



Memorandum

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TO: Zack Hansen and Nikki Stewart
Ramsey/Washington Recycling & Energy Joint Leadership Team (JLT)

CC: Kate Bartelt and Nathan Klett
Foth Infrastructure & Environment, LLC (Foth)

FROM: Jennefer Klennert, Foth

RE: Carted Organics Collection Costs

Introduction

Carted Source Separated Organics (SSO) collection is an additional option for SSO collection by the Recycling & Energy Board (R&E Board). This method assumes organics will be separated by residents, placed in dedicated organics carts, and then kept separate during collection/transfer operations from any other materials (e.g., no commingling or co-collection with yard waste or MSW). While compostable bags are recommended, they are not required for the *separate collection* method. However, the *separate collection* method requires an additional organics cart and dedicated trucks on new collection routes.

Separate collection of SSO in a cart is the organics method selected by the City of Minneapolis (City) for citywide implementation as rolled out in July 2016. The City offers weekly service to all households. Foth utilized information from the City's program to model potential costs of carted SSO collection for Ramsey and Washington Counties (Counties).

Foth has also completed several other reports on SSO collection options including carted SSO. The reports were reviewed for relevant data for this Memo.

- ◆ *Assessment of Residential Source Separated Organics Collection Options: A Study for the City of Minneapolis*, Foth Infrastructure & Environment, LLC. October 2013.
- ◆ *Analysis of Residential Organics Recycling in Dakota County*, Foth Infrastructure & Environment, LLC., September 2017.

- ◆ *Evaluation of Residential Organics Collection in Hennepin County, MN: Estimated Greenhouse Gas Emissions, Recovery Rates, and Pricing*, Foth Infrastructure & Environment, LLC. June 2015.
- ◆ *Processing Alternatives: Durable Compostable Bag (DCB) Technology*, Foth Infrastructure & Environment, LLC., November 2018

Overview of Carted Organics Collection

Jeff Jenks and Kelli Kish, City of Minneapolis Public Works Staff were contacted several times from October 2018 through December 2018 to request information on carted organics services. Additional information on the program was requested and the City of Minneapolis Division of Solid Waste and Recycling – 2018 Factsheet is attached as Appendix 1. The City’s solid waste services are provided by the City and Minneapolis Refuse Incorporated (MRI). The City’s program collectively services approximately 107,240 households.

The City’s carted organics program kicked off in June 2015. Minneapolis has a robust program with sign-up rates summarized in Table 1. A sign-up indicates that a cart has been requested and received for use by a residential household. The City has not yet completed a participation study to determine the set-out rate, which is the rate at which participants in the program are actually using and setting out the cart for collection. Typically, not all participants will have the cart out weekly particularly in the winter months. Sign-up rates for carted organics service in the City are similar to sign up rates for Durable Compostable Bags (DCB), which are predicted to be approximately 40 percent in year four.

Table 1
City of Minneapolis SSO Sign-Up Rates

As of	Percentage Sign Up	Households Signed Up
Year 1 - December, 2015	31.82%	33,922
Year 2 - December, 2016	40.54%	43,319
Year 3 - December, 2017	43.66%	46,757

Tonnage Estimates

The City and MRI both collected carted organics and collected 4,763 tons of source-separated organics in 2017. This equates to approximately 204 pounds of organics collected per sign-up (46,757 households) or approximately 89 pounds of organics collected per residential dwelling serviced (107,240 households).

As a comparison, the Foth Memo *Processing Alternatives: Durable Compostable Bag (DCB) Technology* dated November 20, 2018, (DCB Memo) estimated 480 pounds per participating household per year (8 pounds per DCB and 60 bags per year). Foth recognizes that the DCB pounds per household number are significantly higher than Minneapolis’ actual pounds per household.

For consistency, Foth's modeling for this memo does assume the same SSO pounds per household (480 pounds) as in the DCB memo. Based on a mature SSO system (40% participation) and 480 pounds per participating household, the annual tonnage for the Counties would be 30,595 tons.

Trucks

The City and MRI currently operate twelve trucks, five days per week, for pickup of carted SSO. The City has 46,757 households signed up for carted SSO collection. Each truck services on average 780 households per day. (46,757 households per truck per day / 12 trucks / 5 days per week = 780 potential SSO carted stops per truck per day)

The number of trucks needed to service carted organics are dependent on total households to be driven by, distance between each home, off route time including travel to a transfer station or organics processing facility to empty the truck, and the number of haulers servicing each given area (organized collection with one hauler in each service area or open collection with multiple haulers in each service area). A high-level estimate of a number of trucks needed to provide carted SSO could then be estimated for the Counties.

Ramsey and Washington County are geographically diverse with household densities varying substantially from each community. Foth used the following methodology to determine route density and population for each community.

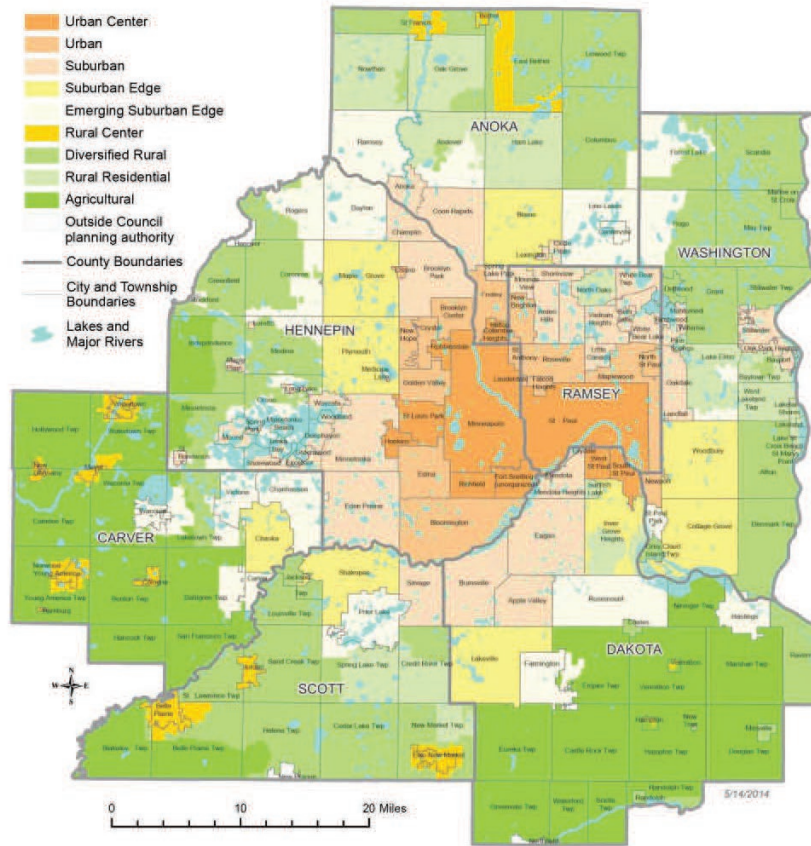
- 1) Metropolitan Council's Thrive MSP 2040¹ community designation type was used to quantify household density. The community designations descriptions are summarized in Table 2, Community Classifications and Descriptions and are shown on Figure 1, Community Designations.
- 2) 2010 U.S. Census Data² was used to verify the number of households in each community. The quantity and percentage of households and community in each classification are listed in Table 3, Community Classification by Household in Ramsey and Washington Counties

¹ Metropolitan Council's Thrive MSP 2040 <https://metrocouncil.org/METC/files/63/6347e827-e9ce-4c44-adff-a6afd8b48106.pdf>

² U.S. Census Bureau, 2010 Census. <https://factfinder.census.gov/>

**Figure 1
Community Designations**

Community Designations



**Table 2
Community Classifications and Descriptions**

Community Classification	Description from Thrive MSP 2040
Diversified Rural	<p>Diversified Rural communities have a variety of farm and non-farm land uses including very large-lot residential, clustered housing, hobby farms and agricultural uses.</p> <p>Characteristics include a mix of uses and large portions of communities in the Diversified Rural area contain prime agricultural soils.</p>
Emerging Suburban Edge	<p>The Emerging Suburban Edge includes cities, townships, and portions of both that are in the early stages of transitioning into urbanized levels of development.</p>

Community Classification	Description from Thrive MSP 2040
	<p>Characteristics include a mix of residential, rural, and agricultural areas, and often including lower-density single-family neighborhoods and small downtown service centers.</p>
Rural Residential	<p>Rural Residential includes residential patterns characterized by large lots and do not have plans to provide urban infrastructure, such as centralized wastewater treatment.</p>
Suburban	<p>Suburban communities saw their primary era of development in the 1980s and into the early 1990s. Many of these communities fall along freeway corridors and include growth along and outside the I-694/I-494 beltway.</p> <p>Development in Suburban communities occurred at significantly lower densities than in previous eras. Many residential subdivisions include cul-de-sacs.</p>
Suburban Edge	<p>The Suburban Edge includes communities that have experienced significant residential growth beginning in the 1990s and continuing to the 2010s. At least 40% of the land in these cities is developed, but significant amounts of land remain for future development.</p> <p>Characteristic include a tendency toward auto-oriented development and transportation patterns. Neighborhoods are often self-contained subdivisions characterized by cul-de-sacs and limited access to major thoroughfares for traffic movement.</p>
Urban	<p>Urban communities developed primarily during the economic prosperity between the end of World War II and the economic recession of 1973-75. These cities, adjacent to the Urban Center communities, experienced rapid development to house the growing families of the Baby Boom era.</p> <p>The development patterns of Urban communities show the growing influence of the automobile as miles and miles of new limited-access highways accelerated further automobile-oriented growth.</p>
Urban Center	<p>The Urban Center includes the largest, most centrally located, and most economically diverse cities of the region.</p> <p>These communities share similar development characteristics such as street grids planned before World War II.</p>

Table 3
Community Classification by Household
in Ramsey and Washington Counties

Community Classification	Quantity of Households in the Counties	Percentage of Total Households in the Counties	Communities in Classification
Diversified Rural	7,885	2%	<ul style="list-style-type: none"> ◆ Afton ◆ Dellwood ◆ Denmark Township ◆ Grant ◆ Grey Cloud Township ◆ Marine on St. Croix ◆ May Township ◆ Scandia ◆ Stillwater Township
Emerging Suburban Edge	15,412	5%	<ul style="list-style-type: none"> ◆ Forest Lake ◆ Hastings ◆ Hugo ◆ St. Paul Park
Rural Residential	6,524	2%	<ul style="list-style-type: none"> ◆ Baytown Township ◆ Lake Elmo ◆ Lake St. Croix Beach ◆ Lakeland ◆ Lakeland Shores ◆ Pine Springs ◆ St. Mary's Point ◆ West Lakeland Township
Suburban	75,324	24%	<ul style="list-style-type: none"> ◆ Arden Hills ◆ Bayport ◆ Birchwood Village ◆ Gem Lake ◆ Landfall ◆ Little Canada ◆ Mahtomedi ◆ Mounds View ◆ North Oaks ◆ Oak Park Heights ◆ Oakdale ◆ Shoreview ◆ Spring Lake Park

Community Classification	Quantity of Households in the Counties	Percentage of Total Households in the Counties	Communities in Classification
			<ul style="list-style-type: none"> ◆ Stillwater ◆ Vadnais Heights ◆ White Bear Lake ◆ White Bear Township ◆ Willernie
Suburban Edge	37,810	12%	<ul style="list-style-type: none"> ◆ Cottage Grove ◆ Woodbury
Urban	53,431	17%	<ul style="list-style-type: none"> ◆ Falcon Heights ◆ Lauderdale ◆ Maplewood ◆ New Brighton ◆ Newport ◆ North St. Paul ◆ Roseville ◆ St. Anthony
Urban Center	122,312	38%	<ul style="list-style-type: none"> ◆ Saint Paul
Diversified Rural	7,885	2%	<ul style="list-style-type: none"> ◆ Afton ◆ Dellwood ◆ Denmark Township ◆ Grant ◆ Grey Cloud Township ◆ Marine on St. Croix ◆ May Township ◆ Scandia ◆ Stillwater Township

The Counties communities have a variety of models for collection services including one hauler systems with organized collection for trash, recycling or both, and open hauler systems where multiple vendors service the community. Due to the complexity and high level of this estimation of utilization of equipment, Foth assumed one hauler for each community. Foth's intent is not to advocate or promote any specific collection system model for carted organics collection; rather it is an attempt to quantify the minimum amount of trucks needed to provide carted organics collection. Foth also recognizes that each communities' model for funding carted organics collection has not yet been determined and therefore is not specified in this memo.

Foth utilized the City of Minneapolis’s stops per truck per day to model the number of trucks needed to service carted SSO in Suburban, Urban, and Urban Center communities. A total of 251,068 households are under these three community classifications. Each truck would service 780 households per day, five days per week. Foth utilized an average of 500 stops per truck per day to model the number of trucks needed to service carted SSO in Diversified Rural, Emerging Suburban Edge, Rural Residential, and Suburban Edge communities. These four community classifications encompass the remaining 67,631 households. This lower number of 500 stops per truck per day is a conservative estimate that accommodates a centrally located facility (transfer station or processing facility) and accounts for the difference in density of households. Foth acknowledges that a centrally located SSO facility does not currently exist in the Counties.

The following calculations were completed using the route densities described resulting in a need for a minimum of 91 trucks to provide carted SSO collection.

- ◆ $251,068 \text{ households per week} / 780 \text{ households per truck} / 5 \text{ days per week} = 64 \text{ trucks and}$
- ◆ $67,631 \text{ households per week} / 500 \text{ households per week} / 5 \text{ days per week} = 27 \text{ trucks.}$

These trucks are assumed to be in addition to the current trucks already providing garbage, recycling, and yard waste services in the Counties. This is a conservative estimate, utilizing the assumption that one hauler is providing service to each area in the Counties when in reality, multiple haulers may provide services creating an inherent inefficiency and a need for more than the calculated 91 trucks.

Table 4
Number of Trucks Need to Provide SSO Collection to all Households in Ramsey and Washington Counties

	Number of Households	Households Serviced Per Truck Per Day	Number of Trucks Needed
Suburban, Urban, and Urban Center	251,068	780	64
Diversified Rural, Emerging Suburban Edge, Rural Residential, and Suburban Edge	67,631	500	27
Total	318,699		91

On average, an automated side load truck (used for modeling carted SSO collection) is \$250,000. Approximately \$22.9 million would need to be spent by the private sector to acquire 91 trucks. The industry standard is to replace a truck every seven years. Using a seven-year simple cost model, annual truck costs would be approximately \$3.3 million. For planning purposes, it should be noted that the industry average time from order to delivery for a collection truck is ten to fourteen months.

Operations & Maintenance Costs

The City of Minneapolis budgeted \$4,078,000 for operations and maintenance (O&M) costs for organics recycling in 2018. Utilizing the 2017 organics processing cost of \$60.00 per ton, \$285,780 can be deducted from the overall O&M budget for an actual O&M cost of \$3,792,220. On average, each truck's O&M cost includes truck maintenance, fuel, and driver wages, which equals \$316,000 per year or \$150.00 per hour. This is reasonable based on industry averages. Annual O&M costs for trucks to provide carted SSO service to the Counties 318,699 households would be \$28.9 million.

Cart Costs

35-gallon carts average \$55.00 per cart for purchase, assembly and delivery, and an in-mold instructional label on the lid. With the expectation that participation would grow to 40 percent over time, 127,480 carts would need to be purchased at the cost of just over \$7 million. Carts are warranted for ten years as per industry standard.

While the carts may last longer, a simple calculation of cart costs over ten years equates to \$700,000 per year for carts. It is difficult to determine the ongoing operations and maintenance cost specific to carts. Ongoing costs include storage of cart inventory, ongoing delivery of carts to new participants, ongoing replacement of carts due to damage or theft and the removal of carts due to canceled participation or damage including the cost to maintain and clean carts to place them back into inventory. The logistics of managing 127,480 carts over the geographic area of the Counties is an undertaking with costs that are not in the scope of this memo.

Recap of Carted SSO Costs

Table 5 Summary of Costs to Provide Carted SSO Collection in the Counties shows one example of what carted SSO collection could potentially cost the Counties using the assumptions quantified in this memo. The assumptions entered into the Model indicates that the average cost per household per year is \$103 (\$32.9 million / 318,699 households). The cost per household does not include transportation to an organics processing facility or processing of the material.

Table 5
Summary of Costs to Provide Carted SSO Collection in the Counties

	Annual Costs
Cart Costs	\$700,000
Truck Costs	\$3,300,000
Operations & Maintenance Costs	\$28,900,000
Total of Provided Costs	\$32,900,000
Cost Per Household	\$103

Infrastructure

The City of Minneapolis SSO is delivered to the SKB-Malcolm Transfer Station, located at the east edge of Minneapolis, and then transferred to the Specialized Environmental Technologies (SET) – Rosemount composting facility for processing. The City currently pays \$60.00 per ton for tipping, transfer, and processing of SSO or \$285,780 in 2017. The City of St. Louis Park recently signed a contract with SET for transfer from SKB-Malcolm Transfer Station to SET – Rosemount for processing at \$73.00 per ton. While tonnage estimates are utilized in this memo, processing costs are not included similar to the modeling done in the DCB Memo.

There are not currently any organics processing facilities or end markets located in the Counties. The closest facility is SET – Rosemount. For modeling purposes, Foth assumed a minimum of one centrally located transfer facility would be located within the Counties to accept the carted SSO materials.

Appendix 1

City of Minneapolis Division of Solid Waste and Recycling 2018 Factsheet

City of Minneapolis

Division of Solid Waste and Recycling

2018 Factsheet

Mission

To provide services in a customer orientated and environmentally protective manner that keeps the city clean, safe and attractive for our residents. We relentlessly integrate field, office and educational programs to maximize efficiency and complete duties in the most cost effective and efficient manner. **A Clean City is Job One!**



Services Provided by Solid Waste & Recycling Division

Minneapolis Solid Waste & Recycling provides service to all residential buildings containing fewer than four dwelling units, some townhomes and a small number of larger buildings, parks, commercial and municipal properties. All residential customers are required to have garbage collection, but are not required to participate in the City's free recycling services. Services provided to our 107,000 customers include:

- Garbage (weekly)
- Recycling (every other week)
- Organics recycling (weekly)
- Large items (weekly)
- Yard waste (seasonal)
- Excessive materials management
 - ◊ Voucher program
 - ◊ Requested cleanups
- Clean City Programs

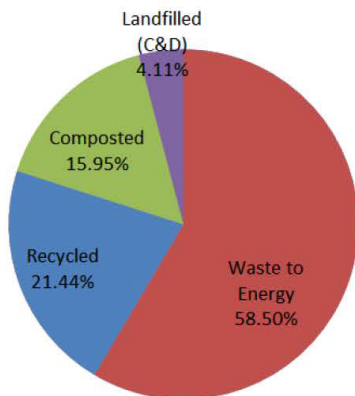
Monthly cost for services

The base fee covers the programs and services identified above and the processing costs for recycling, organics and yard waste. The garbage cart fee covers disposal costs for garbage. Fees are paid through the City of Minneapolis Utility Bill.

- 2018 base fee (per dwelling unit): \$23.99
- Small garbage cart (per cart): \$2.00
- Large garbage cart (per cart): \$5.00



2017 Waste Diversion Overview



Method	Tons	Percentage
Waste to Energy	81,551.18	58.50%
Recycled	29,880.55	21.44%
Composted	22,235.80	15.95%
Landfilled (C&D)	5,725.25	4.11%
Total Generation	139,392.78	
Total Diversion	52,116.22	37.39%

Material Type	Tons
One-Sort	27,235.22
Mattresses	925.95
Appliances & Scrap Metal	1029.99
C&D	72
Batteries	20.05
Tires	110.63
Electronics	486.71
Organics	4,763.14
Yard waste	17,472.66

Division of Solid Waste and Recycling

2018 Factsheet



Recycling Program

Recycling is collected every other week. All Solid Waste & Recycling customers are provided with a cart. The One-Sort recycling program allows for all recyclables to be placed loose in the cart, or within paper bags. Plastic bags are not accepted. Accepted recyclables include plastics, glass, metal, paper, cartons and cardboard cans. For more information, visit minneapolismn.gov/recycling.



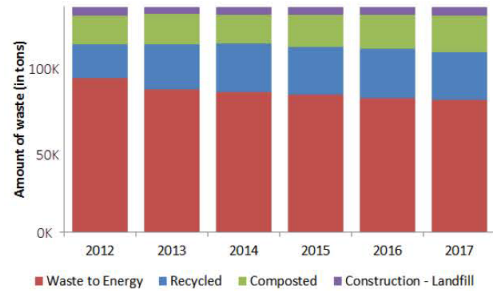
Organics Recycling Program

Organics recycling is collected weekly. Residents are provided a cart and Welcome Kit upon signing up for the program. Organics must be contained in compostable plastic or paper bag. Accepted materials include all food, non-recyclable paper, compostable plastics, and other compostable items. Yard waste is not accepted. SW&R also operates 7 residential organics drop-offs. For more information, visit minneapolismn.gov/organics.

Organics Roll-out Timeline:

- Pilot Program 2008
- Consultant Study 2012-2013
- Drop-offs 2014
- Citywide roll-out 2015-2016

2012—2017 Waste Stream Overview



Collection Tonnages



Sign Up Rates

- Jun 2015 27.13%
- Dec 2015 31.82%
- Jun 2016 35.15%
- Dec 2016 40.54%
- Jun 2017 42.17%
- Dec 2017 43.66%



Yard Waste Program

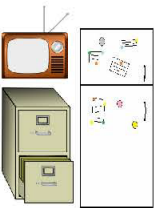
Yard waste is collected seasonal from April through November. No cart is provided. Residents can use their own container, or set out Kraft paper or compostable plastic yard waste bags. State law, Minnesota Statute 115A.931(c), prohibits using conventional plastic bags for yard waste.

Clean City Programs

Clean City offers many programs residents to get involved in keeping the City litter and graffiti free. The programs include:

- Neighborhood CleanSweeps
- Adopt-A-Litter/Recycling or Ash Receptacle
- Adopt-A-Block/Street or Highway
- Graffiti Paint-Over
- Request for Litter Clean-Up Supplies
- Clean City Classroom Curriculum

For more information, visit minneapolismn.gov/cleancity.



Large Item Collection

Two burnable or non-recyclable large or items such as wood furniture and carpeting can be set out each week on garbage day. Two large recyclable items such as appliances, mattresses, electronics, and metal items can be set out each recycling day. There is no additional charge for these services. Residents are encouraged to donate items that can be reused.

Voucher Program

Solid Waste & Recycling customers are given six vouchers annually to dispose of excess material at the City's South Transfer Station. Each voucher is good for up to 2,000 pounds of garbage, scrap metal and construction and debris, plus two appliances, electronic items or mattresses. SW&R customers are also given two tire vouchers per year. Each tire voucher is good for disposal of up to eight tires.