysis in the 2021 Waste Optimization Study

STAFF REFERENCE
If Council members have any questions, please contact Brook Svoboda, Director of Planning & Development, at bsvoboda@northglenn.org or 303.450.8937.

ATTACHMENTS

1. City of Northglenn Waste Optimization Study Final Report
2. Presentation

City of Northglenn

ATTACHMENT 1

WASTE OPTIMIZATION STUDY

LBA ASSOCIATES

kessler consulting inc.
innovative waste solutions

Submitted by

LBA Associates, Inc. &
Kessler Consulting, Inc.
June 2021

Executive Summary

The City of Northglenn's Sanitation Division provides trash and recyclables collection to its single-family residential units (SFUs). Additional services including drop-site recycling and yard waste collection available to both single- and multi-family residential units (MFU). Despite promotion of single-stream recycling, Northglenn's residential landfill diversion rate has remained stagnant at 12% for the last several years. Staff undertook this optimization study to increase that rate with new and expanded diversion services and incentives for participation.

The study focused on the future feasibility of three key program improvements:

- Moving to a volume-based fee structure for curbside SFU collections
- Offering curbside compost collection on a subscription basis to SFUs
- Improving drop-site collections to accept more materials, reduce illegal dumping & minimize recyclables contamination

Each improvement was evaluated in terms of feasibility, cost and environmental benefits. A cost-neutral approach was used to maintain the integrity of the City's Sanitation Enterprise Fund.

Volume-Based Fee System for Curbside Collections

Currently almost two-thirds of Northglenn's SFUs have two to three large carts (weekly collection) and one recycling cart (every-other-week collection) and pay a flat monthly fee of $16/household. This system essentially encourages trash over recycling and those with low levels of trash actually subsidize those with more. To correct these diversion obstacles, the study evaluated the feasibility of a new program with:

- Three trash cart sizes – small (32 or 48 gallons), medium (64 gallons) & large (96 gallons)
- Standard service of one trash & one recyclable cart – extra carts may be available for an additional fee
- Variable fees commensurate with trash cart service levels to clearly establish diversion incentives - i.e., lower monthly fees for smaller carts
- Continued provision of every-other-week recyclables collection (large cart) bundled in each trash service level

Findings indicate that up to 70% of Northglenn's SFUs could reduce their monthly fee for regular curbside collection; 20% of them by as much as one-third of current costs (see Table ES-1). The costs for remaining residents would likely increase, however.

Table ES-1 PAYT Participation and Fee Findings (all service levels include recycling)

	Estimated Number of SFUs at Each Service Level	Estimated Monthly Cost ($/household)
Small Trash Service	20%	$5.00 - $7.15
Medium Trash Service	50%	$10.60 - $11.10
Large Trash Service	30%	$17.50 - $18.25

Price range considers scenarios with small service level at 32- and 48-gallon carts (both with 64-gallon medium & 96-gallon large services levels)

The advantages of volume-based or pay-as-you-throw (PAYT) includes a strong incentive to "trash less" and "recycle more"; an equitable system that, like most utilities, ties fees to level of service required; and

the ability for residents to control their monthly costs. It is expected that Sanitation will buy back existing trash/recycling carts and provide replacement carts for future operations that are City-owned.

Subscription-Based Curbside Compost Collection

The only organics recovery available to SFUs today is seasonal drop-site collection of limbs and branches at the City Maintenance & Operations Facility (M&O). Optional curbside collection of all yard and food waste would provide a new service to SFUs and allow diversion of the biggest divertible fraction in the residential trash stream. One option considered fees that would cover the full cost of new equipment and added operating; the other evaluated a subsidized approach with a proposed subsidy of $1/month paid by all eligible SFUs.

Table ES-2 Subscription Curbside Compost Subscription Fee Findings ($/household-month)

	80% Subscription	40% Subscription	20% Subscription	10% Subscription
Without Subsidy	$9.00	$10.00	$12.60	$17.70
With Subsidy	$7.70	$7.50	$7.60	$7.70

Without a small subsidy, the high rates estimated at low subscription levels (10% to 20%) will make program start-up challenging. The application of a subsidy, however, will effectively negate the impact of subscription levels. The subsidized fee of approximately $8/month will not only improve the likelihood of participation but is low enough that SFUs with a small trash service level could add compost collection and still pay less than current fees (i.e., $12.70 or $14.85 versus $16). Ideally, this subsidy can be eliminated after the first few years of operation.

Optimized Drop-Site Collection

Until early 2021, the City's drop-site system included three sites; two of them were uncontrolled 24/7 collections for single-stream recyclables that were established for SFUs and MFUs but were also used by non-residential and non-Northglenn generators. Trash was regularly dumped at the recycling sites and recyclables had high contamination levels (as much as 15%). While the City's M&O yard waste collection is well-managed, only a limited number of yard waste materials are accepted during limited hours. To improve efficiencies and control operating costs and materials quality, a condensed but expanded drop site program was evaluated:

- Consolidate the three existing sites into one location
- Secure the site with fencing & staff to control access/materials delivery
- Accept all yard wastes & food waste

As it is likely that the City will utilize the previous Northwest Open Space for the new drop site operation, land purchase and development costs were not included. Estimates indicate that annual operating costs (including amortized capital improvements) would only be $11,000 to $12,000/year more than 2020 costs, even with staffing and the collection of organics. While drop-site costs are currently embedded in the $16 monthly SFU fee, cost recovery in the future is recommended from a separate fee so that residential PAYT rates clearly reflect the incentive needed to encourage diversion in curbside collection.

Environmental Impacts of Aggregating All Improvements

The impacts of moving residential collections to a PAYT fee system, adding voluntary compost collections and optimizing drop-site operations are expected to have significant environmental impacts:

- Landfill diversion could double from 12% to 25% - this compares to the Front Range goal of 39% diversion by 2026 for municipal solid waste (residential & commercial streams) set by CDPHE
- Greenhouse gas reduction increase to 26,000 $mtCO_2e$/year – this is equivalent to the City-wide goal set in the 2019 Northglenn Energy Action Plan

Proposed Future Rate Schedule

The recommendation for Northglenn's future solid waste rate schedule includes the three key fees shown in Figure ES-1. The new Environmental Service Fee would cover the cost of several ancillary services currently included in the flat $16 SFU rate (with SFUs essentially subsidizing services utilized by MFUs). These services include:

- Drop-site operations (including proposed improvements)
- Free landfill events
- Fee dumpster day (ideally reduced from the current two days/year to one to avoid undermining PAYT incentives)
- Public education related to new programs & reduced recyclables contamination
- Compost subsidy ($1/SFU-month)

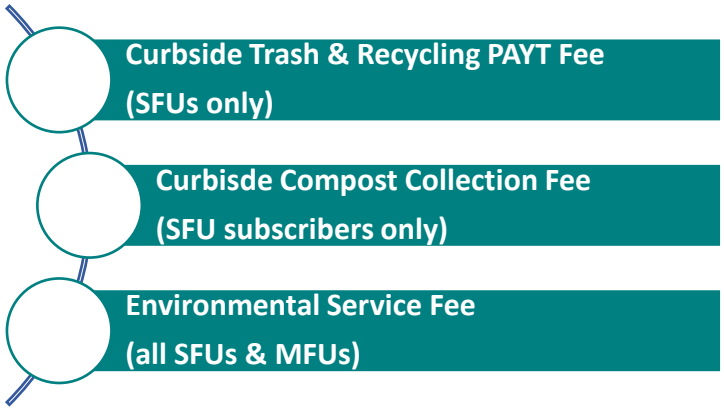

Figure ES-1 Proposed Future Rate Schedule

As the first four of these services are provided to both SFUs and MFUs, their cost will ideally be shared among all residents as shown below. The compost subsidy would only be paid by SFUs, as SFUs constitute the customer base eligible for optional organics collection.

Table ES-3 Comparison of Existing and Proposed Rate Schedules

Programs	Single-Family Units		Multi-Family Units	
	Current	***With Study Improvements***	***Current***	***With Study Improvements***
Regular Curbside Collections ($/hh-month)	$16.00	Small - $5.00 Medium - $11.10 Large - $18.25	na	na
Subscription Compost	na	$7.50 to $7.70	na	na
Environmental Service Fee ($/hh-month)				
Without compost subsidy	na	$1.20	na	$1.20
With compost subsidy (applied to SFU rate only)	na	$2.20	na	$1.20
Total Fees - Regular Service/No Extra Collections ($/hh-month)				
Without compost	$16	Small - $6.20 Medium - $12.30 Large - $19.45	na	$1.20
With compost (assumes subsidy)	na	Small - $14.70 Medium - $21.00 Large - $28.15	na	$1.20

hh = household na = not applicable (service not provided)
PAYT rates reflect scenario with smallest 32-gallon service level

Additional Recommendations

To ensure the success of the key program improvements evaluated, several additional investments and policy decisions are needed. These include:

- New City policy requiring all haulers (including private companies) to report quantities collected in Northglenn (trash, recycling, compost) – to track & measure diversion City-wide
- Improve Sanitation data & rate-setting – to measure changing diversion potential (through materials composition analysis), account for full costs within the enterprise & set fees that are clearly tied to specific services
- Regularly assess best-value processing options for recyclables & organics – these will likely vary over time as quantities & processor facility locations change

Transitioning from Study to On-the-Ground Program & Policy Changes

Without the changes evaluated in the optimization study, Northglenn will continue to see stagnant residential diversion levels and have no data with which to measure diversion on a City-wide level.

With these improvements, however, the City can build on the programs residents support today but achieve more aggressive environmental goals on par with other Front Range communities (and exceed those in most Adams and Weld County cities). The improvements will also support operation of a financially healthy enterprise fund while making only modest changes in customer fees. Specific outcomes will include:

- Catalyzing more active participation in diversion programs to conserve resources & reduce reliance on landfill disposal
- Making composting a visible & effective system component
- Promulgating hauler policy to obtain & track material data City-wide

These outcomes will establish a solid foundation and facilitate Northglenn's ability to make still further solid waste system improvements in future years (see the phased implementation approach in Figure ES-2). Mid- and long-term considerations the City would be able to undertake include the ability to allow additional users at the multi-material drop site, increase the Sanitation Division's customer base, expand hauler recycling requirements in the MFU and commercial sectors, and make composting a core residential service.

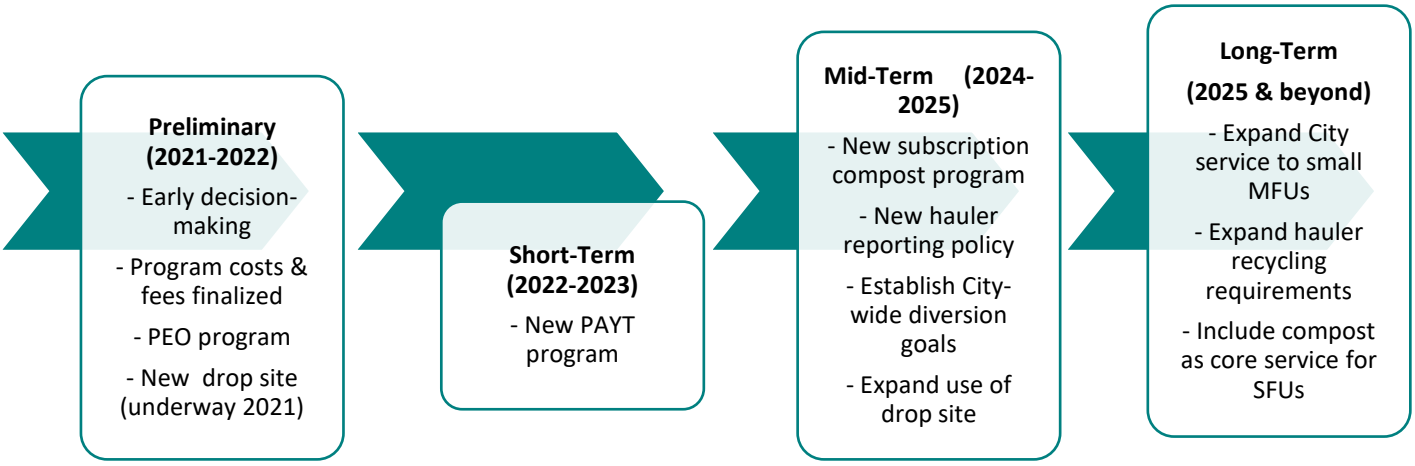

Figure ES-2 Suggested Implementation Schedule

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List of Abbreviations

BCRC	Boulder County Recycling Center
CDPHE	Colorado Department of Public Health & Environment
CY	Cubic yards
ETC	Extra trash (cart) collections
GHG	Greenhouse gas
HHs	Households
HTR	Hard-to-recycle (e.g., electronics, paint, batteries, etc.)
LBA	LBA Associates
$MTCO_2E$	Metric tons of carbon dioxide equivalents (GHG measurement)
M&O	Materials & Operations Facility (City facility)
MFU	Multi-family units
MRF	Materials recovery facility (recyclables processing facility)
MSW	Municipal solid waste (residential, commercial, institutional)
OCC	Old corrugated cardboard
PAYT	Pay-as-you-throw
PEO	Public education & outreach
SFU	Single-family units
SSR	Residential single-stream recyclables
USEPA	United States Environmental Protection Agency
WARM	Waste Reduction Model (USEPA model for assessing GHG reductions)
WM	Waste Management

1.0 BACKGROUND

The City of Northglenn is a home rule municipality located in Adams and Weld County. The City has experienced slow growth for the last several years and has a current population of approximately 39,000.

Through a municipal collection program run by the Public Works Department's Sanitation Division (Sanitation), Northglenn provides waste management services to 9,400 single-family households. In keeping with the City's goal of becoming a zero-waste community, Sanitation provides recycling and limited yard waste collection. In the last three years, however, only 12% of waste generated by these customers was diverted from landfill disposal (no information is available to measure diversion success in other parts of the city).

To address this gap, Northglenn undertook an optimization study to research the economic and environmental impacts of several residential waste management improvements that will foster more aggressive landfill diversion successes.

Northglenn's Solid Waste Optimization Goals:

- Provide single-family customers with new opportunities for recycling and composting
- Create incentives to encourage active customer participation in these programs
- Minimize cost impacts to customers & City operations

1.1 STUDY DESCRIPTION

Staff determined that the programs identified in Table 1-1 would be the most feasible starting points for establishing a stronger foundation for a sustainable waste management system.

Table 1-1 Waste System Improvements

System Improvement	Objective
Change to Volume-Based Fee System for Curbside Collection	Create a financial incentive for customers to increase diversion practices
Add Subscription-Based Compost Collection	Provide a voluntary program for residential curbside collection of food & yard waste organics
Optimize Recycling Drop Sites	Increase efficiency, improve material quality & add organics collection

Major Study Components

To assess these improvements, the City teamed with LBA Associates and Kessler Consultants (the LBA Team) to consider operational, economic and environmental attributes. The project included several major activities:

- Public survey to gauge the public's interest in the study improvements
- Survey of Colorado and national communities with similar programs and policies
- Work sessions with Planning and Public Works Department staff and Northglenn City Council
- Analytic modeling and assessment of improvement scenarios
- Identification of the key components and implementation strategies that will best meet City goals

Next Steps

The results of this study will support City decision-making around program sequencing, fee schedules and additional policy (see Figure 1-1). Once approved, it is expected that the analyses presented in this document will be refined and implementation rolled out over the next four to five years.

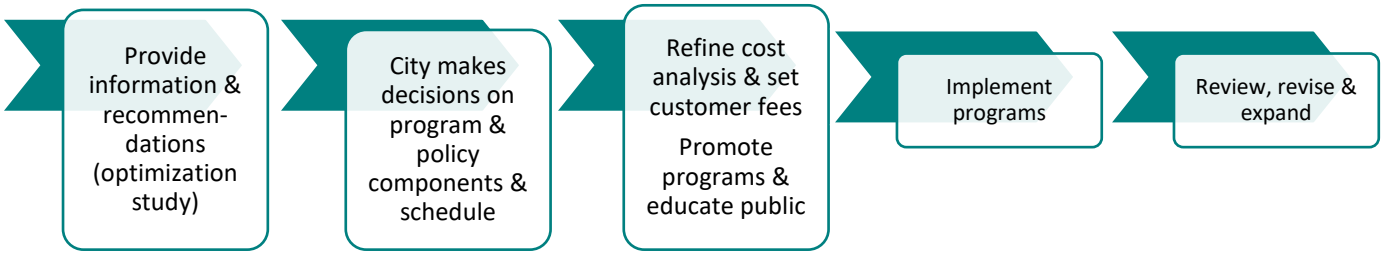

Figure 1-1 Decision-Making and Implementation

1.2 STUDY LIMITATIONS

There are a few factors that hinder the ability to definitively estimate the impacts of system improvements in Northglenn:

1. A pertinent impact of coronavirus was the elevated residential waste tonnages in 2020 as more customers both worked and played at home – 2019 quantities have been used in this study to avoid over-estimating future quantities[1].

2. The Sanitation Division controls primarily single-family residential waste, which is only a portion of the City's total waste stream. This limits the ability to influence City-wide diversion and meet its sustainability goals.

3. Landfill diversion goals are currently not measurable – the City's current goal of 20% diversion by 2023 applies to the total City waste stream but data is tracked & reported for residential single-family units only.

4. Several factors limit the ability to estimate program costs during the study;

    - Some services are provided to other waste generators who do not directly pay fees to the Sanitation Division enterprise fund
    - Some Sanitation costs are incurred by other departments (e.g., fleet maintenance costs) and not well-documented

[1] 2019 trash and recyclables tons were 9% to 14% higher than 2019 quantities; population growth during the same period was <1%.

- Not all costs are attributed to specific programs or services (e.g., collection, drop sites, etc.) and could not be fully identified or used to set definitive user fees

2.0 EXISTING SYSTEM AND NEED FOR OPTIMIZATION

Northglenn controls a small portion of the overall solid waste generated within the city. Figure 2-1 shows the SFU sector relative to the total municipal solid waste (MSW) and non-MSW streams. Understanding this relevancy becomes important when comparing generation and diversion metrics to other communities and when setting sustainability goals.

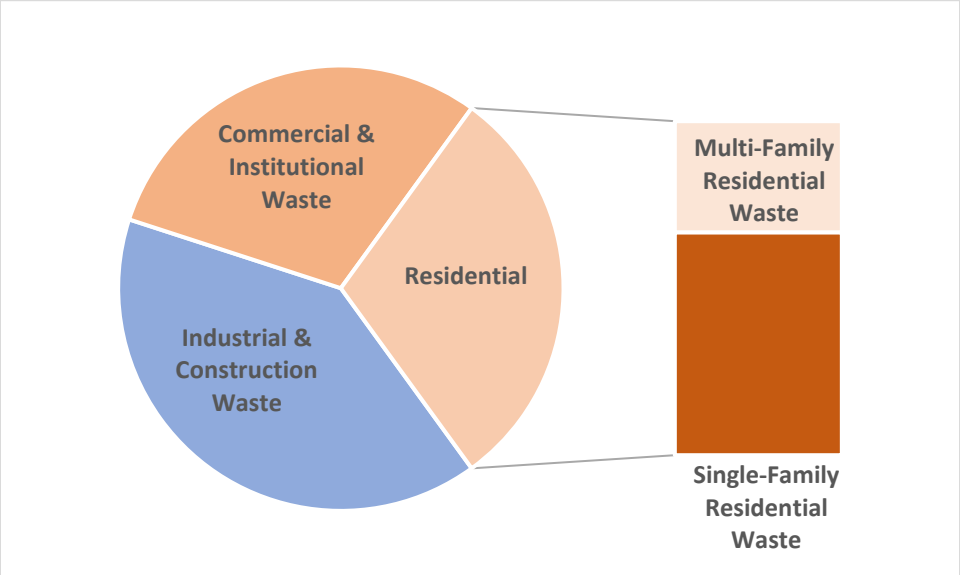

Figure 2-1 Solid Waste Generation Sectors

2.1 EXISTING COLLECTION SYSTEM

Northglenn operates several waste collection programs for its residential customers. Of the 16,900 tons of material collected in 2019, only 12% was diverted from landfill disposal (see Figure 2-2 on the next page).

Sanitation is an enterprise funded by a combination of utility billing revenues and user fees. SFUs pay a flat fee on their monthly utility bills for solid waste services, which primarily includes regular curbside collection of trash and recyclables but also covers most drop site costs and some ancillary services such as free landfill and dumpster days[2]. Additional user fees are assessed on SFUs for initial purchase of

[2] As noted previously, these ancillary services are also available to other generators including multi-family units and - in some cases - commercial generators and generators from outside the City.

carts and for curbside trash collections beyond regular weekly pick-ups. Figure 2-3 illustrates the relative size of these programs in terms of quantities collected.

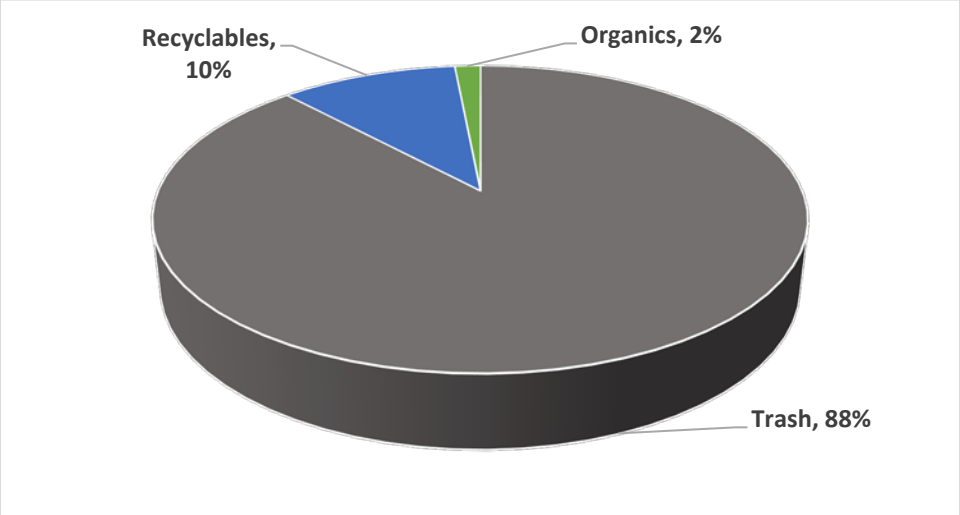

Figure 2-2 2019 Solid Waste Collections (percent by weight)

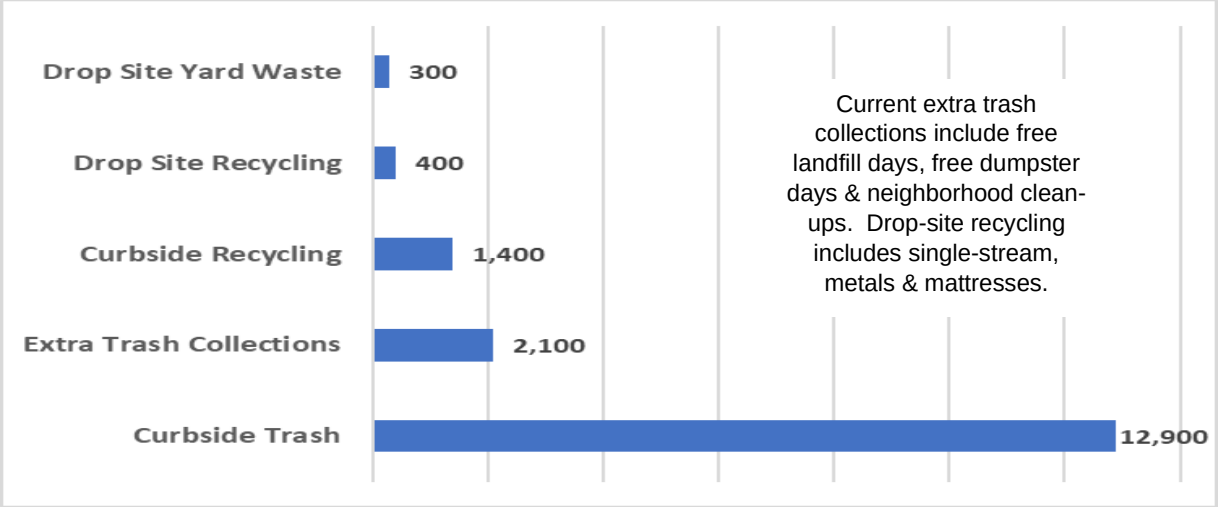

Figure 2-3 2019 Material Quantities by Program

Residential Curbside Collection

Northglenn requires that trash and recyclables from all single-family homes (SFUs) is collected by the City's Sanitation Division. Sanitation's customer base of 9,400 also includes a very small number of multi-family homes (MFUs) with a maximum of two units.

Regular Curbside Trash & Recyclables Service – Northglenn's bundled SFU service includes weekly collection of trash and every-other-week collection of single-stream recyclables. All collections are for wheeled carts; two trash cart sizes are available and one recycling size. Customers are allowed a maximum of four large carts (up to three of these may be trash containers). While trash service is not

unlimited and recycling is encouraged, nearly two-thirds of Sanitation's customers have two or three trash carts while only 6% have more than one recycling cart[3].

Since 2016 (when last cost adjustment was made), customers have paid a flat fee of $16/household-month for regular collection, regardless of how many containers they have. An additional one-time fee is assessed for each trash cart ($58 to $60 each) while recycling carts are provided at no cost.

Extra Trash Collection – City customers may also request extra cart trash collections (ETC) and bulky collections for an additional fee ($10 and $100/pick-up, respectively). These services allow occasional peak trash materials and bulky items (such as furniture, mattresses, appliances, etc.) to be collected as needed without obtaining an additional trash container for permanent use.

Recyclables Collection - Recycling is an opt-in program and most trash customers request service; in 2019, 84% of City customers recycled at least occasionally. Despite these metrics, curbside recycling tons were only a fraction of trash tons (about one-tenth as shown in Figure 2).

The recyclables contamination level represents the collection of unaccepted materials which must ultimately be managed as trash. These materials lead to both the over estimation of landfill diversion[4] and higher processing costs. Most contamination measurements between 2018 and 2020 exceeded 10%. As this level surpassed Northglenn's processing contract threshold, the City incurs a monthly penalty.

Drop Site Collection

All drop site operations are free of charge to both SFUs and MFUs in Northglenn.

Recycling Drop Sites – Until early 2-21, Sanitation operated the Northwest Open Space and Jaycee Park drop sites. Both sites accepted single-stream recyclables in gable-top roll-off containers and were open 24/7. Neither site was fenced or staffed. As a result, the following inefficiencies were regularly observed:

- Non-residential generators both from within Northglenn and outside the City can access the sites (especially the Jaycee Park location) – no hard data is available & this usage is anecdotal
- Trash is deposited outside the drop-site containers – Sanitation collects trash four days/week & requires some overtime labor
- Recyclable's contamination is high – although actual measurements are limited

As a result of these issues, Sanitation closed both sites earlier this year and relocated drop-site collections to an enclosed area of the City's Maintenance and Operations Facility (M&O). Materials are currently accepted during regular business hours plus Saturdays. The facility is unstaffed but adjacent to other on-going government activities (including yard waste collection on Saturdays).

Yard Waste Drop Sites – Brush, limbs and stumps are accepted at M&O weekly during the summer season and monthly in the off season. Northglenn's Christmas tree recycling program and some municipal yard waste operations also occur at this location. These materials are chipped periodically and

[3] In the City's 2020 public survey, the need for additional recycling cart capacity was the number one complaint/request.
[4] For example, while 12% of the residential waste stream was collected as recyclables or organics, once contamination is considered actual landfill diversion falls by one to two percentage points.

much of the material is given away to residents, businesses and schools (excess mulch is applied to city properties).

Ancillary Trash Collections

Finally, Sanitation offers a series of special collections for both its SFU customers and other residents (see Table 2-1).

Table 2-1 Extra Fee-Based and Free Trash Collections

Special Collections	Materials Accepted	Current Users	Fee
Extra Curbside Cart (ETC)	Carted trash only	SFU customers only by appointment	$10/collection
Bulky Material Curbside	Up to 10 items (excl carted & bagged trash, yard waste)	SFU customers only by appointment	$100/collection (fees apply for some items)
Neighborhood Clean-Up Roll-Off Service	20- or 30-cubic yard unit for 3-day rental	All residents (SFUs & MFUs) – individuals or neighborhood groups	$257 ($0 for groups of at least 5 SFUs)
Free Landfill Days (2/year - Tower Road Landfill)	Trash (1 load per resident)	All residents (SFUs & MFUs)	No fee
Free Dumpster Days (2 per year – M&O Facility)	Bulky items are encouraged (1 load per resident)	All residents (SFUs & MFUs)	Fees apply for some items

Non-Residential Collections

Private haulers of non-SFU waste are required to have a general business license issued by the City, but the license is not specific to solid waste. Private haulers are not required to report quantities collected or to provide recycling or composting services to their trash customers.

The only exception to non-residential collections is the trash and recyclables generated at city facilities. These dumpster collections are served by Sanitation; quantities are minimal but are included in the totals shown in Figure 2-2.

Materials Management and Processing

The facilities used by Sanitation to manage materials collected through curbside, drop site and special collection programs include the primary (Republic) and back-up landfills (Waste Connections) identified in Table 2-2 (next page) and Waste Management's (WM) materials recovery facility (MRF). All three are privately owned and operated.

The 2021 WM contract pricing for sorting, baling and marketing the fully commingled recyclable stream varies monthly based on national market indices, quantities recycled, material quality and WM costs. For many years, the City earned net revenues for its recyclables, but since 2017 has incurred annual costs. In 2020, the average processing cost was $53/ton (nearly four times as expensive as landfilling). Table 2-2 also lists other recyclables processing facilities available to the City with different cost and sustainability attributes (see Section 8.0 for further discussion).

Table 2-2 Northglenn's Contract Processing Facilities

Trash		Recyclables		Organics	
Facility	Miles from City / Tip Revenue (Cost)	Facility	Miles from City / Tip Revenue (Cost)	Facility	Miles from City / Tip Revenue (Cost)
Tower Road Landfill / Republic Services (primary landfill)	17 miles ($14/ton)	Franklin St. MRF / Waste Management (current contractor)	11 miles SSR - ($53/ton) OCC -$12/ton	City processing (brush & limbs only)	
Front Range Landfill / Waste Connections (back-up landfill)	13 miles ($15/ton)	Boulder County Recycling Center MRF (future option)	19 miles SSR - ($37/ton) OCC - $24/ton	Rattler Ridge Compost Facility / A1 Organics (grass/leaves & food waste)	20 miles to transfer (40 miles to Rattler Ridge) ($45/ton)
		Momentum Glass Recycling (future option)	9 miles $10/ton		

One-way mileage
MRF tip fees are average 2020 (vary monthly)
Compost processing is discussed in Section 6.0 - A1 Organics fee includes transfer through McDonald Farm

2.2 NEED FOR OPTIMIZATION

While the City provides recycling to SFUs and drop-site users today, participation is voluntary and there is no financial incentive to actively participate. Additionally, organics recovery is limited to those materials Sanitation can grind on site. Overall, Northglenn's landfill diversion rate amongst SFU customers remains steady at 12%.

The City's overall MSW rate is unknown as data from MFU, commercial and institution collection are not tracked; it could be higher or lower than the SFU rate. Given the lack of rules regarding diversion activities by these generators and their private haulers, however, it is likely that the City's MSW rate is less than 12%. By contrast, the Front Range MSW diversion rate averages 16% (2019) and U.S. averages 32% (2018).

Available data from the Colorado Department of Public Health and Environment (CDPHE) shows that the nearly 60% of the MSW being landfilled by Front Range communities could have been recycled or composted (see Figure 2-4 on the next page). It is likely that this reflects the opportunity in Northglenn as well.

Actions Needed

To improve landfill diversion and support its sustainability goals, the City needs to:

- Build a stronger diversion foundation around both recycling & composting for SFU customers
- Implement tools to obtain & track diversion data from other sectors
- Grow programs, increase policy requirements & measure progress
- Consider the value & ability to expand influence & control to other generators

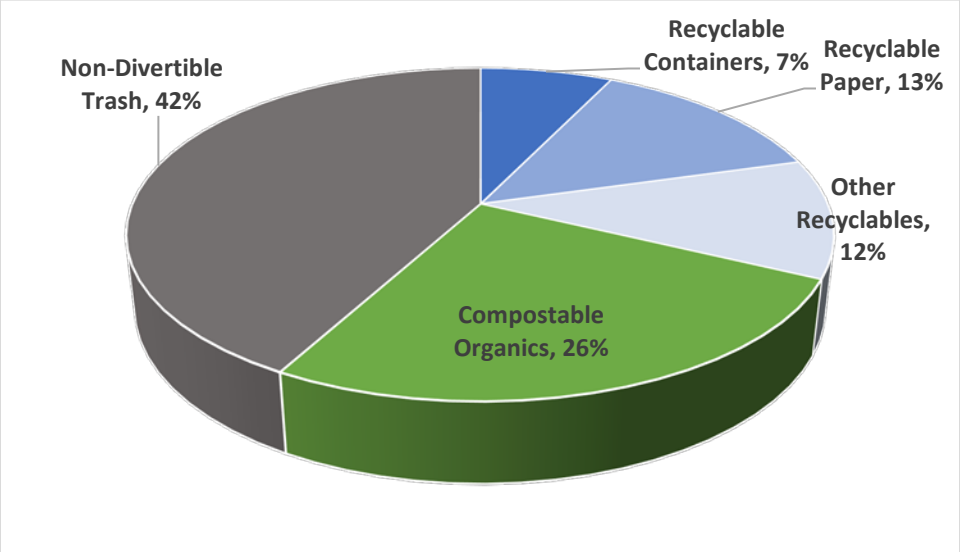

Figure 2-4 Front Range MSW Trash Stream Composition (percent by weight - CDPHE, 2018)

3.0 PUBLIC SUPPORT

In late 2020, the City conducted a public survey to assess support for the system improvements evaluated in this study. The survey was distributed electronically through the Northglenn Connection and in SFU utility bills; a gift-card drawing was provided as an incentive. The survey yielded 206 responses, 92% of which were Sanitation customers. This level of response, while helpful in informing this study, is a small percentage of the impacted public and responses should be used judiciously.

Predominant Survey Feedback:

Over half of survey respondents submitted comments which generally supported more diversion opportunities in terms of additional services, greater collection capacity and increased responsibility for individual waste management practices.

3.1 INCENTIVES FOR LANDFILL DIVERSION

Strong support for landfill diversion was expressed; 98% of the respondents agreed this is an important goal for the City. Ninety percent also indicated a willingness to participate in a program that would provide financial incentives for more diversion and would also provide residents with options for reducing their monthly bills (i.e., volume-based pricing or a similar concept).

3.2 INCREASED RECYCLING OPPORTUNITY

The most common comment indicated the need for greater curbside recycling capacity; many asked for weekly recyclables collection. It appeared that most respondents did not realize that they could request a second cart thereby doubling capacity even if collections remained at an every-other-week level.

Comments concerning recycling drop sites noted a lack of capacity at the Northwest Open Space and Jaycee Park locations. These comments observed full roll-off containers and the inability to accept organics. Additional locations was also requested by some. Figure 3-1 on the next page illustrates reported uses of these sites and the City's M&O facility for yard waste drop off.

3.3 INTEREST IN COMPOST OPTIONS

While 95% or respondents stated the desire for organics collection to be more accessible, only 20 respondents specifically asked for curbside compost collection (Figure 3-2 on the next page summarizes what residents would be willing to pay on a monthly household basis). An additional 67% indicated a likely use of drop site collection if organics were accepted in the future. Several commented about their backyard composting practices as well as the need for compost product to be made available for home and community gardens.

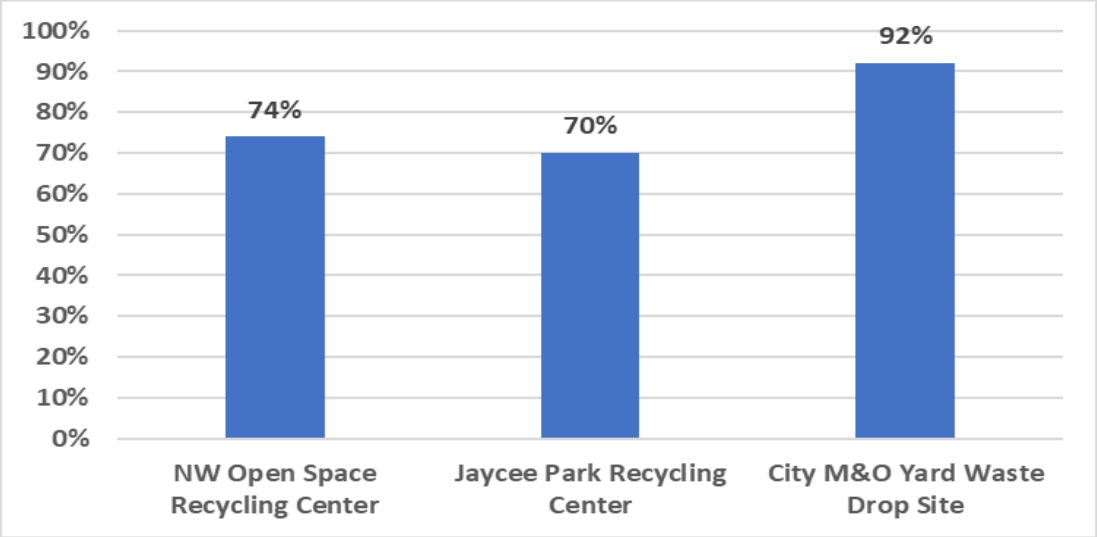

Figure 3-1 Reported Usage of Existing Drop Sites

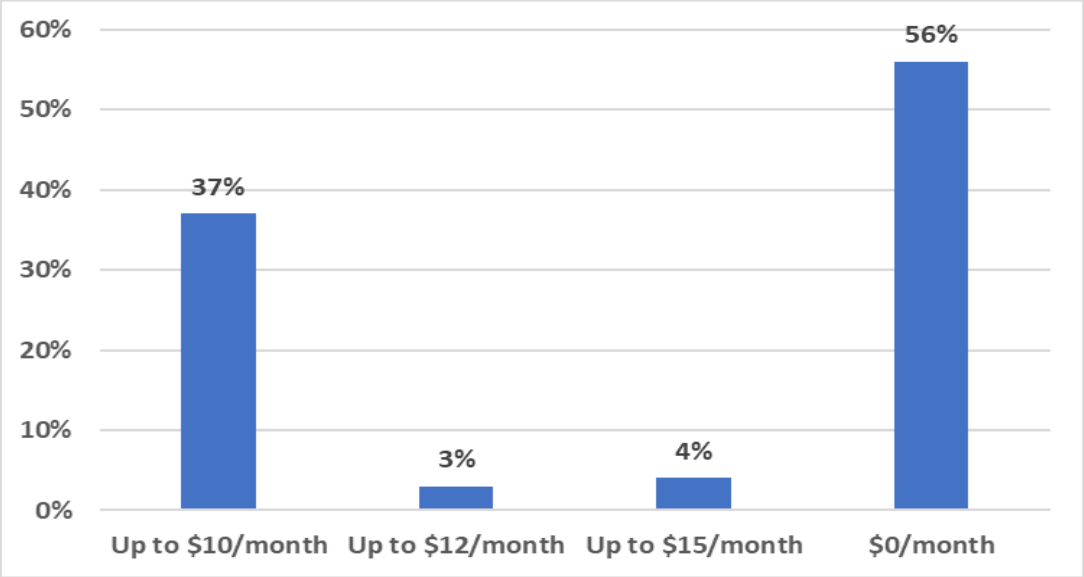

Figure 3-2 Willingness to Pay for Curbside Compost Collection

3.4 OTHER SURVEY INPUT

Other survey input that speaks to possible system changes not specifically addressed in this study (but ultimately valuable in increasing future landfill diversion success) included:

- More information & education around acceptable recyclable materials, where to take organics & how to manage special materials (e.g., electronics, paint & batteries)
- More programs for additional services – including collection of more bulky materials, paper shreds & special materials
- City recycling services for MFUs, institutions & businesses

4.0 COMPARABLE CITY PROGRAMMING

A review of several Colorado and national municipalities was conducted to identify program components, equipment, operations and pricing structures that may be relevant to future improvements in Northglenn.

State of Colorado Context

- Front Range diversion goals = 39% by 2026 & 51% by 2035
- Increased state policy – plastic reduction is legislative focus for 2021
- Increased CDPHE research – recyclables market development, organics recovery & extended producer responsibility is department focus in 2021
- Front Range/State grant programs – opportunity to fund some of Northglenn's capital improvements in 2022

4.1 COLORADO PROGRAMS

The communities of Denver, Longmont, Loveland and Thornton were selected for their relevancy to the study. All four are bigger than Northglenn and serve more residents than the City, but each have implemented a combination of programs evaluated in this study.

All four communities have a municipal collection system with bundled trash (weekly) and recycling (every other week) curbside collection and pay-as-you-throw (PAYT) pricing. Three have weekly curbside compost collections provided by the city; Longmont uses a contract hauler for this service. Collected materials are disposed or processed in a mix of publicly- and privately- owned facilities in the northern Front Range.

Table 4-1 on the next page includes a summary of Colorado findings. Key observations include:

- Landfill diversion rates vary - Longmont (35%) & Loveland (60%) are the leaders; Denver's "free" recycling & Thornton's lack of distinct PAYT pricing keep their rates at 23% & 12%, respectively
- Trash carts - all four communities provide at least three trash cart sizes (Thornton's options include multiple carts of same size with slightly increased pricing)
- PAYT – Longmont & Loveland use a clear pricing differential for curbside trash/recycling
- Additional waste management fee – Longmont & Loveland assess between $2.96 and $11.25/month for SFUs to off-set other free or subsidized services[5] (fees are also assessed on MFUs and apply even if residents do not receive city's curbside service)
- Drop site services – all four cities operate one or more drop sites for single-stream recyclables, seasonal yard waste, food waste and hard-to-recycle materials

[5] Such as free landfill days, drop-site operations, holiday recycling, hard-to-recycle material services, public outreach programs, etc.

- Curbside compost service - Denver, Longmont & Loveland all offer subscription-based curbside compost collection charging between $6.60 to $9.75/household-month; Denver & Longmont have year-round programs while Loveland's is seasonal

Table 4-1 Solid Waste Program Summary for Colorado Cities

Cities (2019 Population)	Denver (727,200)	Longmont (97,300)	Loveland (78,900)	Thornton (141,500)
Residential Customer Base	Up to 7 units (180,000 hhs)	Up to 7 units (29,800 hhs)	Up to 3 units (25,200 hhs)	SFUs & small MFUs (>30,000 hhs)
2019 Residential Diversion Rate	23% includes some MFU	35% includes some MFU	60% includes some MFU	13%
Bundled Trash/Recycling Service				
Service Levels equivalent weekly size	Trash – 35, 65, 95 gal Recycling – 35, 65, 95 gal	Trash – 24, 48, 96 gal Recycling – 96 gal	Trash – 17, 35, 65, 95 gal Recycling – 35, 65, 95 gal	Trash – 96 gal (up to 4 carts) Recycling – 96 gal
PAYT ($/hh-month) all prices based on trash but include recycling	No user fees (incl in property taxes)	24 gal - $6.50 48-gal trash - $12.90 96-gal trash - $24.00	17 gal - $3.25 35 gal - $6.50 65 gal - $13.00 95 gal - $19.50	One cart - $13.50 Two carts - $16.00 Three carts - $25.20 Four carts - $34.40
Drop-Site Collections (no cost)	Single-stream, organics, HTR materials	Single-stream, organics HTR materials	Single-stream, seasonal yard waste	Single- stream, organics, HTR materials
Curbside Organics				
Service Levels	Subscription curbside Carts – 35, 65, 95 gal (weekly)	Subscription curbside Carts – 96 gal (every other week)	Subscription curbside yard waste Carts – 96 gal (weekly during season)	Curbside leaf collection 4 weeks each fall only
Pricing ($/hh-month)	$9.75	$6.60	$8.50 (Mar-Nov only)	$0
Additional Waste Management Fees ($/hh-month)		Flat fee of $2.96 assessed on residents of all sizes	Flat fee of $11.25 for SFUs, $9.50 for MFUs	

hh = households *HTR = hard-to-recycle*

As noted, Longmont and Loveland report the best residential diversion rates. Their systems are operated as enterprise funds, their public outreach is comprehensive, and their diversion programs have matured over many years (e.g., Loveland's PAYT program is 25 years old). Despite its lower diversion success, Denver's system is also a good example for Northglenn in terms of its low level of recyclables contamination (<10%), phased-in subscription compost program, and city-wide data tracking that allows an annual assessment of landfill diversion across all generating sectors.

4.2 NATIONAL PROGRAMS

The solid waste systems operated by Prescott, AZ; Dubuque, IA; and Stillwater, OK were selected as national examples as they each have municipal collection systems with bundled trash and recycling (all cities collect both streams weekly). Two of the cities have PAYT pricing and two provide curbside compost collections. Table 4-2 on the next page summarizes key findings.

Of note is Prescott's relatively high diversion level given only two trash cart sizes and a small pricing incentive. As the city's recyclables contamination level is reported at upwards of 25%, however, its actual diversion is several percentage points lower than that shown below.

Table 4-2 Solid Waste Program Summary for National Cities

Cities (2019 Population)	Prescott, AZ (44,300)	Dubuque, IA (57,900)	Stillwater, OK (50,300)
Residential Customer Base	Up to 3 units	Up to 5 units	Up to 2 units & mobile homes
2019 Residential Diversion Rate	30% (residential & commercial)	Not available	15%
Bundled Trash/Recycling Service			
Service Levels equivalent weekly size	SFU trash – 68 gal (up to 2 carts) SFU recycling – 68 gal	Trash – 35, 50, 65, 70, 95 gal Recycling - bins	Trash - bags, 35, 64, 96, 128, 192 gal Recycling – 35, 64, 96 gal
PAYT ($/hh-month) all prices based on trash but include recycling	One cart - $17.50 Two carts - $25.00	35 gal - $14.99 50 gal - $20.62 65 gal - $20.65 70 gal - $23.62 95 gal - $29.00	Bags - $1.50 each 35 gal - $13.74 64 gal - $16.01 96 gal - $18.28 128 gal - $26.74 192 gal - $29.93
Drop-Site Collections (no cost)	Single-stream, yard waste, HTR materials, seasonal debris		
Curbside Organics			
Service Levels	Drop-site yard waste collection only	Subscription curbside for food waste – 13, 48, 65 gal Separate seasonal subscription for yard waste – small, large (both collection weekly)	Curbside yard waste bundled with trash & recycling (up to 10 bags/week – 3 weeks/month)
Pricing ($/hh-month)	$0	Food waste - $1, $8 or $11 Yard waste - $11/month (Dec-Mar) or $35/year	$0

hh = households

Both Dubuque and Stillwater have numerous trash and organics service levels which provide a wide range of options. Both cities' pricing structure uses a low differential between cart sizes, which does not create a clear diversion incentive (Stillwater's diversion was only 15% and Dubuque's was not reported).

These national examples had some unique program features:

- Stillwater's curbside recycling program requires glass to be separated from single-stream for monthly collection
- Stillwater provides a cart cleaning service upon request for $10/cart
- Dubuque allows a 50% monthly fee discount for qualifying customers (low income, elderly, large number of persons/household)

4.3 OBSERVATIONS

Researching comparable cities can yield potentially helpful examples of what has worked or failed in other parts of the state or country. Findings are also useful in identifying metrics such as participation levels, service levels, quantities generated, etc. that new programs might aspire to and that can be used for feasibility and cost evaluations.

However, there a large number of variables in every system that will impact program success such that no two programs are the same or can expect to achieve the same results. As a result, research findings should be used judiciously.

5.0 VOLUME-BASED FEE SYSTEM FOR CURBSIDE COLLECTIONS

Many residential curbside collection programs operated by Colorado municipalities charge flat fees regardless of the amount of trash generated. While flat pricing is relatively simple to implement, it can create a disincentive for diversion. Experience shows that flat pricing systems - or those with low pricing differentials between cart sizes tend to have lower landfill diversion levels than those with volume-based pricing (Tables 4-1 and 4-2 demonstrated the contrast between PAYT program examples with and without clear pricing incentives).

PAYT pricing is growing in popularity in Colorado and the U.S.[6] PAYT systems have multiple trash cart sizes and corresponding price differentials that provide equity for waste generators (whose monthly rate is tied to the specific level of service they need) and allows individual cost control. As a result, PAYT encourages customers to reduce trash generation in favor of waste reduction, recycling and composting. As PAYT encourages landfill diversion, recycling is often bundled with curbside service and the cost of recyclables collection included in the PAYT trash service levels.

Northglenn PAYT Goals:

- Increase diversion of recyclables
- Establish fees for actual level of service
- Tie fees to specific, regular

The concept of volume-based pricing and cost-control was supported by a majority of respondents in the City's 2020 public survey.

5.1 CURRENT CITY SERVICES

Section 2.0 described the key metrics for Northglenn's SFU collection program:

- Flat fee of $16/month for bundled trash & recycling
- Weekly trash & every-other-week recycling
- All customers utilize trash service - only 84% recycle
- Trash cart option of 64- or 96-gallon carts (up to three permitted) – 94% of customers use large cart & 67% have two or more trash carts
- Recycling cart is 96 gallons (multiple carts permitted) - most have one cart only

Table 5-1 on the next page summarizes current City costs for this program.

[6] Over 7,500 communities throughout the U.S. have moved to PAYT pricing.

Table 5-1 Current Curbside Collection Costs (2020)

	Current City Costs
Annualized Capital	$503,400
Operating Cost	$970,200
Total Annual Cost	$1,473,600

5.2 SERVICE LEVEL OPTIONS

PAYT service levels are tied to trash cart size and can vary depending on collection equipment, range of options municipalities want to provide customers and cost. Two service level options were evaluated for Northglenn (see Table 5-2). Both options maximize carts already in use throughout the city (i.e., 64 and 96 gallons) and the vehicles that serve them. The base level of service for both options includes one trash cart and one recyclables cart (it is expected that Sanitation will allow for additional trash carts at an additional cost as needed).

Table 5-2 PAYT Service Level Options

	Trash Service Level Options	Recycling Cart
Option A	Small - 32 gallons Medium - 64 gallons Large – 96 gallons	Large - 96 gallons
Option B	Hybrid – 48 gallons Medium – 64 gallons Large - 96 gallons	Large - 96 gallons

The only difference between Option A and Option B is the size of the smallest cart (32 or 48 gallons). Sanitation has had limited experience servicing small, 32-gallon carts with its existing vehicle lift arm equipment. It is possible that there may be incompatibilities that either damage the small carts, drop them in the hopper when tipped or require different tension settings – any of these outcomes would be unacceptable. Field testing is needed to verify equipment compatibility, which Sanitation intends to complete in 2021[7].

5.3 CONSIDERATIONS FOR ANALYSIS

Increased Diversion

Moving to a PAYT pricing system has been shown to have a notable impact on residential diversion. Not only are residents financially encouraged to "trash less and recycle more", PAYT improvements are typically implemented in tandem with other system changes that also help drive diversion. In Northglenn's case these additional changes are expected to include buying back/re-deploying carts (see next page), adding a subscription-based curbside compost program (see Section 6.0), consolidating and improving the City's drop site (see Section 7.0) and developing a comprehensive public education and

[7] Manufacturers of both the vehicles' current lift arms (Faris Machinery/Scorpion Lift Arm) and carts (Toter) have agreed to assist in testing - KCI communications, January 2021.

outreach (PEO) program (see Section 8.0). If other policies (see recommendations described in Section 8.0) are promulgated, the overall SFU diversion success could be even greater[8].

Assumed Customer Service Levels

One of the first steps in implementing a PAYT program is the customer selection process when SFUs choose a small, medium or large service level. The break-down of these selections (and ultimately the cart distributions) will impact capital and operating costs. Typically, the distributions in new PAYT programs have more medium and large carts. These distributions will likely change over time as customers become more comfortable with the ability to increase their recycling efforts and subsequently require smaller trash carts. The distribution shown below has been assumed for the first years of Northglenn's program based on observations from other Front Range cities with municipal collections:

- 20% small service level (32- or 48-gallon carts)
- 50% medium (64-gallon)
- 30% large (96-gallon)

It will be important for the City to evaluate distribution changes - and resulting costs - over time and adjust fees as appropriate.

Customer Fee-Setting

Once program costs are identified, customer fees can be set. This fee schedule can be based on several factors:

- Field test results – which will determine the feasibility of service level Option A
- Cost recovery – PAYT fees paid by SFU customers may
    - Include regular collection costs (minimum cost coverage)
    - Include small subsidy for new subscription compost program (see Section 6.0 for further discussion)
    - Exclude "free" services (drop site, landfill & dumpster days) that are provided to both SFUs & MFUs (see Section 8.0 for an alternative fee recommendation)
    - Exclude public education & outreach (PEO) activities that also benefit all residents (see Section 8.0 for further discussion)
- Creation of clear incentive for diversion – such that customers see distinct difference in pricing for small, medium & large service sizes (this may require small adjustment to actual costs)

Cart Ownership

SFUs currently own their trash and recycling carts. Going forward with PAYT, many customers will select trash cart sizes different from their current container and a cart swap will be required. To facilitate the ability to swap carts in the future (as customers choose to down- or up-size) and simplify the program, Northglenn intends to:

- Buy back all current trash and recycling carts from current customers[9]

[8] For modelling purposes, the LBA Team assumed that the cumulative effect of PAYT pricing and other changes will increase current SFU curbside recyclable quantities by 50% during the first years of implementation.
[9] Buy back in this analysis based on average cart cost to customers. When implemented, the City may decide to reimburse customers based on age of cart through credit on utility bill or similar approach.

- Re-deploy used trash carts as appropriate to customer selections[10]
- Retain City-ownership of all carts in the future

About 25,000 total trash and recycling carts are deployed across the City, and they vary in age and value. A per-cart rate equal to 50% of today's purchase price has been used in the PAYT evaluation to represent the cost of buy-back for a total capital cost of approximately $587,500.

Change to Accepted Materials

There are potential refinements the City could make to its list of currently accepted recyclables that may reduce contamination (and lower processing costs) and/or improve quantities and revenues. These changes should carefully weigh ease of implementation, magnitude of benefit (material volume), ability to educate the public and long-term marketability. They may also be processor-specific; joint decisions with the City's processor and commitment on the company's part are also important. Examples based on 2020 market observations include:

- Moving away from accepting plastics with low marketability (i.e., polyvinyl chloride, polystyrene & other non-recyclable plastics) – could reduce single-stream contaminants but very low-weight materials & difficult for the public to differentiate from other plastics
- Potentially adding other items that have become more prevalent in the waste stream (e.g., paper coffee cups and polypropylene coffee pods) – could provide opportunity for awareness-raising but may be processor-specific in terms of acceptability[11]

5.4 COST ANALYSIS AND OBSERVATIONS

A comparative estimation of capital costs, amortized capital costs, annual operating costs and total annual costs were developed for each of the PAYT service level options in Table 5-3. Appendices A and B include additional detail on the data, costs and assumptions used for this analysis.

Table 5-3 PAYT Cost Analysis Summary (2021$)

	Option A (32-,64- & 96-gallon carts)	Option B (48-, 64- & 96-gallon carts)
Total Program Costs (incl trash & recycling service)		
Capital Cost	$2,674,500	$2,674,500
Annualized Capital	$388,700	$388,700
Operating Cost	$921,600	$921,600
Total Annual Cost	***$1,310,300***	***$1,310,300***
Per Household Costs ($/month)		
	Small - $5.50 Medium - $11.10 Large - $16.60	Hybrid - $7.90 Medium - $10.60 Large - $15.80

Capital costs include collection vehicles, new carts, cart buy back
Operating costs include labor, operations, hauling, tip fees & administration

[10] It was assumed that trash carts currently in use are in good condition and can be re-deployed, thereby reducing capital costs. .
[11] Neither are currently accepted by Waste Management.

Key Observations

Comparison of Estimated PAYT Collection Costs to Current Flat Fee – The current fee of $16/month includes multiple 96-gallon trash carts and a 96-gallon recycling cart for most SFUs[12]. Every customer will see an adjustment in service to a maximum of two carts (one trash and one recycle).

If customer fees are ultimately set equal to the costs in Table 5-3, customers will also see a monthly fee roughly equal to or lower than their current utility bill.

Those customers who are able to down-size their trash service to a small or medium cart will see a notable reduction in their monthly fee; this could be a fraction of their current bill.

Setting PAYT Fees – The costs tabulated above reflect actual, break-even program costs. The City may choose to adjust the ultimate fee schedule to create the best diversion incentive possible. For example, the Option B differential between the 48- and 64-gallon carts is small enough that SFUs may not consider the smaller size; an adjustment to increase this gap may encourage selection of the small service level.

Adjusted Option A Fees (+/- 10%)
Small – $5.00
Medium – $11.10
Large - $18.25

Adjusted Option B Fees (+/- 10%)
Small – $7.15
Medium – $10.60
Large - $17.50

One approach to encourage trash cart down-sizing is to slightly reduce the small service fee and increase the large service fee (this would effectively create a system where the large service partially subsidizes small service). The side bar at left shows the estimated impact of adjusting the break-even small and large service level costs in Table 5-3 by -10% and +10%, respectively. This example provides a very clear distinction between service levels, while still covering City costs[13].

Other Program Considerations:

- Strong PEO program – to communicate the value of PAYT & consistency with City goals, and address the "cons" of volume-based pricing (for example, some customers with multiple trash carts today will feel their service is reduced in the future but their fees stay the same)
- Myriad of "fringe" services can be provided to address small customers groups – many of these are provided by Sanitation now but could require an adjustment to Table 5-3 costs if maintained;
    - Door-to-door service for elderly & disabled[14]
    - Recycling waivers for SFUs with severe space constraints to refuse recycling service
    - Option for even smaller trash service level – such as every-other-week trash collection
    - Option to increase trash beyond 96 gallons – for additional fees that maintain diversion incentive

[12] The existing SFU fee also covers "free" services and drop-site operations; study estimates are that an average $13.60/household-month of the $16 currently assessed represents curbside-only costs, leaving $2.40/month for ancillary services.
[13] The study analysis estimates that Sanitation will have an annual revenue surplus in this example of $36,000 (Option B) to $44,000 (Option A) which can be used to offset unbudgeted program cost increases/revenue decreases.
[14] Dubuque, IA offers a 50% monthly discount to low income and elderly customers, as well as household with a large number of residents.

  - Option to increase recycling beyond 96 gallons – at no extra cost
- Include annual increase to cover inflation for curbside collection (likely tied to local Consumer Price Index)
- Weekly curbside recyclables collection (requested by many in City's 2020 public survey) – the cost of adding a weekly collection would increase Table 5-3 totals; obtaining an additional recycling cart instead (at no extra cost) would likely meet customer needs at notably less cost

6.0 SUBSCRIPTION-BASED CURBSIDE COMPOST COLLECTION

Figure 2-4 illustrated the fact that well over 50% of the waste sent to Front Range landfills could have been diverted in 2018. Nearly half of this was compostable yard and food waste - yet organics is the least-diverted stream in Colorado today. Many communities – including those described in Section 4.0 – are beginning to address this discrepancy by adding voluntary curbside collection programs.

These subscription-based programs increase costs for participating households through the addition of a new service. Subscribing households, however, may be able to off-set compost fees by down-sizing their trash cart service level.

Currently, Northglenn only collects some yard waste weekly or monthly at its M&O drop-site. The City has chosen to explore the feasibility of capitalizing a new subscription curbside compost program.

Northglenn Compost Goals:

- Establish new subscription-based curbside collection SFU service
- Increase diversion & decrease landfilling
- Build & operate a break-even program

6.1 SUBSCRIPTION LEVELS

To fully evaluate cost feasibility, four potential subscription levels were analyzed (see Table 6-1). It is expected that each subscribing household would have one 64-gallon cart for weekly organics collection.

Table 6-1 Curbside Compost Subscription Levels

	Participation (% of SFUs)
Subscription Level 1	80%
Subscription Level 2	40%
Subscription Level 3	20%
Subscription Level 4	10%

6.2 CONSIDERATIONS FOR ANALYSIS

Participation

Like any voluntary program, it is expected that subscription levels will be low initially but will grow over time as customers come to appreciate their ability to reduce trash and PAYT fees, as well as maximize landfill diversion. By way of example, Denver's subscription program participation increased to nearly 20% in the three years since subscription was offered city-wide. Other cities like Boulder, Lafayette and Louisville have much higher participation, but they include composting as part of their bundled PAYT program (i.e., generators automatically billed for service).

Subsidy for Early Implementation

Adding a new program is an expensive endeavor that will require new equipment and relatively high operational costs (i.e., low collection efficiencies from partial household participation and long-distance haul to A1 Organics). These costs can be relatively reasonable if they can be shared by a large number of participants. The challenge of a subscription-based program, however, is that costs are higher in the early years when participation is low, but high initial costs keep residents from subscribing.

One approach to address this dynamic is to provide a small subsidy to jump-start the new program. That can reduce subscriber costs and encourage participation. As shown below, a $1/SFU-month subsidy could make Northglenn's new compost service affordable in the short-term. As the program grows, the subsidy could potentially be discontinued.

Accepted Materials

Contamination is also a critical issue with composting. In particular, plastics are detrimental to operational efficiency and producing high-value end-products. It is expected that while a wide range of yard debris and food wastes as well as plant-based food containers and packaging will be accepted, plastics and recyclables (except carboard & paper products) will not[15].

6.3 COST ANALYSIS AND OBSERVATIONS

A comparative estimation of capital costs, amortized capital costs, annual operating costs and total annual costs were developed for each of the compost subscription levels in Table 6-2. Appendices A and C include additional detail on the data, costs and assumptions used for this analysis.

Table 6-2 Curbside Compost Cost Analysis Summary (2021$)

	Subscription 1 (80%)	Subscription 2 (40%)	Subscription 3 (20%)	Subscription 4 (10%)
Number of Subscribers (households)	**7,520**	**3,760**	1,880	940
Total Program Costs				
Capital Cost	$1,574,000	$933,500	$466,800	$326,400
Annualized Capital	$227,900	$134,000	$100,600	$71,800
Operating Cost	$581,700	$362,200	$179,700	$126,600
Total Annual Cost	$809,600	$496,200	$280,300	$198,300
Potential subsidy	($112,800)	($112,800)	($112,800)	($112,800)
Per Household Costs/Fees ($/month)				
Without subsidy	$9.00	$10.00	$12.60	$17.70
With subsidy	$7.70	$7.50	$7.60	$7.70

Capital costs include collection vehicles & new carts
Operating costs include labor, operations, hauling, tip fees & administration
Subsidy costs covered in proposed new environmental service fee (Section 8.0)

[15] A listing of accepted and prohibited materials at A1 Organics' Rattler Ridge facility can be found at the bottom of the commercial organics recycling page - https://a1organics.com/commercial/.

Key Observations

Composting represents one of the most significant contributions to landfill diversion. Composting is the also the most effective way to reduce greenhouse gas (GHG) emissions due to the ability to sequester carbon.

It is improbable that Northglenn will become a zero-waste community until it successfully advances organics recovery across the city.

At a fee of $8/month, SFUs with the small trash service level of about $5/month can enjoy the three-stream collection for less than they pay today.

Subsidy – As shown above, the application of a small subsidy minimizes cost-sensitivity to subscription levels while still encouraging participation through relatively low monthly costs. In fact, Sanitation customers will have the ability to obtain an entirely new service while lowering their current bills.

The subsidized rates in Table 6-2 are consistent with those for other Colorado communities with similar programs (see Table 4-1). They are also within (or below) the range that 44% of the respondents to the City's 2020 public survey were willing to spend for curbside service (see Section 3.0)[16].

Other Program Needs - Effective promotion and support by the City will be critical in communicating the value of this program and obtaining reasonable participation regardless of fees. Additionally, organics collection at the City drop site will be needed to supplement the curbside program and pursue Northglenn's zero-waste goals.

[16] Over half of the respondents stated an unwillingness to pay any new fees.

7.0 OPTIMIZED DROP-SITE COLLECTION

Centrally-located drop sites are an effective way to provide additional recycling capacity to residents who already have curbside collection and access to recycling who do not currently have service (such as many multi-family households). Many drop sites also accept organic, hard-to-recycle and other materials. To be efficient, these sites need controls such as good signage, fencing, gates and staff to limit unauthorized use, wildlife access, illegal dumping of trash and unacceptable items, and contamination of recyclables. This is especially true when organics are collected but is becoming more important as the cost of processing recyclables increases.

This study evaluated several opportunities for improving operational effectiveness and access to both SFU and MFU residents. As shown at right, these include expansion to accept all organics including general yard debris and food waste.

Northglenn Drop Site Optimization Goals:

- Increase efficiency
- Increase material quality
- Expand organics collection

7.1 CURRENT CITY SERVICES

Currently, Northglenn's drop-site collections accept single-stream materials only. Through early 2021, the sites were open 24/7 and were unfenced and unstaffed[17]. Unauthorized use, illegal trash dumping, and contaminated recyclables were regular occurrences. The City's yard waste drop site, located at its M&O Facility, accepts brush, limbs and stumps only[18]. Neither food waste nor other yard waste is accepted elsewhere in the city (unless by private service providers to individual customers).

Sanitation does not track existing drop-site costs as a discrete operation so any comparison against estimated future costs is inexact. An estimate of approximate costs for the combined operations of the Northwest Open Space, Jaycee Park and yard waste drop sites is shown in Table 7-1.

Table 7-1 Current Drop Site and Yard Waste Costs (2020)

	Current City Costs
Annualized Capital	$2,600 - $3,000
Operating Cost	$91,100 - $115,400
Total Annual Cost	$93,700 - $118,400

[17] Beginning in mid-March 2021 Sanitation began accepting recyclables at M&O as a temporary measure while they begin work on a newly expanded (and consolidated) drop site facility.
[18] These collections are staffed and occur once/week during spring, summer and fall and once-month in the off season.

7.2 STUDY SCENARIOS

Four scenarios were selected for pursuing the City's goals (see Table 7-2). It was assumed that each scenario will:

- Serve Northglenn residents only – both SFUs & MFUs[19]
- Consolidate all existing recyclable & yard waste drop sites into one site – to maximize efficiency/minimize City costs
- Accept brush/limbs/stumps, general yard debris & food waste
- Be located on property not identified in this study (but is expected to be owned by the City)
- Be two acres in size – to provide flexibility for managing bulk yard waste, future growth & flexibility
- Have limited hours – providing accessibility during both weekday/evening & weekend periods
- Be staffed during operating hours – with two part-time employees

Table 7-2 Drop Site Scenarios

Scenario 1	SSR with Yard Waste	Yard waste includes both brush/limbs (bulk collection for chipping) & grass/leaves (containerized for composting)
Scenario 2	SSR + OCC with Yard Waste	
Scenario 3	SSR + OCC + Glass with Yard Waste	
Scenario 4	Food Waste (add-on to Scenarios 1-3)	Only considered if/when curbside compost collection is implemented

SSR = residential single-stream recyclables *OCC = cardboard*

7.3 CONSIDERATIONS FOR ANALYSIS

Accepted Materials

Refining the list of accepted recyclables and how recyclables are accepted can increase material recovery and reduce net costs by decreasing contamination and preserving material quality.

Isolate Cardboard & Glass from Single-Stream - Fully commingled recyclables are the most convenient for drop site users, but typically have higher contamination levels than multiple streams. Commingled materials are also more costly to process once collected. Well-signed and staffed drop sites offer a reasonable ability to separate out those recyclables that can provide additional economic and environmental benefits.

The limited composition data available from WM indicates that cardboard and glass comprise the majority of recyclables collected currently (both are about 25% by weight). Cardboard is a relatively high-value material when clean but is often contaminated in single-stream collections; it also wastes container space when mixed with other materials and not flattened. Glass also has a favorable revenue[20] but its breakability both limits the remaining amount of re-useable glass and contaminates other materials.

[19] The 2020 public survey underscored an interest in City-provision of recycling services to an expanded residential customer base.
[20] Based on rebate Northglenn can earn from Momentum Glass Recycling.

Sorting these materials out of the commingled mix can increase their quality and quantity, improve the quality of the remaining single-stream and partially off-set the cost of processing with revenue earnings.

All three streams – single-stream, cardboard and glass - can be containerized in roll-offs and processed locally. The drop-site analysis in this study evaluated the potential benefit of separating out both of these materials.

Additionally, the capacity for accepting source-separated materials (especially cardboard) at the drop site will allow the City to encourage SFUs to divert some of what they generate from curbside to drop site collections as a way to reduce their trash service level (and monthly costs). This in turn will allow Sanitation to maximize cost benefits from both collection streams. In the future with increased cardboard quantities, a compactor may also reduce hauling costs[21].

Other Recyclables Changes – As discussed in Section 5.0, other refinements that could considered include moving to a limited list of plastic resins and potentially adding new items such as paper coffee cups and polypropylene coffee pods. These changes should carefully weigh ease of implementation, long-term marketability and commitment by the City's processor before implementation decisions are made, however.

Begin to Accept Organics – Based on regional data, it is expected that organics comprise about 26% of the City's trash stream, with yard and food waste each being about 12%[22]. The ability to separate these materials from the trash stream represents one of the biggest landfill diversion opportunities available.

Accepting yard waste at the City's future drop site will both increase accessibility to residents (who are now limited to periodic weekends at the M&O Facility) and consolidate operations for Sanitation. Because brush, limbs and stumps can be ground on site, bulk collection on open ground will be most effective. General yard debris including grass and leaves to be processed into soil amendment product will require roll-off collection and hauling to a remote compost facility.

Northglenn's residents currently have no food waste collection service but have voiced the desire for better options in the future[23]. Given the putrescibility and weight of this material, collection in wheeled carts is recommended and will require service by vehicles with cart-loading (versus roll-off) capability. Sanitation will have this equipment in their fleet for the subscription-based curbside compost program; as a result, it is unlikely that food waste will not be accepted at the drop site until curbside collection is on-line.

Provide Controlled Outlet for Contaminants – While trash would not be accepted at the future drop site, small quantities of contaminants will inevitably be collected. It is assumed that wheeled carts will be used to containerize these materials and that the carts will be serviced by Sanitation trucks while on regular curbside routes[24]. Due in large part to staff controls, trash management at the future drop site is expected to be minimal.

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[21] Quantities and recyclables pricing will need to off-set the costs of three-phase power, compactor operations and maintenance.
[22] CDPHE compilation of Front Range composition data in 2018 – see Figure 2-4.
[23] Sixty-seven percent of survey respondents expressed the desire for drop site organics (see Section 3.0).
[24] Currently trash is collected as bulk litter from existing sites up to four days a week with one over-time route. In the future, a gated site with limited hours and staff oversight should eliminate the need for over time.

Site Management

The ability to monitor roll-offs so that containers are not over-filled and limit use by drop-site customers will be improved once the facility is staffed. Overfilled containers were a major complaint related to existing operations made by respondents to the City's 2020 public survey. Additionally, fencing and staff will significantly reduce illegal dumping of unacceptable materials.

7.4 COST ANALYSIS AND OBSERVATIONS

A comparative estimation of capital costs, amortized capital costs, annual operating costs and total annual costs were assessed against multiple processor options for the drop site scenarios (see Table 7-3). Appendix D includes additional detail on the data, costs and assumptions used for this analysis.

Table 7-3 Drop Site Cost Analysis Summary (2021$)

	Processor Option	Processor Option
Scenario 1 - Residential SSR with Yard Waste		
	SSR - Waste Management	*SSR - Boulder County*
Capital Cost	$407,800 - $483,200	$407,800 - $483,200
Annualized Capital	$27,300 - $32,400	$27,300 - $32,400
Operating Cost	$101,300 - $128,400	$101,000 - $128,300
Total Annual Cost	$128,600 - $160,700	$128,300 - $160,700
Scenario 2 - Residential SSR + OCC with Yard Waste		
	SSR + OCC - Waste Management	*SSR – Waste Management* *OCC - Boulder County*
Capital Cost	$408,500 - $483,800	$408,500 - $483,800
Annualized Capital	$27,400 - $32,400	$27,400 - $32,400
Operating Cost	$101,300 - $128,500	$102,400 - $130,200
Total Annual Cost	$128,700 - $160,900	$129,800 - $162,600
Scenario 3 - Residential SSR +OCC + Glass with Yard Waste		
	SSR + OCC - Waste Management *Glass - Momentum*	*SSR + OCC – Waste Management* *Glass – Republic Landfill*
Capital Cost	$412,600 - $488,500	$412,600 - $488,500
Annualized Capital	$27,800 - $32,900	$27,800 - $32,900
Operating Cost	$99,600 - $123,900	$101,100 - $125,300
Total Annual Cost	$127,400 - $156,800	$128,000 - $158,200
Scenario 4 – Food Waste (as add-on to Scenarios 1-3 once curbside collection is implemented)		
	General Yard Debris & Food Waste – A1 Organics	
Capital Cost	$1,100 - $1,200	
Annualized Capital	<$1,000	
Operating Cost	$2,700 - $3,600	
Total Annual Cost	$2,800 - $3,700	

Capital costs include site grading, fencing, containers and staff amenities (does not include site acquisition)
Operating costs include labor, operations, hauling, tip revenues (costs) & administration
SSR = residential single-stream recyclables OCC = cardboard

Key Observations

Need for Site Development - The estimated costs for Scenarios 1 through 3 are roughly 35% higher than existing City costs (see Table 7-3) and are due in part to developing a new two-acre site. If the City ultimately consolidates its operation on a site with minimal development needs (e.g., existing Northwest

Open Space drop site), the increase of existing annual costs (including amortized capital) will only be about 10% higher than existing costs[25] (see Table 7-4).

Processing Facilities – As note in Table 7-3, there is minor cost difference between recyclables processing at WM's MRF (which is closer to Northglenn but has higher tip fees) and BCRC (located further away but has more advantageous pricing).

Table 7-4 Drop-Site Costs Without Site Grading (2021$)

SSR + OCC – Waste Management Glass – Momentum Scenario	**Current City Costs**
Capital Cost	$54,800 - $66,700
Annualized Capital	$4,900 - $5,800
Operating Cost	$99,600 - $123,900
Total Annual Cost	$104,500 - $129,700

Comparison based on Scenario 3 from Table 7-3

Separating Cardboard and Glass from Single-Stream – Similarly, the direct cost of separating out cardboard and/or glass from the City's drop-site single-stream is not expected to be significantly different from maintaining a fully commingled recyclable stream. However – this differential may increase as cardboard becomes an even more significant recyclable (assuming on-line shopping continues to increase) and diversion activities increase (which is likely as the City's diversion programs and public participation grows).

Food Waste – The estimated cost of collecting food waste at the drop-site is minor because it would be partnered with the City's subscription curbside compost program (hauling costs would be absorbed into those costs identified in Section 6.0). This dynamic would likely delay the acceptance of drop-site food waste until the SFU curbside collections are on-line.

[25] Comparison based on Scenario 3 (SSR+OCC to Waste Management, glass to Momentum).

8.0 AGGREGATION OF SYSTEM IMPROVEMENTS

This section considers the benefits and attributes of the City's overall, integrated system once it is enhanced with the multiple improvements considered during the completion of this study.

8.1 ENVIRONMENTAL BENEFITS

The long-term environmental benefits of diversion are often not as tangible and harder to quantify than costs incurred in the short-term, but they are significant:

- Conserve rather than discard resources – reducing the need for extraction/mining & manufacture of new products
- Reduce GHG emissions – reducing energy consumption, production & release of methane/other GHGs to the atmosphere
- Reduce landfill space – Northglenn's SFU trash would fill a football field to a depth of nearly 20 feet & is only a fraction of volume generated City-wide
- Create more jobs – recycling creates 10 times as many jobs as landfilling; composting creates at least twice as many jobs[26]

Landfill Diversion

Table 8-1 on the next page summarizes the total tons that could be diverted from landfill disposal by Northglenn's SFUs if the programs described in this study are effectively implemented (also includes MFU contributions to drop-site and "free" collections). Based on estimates around increased diversion incentivized by new PAYT pricing, new curbside compost collection and the acceptance of organics at the drop site it is possible that the City could double its SFU landfill diversion rate during the first few years of implementation[27].

While 24% to 26% landfill diversion would be a significant improvement for SFUs, neither MSW (including MFU, commercial and institutional) or industrial data is available. As a result, Northglenn's progress on a City-wide level is unknown. This will continue to be the case until hauler reporting or similar policy is implemented.

To meet the CDPHE MSW diversion goals for Front Range communities of 39% by 2026 and 51% by 2025 (and reasonably pursue its own zero waste goal), Northglenn will need to continue to grow SFU programs and encourage highly successful programs across the City.

[26] https://www.ecocyclesolutionshub.org/about-zero-waste/jobs-eco-impact/
[27] LBA Team modelling results based on projected quantities for 2021. Since 2010, Northglenn's population rate has increased less than 1% per year (U.S. Census Quick Facts).

These values are dependent on many factors and will require careful tracking, review and program tweaking as needed to maintain participation and control costs.

Table 8-1 Program Tonnages and Landfill Diversion Estimated with System Improvements

Programs	Data Source	Tons/Year
Regular Curbside Collection		
Single-Stream Recyclables	LBA Team PAYT analysis	2,800
Trash	LBA Team PAYT analysis	11,500
Extra Collections		
Curbside Trash Cart	City data (2020)	200
Curbside Bulky Materials	City data (2020)	included in extra curbside trash
Neighborhood Clean-Ups	City data (2020)	1,000
Subscription Curbside Compost	LBA Team compost analysis (Subscription Level 3 to 4)	400 - 700
Drop-Site Collection		
Single-Stream Recyclables/OCC/Glass	LBA Team drop-site analysis (any scenario)	300
Yard Waste (bulk + processed)	LBA drop-site analysis (any scenario)	500 - 600
Food Waste	LBA drop-site analysis (food waste only)	100
Trash/Contaminants	LBA drop-site analysis (any scenario)	100
Free Collections (landfill/dumpster days)	BA Environmental service fee analysis	100
Total Tons		**17,000 – 17,400**
Recyclables & Compost Tons		**4,100 – 4,500**
Landfill Diversion Rate		**24% - 26%**

Rounded to nearest 100 tons

Greenhouse Gas Emission Reductions

The ability to reduce GHGs through reduced manufacturing of new products to replace "wasted" items, reduced fossil fuel use and carbon sequestration are key benefits of recycling and composting. Based on the diversion assessment summarized in Table 8-1, it is expected that nearly 2,600 metric tons of carbon dioxide equivalent ($mtCO_2e$) per year could be reduced annually if the landfill diversion programs described in this study are implemented in Northglenn[28]. This reduction is equivalent to conserving over 289,500 gallons of gasoline and taking 546 passenger vehicles off the road.

Putting the GHG reduction potential of improved landfill diversion programs into perspective:

The City estimated that it would reduce the same number of GHGs (2,600 $mtCO_2e$) by implementing all of the energy-saving measures in its 2019 Energy Action Plan.

[28] Based on USEPA Waste Reduction Model (WARM), version 15.

8.2 CONSOLIDATED INFRASTRUCTURE

Collection Vehicles in PAYT System

Conversion to PAYT is expected to significantly reduce the number of households with multiple trash carts as well as reduce the volume of trash collected. This presents a significant opportunity to increase trash route size and improve trash collection efficiency. Conversely, PAYT will require curbside recycling service for more households. This increased workload can be kept to a minimum by ensuring efficient collection operations. The consolidated impact of decreased trash volume, improved recycling route density and other operational improvements will enable the City to provide curbside collection service with the same, or potentially fewer, number of front-line collection vehicles used today.

Carts in PAYT System

Conversion to PAYT is expected to yield to benefits regarding cart inventory and cart utilization. Currently, approximately 24,820 carts are deployed (16,450 for trash and 8,370 for recycling); for an average of 2.6 carts/SFU. PAYT will reduce the total inventory deployed and needing to be maintained (to about 9,400 trash and 9,400 recycling carts, or 2 carts/SFU). PAYT will also create the incentive for households to utilize the cart volume more efficiently. For example, recycling carts will be fuller and there will less tendency for households to pay for, and set out, an extra trash cart with only a bag or two of trash in it. Combined, these factors provide an opportunity for the City improve collection efficiency (e.g., customers per hour) and productivity (tons per on-route hour).

New Curbside Compost Program

A new subscription-based compost collection program will have several variables including the number of subscribers and routing decisions. As a result, it is difficult to predict whether existing collection vehicles could be used for curbside organics (Section 6.0 assumes new equipment is required). Given the small number of 64-gallon containers currently in use by SFUs (and expected demand for this mid-size container under PAYT), it is also expected that new curbside compost containers will be required.

8.3 PROPOSED FUTURE RATE SCHEDULE

Figure 8-1 illustrates the three user fees evaluated for Northglenn's future solid waste services. Table 8-2 (on the next page) provides a comparison between current and proposed cost values.

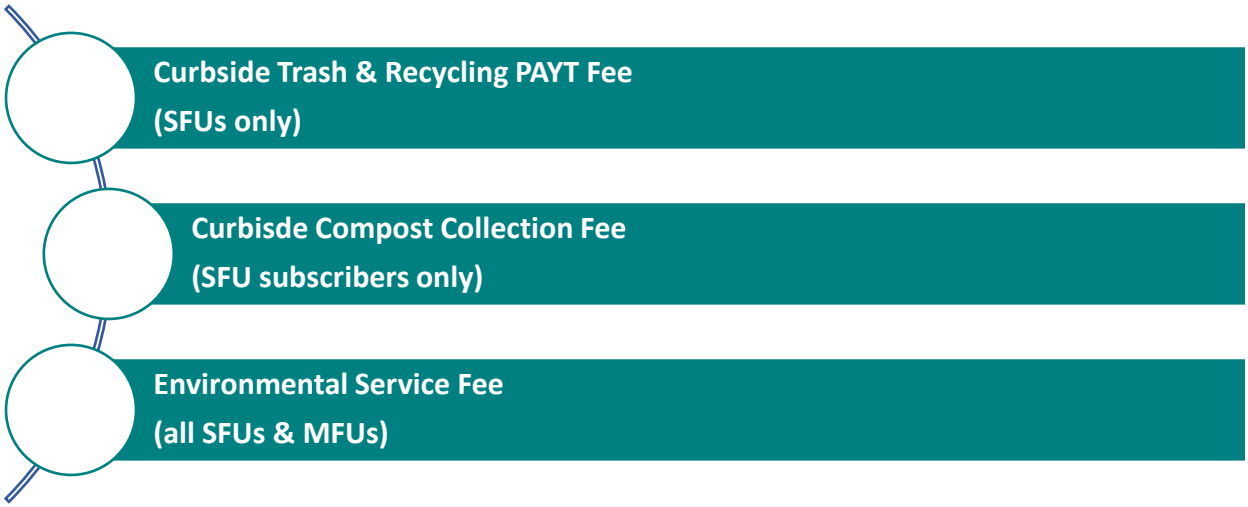

Figure 8-1 Proposed Northglenn User Fee Structure

PAYT Curbside Fee

As detailed in Section 5.0, this fee will vary depending on the trash service level each SFU selects (i.e., small, medium or large carts). The monthly fee will include weekly trash and every-other-week recyclables collection. The City will buy back and retain ownership of all carts.

Table 8-2 Comparison of Existing and Proposed System Rate Schedules

Programs	Single-Family Units		Multi-Family Units	
	Current	*With Study Improvements*	*Current*	*With Study Improvements*
Regular Curbside Collections ($/hh-month)	$16.00	Small - $5.00 Medium - $11.10 Large - $18.25	na	na
Extra Collections	$10/ETC $100/bulky $257/roll-off	$10/ETC $100/bulky $257/roll-off	na	na
Subscription Compost (assumes $1/SFU subsidy)	na	$7.50 to $7.70	na	na
Drop-Site Collection	$0	$0	$0	$0
Free Collections	$0	$0	$0	$0
Environmental Service Fee ($/hh-month)				
Without compost subsidy	na	$1.20	na	$1.20
With compost subsidy (applied to SFU rate only)	na	$2.20	na	$1.20
Total Fees - Regular Service/No Extra Collections ($/hh-month)				
Without compost	$16	Small - $7.20 Medium - $13.30 Large - $20.45	na	$1.20
With compost	na	Small - $14.80 Medium - $20.90 Large - $28.05	na	$1.20

hh = household na = not applicable (service not provided)
proposed PAYT rates reflect Option A cart sizes and +/1 10% fee adjustment (see Section 5.0)
if no fees are assessed for MFUs, SFU environmental service fee would increase to about $2.80/month

New Subscription Compost Curbside Fee

The monthly fee for this voluntary program will be based on assumed participation unless the subsidy proposed in Section 6.0 is implemented (in which case the cost will be about $8/household-month regardless of subscription levels). This program will include weekly collection of a medium compost cart from SFU subscribers only.

With PAYT, SFUs that opt for the smallest trash service may reduce their monthly costs by over 60%.

Those who subscribe to compost collection with small trash service may still be able to pay less than they do today.

Conversely, those who maintain large trash service may see more than a 20% increase on their utility bill without adding compost service.

New Environmental Service Fee

This would be a new flat fee to cover the cost of ancillary, "free" services to be assessed on all SFUs and MFUs who currently have access to these services. The proposed $1.20/household-month fee would cover free landfill and dumpster[29] days and drop site operations; it would also cover the cost of a new PEO program needed to promote and support new programs (see Appendices A and E for assumptions and cost analyses). The environmental service fee can be assessed on a monthly, quarterly or annual basis[30].

An additional refinement to this fee is the inclusion of a small subsidy for the subscription curbside compost collection program to be provided to Sanitation customers (described in Section 6.0). The study analysis has assumed that this subsidy would be assessed on SFU customers only through the environmental service fee. As shown in Table 8-2, this would increase the SFU fee to $2.20/month.

This separate, stand-alone fee of $1.20 to $2.20/household-month contrasts with the approximate $2.40 embedded in current SFUs bills for "free" services that exclude PEO programming and a compost subsidy.

The concept of a separate, stand-alone fee assessed on the users of ancillary services is not uncommon in Colorado. For example:

- Longmont assesses $2.96/household-month on all residents in addition to PAYT trash/recycling & subscription compost fees – to cover drop site, free landfill, seasonal yard waste & holiday recycling services plus PEO
- Loveland assesses $11.25/month for SFUs & $9.50 for small MFUs in addition to PAYT trash/recycling & subscription compost fees – to cover recyclable/yard waste drop sites, hard-to-recycle materials service & PEO
- Lafayette assesses $0.50/month for administration of its PAYT program
- Carbondale assesses 17.5% on top of its base PAYT fee for administrative & special program costs

[29] These results assume that free dumpster days will be reduced to once/year as a means of protecting the integrity of the PAYT incentive for SFUs and controlling City costs.
[30] Direct assessment on residential utility bills can be done for SFUs and individually-billed households in smaller MFUs. Direct billing may be more challenging in other MFUs.

8.4 NEW PUBLIC EDUCATION AND OUTREACH PROGRAM

A comprehensive and effective public education and outreach program will be critical to any landfill diversion effort. A new PEO program should be developed and rolled out prior to any other system improvement.

A PEO program has not been developed as part of this study, but a conservative estimate of $5/household-year has been included in the proposed Environmental Services fee (see Section 9.0).

It is expected that the City will develop a comprehensive PEO program prior to the implementation of any system improvements. The need for more information on diversion opportunities and guidelines was one of the most common requests in the City's 2020 public survey. Effective and regular communications will be critical for Sanitation's customers and the public to:

- Understand PAYT options
- Appropriately select PAYT service levels
- Grasp value & participating in curbside compost option
- Maximize recycling & minimize monthly costs
- Reduce recyclable & compost contaminants
- Use the drop site to bolster curbside service (especially cardboard and organics)

It is expected that this program will include dedicated staff who will focus on both SFU and MFU generators as appropriate to each program:

- Develop & roll out promotional materials
- Work closely with Sanitation during implementation (especially PAYT service selection process)
- Provide one-on-one communications around "recycling right" & materials contamination
- Provide feedback and "soft" enforcement – identify SFU addresses with contamination issues, provide guidance for correction & coordinate with the City's code enforcement staff if more rigorous measures are needed
- Maintain website & social media outlets with current information, FAQs, tools & resources
- Regularly provide results on program successes
- Coordinate with private MFU haulers as needed

PEO efforts will likely be more intense during program start-up but will need to be maintained as each program matures. Mid-term PEO activities may focus on desired behavioral changes around waste diversion, reuse and re-purposing. Over the long-term, PEO efforts will likely expand to include commercial, institutional and industrial waste generators.

9.0 ADDITIONAL RECOMMENDATIONS

The system improvements described in this document are intended to significantly strengthen landfill diversion with Northglenn's SFU sector. To build a foundation for diversion beyond SFUs, additional programs and policies will be needed.

9.1 IMPROVED RECYCLABLES AND ORGANICS PROCESSING

Given a number of economic, pandemic and consumer preference factors, the cost of recycling and composting in the Front Range of Colorado today is more expensive than landfilling. The location of processing facilities, facility contract terms and tip fees are critical to controlling costs.

Recyclables Processing

Northglenn is fortunate to have two MRFs within reasonable hauling distance. Table 9-1 includes a comparison of its current contract privately owned/operated processor (WM) and the Boulder County Recycling Center (BCRC) which is publicly owned and operated by a non-profit recycling organization.

Table 9-1 Comparison of Processing Facility Options

	Waste Management MRF	Boulder County Recycling Center MRF
Distance from Northglenn	11 miles	19 miles (increases hauling costs over closer option)
Pricing Determination	Contract includes pricing calculation & example rate – WM estimates at end of each month	Pricing is set for all customers & posted at beginning of month (before materials delivered)
Single-Stream Tip Fee Revenue (Cost)	2021 – ($53/ton) (contract example only – cost may change)	March 2021 – ($34/ton)
Cardboard Revenue (Cost)	$12/ton (single-stream tip fee increases slightly if cardboard separated out)	March 2021 - $29/ton (no impact to single-stream tip fee)
Contract Requirement	Yes – minimum one year	No – initial application form only
Requirement for Materials Exclusivity	Yes – all City recyclables from any program must be tipped at WM MRF	No
Penalty for Contamination	Yes $6/ton for all tons if residue rate >8% (measured by WM)	No – if contamination becomes excessive County will work with City to address

The Section 7.0 analysis determined that the longer hauler distance to BCRC off-set the facilities more advantageous pricing. Costs are only factor in materials processing, however. There are other factors that differentiate these MRFs:

It is recommended that prior to executing a processing contract for 2022 and beyond, the City establish negotiating criteria that also include these non-cost considerations.

- Simplicity – BCRC does not require a contract & sets straightforward per-ton cost/revenue values; WM contract pricing is complicated & depends on factors the City does not have access to nor can easily corroborate
- Flexibility – during the course of Northglenn's one-year contracts with WM all City materials must be delivered to this MRF regardless of pricing calculations; materials can be taken (or not) to BCRC at any time
- Penalties for contamination – all MRFs incur costs when managing contaminants but WM passes at specific financial penalty on to Northglenn based on a relatively low contamination rate[31]; BCRC prefers to work with material suppliers on public messaging & collection strategies before a penalty is considered

It is also possible that as the City's cardboard tonnages increase and are separated out of the commingled stream at the drop site, BCRC may provide a clearer economic advantage (especially if tonnages reach a level that warrants drop-site compaction which would reduce hauling costs).

Organics Processing

A1 Organics' Rattler Ridge compost facility in Keenesburg is the most likely facility for processing Northglenn's yard and food waste in the short-term. Use of this facility requires a long-distance haul, however (approximately 40 miles). The availability of an alternative processing facility closer to Northglenn would decrease haul costs.

Boulder County is currently working to create a new compost processing facility which would notably reduce the haul distance to A1. Northglenn's support of this project could help ensure its development (if successful, the facility could be on-line sometime in late 2022 or 2023)[32].

9.2 IMPROVED DATA COLLECTION AND COST ANALYSIS

Recommendations to improve the information available to the City for running efficient programs, understanding program-specific costs and assessing definitive user rates include:

- Analyze collection operations and performance metrics - to identify additional improvements and to refine program-specific cost of services
- Conduct a system-wide cost of service analysis to verify that costs are fully allocated to correct programs
- Track tonnage quantities generated by program – including each extra collection program & "free" services

[31] Northglenn paid nearly $9,000 in penalties in 2020.
[32] Northglenn can track project progress at https://www.bouldercounty.org/environment/composting/county-composting-facility/.

- Re-evaluate program costs regularly (every 2-3 years) to assess adequacy of fee structures
- Audit recyclables composition data every 2 years – to verify processor information (e.g., drop site staff could complete on representative curbside & drop site samples using a simple audit protocol)
- Audit trash composition every 3 to 4 years - to measure effectiveness of recycling & organics programs

9.3 Expand Drop-Site Use to Include Commercial Generators

Although any generator can use the City's drop sites today, it is recommended that short-term use be limited to residents until operations with new organics service, limited hours and on-site staff involvement are well established. This policy will allow Sanitation time to modify residential operations, work with public and staff to improve material quality and ensure that operating costs are fully identified.

After the first year or two of operation, self-hauled recyclables and organics from commercial and institutional generators (i.e., excluding private haulers) could potentially be allowed for a user fee. The fee – ideally tied to size of load, such as car, pick-up truck, trailer or other – will off-set the City's cost of managing additional recyclables and organics[33]. This expansion would not only improve recycling access to those generators who do not have private curbside service but will increase City tons and lower per-ton facility and materials management costs.

9.4 Hauler Reporting Policy

The requirements of a hauler licensing policy can vary from simple tracking of private haulers operating in the City to a full requirement for providing recycling and compost collection to all trash customers. A key component for any policy – and especially important to Northglenn – is a requirement to report the quantity of trash, recyclables, organics and other materials collected such that waste generation and landfill diversion can be understood across all sectors in the City. This data can be collected at any frequency; annual reporting tied to the calendar year is a reasonable approach.

Other policy inclusions often include minimum performance standards such as vehicle inspections and registration; mandates for covered loads and correcting leaks/damage to municipal or private property; and driver licensure. Many Colorado communities have a similar policy (e.g., Boulder, Denver, Fort Collins and Loveland). Most large, national haulers are familiar with hauler licensing rules; all haulers will require assurances about confidentiality.

[33] For example, Teton County, WY recently began accepting self-haul commercial food/yard waste at its facility for a cost of $0.03/pound ($10 minimum).

While Northglenn is a relatively small community, management of reported data will require some staff time. The use of a software system to assist in developing hauler reporting forms, assimilating reports and sending late notices can reduce staff time[34].

Over the long-term, this policy could be expanded to include requirements for generators, primarily including a mandate to obtain (generators) and provide (haulers) recycling service. For example, Boulder and Aspen have modified their hauler policies with these policy mandates (Boulder policy also requires compost service).

9.5 Expand Curbside Collection to Small MFUs with Cart Service

Northglenn has slightly more than 400 residential homes with two, three or four units located within MFU complexes[35] which may be small enough to use carts serviced by Sanitation's existing fleet. They represent a potential for increasing the City's influence over landfill diversion in the residential sector. Alternatively, Colorado municipalities are allowed to provide service to MFUs up to 7 units – the larger units are likely to require dumpster service, however (which cannot be serviced by existing equipment)[36].

9.6 Include Compost as Part of Bundled Service to All Sanitation Customers

Once subscription-based compost service is well established and participation rates have grown, the City may elect to include weekly compost collection as part of the PAYT program with trash and recyclables. This would effectively increase compost participation to 100% such that all customers would pay for service, but average per-household costs would drop below those assessed for the subscription program.

[34] For example, ReTRAC Connect is used by some Colorado communities (subscription cost is about $7,500/year). The Front Range Waste Diversion enterprise is currently evaluating the ability to use this or similar software universally to improve data-sharing and comparisons in Colorado.
[35] U.S. Census Bureau.
[36] Sanitation can currently manage roll-off materials should this be a future option for MFU service.

10.0 CONCLUSIONS AND IMPLEMENTATION

10.1 OVER-ARCHING CONCLUSIONS

The City of Northglenn has developed detailed sustainability and energy action plans and has set specific waste diversion goals. However, it is not on target to meet these goals and is lagging beyond other Front Range communities. Most notably:

- The City imposes no regulatory requirement or offers no financial incentive to recycle on its customers
- Sanitation's trash & recycling zone of influence is limited to SFUs which generates only a fraction of the City-wide waste stream
- SFU service fees have not been reviewed or adjusted since 2016 – program-specific costs are incomplete for "free" programs
- The City has no data describing waste generation or diversion beyond SFUs
- Access to composting is limited City-wide

Moving forward, the City will need to implement more robust programming to meet its goals:

- Catalyze more active participation in diversion programs City-wide
- Include compost as a visible, effective diversion program both curbside and at drop site - eventually as a core service with recycling & trash
- Establish policy to obtain good data describing diversion in all City sectors – and eventually expanding this policy to include diversion requirements

10.2 IMPLEMENTATION

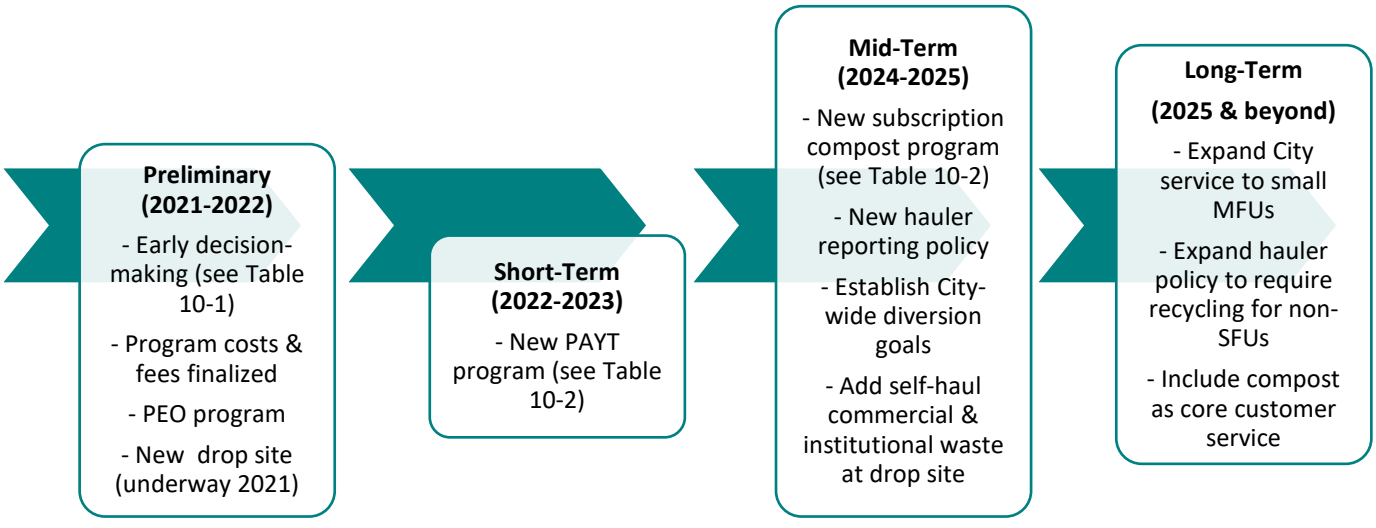

Figure 10-1 Suggested Implementation Schedule

Figure 10-1 (previous page) illustrates four key implementation periods. Table 10-1 lists the decisions Northglenn staff and City Council will need to make prior to finalizing program costs, setting user fees and promoting changes to the public. Table 10-2 includes an initial list of specific actions needed to bring each program on-line.

Table 10-1 Preliminary City Decisions

PAYT	Curbside Compost	Drop Site	Other
Conduct field-testing of 32-gallon carts – select Option A or Option B	Re-assess cost if subsidy provided through PAYT fees	Whether to consolidate to one site	Recyclables' processing option (should be on-going evaluation)
Whether to automatically include annual inflation		Which site location	
Whether to include subsidy for curbside compost	Which subscription level (or range)	Hours of operation	Support Boulder County compost project
Which "fringe" services to provide		Material separations (SSR, OCC, glass)	
What price differential between service levels			

Table 10-2 Short-Term Implementation Needs

PAYT	Curbside Compost	Drop Site
Promotion & outreach campaign	Promotion & outreach campaign	Promotion & outreach campaign
SFU customer service level selection	SFU customer sign-up	Site development (grading, fencing, staff trailer)
Cart swap, purchase & deployment	Vehicle & cart purchase, cart deployment	Hire & train staff
Program roll-out	Program roll-out	Purchase new roll-offs & carts – develop new signage

APPENDIX A

MODELLING ASSUMPTIONS – PAYT, Subscription Compost & Environmental Service Fee

City of Northglenn, CO PAYT & Organics Model Assumptions

Description	Source*	Baseline Current T-R T-96/64 Trash Recyclables Food & Yard Waste Frequency (per week) Weekly	Baseline Current T-R R-96 EO Week
Service			
Number of Customers	CS	9,400	9,400
Percent Served by Hauler	CS	100%	84%
Number of Customers	CS	9,400	7,896
Frequency (per week)	CS	1.0	0.5
Days/Week	CS	5	5
Hours/Day	CS	8	8
Labor			
SW Collection Driver	IS	$69,375	$69,375
Collector	IS		
Benefits (% of payroll)	n/a		
Annual Leave Per Employee (days)	n/a		
Sick Leave Per Employee (days)	n/a		
Equipment			
Vehicle	CS	$310,000	$310,000
Cost of Financing	IS	5%	5%
Fleet Replacement (years)	IS	9	9
Equipment (spare ratio)	IS	20%	20%
Cart Inventory (%)			
96-gal Carts (% of customers)	CS/IR	169%	106%
64-gal Carts (% of customers)	CS/IR	6%	
48-gal Carts (% of customers)	IR		
32-gal Carts (% of customers)	IR		
Cart Inventory			
96-gal Carts	CS	15,886	8,370
64-gal Carts	CS	564	0
48-gal Carts	CS	0	0
32-gal Carts	CS	0	0
Buyback Discount (% of new cost)		n/a	n/a
New Cart Cost			
96-gal Carts ($/cart)	CS	$60	$60
64-gal Carts ($/cart)	CS	$58	
48-gal Carts ($/cart)	IS		
32-gal Carts ($/cart)	IS		
Carts/Bins (years)	IS	8	8
Carts /Bins (spare ratio)	IS	5%	5%
Fleet (per truck)			
Route Miles (weekly)	CS	400	400
Fuel Consumption (mpg)	IS	2.5	2.5
Fuel Cost ($/gal)	IS	$2.50	$2.50
Maintenance & Repair ($/vehicle)	CS		
Fleet Labor	CS	$7,750	$7,750
Sanitation Labor	n/a		
Parts & Supplies	CS		
Total		$7,750	$7,750
Insurance, License, Tax ($/vehicle)	IS	$7,750	$7,750
Supplies ($/vehicle)	IS	$2,000	$2,000
Sanitation Dept Cost Adjustments			
General/Administration (Ops Mgr, Super & Cust Svc salary)	CS	25.0%	25.0%
Profit	IS		
Inefficiency Factor	IS		
Avg Route Size (customer/route/day)			
Trash	CS	470	
Recyclables	CS		790
Organics	IS		

City of Northglenn, CO PAYT & Organics Model Assumptions

Description	Source*	Baseline Current T-R T-96/64 Trash Recyclables Food & Yard Waste Frequency (per week) Weekly	Baseline Current T-R R-96 EO Week
Tons			
Total - All Customer	CS	12,900	1,400
Percent Served by Hauler		100%	100%
Tons - Trash	CS	12,900	
Tons - Recyclables	CS		1,400
Tons - Organics	CS		
Tip Fees			
Tip Fee - Trash (Republic)	CS	$14.00	
Tip Fee - Recyclables (WM)	CS		$52.63
Tip Fee - Organics	IR		
City Administration & Billing			
% of Total Cost	CS	3.0%	3.0%
Annual Costs for Environmental Service Fee			
Recycling Drop-Off Center			
Total Capital Cost			
Annualized Capex			
Labor & Operations			
Hauling Costs			
Tip Fees (net of revenue)			
Total Cost/Year			
Yard Waste Drop / Mulch			
Free Landfill Day (1 pickup truck/hh/event)			
Days/Yr		2	
Container Type		self haul	
Number of Containers/Day			n/a self haul
Annualized Capex (based on DOC analysis)			n/a
Total Loads/Day		157	313/yr
Cost/Pull (City truck & driver based on DOC analysis SSR-WM)			n/a
Tons/Day		23	assume 300 lb/load
Disposal Cost/Ton (Republic)		$14.00	
Number of Staff			n/a
Work Hours/Day			n/a
Average Annual Salary			n/a
Total Cost/Year		$657	
Free Dumpster Days			
Days/Yr		2	
Container Type		n/a provided by Republic	
Number of Containers/Day			53 loads/yr (Brigette)
Annualized Capex (based on DOC analysis)			
Total Pulls/Day		27	53 loads/yr to be confirmed
Cost/Pull (based on DOC analysis City driver & truck Glass-Rep)		$140	
Tons/Day		38	75.74/yr
Disposal Cost/Ton (Republic)		$14.00	
Number of Site Staff		2	
Site Staff Work Hours/Day		8	
Site Staff Average Annual Salary		$67,113	
Total Cost/Year		$16,740	
Comprehensive Public Education & Outreach Program			
Cost/hh/year			
Total Cost/Year			
Curbside Organics Subsidy			
Cost/sf hh/month			
Total Cost/Year			
Total Env Svc Fee Cost/Year			
Number of Single Family			
Number of Multi Family			
Total Households			
Average Cost/Household/Month			
Single Family for All Cost			
Allocated Single Family			
Allocated Multi Family			
Costs for Additional Services for A Fee (not included in modeling)			
Extra Trash Collection ($10/pickup/hh)		84 occurrences in 2020 before PAYT	
Bulky Waste Collection ($100/pickup/hh)			
Roll-Off Clean-Up Service ($257/pickup (3 days)		2052.43 tons in 2020	

*Data Source Codes:

CS = City Supplied, IB = Industry Benchmark,
IS = Industry Standard, IR = Industry Research

City of Northglenn, CO PAYT & Organics Model Assumptions

Description	Source*	PAYT Option A PAYT T-R T-32/64/96 gal R-96 gal Trash Recyclables Food & Yard Waste Frequency (per week) Weekly EO Week		PAYT Option B PAYT T-R T-48/64/96 gal R-96 gal Weekly EO Week	
Service					
Number of Customers	CS	9,400	9,400	9,400	9,400
Percent Served by Hauler	CS	100%	100%	100%	100%
Number of Customers	CS	9,400	9,400	9,400	9,400
Frequency (per week)	CS	1.0	0.5	1.0	0.5
Days/Week	CS	5	5	5	5
Hours/Day	CS	8	8	8	8
Labor					
SW Collection Driver	IS	$69,375	$69,375	$69,375	$69,375
Collector	IS				
Benefits (% of payroll)	n/a				
Annual Leave Per Employee (days)	n/a				
Sick Leave Per Employee (days)	n/a				
Equipment					
Vehicle	CS	$310,000	$310,000	$310,000	$310,000
Cost of Financing	IS	5%	5%	5%	5%
Fleet Replacement (years)	IS	9	9	9	9
Equipment (spare ratio)	IS	20%	20%	20%	20%
Cart Inventory (%)					
96-gal Carts (% of customers)	CS/IR	30%	100%	30%	100%
64-gal Carts (% of customers)	CS/IR	50%		50%	
48-gal Carts (% of customers)	IR			20%	
32-gal Carts (% of customers)	IR	20%			
Cart Inventory					
96-gal Carts	CS	2,820	9,400	2,820	9,400
64-gal Carts	CS	4,700	0	4,700	0
48-gal Carts	CS	0	0	1,880	0
32-gal Carts	CS	1,880	0	0	0
Buyback Discount (% of new cost)		50%	50%	50%	50%
New Cart Cost					
96-gal Carts ($/cart)	CS	$60	$60	$60	$60
64-gal Carts ($/cart)	CS	$58		$58	
48-gal Carts ($/cart)	IS	$50		$50	
32-gal Carts ($/cart)	IS	$50		$50	
Carts/Bins (years)	IS	8	8	8	8
Carts /Bins (spare ratio)	IS	5%	5%	5%	5%
Fleet (per truck)					
Route Miles (weekly)	CS	400	400	400	400
Fuel Consumption (mpg)	IS	2.5	2.5	2.5	2.5
Fuel Cost ($/gal)	IS	$2.50	$2.50	$2.50	$2.50
Maintenance & Repair ($/vehicle)	CS				
Fleet Labor	CS	$7,750	$7,750	$7,750	$7,750
Sanitation Labor	n/a				
Parts & Supplies	CS	$7,335	$7,335	$7,335	$7,335
Total		$15,085	$15,085	$15,085	$15,085
Insurance, License, Tax ($/vehicle)	IS	$7,750	$7,750	$7,750	$7,750
Supplies ($/vehicle)	IS	$2,000	$2,000	$2,000	$2,000
Sanitation Dept Cost Adjustments					
General/Administration (Ops Mgr, Super & Cust Svc salary)	CS	25.0%	25.0%	25.0%	25.0%
Profit	IS				
Inefficiency Factor	IS				
Avg Route Size (customer/route/day)					
Trash	CS	750		750	
Recyclables	CS		850		850
Organics	IS				

City of Northglenn, CO PAYT & Organics Model Assumptions

Description	Source*	PAYT Option A PAYT T-R T-32/64/96 gal Trash Recyclables Food & Yard Waste Frequency (per week) Weekly	PAYT Option A PAYT T-R R-96 gal EO Week	PAYT Option B PAYT T-R T-48/64/96 gal Weekly	PAYT Option B PAYT T-R R-96 gal EO Week
Tons					
Total - All Customer	CS	11,500	2,800	11,500	2,800
Percent Served by Hauler		100%	100%	100%	100%
Tons - Trash	CS	11,500		11,500	
Tons - Recyclables	CS		2,800		2,800
Tons - Organics	CS				
Tip Fees					
Tip Fee - Trash (Republic)	CS	$14.00		$14.00	
Tip Fee - Recyclables (WM)	CS		$52.63		$52.63
Tip Fee - Organics	IR				
City Administration & Billing					
% of Total Cost	CS	3.00%	3.00%	3.00%	3.00%
Annual Costs for Environmental Service Fee					
Recycling Drop-Off Center		based on SSR&OCC-WM Glass-Mo		based on SSR&OCC-WM Glass-Mo	
Total Capital Cost		$450,550		$450,550	
Annualized Capex		$30,350		$30,350	
Labor & Operations		$71,400		$71,400	
Hauling Costs		$18,200		$18,200	
Tip Fees (net of revenue)		$22,150		$22,150	
Total Cost/Year		$142,100		$142,100	
Yard Waste Drop / Mulch		included		included	
Free Landfill Day (1 pickup truck/hh/event)					
Days/Yr		2		2	
Container Type					
Number of Containers/Day					
Annualized Capex (based on DOC analysis)					
Total Loads/Day		188	increase (see notes)	188	increase (see notes)
Cost/Pull (City truck & driver based on DOC analysis SSR-WM)					
Tons/Day		28	increase (see notes)	28	increase (see notes)
Disposal Cost/Ton (Republic)		$14.00		$14.00	
Number of Staff					
Work Hours/Day					
Average Annual Salary					
Total Cost/Year		$789		$789	
Free Dumpster Days					
Days/Yr		1		1	
Container Type		30-Yd Open Top Roll-Off		30-Yd Open Top Roll-Off	
Number of Containers/Day					
Annualized Capex (based on DOC analysis)		$1,127		$1,127	
Total Pulls/Day		32	increase (see notes)	32	increase (see notes)
Cost/Pull (based on DOC analysis City driver & truck Glass-Rep)		$140		$140	
Tons/Day		45	increase (see notes)	45	increase (see notes)
Disposal Cost/Ton (Republic)		$14.00		$14.00	
Number of Site Staff		2		2	
Site Staff Work Hours/Day		8		8	
Site Staff Average Annual Salary		$67,113		$67,113	
Total Cost/Year		$9,218		$9,218	
Comprehensive Public Education & Outreach Program					
Cost/hh/year		$5.00		$5.00	
Total Cost/Year		$47,000		$47,000	
Curbside Organics Subsidy					
Cost/sf hh/month		$1.00		$1.00	
Total Cost/Year		$112,800		$112,800	
Total Env Svc Fee Cost/Year		$311,907		$311,907	
Number of Single Family		9,400		9,400	
Number of Multi Family		4,683		4,683	
Total Households		14,083		14,083	
Average Cost/Household/Month					
Single Family for All Cost		$2.77		$2.77	
Allocated Single Family		$2.18		$2.18	
Allocated Multi Family		$1.18		$1.18	
Costs for Additional Services for A Fee (not included in modeling)					
Extra Trash Collection ($10/pickup/hh)					
Bulky Waste Collection ($100/pickup/hh)					
Roll-Off Clean-Up Service ($257/pickup (3 days)					

*Data Source Codes:

CS = City Supplied, IB = Industry Benchmark,

IS = Industry Standard, IR = Industry Research

City of Northglenn, CO PAYT & Organics Model Assumptions

Description	Source*	Organics $8/hh/mo Trash Recyclables Food & Yard Waste Frequency (per week) FW&YW-64 gal Weekly	Organics $10/hh/mo FW&YW-64 gal Weekly	Organics $12/hh/mo FW&YW-64 gal Weekly	Organics FW&YW-64 gal Weekly
Service					
Number of Customers	CS	9,400	9,400	9,400	9,400
Percent Served by Hauler	CS	80%	40%	20%	10%
Number of Customers	CS	7,520	3,760	1,880	940
Frequency (per week)	CS	1.0	1.0	1.0	1.0
Days/Week	CS	5	5	5	5
Hours/Day	CS	8	8	8	8
Labor					
SW Collection Driver	IS	$69,375	$69,375	$69,375	$69,375
Collector	IS				
Benefits (% of payroll)	n/a				
Annual Leave Per Employee (days)	n/a				
Sick Leave Per Employee (days)	n/a				
Equipment					
Vehicle	CS	$310,000	$310,000	$310,000	$310,000
Cost of Financing	IS	5%	5%	5%	5%
Fleet Replacement (years)	IS	9	9	5	5
Equipment (spare ratio)	IS	20%	20%	20%	20%
Cart Inventory (%)					
96-gal Carts (% of customers)	CS/IR				
64-gal Carts (% of customers)	CS/IR	100%	100%	100%	100%
48-gal Carts (% of customers)	IR				
32-gal Carts (% of customers)	IR				
Cart Inventory					
96-gal Carts	CS	0	0	0	0
64-gal Carts	CS	7,520	3,760	1,880	940
48-gal Carts	CS	0	0	0	0
32-gal Carts	CS	0	0	0	0
Buyback Discount (% of new cost)		n/a	n/a	n/a	n/a
New Cart Cost					
96-gal Carts ($/cart)	CS				
64-gal Carts ($/cart)	CS	$58	$58	$58	$58
48-gal Carts ($/cart)	IS				
32-gal Carts ($/cart)	IS				
Carts/Bins (years)	IS	8	8	8	8
Carts /Bins (spare ratio)	IS	5%	5%	5%	5%
Fleet (per truck)					
Route Miles (weekly)	CS	400	375	340	340
Fuel Consumption (mpg)	IS	2.5	2.5	2.5	2.5
Fuel Cost ($/gal)	IS	$2.50	$2.50	$2.50	$2.50
Maintenance & Repair ($/vehicle)	CS				
Fleet Labor	CS	$7,750	$7,750	$7,750	$7,750
Sanitation Labor	n/a				
Parts & Supplies	CS	$7,335	$7,335	$7,335	$7,335
Total		$15,085	$15,085	$15,085	$15,085
Insurance, License, Tax ($/vehicle)	IS	$7,750	$7,750	$7,750	$7,750
Supplies ($/vehicle)	IS	$2,000	$2,000	$2,000	$2,000
Sanitation Dept Cost Adjustments					
General/Administration (Ops Mgr, Super & Cust Svc salary)	CS	25.0%	25.0%	25.0%	25.0%
Profit	IS				
Inefficiency Factor	IS				
Avg Route Size (customer/route/day)		100%	82%	76%	71%
Trash	CS				
Recyclables	CS				
Organics	IS	525	430	400	375

City of Northglenn, CO PAYT & Organics Model Assumptions

Trash Recyclables Food & Yard Waste Frequency (per week) Description	Source*	Organics $8/hh/mo FW&YW-64 gal Weekly	Organics $10/hh/mo FW&YW-64 gal Weekly	Organics $12/hh/mo FW&YW-64 gal Weekly	Organics FW&YW-64 gal Weekly
Tons					
Total - All Customer	CS	3,525	3,525	3,525	3,525
Percent Served by Hauler		80%	40%	20%	10%
Tons - Trash	CS				
Tons - Recyclables	CS				
Tons - Organics	CS	2,820	1,410	705	353
Tip Fees					
Tip Fee - Trash (Republic)	CS				
Tip Fee - Recyclables (WM)	CS				
Tip Fee - Organics	IR	$45.00	$45.00	$45.00	$45.00
City Administration & Billing					
% of Total Cost	CS	3.00%	3.00%	3.00%	3.00%
Annual Costs for Environmental Service Fee					
Recycling Drop-Off Center					
Total Capital Cost					
Annualized Capex					
Labor & Operations					
Hauling Costs					
Tip Fees (net of revenue)					
Total Cost/Year					
Yard Waste Drop / Mulch					
Free Landfill Day (1 pickup truck/hh/event)					
Days/Yr					
Container Type					
Number of Containers/Day					
Annualized Capex (based on DOC analysis)					
Total Loads/Day					
Cost/Pull (City truck & driver based on DOC analysis SSR-WM)					
Tons/Day					
Disposal Cost/Ton (Republic)					
Number of Staff					
Work Hours/Day					
Average Annual Salary					
Total Cost/Year					
Free Dumpster Days					
Days/Yr					
Container Type					
Number of Containers/Day					
Annualized Capex (based on DOC analysis)					
Total Pulls/Day					
Cost/Pull (based on DOC analysis City driver & truck Glass-Rep)					
Tons/Day					
Disposal Cost/Ton (Republic)					
Number of Site Staff					
Site Staff Work Hours/Day					
Site Staff Average Annual Salary					
Total Cost/Year					
Comprehensive Public Education & Outreach Program					
Cost/hh/year					
Total Cost/Year					
Curbside Organics Subsidy					
Cost/sf hh/month					
Total Cost/Year					
Total Env Svc Fee Cost/Year					
Number of Single Family					
Number of Multi Family					
Total Households					
Average Cost/Household/Month					
Single Family for All Cost					
Allocated Single Family					
Allocated Multi Family					
Costs for Additional Services for A Fee (not included in modeling)					
Extra Trash Collection ($10/pickup/hh)					
Bulky Waste Collection ($100/pickup/hh)					
Roll-Off Clean-Up Service ($257/pickup (3 days)					

*Data Source Codes:

CS = City Supplied, IB = Industry Benchmark,

IS = Industry Standard, IR = Industry Research

City of Northglenn, CO - Environmental Service Fee Model Assumptions

Description	Source*	Baseline Current T-R T-96/64 Trash Recyclables Food & Yard Waste Frequency (per week)	Baseline Current T-R R-96 EO Week	PAYT Option A PAYT T-R T-32/64/96 gal Weekly	PAYT Option A PAYT T-R R-96 gal EO Week	PAYT Option B PAYT T-R T-48/64/96 gal Weekly	PAYT Option B PAYT T-R R-96 gal EO Week
Annual Costs for Environmental Service Fee							
Recycling Drop-Off Center				based on SSR&OCC-WM Glass-Mo		based on SSR&OCC-WM Glass-Mo	
Total Capital Cost				$450,550		$450,550	
Annualized Capex				$30,350		$30,350	
Labor & Operations				$71,400		$71,400	
Hauling Costs				$18,200		$18,200	
Tip Fees (net of revenue)				$22,150		$22,150	
Total Cost/Year				$142,100		$142,100	
Yard Waste Drop / Mulch				included		included	
Free Landfill Day (1 pickup truck/hh/event)							
Days/Yr		2		2		2	
Container Type		self haul					
Number of Containers/Day			n/a self haul				
Annualized Capex (based on DOC analysis)			n/a				
Total Loads/Day		157	313/yr	188	increase (see notes)	188	increase (see notes)
Cost/Pull (City truck & driver based on DOC analysis SSR-WM)			n/a				
Tons/Day		23	assume 300 lb/load	28	increase (see notes)	28	increase (see notes)
Disposal Cost/Ton (Republic)		$14.00		$14.00		$14.00	
Number of Staff			n/a				
Work Hours/Day			n/a				
Average Annual Salary			n/a				
Total Cost/Year		$657		$789		$789	
Free Dumpster Days							
Days/Yr		2		1		1	
Container Type		n/a provided by Republic		30-Yd Open Top Roll-Off		30-Yd Open Top Roll-Off	
Number of Containers/Day			53 loads/yr (Brigette)				
Annualized Capex (based on DOC analysis)				$1,127		$1,127	
Total Pulls/Day		27	53 loads/yr to be confirmed	32	increase (see notes)	32	increase (see notes)
Cost/Pull (based on DOC analysis City driver & truck Glass-Rep)		$140		$140		$140	
Tons/Day		38	75.74/yr	45	increase (see notes)	45	increase (see notes)
Disposal Cost/Ton (Republic)		$14.00		$14.00		$14.00	
Number of Site Staff		2		2		2	
Site Staff Work Hours/Day		8		8		8	
Site Staff Average Annual Salary		$67,113		$67,113		$67,113	
Total Cost/Year		$16,740		$9,218		$9,218	
Comprehensive Public Education & Outreach Program							
Cost/hh/year				$5.00		$5.00	
Total Cost/Year				$47,000		$47,000	
Curbside Organics Subsidy							
Cost/sf hh/month				$1.00		$1.00	
Total Cost/Year				$112,800		$112,800	
Total Env Svc Fee Cost/Year				$311,907		$311,907	
Number of Single Family				9,400		9,400	
Number of Multi Family				4,683		4,683	
Total Households				14,083		14,083	
Average Cost/Household/Month							
Single Family for All Cost				$2.77		$2.77	
Allocated Single Family				$2.18		$2.18	
Allocated Multi Family				$1.18		$1.18	
Costs for Additional Services for A Fee (not included in modeling)							
Extra Trash Collection ($10/pickup/hh)		84 occurrences in 2020 before PAYT					
Bulky Waste Collection ($100/pickup/hh)							
Roll-Off Clean-Up Service ($257/pickup (3 days)		2052.43 tons in 2020					

APPENDIX B
PAYT COST ANALYSIS – Results Summary

City of Northglenn, CO - PAYT Results Summary

	PAYT Option A	PAYT Option A	Total	PAYT Option B	PAYT Option B	Total
	PAYT T-R	PAYT T-R		PAYT T-R	PAYT T-R	
Trash	T-32/64/96 gal			T-48/64/96 gal		
Recyclables		R-96 gal			R-96 gal	
Food & Yard Waste						
Frequency	Weekly	EO Week	T-W ; R-EOW	Weekly	EO Week	T-W ; R-EOW
Capital Cost						
Trucks	$ 1,023,000	$ 465,000	$ 1,488,000	$ 1,023,000	$ 465,000	$ 1,488,000
New Carts	$ 350,600	$ 64,900	$ 415,500	$ 350,600	$ 64,900	$ 415,500
Cart Buyback	$ 492,900	$ 251,100	$ 744,000	$ 492,900	$ 251,100	$ 744,000
Total	*$ 1,866,500*	*$ 781,000*	*$ 2,647,500*	*$ 1,866,500*	*$ 781,000*	*$ 2,647,500*
Annualized Capex	*$ 274,400*	*$ 114,300*	*$ 388,700*	*$ 274,400*	*$ 114,300*	*$ 388,700*
Operating Cost						
Labor	$ 190,800	$ 86,700	$ 277,500	$ 190,800	$ 86,700	$ 277,500
O&M	$ 125,500	$ 57,000	$ 182,500	$ 125,500	$ 57,000	$ 182,500
Tip Fees	$ 161,000	$ 147,400	$ 308,400	$ 161,000	$ 147,400	$ 308,400
Total	*$ 477,300*	*$ 291,100*	*$ 768,400*	*$ 477,300*	*$ 291,100*	*$ 768,400*
Indirect Cost						
Sanitation Admin	$ 79,100	$ 35,900	$ 115,000	$ 79,100	$ 35,900	$ 115,000
City Admin	$ 24,900	$ 13,200	$ 38,100	$ 24,900	$ 13,200	$ 38,100
Total	$ 104,000	$ 49,200	*$ 153,200*	$ 104,000	$ 49,200	*$ 153,200*
Total Cost	$ 855,700	$ 454,600	$ 1,310,300	$ 855,700	$ 454,600	$ 1,310,300
Average Cost/Household/Month	$ 7.60	$ 4.00	$ 11.60	$ 7.60	$ 4.00	$ 11.60
Volume Based Cost:						
96-Gal Cart/Month			$ 16.60			$ 15.80
64-Gal Cart/Month			$ 11.10			$ 10.60
48-Gal Cart/Month						$ 7.90
32-Gal Cart/Month			$ 5.50			

Customers		9,400	9,400
Cost Customer/Month		$11.62	$11.62
Gallons of T Service/Year		32,847,360	34,411,520
Cost/Gallon of T Service		$0.04	$0.04
Cost/96-gal Cart/Month		$16.59	$15.84
Cost/64-gal Cart/Month		$11.06	$10.56
Cost/48-gal Cart/Month		$8.30	$7.92
Cost/32-gal Cart/Month		$5.53	$5.28
check		$0.00	$0.00
cart size		carts	carts
	96	2,820	2,820
	64	4,700	4,700
	48	0	1,880
	32	1,880	0

Fee Scenario	Multiplier for Cost/Gal of T Svc		
Cost/96-gal Cart/Month	110%	$18.25	$17.42
Cost/64-gal Cart/Month	100%	$11.06	$10.56
Cost/48-gal Cart/Month	90%		$7.13
Cost/32-gal Cart/Month	90%	$4.98	
Revenue Requirement Check			
Surplus(Deficit)		$43,677	$35,735

APPENDIX C
CURBSIDE COMPOST – Results Summary

City of Northglenn, CO - Subscription Compost Results Summary

Trash Recyclables Food & Yard Waste Frequency	Organics 80% Subscrip FW&YW-64 gal Weekly	Organics 40% Subscrip FW&YW-64 gal Weekly	Organics 20% Subscrip FW&YW-64 gal Weekly	Organics 10% Subscrip FW&YW-64 gal Weekly
Capital Cost				
Trucks	$ 1,116,000	$ 651,000	$ 372,000	$ 279,000
New Carts	$ 458,000	$ 229,000	$ 114,500	$ 57,200
Cart Buyback	$ -	$ -	$ -	$ -
Total	*$ 1,574,000*	*$ 880,000*	*$ 486,500*	*$ 336,200*
Annualized Capex	*$ 227,900*	*$ 127,000*	*$ 103,600*	*$ 73,300*
Operating Cost				
Labor	$ 208,100	$ 121,400	$ 69,400	$ 52,000
O&M	$ 136,900	$ 77,600	$ 42,500	$ 31,900
Tip Fees	$ 126,900	$ 63,500	$ 31,700	$ 15,900
Total	*$ 471,900*	*$ 262,400*	*$ 143,600*	*$ 99,800*
Indirect Cost				
Sanitation Admin	$ 86,300	$ 49,700	$ 28,000	$ 21,000
City Admin	$ 23,600	$ 13,200	$ 8,300	$ 5,800
Total	$ 109,800	$ 62,900	$ 36,200	$ 26,800
Total Cost	$ 809,600	$ 452,400	$ 283,500	$ 199,900
Average Cost/Household/Month	$ 9.00	$ 10.00	$ 12.60	$ 17.70
Environmental Service Fee Subsidy	$ (112,800)	$ (112,800)	$ (112,800)	$ (112,800)
Adjusted Total	$ 696,800	$ 339,600	$ 170,700	$ 87,100
Average Cost/Household/Month	$ 7.70	$ 7.50	$ 7.60	$ 7.70
Volume Based Cost:				
96-Gal Cart/Month				
64-Gal Cart/Month	$ 7.70	$ 7.50	$ 7.60	$ 7.70
48-Gal Cart/Month				
32-Gal Cart/Month				

Customers	7,520	3,760	1,880	940
Cost Customer/Month	$8.97	$10.03	$12.57	$17.72
Gallons of T Service/Year	25,026,560	12,513,280	6,256,640	3,128,320
Cost Gallon of T Service	$0.03	$0.04	$0.05	$0.06
Cost/96-gal Cart/Month	$13.46	$15.04	$18.85	$26.58
Cost/64-gal Cart/Month	$8.97	$10.03	$12.57	$17.72
Cost/48-gal Cart/Month	$6.73	$7.52	$9.42	$13.29
Cost/32-gal Cart/Month	$4.49	$5.01	$6.28	$8.86
check	$0.00	$0.00	$0.00	$0.00

cart size	carts	carts	carts	carts
96	0	0	0	0
64	7,520	3,760	1,880	940
48	0	0	0	0
32	0	0	0	0

APPENDIX D

DROP SITE ANALYSIS – Assumptions & Results Summary

City of Northglenn, CO - Drop Site Results Summary

[note: capital cost estimates does not include land purchase or electrical utility]
[note: operating cost does not include administration or insurance]

Current Recycling Drop-Offs

	SSR-WM	
	Total Cost - Low	**Total Cost - High**
Capital Cost	$23,000	$26,500
Annualized Capital Cost	*$2,600*	*$3,000*
Operating Cost		
Labor & Operations	$54,600	$66,600
Hauling Costs	$12,000	$17,700
Tip Fees (net of revenue)	$24,500	$31,100
Total	*$91,100*	*$115,400*
Total Annual Cost	*$93,700*	*$118,400*

Recycling Drop-Off

	SSR-WM		SSR-BCRC	
	Total Cost - Low	**Total Cost - High**	**Total Cost - Low**	**Total Cost - High**
Capital Cost	$407,800	$483,200	$407,800	$483,200
Annualized Capital Cost	*$27,300*	*$32,400*	*$27,300*	*$32,400*
Operating Cost				
Labor & Operations	$64,100	$78,700	$64,100	$78,700
Hauling Costs	$12,000	$17,700	$16,000	$22,800
Tip Fees (net of revenue)	$25,200	$32,000	$20,900	$26,800
Total	*$101,300*	*$128,400*	*$101,000*	*$128,300*
Total Annual Cost	*$128,600*	*$160,700*	*$128,300*	*$160,700*

	SSR&OCC-WM		SSR-WM OCC-BCRC	
	Total Cost - Low	**Total Cost - High**	**Total Cost - Low**	**Total Cost - High**
Capital Cost	$408,500	$483,800	$408,500	$483,800
Annualized Capital Cost	*$27,400*	*$32,400*	*$27,400*	*$32,400*
Operating Cost				
Labor & Operations	$64,100	$78,700	$64,100	$78,700
Hauling Costs	$14,200	$21,300	$16,000	$24,000
Tip Fees (net of revenue)	$23,000	$28,500	$22,300	$27,500
Total	*$101,300*	*$128,500*	*$102,400*	*$130,200*
Total Annual Cost	*$128,700*	*$160,900*	*$129,800*	*$162,600*

	SSR&OCC-WM Glass-Momentum		SSR&OCC-WM Glass-Republic		SSR&OCC-WM Glass-Momentum*	
	Total Cost - Low	**Total Cost - High**	**Total Cost - Low**	**Total Cost - High**	**Total Cost - Low**	**Total Cost - High**
Capital Cost	$412,600	$488,500	$412,600	$488,500	$54,800	$66,700
Annualized Capital Cost	*$27,800*	*$32,900*	*$27,800*	*$32,900*	*$4,900*	*$5,800*
Operating Cost						
Labor & Operations	$64,100	$78,700	$64,100	$78,700	$64,100	$78,700
Hauling Costs	$15,000	$21,400	$15,100	$21,600	$15,000	$21,400
Tip Fees (net of revenue)	$20,500	$23,800	$20,900	$25,000	$20,500	$23,800
Total	*$99,600*	*$123,900*	*$100,100*	*$125,300*	*$99,600*	*$123,900*
Total Annual Cost	*$127,400*	*$156,800*	*$128,000*	*$158,200*	*$104,500*	*$129,700*

* no site work or grading

Snapshot Adding Food Waste to Drop-Off

	Organics-A1	
	Total Cost - Low	**Total Cost - High**
Capital Cost	$1,100	$1,200
Annualized Capital Cost	*$100*	*$100*
Operating Cost		
Labor & Operations	$0	$0
Hauling Costs	$0	$0
Tip Fees (net of revenue)	$2,700	$3,600
Total	*$2,700*	*$3,600*
Total Annual Cost	*$2,800*	*$3,700*

City of Northglenn, CO - Drop Site Model Assumptions

Material Weight assumptions

Average Tons per Load	Tons	Density lbs/cy	Comments
			Staff remarked that SSR 30 yd roll-offs are pulled 2-3 times per week
SSR (30 yd)	2.3	150	Conversion of lbs/cu yd = tons per container for each material stream
SSR-OCC (30 yd)	2.3	150	
SSR-OCC-Glass (30 yd)	1.9	125	
OCC (30 yd)	1.1	75	
Glass (30 yd)	9.0	600	
Yard Waste for On-Site Grinding	7.0	350	1 CY = 350 lbs - from NG Diversion 2014-2020
Yard Waste for A1 (40 yd)	8.0	400	Leaves, grasss & brush not ground; transfer to A1
Trash (96 gal cart)	0.1	450	
Food Waste (64 gal carts)	0.1	800	

Annual Tonnage Assumptions

	Projected 2021 Low	Projected 2021 High	Based on 2 DOCs - plus/minus 10% over 2021 projection
SSR (30 yd)	265	324	
SSR-OCC (30 yd)	205	239	Assumes only 25% remaining in SSR
SSR-OCC-Glass (30 yd)	186	190	Assumes only 40% remaining in SSR
OCC (30 yd)	60	85	
Glass (30 yd)	19	49	
Yard Waste for On-Site Grinding	257	283	2019 total from NG Diversion 2014-2020; high is based on assumed 10% increase
Yard Waste for A1	234	312	
Trash (twelve 96 gal carts) 1 x weekly	50	67	Waste & contamination from operations; assume eight 75% to 100% full 96-gal carts/week
Food Waste (twelve 64 gal carts)	59	79	Assume eight 75% to 100% full 64-gal carts/week

Tip Fees Cost per Ton

Based on Material type	red cost	blue revenue	
SSR WM	($52.63)	($52.63)	Based on estimated pricing for 2021 for ALL single-stream with OCC (WM draft Exh B)
SSR BCRC	($36.50)	($36.50)	As posted for Jan 2021 for ALL single-stream with OCC - avg monthly 2021 postings = -$36
SSR-OCC WM	($60.90)	($60.90)	Based on average market value estimated with only 25% OCC - confirmed by WM
SSR-OCC BCRC	($36.50)	($36.50)	As posted for Jan 2021 for ALL single-stream with OCC - avg monthly 2021 postings = -$36
SSR-OCC-Glass WM	($54.53)	($54.53)	Based on average market value estimated with only 25% OCC & 40% glass
SSR-OCC-Glass BCRC	($36.50)	($36.50)	As posted for Jan 2021 for ALL single-stream with OCC - avg monthly 2021 postings = -$36
OCC WM	$12.00	$12.00	Based on PPI, 95% purity, $50 baling fee, 50% split - per WM 2/2/21
OCC BCRC	$24.03	$24.03	As posted for Jan 2021 - avg monthly 2021 postings = $18
Glass Momentum Recycling	$10.00	$10.00	
Glass Republic LF	($14.00)	($14.00)	Based on 2020 contract tip fees for Republic LF
Trash Republic LF	($14.00)	($14.00)	Based on 2020 contract tip fees for Republic LF
Food Waste A1 Organics	($45.00)	($45.00)	Tip fee at McDonald for transfer & tip at A1 Keanesburg

Annual Tip Fees

Based on Material type		
SSR WM	($13,947)	($17,052)
SSR BCRC	($9,673)	($11,826)
SSR-OCC WM	($12,508)	($14,553)
SSR-OCC BCRC	($7,496)	($8,722)
SSR-OCC-Glass WM	($10,160)	($10,381)
SSR-OCC-Glass BCRC	($6,800)	($6,948)
OCC WM	$716	$1,021
OCC BCRC	$1,433	$2,044
Glass Republic LF	($267)	($680)
Glass Momentum Recycling	$191	$486
Trash Republic LF	($701)	($934)
Food Waste A1 Organics	($11,576)	($12,734)

DOC Cost Assumptions

Capital Cost

Site Acquisition	$0	$0	per acre
Site Grading, Stormwater & Paving	$125,000	$150,000	per acre
Concrete Retaining Wall	$150	$175	per lineal foot
Material Inspection Table	$500	$750	each, for residents to place recyclable and staff to inspect prior to putting in roll offs
Office Trailer	$15,000	$20,000	For staff when open
Signage	$2,000	$2,500	basic
Signage	$500	$500	per additional material
Portolet	$2,000	$2,500	ea
Gate	$700	$800	ea
Fencing	$25	$25	per lf, based on Webber quote $35K for 700 lf
Spare Container allowance	10%	10%	Roll-offs and 96 gal carts

Operating Costs DOC

Annual Salary	$55,505	$67,113	Low is 2020 Customer Service 1 Wage & Ben.; High is 2020 Average Sanitation wage
Hours/Week	16.0		
Number of Staff	2.0		
Utilities & Site Maintenance	$3,000	$4,000	allowance for heat, sanitary service, & maintenance
Tools & Supplies	$1,500	$2,000	allowance
Tub Grinder Rental	$15,200	$19,000	From Weber Budget Breakdown
Utilities/Communications			

Other Operating Cost Factors

Diesel Fuel	$2.50	$2.50
Fuel Consumption for Tub Grinder		
Paid Work Hours/Day	4.0	4.0
Productive Work Hours/Day	4.0	4.0
Days/Week	3	3

Productive Work Hours/Year (FTE)	624	624	DOC to be staffed 12 hrs / week spread over 3 days; using 2 part-time staff

Annualized Capital Cost Factors

Replacement Schedule (yrs)	10	10
Interest/Depreciation Rate	5%	5%

SSR	Single Stream Recycling
SSR-OCC	Single Stream Recycling - OCC
SSR-OCC-Glass	Single Stream Recycling - OCC-Glass

References

Salaries from Weber Budget Breakdown

City of Northglenn, CO - Drop Site Hauling Assumptions

	PROJECTED 2021		
	Low	High	
Mileage Assumptions (Roundtrip DOC to scale)			
	Miles RT	Miles RT	
WM MRF	20	22	10-11 One-way miles from NWOS
BCRC MRF	36	40	18-20 One-way miles from NWOS
Momentum Recycling	16	18	8-9 One-way miles from NWOS
Republic LF	32	34	16-17 One-way miles from NWOS
A1 Organics (Tip at MacDonald Farm Fredrick CO then transfer to Ke	20	20	FW carts to be serviced by organics curbside service; YW roll-off 40 one-way miles from NWOS
Travel Time Assumptions (Roundtrip DOC to scale)			
	Hours	Hours	
WM MRF	0.67	0.67	20 min one-way
BCRC MRF	1.00	1.00	30 min one-way
Momentum Recycling	0.57	0.57	17 min one-way
Republic LF	1.00	1.00	30 min one-way
A1 Organics (Tip at MacDonald Farm Fredrick CO then transfer to Ke	0.67	0.67	20 min one-way
Load & Tip Time Assumptions (Hours scale-in to scale-out)			
	Hours	Hours	
Loading time	0	0	not applicable; already loaded
Tipping time	0.5	0.75	load
Driver Annual Loaded Salary	$69,375.00		
Hourly	$33.35		2080 hours annually
Fleet (per truck)			
Weekly			
Fuel Consumption (2.5 mpg)	2.5		IS
Fuel Cost ($2.5/gal)	$2.50		IS
Maintenance & Repair ($/hr)	$14.90		IS - $31,000 per year
Insurance, License, Tax ($/hr)	$3.73		IS - $7,7500 per year
Supplies ($/hr)	$0.96		IS - $2,000 per year
Weekly Consumables	**$19.59**		
Driver Cost Per Pull			
WM MRF	$38.91	$47.25	
BCRC MRF	$50.03	$58.37	
Momentum Recycling	$35.58	$43.92	
Republic LF	$50.03	$58.37	
A1 Organics (Keanesburg)	$38.91	$47.25	
Fuel by Location Per Pull			
WM MRF	$20.00	$22.00	Miles / mpg x fuel per gal
BCRC MRF	$36.00	$40.00	
Momentum Recycling	$16.00	$18.00	
Republic LF	$32.00	$34.00	
A1 Organics (Keanesburg)	$20.00	$20.00	
Cost of Pulls Weekly	2	3	
WM MRF	$137.42	$227.34	Fuel by location + Driver x weekly pulls
BCRC MRF	$191.65	$314.70	
Momentum Recycling	$6.14	$6.84	only 1 x per month
Republic LF	$9.18	$9.89	only 1 x per month
A1 Organics (Keanesburg)	$137.42	$221.34	
Site Prep			
Elevated Drop Area			
Concrete Retaining Wall	2000	2500	basic; increase for multiple material separations
Portolet	2000	2500	ea
Gate			ea
Fencing			per lf

APPENDIX E

ENVIRONMENTAL SERVICE FEE – Results Summary

City of Northglenn, CO - Environmental Service Fee Results Summary

Staffed Recycling Drop Off Center		All Hhlds
Free Landfill Days (2/year)		All Hhlds
Free Dumpster Days (1/year)		All Hhlds
Curbside Organics Subsidy		SF Hhlds
Comprehensive E&O Program		All Hhlds
Capital Cost		
Drop Off Center	$	450,600
Annualized Capital Cost	*$*	*30,400*
Operating Cost		
Drop Off Center	$	142,100
Free Landfill Days	$	800
Free Dumpster Days	$	9,200
Curbside Organics Subsidy	$	112,800
Comprehensive E&O Program	$	47,000
Total	*$*	*311,900*
Total Cost	$	311,900
Cost/SF Household/Month	$	2.80
Allocated Cost/Household/Month		
Single Family	$	2.20
Multi Family	$	1.20

Note: DOC costs based on average cost of SSR&OCC-WM Glass-Mo Scenario

SOLID WASTE OPTIMIZATION STRATEGY

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Consultant

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Study Session

Oct. 17, 2022

CITY OF Northglenn

PURPOSE

To provide City Council with the findings and recommendations from the Waste Optimization Study and seek direction from City Council on improvements to Northglenn's waste management system.

WHY ARE WE HERE?

- City Council requested waste optimization options
- Residents want more recycling and composting – but incentives are needed
- Environmental benefits to entire City

BACKGROUND: CURRENT SERVICES

Curbside Trash and Recycling (T&R) collection to 9,400 single-family units (SFUs)

- Carts are purchased by each household

Ancillary services to 14,000 households (including multi-family units, or MFUs)

- 2 landfill days
- 1 bulk / dumpster day
- 2 recycling drop site (1 also accepts yard waste)

CURRENT SFU PRICING BASIS

Current SFU Fees

Flat monthly T+R fee $16 per household regardless of cart number or size

Collection Schedule

Weekly trash

Bi-weekly recycling

SFUs subsidize all ancillary services for MFUs

Recycling Opportunities

- **Residents must “opt in” – 16% do not**
- **Not “recycling right” leads to high contamination rates**

PAST SANITATION FEES

April 9, 2009

- $12.25 for flat rate for trash service
- Approved utilization of automated trash trucks
  - Replaced throwing bagged trash into trucks by hand

Nov. 14, 2016

- $16 for flat rate for trash service
- No policy in place for future increases in residential sanitation fees

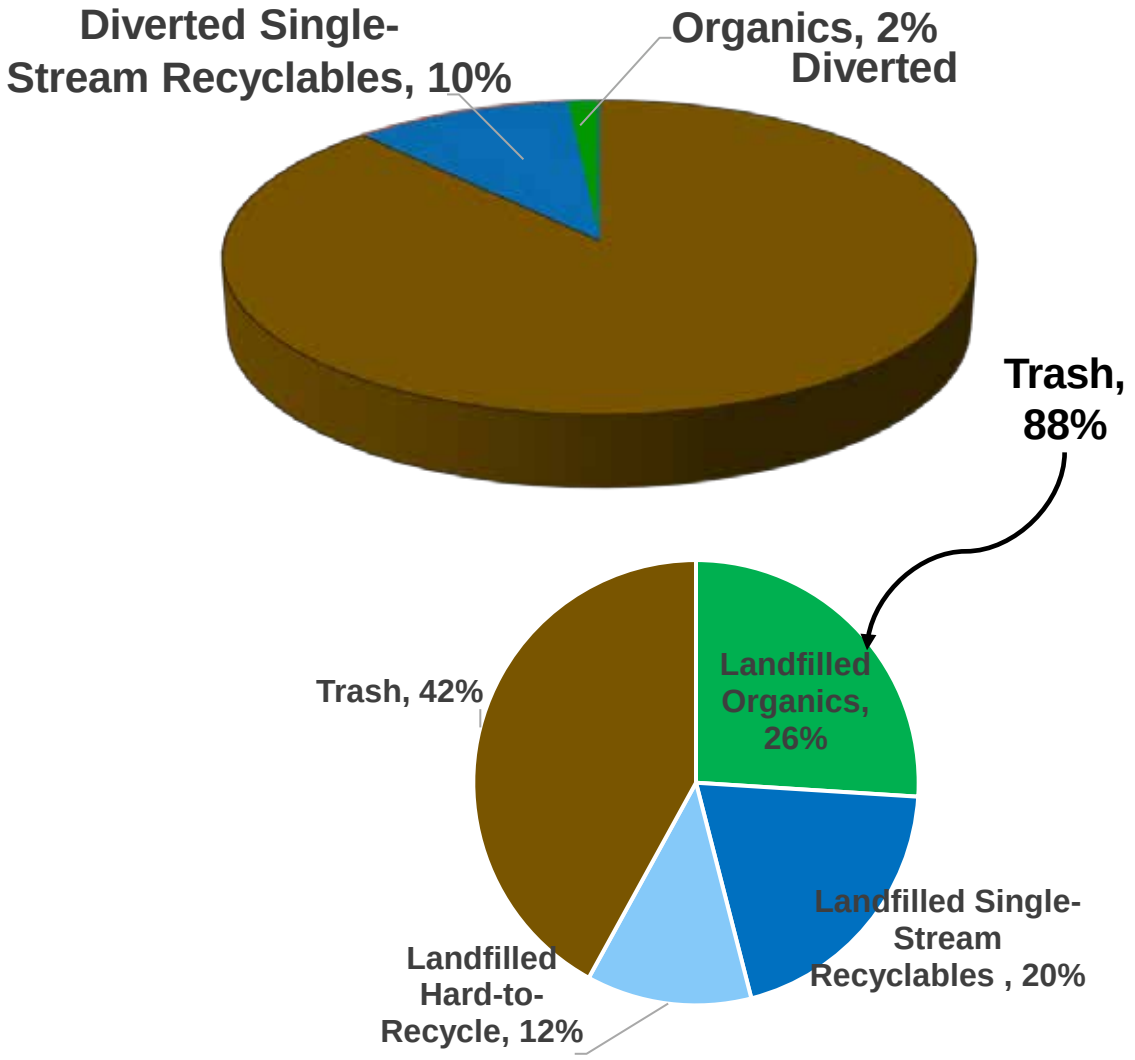
CURRENT CART ALLOCATION

TRASH	Break Down of 9,400 Households by Percentage		Service Received as Percentage of Total Available	Monthly Cost Per Household
	SFU with one 64-gal T cart	6%	22%	$16
	SFU with one 96-gal T cart	40%	33%	$16
	SFU with two 96-gal T carts	42%	67%	$16
	SFU with three 96-gal T carts	12%	100%	$16

RECYCLING	Break Down of 7,800 Households by Percentage	
	SFU with one 96-gal R cart	94%
	SFU with two 96-gal R carts	6%

OPPORTUNITIES TARGETED

1. High reliance on landfill disposal – current program incentivizes trash
2. City sustainability goal will not be met - <12% diverted versus 20% goal (2023)
3. Homes that produced less trash subsidize those that trash more
4. SFUs subsidize ancillary services to MFUs
5. Recycling contamination as high as 20%
6. Recycling drop sites are under-utilized
7. Limited compost - but biggest opportunity



PROGRAM OPTIMIZATIONS

PHASE I:

Residential Pay-As-You-Throw (PAYT) Pricing for Curbside Trash + Recycling

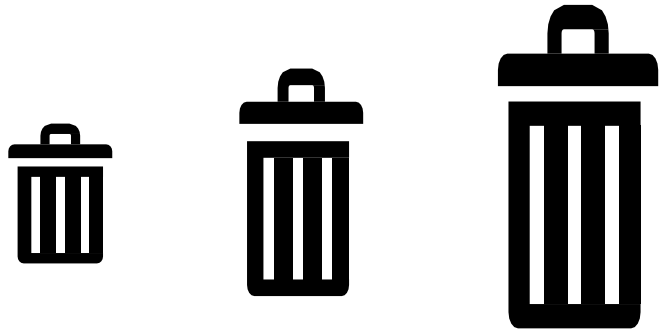
- Three T service levels with tiered fees
- R service for all SFUs

PHASE 2:

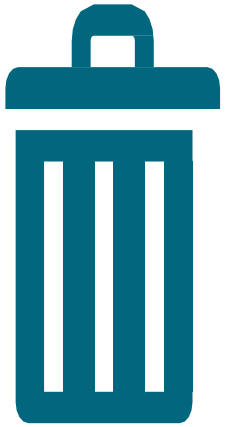
Expanded Drop-Site Collection

Subscription-Based Curbside Composting

PHASE I: PAYT FOR SFUs



Trash Cart Options – Small (32-gal), Medium (64-gal) and Large (96-gal)



All households receive large (96-gal) recycling cart

$ $ $

Corresponding fees are Low, Medium, and High

Fees still cover ancillary services for SFU-only households

PAYT PRICING BASIS

SFU Residents *(curbside and ancillary services)*

- 70% expected to select small or medium T cart and reduce monthly cost
- 30% expected to keep large T cart(s) and increase monthly cost

MFU Residents *(ancillary services)*

- New fee of $1.20 per household per month
- Will eliminate current SFU subsidy

PAYT PRICING STRUCTURE

Service Level	Estimated Monthly Cost (cost per household)	Estimated Percentage of SFUs at Each Service Level	Cost Differential from Current Flat $16/household-month
Small Trash Service	$7	20%	Savings = $9
Medium Trash Service	$13	50%	Savings = $3
Large Trash Service	$18	30%	Additional cost = $2

CART OWNERSHIP

- **Residents currently purchase trash carts**
- **Under PAYT City will buy back carts on pro-rated basis**
- **City will retain cart ownership going forward**
- **Exchange existing/new carts**

NET-NEUTRAL PROGRAM

PAYT is cost-neutral for Sanitation Division

- No support from General Fund
- All costs included in customer fees including cart buy-back
- Assumes new MFU fee for ancillary services

PAYT creates recycling incentive

- As recycling quantities increase, trash decreases

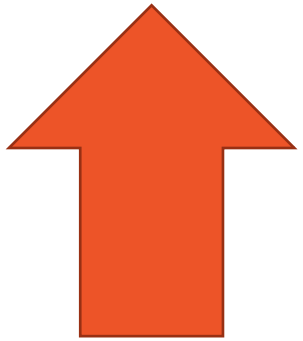
Based on conservative recyclable pricing

- City will build contingency funding to cover commodity market volatility

PHASE I PAYT IMPLEMENTATION

- **Public outreach and T cart selection**
- **Cart buy-back, purchase and exchange**
- **Adjust billing system**
- **Determine waivers and reduced fees**
- **Roll-out using existing routes**
  - 6 to 10 months
  - Adjust as needed
- **Ongoing**
  - Public education to control contamination
  - Evaluate fees and recycling frequency regularly

PAYT BENEFITS

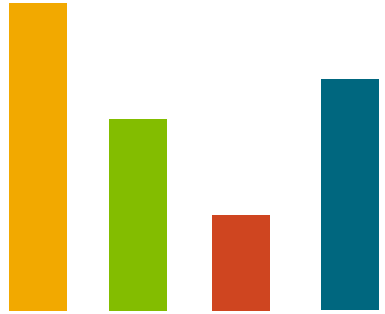


Increase Environmental Sustainability

Customers Control Costs

Maintain Integrity of Sanitation Enterprise

Introduce Service Equity



Measurable Outcomes

QUESTIONS?

Design and Implementation of Residential PAYT Program

CITY OF Northglenn

PHASE II: EXPANDED DROP-SITE COLLECTIONS

Build upon 2022 improvements completed by Sanitation Division:

- Add source-separated cardboard collection – address the “Amazon effect”
- Add source-separated glass collection – minimize contamination
- Pilot food waste collection – to provide data for curbside compost collection
- Add hard-to-recycle materials – tires, waste oil, etc.

PHASE II: SUBSCRIPTION-BASED CURBSIDE COMPOST COLLECTION

Key tool to help downsize curbside T service:

- Available to all SFUs
- Will add organics (“O”) carts and collection routes
- Additional $8 per household per month for subscribers
  - Based on grant or local funding to encourage initial participation
- Initial analysis
  - SFUs with small T+R service could add O service and still pay less than $16 per month.

PHASE II: OTHER CONSIDERATIONS

Hauler reporting policy:

- Apply to companies/ organizations that haul solid waste collected within the City of Northglenn
- Require reporting of tonnages collected – T, R, O, etc.
- Allows the City to:
  - Track landfill diversion rates and progress towards sustainability goals
  - Encourage diversion and ensure recyclables are properly managed

CUMULATIVE ENVIRONMENTAL BENEFITS

(PAYT + EXPANDED DROP-SITES + CURBSIDE COMPOST COLLECTION)

Landfill Diversion

- Increase from <12% to 25%
- Expected to reduce contamination

**Based on SFUs – benefits will vary once data for other sectors is available*

Greenhouse Gas Reductions

- Total reduction of 2,600 mtCO2e/year
- Would match projection for all measures identified in City's 2019 Energy Action Plan

WHY SHOULD SOLID WASTE SYSTEM OPTIMIZATION BE A PRIORITY?

Negative impacts of landfilling are expected to escalate in coming years

When recycling and composting is promoted, environmental benefits increase

Increased public awareness leads to greater participation and less contamination

Sanitation only manages 25% of City waste stream (no data on other 75%)

COMMON "MYTHS" ABOUT PAYT

Monthly fees will go up

PAYT is too complicated

PAYT will cause illegal dumping

Tiered pricing discriminates against large families

Recyclables are just thrown in landfill anyway

Worrying about recycling is the City's job

QUESTIONS?

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