Report

Analysis of Residential Organics Recycling in Dakota County

Project I.D.: 17D007

Prepared for
Dakota County
Apple Valley, Minnesota

September 21, 2017

Dakota
COUNTY

Foth

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September 21, 2017

John Exner, Environmental Specialist
Environmental Resources Department
Dakota County Physical Development Division
14955 Galaxie Avenue
Apple Valley, MN 55124

Dear John:

RE: Analysis of Residential Organics Recycling in Dakota County

Foth Infrastructure & Environment, LLC (Foth) is pleased to submit the attached final report, *Analysis of Residential Organics Recycling in Dakota County*. We appreciated the opportunity to discuss this final report with County staff. Thank you for the opportunity to serve Dakota County.

Sincerely,

Foth Infrastructure & Environment, LLC

Nate Klett, P.E.
Project Environmental Engineer

Dan Krivit
Senior Project Manager

cc: Lori Frekot, Dakota County

Analysis of Residential Organics Recycling In Dakota County

Distribution

No. of Copies	Sent To
1	John Exner (electronic via email)
1	Lori Frekot (electronic via email)

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Executive Summary

The primary goal of this study is to evaluate the relative costs and effectiveness of residential curbside organics collection within Dakota County. Two potential organics curbside collection methods are thoroughly analyzed:

1. *"Separate Collection"* in a separate cart using a separate truck; and

2. *"Co-Collection with Trash"*.

These collection method variables are combined with the variables of "open" versus "organized, "subscribers pay" versus "everyone pays", and "mandatory" versus "voluntary" organics separation to form 12 separate scenarios for comparison.

Table ES-1 provides a summary of the effectiveness of these scenarios in term of ton of organics composted per year.

Table ES-1
Estimated Organics Recovery Rate

Scenario Title	**Scenario Management Details**	**Assumed Organics Collected** (Lbs./Total HH)	**Organics Composted** (Tons/Year)
(Baseline)	Baseline	NA	0
(1.a & 2.a)	Sep. Colln., Subscribers Pay	50	2,825
(1.b & 2.b)	Sep. Colln., Everyone Pays	100	5,650
(3.a & 4.a)	Co-Colln., Subscribers Pay	40	2,260
(3.b & 4.b)	Co-Colln., Everyone Pays	80	4,520
(1.c & 2.c)	Mandatory Sep. Colln., Everyone Pays	250	14,125
(3.c & 4.c)	Mandatory Co-Colln., Everyone Pays	200	11,300

Based on the available data for the various scenarios analyzed, the number of pounds of organics per total household were estimated. This number is the main variable in determining the total tons of organics composted per year. Based on these assumptions, the "Mandatory, separate collection, everyone pays" scenario is the most effective in terms of organics composted.

Based on data available from local curbside organics recycling programs in the greater Twin Cities Metropolitan Area, the cost of *separate collection* is estimated at $3.35 per *total* household

(i.e., everyone pays) based on Minneapolis data and about $4 to $7 per household for *co-collection with trash* depending on who pays and other system variables (e.g., size of the compostable bags, etc.).

Relative environmental impacts in terms of greenhouse gas (GHG) emissions are also analyzed for these two collection methods. Specific policy strategy options and alternative methods of funding and implementation are also included as part of the overall analysis. This study examined organized collection as a potential means to implement curbside organics collection. All factors (costs, effectiveness, environmental impacts, ease of implementation) were then considered to determine if a best fit method of curbside organics collection could be recommended for Dakota County.

The current state (or *"baseline"*) system has no active residential curbside organics collection operations in Dakota County. The other scenarios analyzed and their respective net GHG emissions (compared to baseline) are shown in Table ES-2.

Table ES-2
GHG Emissions Modeling Results

Scenario Title	**Scenario Management Details**	**Net Emissions Increase or (Reduction) Compared to Baseline** ($MTCO_{2e}$)
Baseline	Baseline	0
(1.a)	Open, Sep. Colln., Subscribers Pay	1,207
(1.b)	Open, Sep. Colln., Everyone Pays	653
(1.c)	Open, Sep. Colln., Everyone Pays (Mandatory)	(580)
(4.a)	Open, Co-Colln., Subscribers Pay	(1,046)
(4.b)	Open, Co-Colln., Everyone Pays	(1,420)
(4.c)	Open, Co-Colln., Everyone Pays (Mandatory)	(2,539)
(2.a)	Organized, Sep. Colln., Subscribers Pay	(2,558)
(2.b)	Organized, Sep. Colln., Everyone Pays	(2,702)
(2.c)	Organized, Sep. Colln., Everyone Pays (Mandatory)	(3,944)
(3.a)	Organized, Co-Colln., Subscribers Pay	(2,791)
(3.b)	Organized, Co-Colln., Everyone Pays	(3,164)
(3.c)	Organized, Co-Colln., Everyone Pays (Mandatory)	(4,284)

In terms of environmental impacts (e.g. reduced GHG emissions), the scenario "Mandatory Organized, Co-collection, Everyone Pays" achieves the greatest reduction in GHG emissions.

One conclusion is that Dakota County may wish to adopt a policy that favors the "everyone pays, citywide" form of funding for residential organics recycling for future permanent collection programs. This type of "everyone pays" policy can be considered as more equitable given that the opportunity to recycle organics is universal to *all* residents; there is no added charge for residents to sign up and participate.

Dakota County has multiple policy options for implementation of residential organics collection operations. For example, the County could contract directly with a hauler (or multiple haulers) for residential organics collection services to be implemented within cities that have applied for and signed up as a municipal partner for such a program. As another example strategy, a new County mandatory organics recycling ordinance (e.g., with a requirement for "source separation" of organics by residents) could be adopted as one of the most cost-effective means to achieve significant organics diversion and recovery. This type of mandatory organics recycling ordinance could also be adopted by cities or townships. Several other policy options are itemized in this Report. These policy options are not mutually exclusive such that the County could pursue a combination of several strategies at the same time.

Changing to organized collection can be an additional tool to help facilitate the development of new residential organics curbside collection services, but it is not an essential pathway to implement organics collection. Organized collection can help facilitate the planning and development of residential organics curbside collection, but does not guarantee its implementation. Organized collection should be considered as an independent initiative from residential curbside organics collection. Many open hauling communities want to develop new residential organics collection services, but may not want to change to organized collection.

It will likely take 10 to 20 years for organics recycling systems and infrastructure to fully mature. Similar to when yard waste composting was first introduced in the region more than 40 years ago, curbside organics recycling is a new material collection strategy for Dakota County. The County may wish to consider further strengthening and broadening its working relationships with its cities, haulers and private composting facility operators as part of a strategy to develop sustainable curbside organics recycling systems.

Abbreviations, Acronyms and Symbols

BPI	Biodegradable Products Institute
CH_4	methane
CO_2	carbon dioxide
CO_{2e}	carbon dioxide emission equivalents
County	Dakota County, Minnesota
Dakota County	Dakota County, Minnesota
EPA	United States Environmental Protection Agency
Foth	Foth Infrastructure & Environment, LLC
FY	fiscal year
GHG	greenhouse gas
HH	household
ID	identification
Kwh	kilowatt hour
lbs	pounds
LMC	League of Minnesota Cities
MPCA	Minnesota Pollution Control Agency
MRI	Minneapolis Refuse, Inc.
MSW	Municipal Solid Waste
$MTCO_{2e}$	metric tons of carbon dioxide emission equivalents
N.A.	not applicable
N_2O	nitrous oxide
R&E Center	Ramsey/Washington Counties Recycling & Energy Center in Newport
RDF	Refuse Derived Fuel
REC	Minnesota Recycling Education Committee
RFEI	request for expressions of interest
SCORE	Select Committee on Recycling and the Environment
SET	Specialized Environmental Technologies, Inc.
SMSC	Shakopee Mdewakanton Sioux Community
SSO	Source Separated Organics
TPY	tons per year
WARM	Waste Reduction Model by EPA
WLSSD	Western Lake Superior Sanitary District

Definitions

County	Dakota County, Minnesota.
Greenhouse gas	The CO_2 and other emissions that contribute to climate change due to the greenhouse gas effect.
Mandatory Organics Recycling	A legal requirement, usually adopted through an ordinance, that residents must separate their organic materials for recovery and prohibits disposal of such organics with regular trash. Backyard composting, drop-off sites and any form of curbside collection of organics would all be eligible methods to satisfy such a mandatory organics recycling requirement.
Master Plan	Dakota County's Solid Waste Master Plan
Metric ton	One metric ton equals 2,204.62 pounds
Mixed municipal solid waste	As defined per Minnesota Statutes M.S. 115A.03, Subd. 21 and means (a) garbage, refuse, and other solid waste from residential, commercial, industrial, and community activities that the generator of the waste aggregates for collection; (b) Mixed municipal solid waste does not include auto hulks, street sweepings, ash, construction debris, mining waste, sludges, tree and agricultural wastes, tires, lead acid batteries, motor and vehicle fluids and filters, and other materials collected, processed, and disposed of as separate waste streams. The term "trash" is also used in this study.
MPCA Collection Tool	The MPCA Excel spreadsheet tool developed as part of the MPCA *Analysis of Waste Collection Service Arrangements* study.
Organics	(Synonymous with "Source Separated Organics")
Participant	A subscriber to the City's organics collection program that receives a cart and actually participates by sorting their household organic materials and setting them out for collection as per the program instructions.
Participation rate	The number of households that set out organics materials over a period of time (e.g., four to six weeks) over the total route households serviced. Similar to subscriber rate.
Recyclables	Refers to the traditional list of recyclable materials such as paper, glass, metal, and plastics. Detailed specifications for each recyclable material type are defined by Dakota County,

	local municipal recycling programs and haulers. The term "recyclables" does not include yard waste or organics as used in this study. (For more details see the Dakota County *2016 Residential Recycling Service Providers* web page.)
Recovery rate	The pounds of organics collected per total household serviced on a route, city or county. ("Total households" includes households that do not subscribe or participate in organics collection services.)
Residential household	Defined by County ordinance to be households from 1 to 3-plex. There may be multiple households within one building (e.g., a duplex has two households). Also referred to as "residential parcels" in this study.
Set-out	An individual organics cart containing organics as set out by a participating resident. One cart per set out. Multiple cart set-outs may be collected at one stop.
Set out rate	The number of set outs on any one given collection day over the total route households serviced.
Source-separated organics	Organic materials separated by the resident in preparation for collection as per the organics recycling program instructions. Also referred to in this study as "organics".
Source-separated compostable materials	As defined by Minnesota Statutes, M.S. 115A.03, Subd. 32.a.[1] and M.S. 115A.551, Subd. 1(a)[2] and means materials that: (1) Are separated at the source by waste generators for the purpose of preparing them for use as compost; (2) Are collected separately from mixed municipal solid waste, and are governed by the licensing provisions of section 115A.93; (3) Are comprised of food wastes, fish and animal waste, plant materials, diapers, sanitary products, and paper that is not recyclable because the commissioner has determined that no other person is willing to accept the paper for recycling; (4) Are delivered to a facility to undergo controlled microbial degradation to yield a humus-like product meeting the agency's class I or class II, or equivalent, compost standards and where process residues do not exceed 15 percent by weight of the total material delivered to the facility; and (5) May be delivered to a transfer station, mixed municipal solid waste processing facility, or recycling facility

	only for the purposes of composting or transfer to a composting facility, unless the commissioner determines that no other person is willing to accept the materials.
Stop	A specific location where organics carts are stationed (e.g., at the resident's curb line) where the truck stops to tip the organics cart(s) into the truck. A stop may include multiple carts.
Subscriber	A household that proactively "opts-in" to voluntarily receive an organics cart and participate as per the program instructions. The number of organics program subscribers equals the number of organics carts delivered.
Trash	See definition for "mixed municipal solid waste" above.
Twin Cities Metropolitan Area	Seven County Metropolitan Area including the Counties of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington. (Also referred to as the "Metropolitan Area",)

1 Introduction

This study provides an overview and analysis of the economics, environmental impacts, and potential diversion rates (e.g. effectiveness) for two potential organics (food waste and non-recyclable paper) residential curbside collection methods within Dakota County, Minnesota:

1. *"Separate Collection"* in a separate cart using a separate truck; and

2. *"Co-Collection with Trash"*

This study will be used by Dakota County to further evaluate options for new residential curbside organics policies and programs as part of the ongoing work to draft an updated version of the Dakota County Solid Waste Master Plan ("Master Plan").[3]

The State of Minnesota has developed multiple policies on organics recycling in statute and as part of the new Metropolitan Solid Waste Policy Plan[4] ("Policy Plan") recently adopted by the Minnesota Pollution Control Agency (MPCA). The new MPCA Policy Plan sets a planning goal of 15 percent of the total solid waste stream in the Metropolitan Area should be managed through organics recycling by 2030. MPCA defines organics recycling as: food to people, food to animals, and composting of source-separated compostable materials. MPCA estimates that the region is currently at 10 percent organics recycling. The current Dakota County Master Plan states that three percent of the County's total mixed municipal solid waste (MSW) managed in 2010 was managed through organics recovery.[5]

In 2015 the Minnesota Legislature increased the State recycling block grants known as "SCORE" funding for the state's 2015 and 2016 fiscal years. The Legislature required Metropolitan counties to spend half of the new funding on organics. Dakota County's obligations for organics spending in the three fiscal years (FY) listed in the MPCA Policy Plan are:

- FY 2015 = $138,111
- FY 2016 = $103,145
- FY 2017 = $120,659

This analysis is for residential materials only; not commercial. Also, this study is focused on curbside collection methods only; not drop-off sites or backyard composting initiatives.

The definition of organics is as defined by Dakota County's current public education materials (See Appendix A for more details and specific County resource documents). As a general rule of thumb, the term "organics" as used in this study includes residential food waste and selected items of *non-recyclable* but *compostable* paper; Organics does not include yard waste.

This study includes:

1. A summary review of curbside organics recycling programs in other selected communities.

2. A discussion of the variable of "organized" versus "open" collection legal structures within the context of alternative means to implement curbside organics collection systems.

3. Recommendations for Dakota County that will assist the County in making policy decisions for development and management of residential organic waste programs.

This study was limited to a "County-wide" view of organics collection. It does not go into detail on the specific situation, needs, or policies of individual cities, townships or haulers.

2 Study Methods

This study compares two curbside organics collection methods to the current system without curbside collection of organics. The current system is described including a specific definition of organics from the existing County organics recycling *drop-off* program. The current residential system (without curbside organics collection) is also referred to as the "baseline" system in this study. (See Section 3 and Appendix A for details about the current Dakota County organics recycling drop-off program.)

The two curbside organics collection methods are fully described, including the detailed assumptions about collection equipment, instructions to residents, and sorting methods. Case studies of other communities that have similar curbside organics collection systems are summarized. Available data about the performance results from these case studies is summarized and used to help forecast potential results (e.g., effectiveness in terms of participation rate, recovery rate per household) for curbside organics collection programs in Dakota County. The assumptions associated with the tons of organics recovered will be variable. However, for this analysis, the pounds of organics (and resulting total tons) were estimated for each of the scenarios based on the available data. These numbers will vary by community, season, program maturity, and collection method.

The environmental impacts and benefits of the two curbside organics recycling systems are estimated primarily through estimating the net changes in GHG emissions due to additional collection methods and composting of the material instead of disposal. A combination of two models are used to analyze the GHG emissions. The Minnesota Pollution Control Agency (MPCA) *Collection Analysis Tool* (MPCA Tool) was used to estimate emissions from material transportation. The United States Environmental Protection Agency's (EPA's) *Waste Reduction Model (WARM)* is used to estimate the changes in GHG emissions from the various waste management facilities due to increased composting of the organics materials and decreased material deliveries to the various waste management facilities. The overall net change in GHG emissions are estimated by adding the transportation impacts to the facility impacts. (See Appendix B for details about the GHG modeling methods and assumptions used for this study.)

The results from the technical analyses on a variety of system issues are described and discussed in the following sections of this report. Conclusions and recommendations are developed to summarize the results and implications.

3 Description of Current Collection and Composting Systems

3.1 Dakota County's Drop-Off Site

Dakota County recently developed an organics recycling drop-off site at Thompson County Park in West St. Paul. There are no charges for Dakota County residents to drop-off their organics, but participants must call or email County staff to sign up. Residents then receive a welcome kit with a free container label, compostable bags and instruction on how to prepare organics for deposition at the drop-off site. Subscribers then also receive the access code to the locked drop-off enclosure. (For more details, see Appendix A, including the reference to the County's *"Organic Drop Off"* program web page.)

County staff have used this drop-off site as a means to research residents' willingness to participate in a self-haul program and to evaluate compliance with program instructions (e.g., types of acceptable organics materials). As of January 2017, the County's Thompson County Park drop-off program had 753 subscribers recycling about 2,000 pounds (lbs) per week of organics. The organics material deposited by residents has been very pure with little contamination from unacceptable material as documented by visual observations, photographs and reports from the composting facility. County staff have conducted surveys of the participating residents and report that about 80 percent of the participants are driving up to two (2) miles to participate in the organics drop-off program.

3.2 Private Composting Facilities

Dakota County's *"Organics Drop Off"* program web page lists the Mulch Store/Specialized Environmental Technologies (SET) in Empire Township and the Shakopee Mdewakanton Sioux Community (SMSC) Organics Recycling Facility in Shakopee as available private composting facilities in the area. Both facilities charge a tipping fee to help cover their composting services. Tipping fee prices vary depending on the source, type, amount and quality of incoming feedstock material. Current tipping fees (without a contract) are $38 to up to $60 per ton of delivered organics. Contract supplies from organics haulers are negotiated on a case by case basis. For all composting operations, the quality of the incoming material is of paramount importance as the costs of processing and residual disposal goes up as contamination increases. Therefore, all composting facilities in the region emphasize to their suppliers the need for pure organics materials.

Recently, a voluntary group known as the Minnesota Recycling Education Committee (REC) developed a white paper on coordinated messaging and community outreach related to recycling, including organics recycling.[6] REC's example messaging for organics composting lists the *top 10* items to be included *in the organics bin*:

- All food (including meat, bones, dairy)
- Napkins, paper towels tissues (no bathroom tissues at Western Lake Superior Sanitary District)

- Delivery pizza boxes
- Coffee grounds, filters
- Paper egg cartons
- Certified compostable products (i.e., Biodegradable Products Institute [BPI]-certified)
- Cut flowers and houseplants
- Wooden Chopsticks, Popsicle sticks and toothpicks
- Hair
- Nail clippings

Equally important is REC's example messaging for the *top 10* items ***NOT*** to be include *in the organics bin:*

- Plastic lined paper
- Frozen food boxes
- Fast food wrappers
- Foam packaging
- Animal waste, litter and bedding
- Diapers and sanitary products
- Dryer sheets and disposable wipes: baby/cleaning/sanitary
- Grease/oil
- Latex or rubber products
- Textiles

The REC *White Paper* is a consensus – based set of guidelines that can and should be used by recycling professionals to promote high quality traditional recyclables (paper, cans, glass, and plastic) as well as organics collection. Representatives from composting facilities and organics haulers have been a part of the REC consensus development process.

3.3 Current Trash and Recyclables Hauling Systems in Dakota County

The existing Dakota County Solid Waste Master plan describes the current hauling systems in Dakota County.[7] Collection and transportation of MSW, recycling, and yard waste in the County occurs largely through an open hauling system where businesses and residents contract with a private waste hauler of their choice. Dakota County has 33 cities or townships (not including Northfield which has only a small portion in Dakota County); 31of these communities in the County utilize an open hauling system. Roughly 89 percent of County residents live in communities with open hauling systems for residential trash and recyclables.

The Cities of Hastings and Farmington have organized collection for residential trash and recyclables. Approximately 11 percent of the County's population live in these two cities. Under organized collection, a city provides or contracts for residential trash and recyclables collection services. The City of Hastings undergoes an open bid process and contracts with one private hauler to collect and transport residential MSW, recycling, and yard waste. Commercial sector waste in Hastings is managed through an open hauling system. Residents pay for collection service either on their utility bill or by direct billing from the hauler.

The City of Farmington collects and transports trash using municipal crews and city-owned vehicles. Farmington undergoes an open bid process and contracts with one private hauler to collect and transport recyclables and yard waste. Residential and commercial waste is generally managed through Farmington's collection systems, although some larger commercial establishments directly contract with their own hauler. As required by Minn. Stat. §115A.471, both Hastings and Farmington direct the MSW collected to resource recovery facilities.

Solid waste haulers must have a license from Dakota County to operate, including licenses for both trash and recyclables hauling.[8] The County's hauler licensing and other requirements are specified in *"Ordinance 110 – Solid Waste Management."*[9] Most suburban cities also license solid waste haulers. Sunfish Lake and the rural cities and townships[10] of Dakota County do not separately license haulers. Any hauler licensed by Dakota County can operate in these cities and townships. For more details see also the Dakota County lists of *City-Licensed Waste Haulers* [11] and *Residential Recycling Service Providers.*[12]

4 Description of Organics Collection Methods

4.1 *"Current System"* - No Organics Sorting or Separate Curbside Collections

("Baseline")

The "baseline" waste management scenario for purposes of the GHG analysis is a simplified form of the current state of organics operations and assumes:

- No organics separation by residents. No separate organics collection services.
- All of the residential organic waste generated for off-site removal (e.g., not including backyard composting or sewering via garbage disposals) is commingled with other trash and collected as MSW.
- The MSW is either hauled from the route (e.g., packer trucks) to a transfer station or directly to a MSW disposal or processing/recovery facility.
- The MSW is either landfilled or processed for energy recovery. The MSW disposal/recovery facility varies by city and by hauler (if in an open hauling community).
- The resource recovery facility assumed is the Ramsey/Washington Counties Recycling & Energy Center (R&E Center) in Newport. This generic assumption is for purposes of GHG modeling and is not intended to be predictive of future County policies. This

assumption is based on past operations and may not be reflective of what will be conducted in the future.

The GHG analysis needed to simplify the modeling assumptions into "all or nothing" scenarios. This approach allows for more definitive comparisons and control of variables. While hybrids of these scenarios will be possible in Dakota County, this analysis was not intended to replicate exact operations as they occur today.

4.2 *"Separate Collection of Organics"*

(No commingling or co-collection with any other materials)

This is the organics method selected by the City of Minneapolis for citywide implementation as rolled out citywide in July 2016. This collection 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).

- All of the organics will be hauled directly to a composting facility. For this study, the SET – Empire composting facility was assumed as the destination for modeling purposes. Some of the future organics collection operations in Dakota County may actually be hauled directly to an organics transfer station or other composting facilities; but, for purposes of this preliminary GHG analysis, all organics were assumed to be handled at SET – Empire.

- All of the collected organics will be composted.

4.3 *"Co-Collection with Trash"*

Under this method, organics are collected in a separate, compostable plastic bag within the trash cart. The trash may be loose or bagged.) The intent is to reduce collection costs and environmental impacts by combining separately bagged organics with mixed MSW collection operations. The compostable bag is used to contain the organics in the household and keep the organics separate from trash during collection, transport and sorting operations until the bags are sorted out from the trash. This scenario assumes:

- Organics will be separated by residents and then placed in a separate compostable bag.

- The bags will be placed in the trash cart and co-collected with mixed MSW in the regular trash cart.

- All of the co-collected organics + mixed MSW will be hauled to a facility equipped to sort the bags of organics from trash. For purposes of the GHG modeling for this study, all organics will be assumed to be hauled directly to SET – Empire for sorting and composting. (Note: This assumption is for GHG modeling only; Future operations may involve other organics transfer stations or other composting facilities.)

- The co-collected organics + mixed MSW will be tipped at the sorting/transfer facility. The bags of organics will be sorted from trash. The bagged organics will then be composted using standard mixing, blending and windrow operations.

- All of the organics will be composted, minus any loss (e.g. bag breakage or spillage) due to improper tying off of the compostable bags or the actions of the packer truck, unloading, handling, or sorting operations at the sorting/transfer facility.

- The MSW will be re-loaded and delivered to a landfill or MSW processing facility. For purposes of the GHG modeling for this study and based on current operations, 90% of the MSW is assumed to be transferred to the nearest landfill (Pine Bend Landfill in Inver Grove Heights) and 10% of the MSW is assumed to be transferred to the nearest mixed MSW processing facility R&E Center in Newport. (Note: These assumptions are for GHG modeling only and does not necessarily reflect future County policy; Future operations may differ.)

4.4 Comparative Summary of the Two Alternative Organics Collection Methods

Table 1 provides a comparative summary of the two alternative curbside organics collection methods. Table 1 is a comparison of the technical and operational variables to further describe and summarize the two collection methods.

Table 1
Comparative Operations Descriptions of the Two Alternative Organics Collection Methods

Variable	*Separate Collection of Organics* (Separate carts, trucks and routes)	*Co-Collection of Organics with Trash* (In compostable plastic bags)
Additional truck needed?	Yes.	No.
Additional organics cart needed?	Yes.	No.
Certified compostable bags required?	Depends on the program. Use of certified compostable bags is required in Minneapolis, for example, to keep carts cleaner and prevent organics from freezing to the sides of the cart.	Yes. "Durable" certified compostable plastic bags required to enable interim sorting
Additional sorting and/or pre-grinding required?	No.	Yes. Sorting required to separate bagged organics from regular trash.

5 Other Community Case Studies

Table 2 lists the selected residential curbside organics collection programs in the greater Twin Cities Metropolitan Area including information about:

- The legal trash collection structure (i.e., "organized" or "open");
- Organics collection method;
- Who pays;
- How the organics program cost is paid (e.g., if it is included in the recycling base rate or the trash base rate);
- Sign up rate as an indicator of the percent of residents who elected to subscribe; and
- Pounds of organics per subscribing household (in pounds of organics per household signed up per year).

Pounds of organics per "subscribing" household rate is higher than the pounds per "total" household served because it is the amount of organics per households that sign up for the service. To estimate the projected amounts of organics that could be expected for future curbside organics in Dakota County, the assumed subscription rate was taken into account.

Table 3 lists selected cities that have residential organics collection programs with data as reported by counties to MPCA and published via the Re-TRAC recycling data management system. Table 3 displays the number of total households served (e.g., residential households) together with the comparative calculations of pounds of organics per total household served. This metric is a more standardized means of comparing organics recovery rates accounting for subscription rates, participation and recovery rates per participating household.

The Appendices provide detailed case study profiles of existing residential curbside organics recycling programs. All known web-based resources are listed including hyperlinks when available. In most cases, interviews were conducted to help fill in data gaps.

The four programs profiled from the Twin Cities Metropolitan Area include:

- Minneapolis (Appendix C)
- Wayzata (Appendix D)
- Coon Rapids/Walters (Appendix E)
- St. Louis Park (Appendix F)

The three national programs profiled from outside of Minnesota include:

- Portland, Oregon (Appendix G)
- Seattle, Washington (Appendix H)
- King County, Washing (Appendix I)

The four local case studies were selected because of their direct relevance to this Dakota County study and because these cities have readily available resident information and program data. The first three are examples of local current curbside programs using either the *separate collection* (Minneapolis) or the *co-collection with trash* (Wayzata, Coon Rapids/Walters) methods of organics collection. St. Louis Park was included because of their recent conversion from the "subscribers only pay" method of funding to the "everyone pays citywide", even though the City is using a different method of organics collection – *co-collection with yard waste.*

The three national programs were selected because of their mature mandatory recycling and organics collection systems. Each of these case studies also have readily available resident information and program data. All three use the *organics commingled with yard waste* method of collection with a separate organics / yard waste cart provided to residents that sign up for this weekly service referred to more generically as "composting collection". Although these national case studies use a different method of organics collection (i.e., *commingled with yard waste*), they do provide a glimpse into the future of robust, long-standing organics recycling programs with specified requirements for haulers or residents.

The City of Portland requires their franchised haulers to collect organics as a condition of their franchise agreement. If a residential customer (defined as single family through four-plex dwellings) orders trash service from their assigned hauler, the cost of weekly recyclables and organics (yard waste and/or food scraps) collection services are included in the base trash rate. In the City's *Residential Curbside Collection Service Rate Study* published in June 2017 for rates effective July 1, 2017, the organics/yard waste rate component of a resident's total solid waste rate (using a 35-gallon trash cart) is $4.07 for collection and $2.96 for disposal for a total organics/yard waste rate component of $7.03. The total of all trash, recycling and organics/yard waste rate components for a bundled set of solid waste services (at the 35-gallon trash cart service level) is $29.25. Trash service is only provided every-other-week.

If a Portland resident orders recycling only (without trash collection), the current rate is $8.50 per household per month. If the resident orders recycling *plus* organics/yard waste collection only, the rate is $18.20 per household per month. So the calculated difference suggests that the value of the organics/yard waste service alone (separated from the recycling only rate) is $9.70 per household per month when not bundled within trash collection services. (For more details, see the City's *Rate Study* as referenced above and Appendix G.)

In the City of Seattle, organics recycling is mandatory. Specified organics materials (e.g., yard waste, food waste and non-recyclable paper) are banned from the trash as verified by cart inspections. Residents can use backyard composting or self-haul; they are not required to subscribe to the curbside organics/yard waste collection service. The City contracts with two haulers to serve residential customers. Trash collection is only provided every-other-week. Even though recycling costs are embedded into the base solid waste rates, weekly curbside organics/yard waste collection service from residents is an extra charge ranging from $6.05 per household per month (for a 13-gallon organics cart) to $11.65 for the largest organics/yard waste cart (96-gallons). The rate for a 32-gallon organics/yard waste cart is $9.10 per month. Keep in

mind these rates include yard waste and the growing season is much longer in Seattle than in Minnesota. (For more details, see Appendix H.)

King County manages solid waste and recycling collection systems for the suburban and rural areas of the County, but not for Seattle. The City of Seattle Public Utilities manages the Seattle solid waste systems. (See summary above and Appendix H for more details on Seattle's system.) King County manages organics/yard waste collection services through the services of three different hauling companies. Organics/yard waste curbside collection is weekly in the summer months and every-other-week in the winter months. Organics/yard waste rates differ between the cities hauler contracts, as well as pick up service type. For example, for residents in the City of Sammamish, served by Waste Management, curbside collection of organics/yard waste is $9.26 per household per month (for a 35-gallon organics/yard waste cart). Waste Management charges $10.35 for a 64-gallon organics/yard waste cart and $11.33 for a 96-gallon organics/yard waste cart. In cities served by Republic Services Inc., the cost of service for one organics/yard waste cart is included in the base solid waste rate. Republic charges residents $2.50 per household per month for an *extra* 96-gallon organics/yard waste cart. (For more details on the Seattle system, see Appendix I.)

Table 2
List of Known Residential Curbside Organics Collection Programs in the Greater Twin Cities Metropolitan Area: "Sign Up"/Subscription Rates

City	Organics Collection Method	Who Pays?	Program Cost to Customer	Sign Up %	Pounds Organics/HH/ Signed up/Year
Organized Trash Collection Cities:					
Elk River[d]	Co-collected w/ trash	Subscribers only	Additional cost	4%	
Loretto[e, f]	Co-collected w/ trash	Subscribers only	Additional cost	18%	143
Maple Plain	Co-collected w/ trash	Subscribers only	Additional cost	21%	144
Medicine Lake	Co-collected w/ trash	All residents	Included in recycling rate	32%	145
Medina[a]	Co-collected w/ trash	All residents	Included in recycling rate	28%	145
Minneapolis[c]	Source separated	All residents	Included in solid waste rate	43%	200
St. Bonifacius[a]	Co-collected w/ trash	Subscribers only	Additional cost	24%	144
St. Louis Park[g]	Co-collected w/ yard waste	All residents	Included in solid waste rate	30%	397
Wayzata[a]	Co-collected w/ trash	All residents	Included in recycling rate	51%	111
Open Trash Collection Cities:					
Coon Rapids	Co-collected w/ trash	Subscribers only	Additional cost		
Edina	Commingled w/ yard waste	Subscribers only	Additional cost		
Minnetonka[b]	Co-collected w/ trash	Subscribers only	Additional cost		
	Commingled w/ yard waste	Subscribers only	Additional cost		

Table 2 ***(continued)***

City	Organics Collection Method	Who Pays?	Program Cost to Customer	Sign Up %	Pounds Organics/HH/ Signed up/Year
Orono[(b)]	Co-collected w/ trash	Subscribers only	Additional cost		
	Commingled w/ yard waste	Subscribers only	Additional cost		
Shorewood[(b)]	Commingled w/ yard waste	Subscribers only	Additional cost		
	Commingled w/ yard waste	Subscribers only	Additional cost		

Notes:
[(a)]Medina, St. Bonifacius, and Wayzata have contracts that bundle the price of organics and recycling. The source separated organics (SSO) cost is included within the household's recycling rate.
[(b)]Minnetonka, Orono, and Shorewood are open hauling cities. Multiple haulers provide SSO collection.
[(c)]Minneapolis staff report $3.35/HH/month of the $4.00 rate is allocated to organics, and $0.65/HH/month is allocated to other recycling costs (e.g., yard waste trucks, etc.). As of Monday August 28, 2017, 43.11%, of Minneapolis Solid Waste & Recycling customers (46,132 households) have signed up to participate (source: City of Minneapolis "Residential organics recycling - Sign Up Now"[13]).
[(d)]Elk River sign-up rate = 312 organics subscribers out of about 7,400 households, per City staff and personal communication (2/1/2016).
[(e)]Loretto resident price subscription rate per Hennepin County staff (June 2015).
[(f)]Loretto resident price subscription rates per City web page (1/9/2017).
[(g)]St. Louis Park started including the cost of organics within the solid waste (base) rate in January 2017.

Sources: Various county and city data, web pages, phone interviews, other personal communications, etc. (See notes for more details.)

Table 3
List of Residential Curbside Organics Collection Programs
In the Greater Twin Cities Metropolitan Area: Pounds per Total Household Served

City	Number of Single Family Homes with Curbside Recycling Service					Tons of Single Family Curbside Organics					Pounds per Total Household of Single Family Curbside Organics				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Loretto	222	223	223	223	223	17.7	6.3	3.4	2.9	2.8	159	57	30	26	25
Maple Plain	535	536	538	538	642	N.A.	13.9	15.5	7.1	4.4		52	58	26	14
Medicine Lake	133	133	133	133	133	N.A.	302	N.A.	4.2	4.2		48		63	63
Medina	1,648	1,792	1,908	1,971	2,035	27.9	34.1	37.8	29.4	34.8	34	38	40	30	34
St. Bonifacius			717	718	719	3.9	3.6	14.7	11.0	12.2	11	10	41	31	34
St. Louis Park			12,323	12,326	12,325			266.8	249.8	281.1			43	41	46
Wayzata	1,267	1,258	1,267	1,276	1,285	75.3	36.3	36.0	37.8	36.7	119	58	57	59	57
Bloomington	26,084	26,102	26,122	26,123	21,881	5.0	55..0	58.0	82.0	54.8	0	4	4	6	5
Orono	2,953	3,003	3,229	3,251	3,251	62.3	65.6	58.8	119.0	10.1	42	44	36	73	6

Sources: Annual City and County Recycling ("SCORE") reports to MPCA as reported by MPCA via Re-TRAC.

6 Legal Structures for Collection

("Open" and "organized" collection systems)

Cities in Minnesota have developed two legal structures for trash and recycling collection: "open" (or subscription hauling) and "organized" (or contract hauling). About 65 to 80 percent of Minnesota cities have open trash collection and about 40 to 50 percent of these cities have open hauling for recycling.[14] Therefore, some cities have open trash and organized recycling collection structures. The balance of Minnesota cities use organized legal structures.

Only two cities in Dakota County, Farmington and Hastings, have organized collection structures. Hastings has a contract with a single hauler for both trash and recyclables collection. Farmington uses city crews and equipment for trash collection and contracts for recyclables collection. The other 31 cities and townships in Dakota County have open hauling systems; According to the County's current Master Plan, 89 percent of the County's population is served within an open hauling structure.

The City of Northfield has a very small portion of its population that is technically in Dakota County. Northfield also has an organized collection structure for trash and recyclables contracting with a private hauler. In early 2017, local citizens organized a non-profit, worker co-op, "Northfield Curbside Composting". Their system is a "subscribers pay" method of funding using the *separate collection* method operated by Northfield Curbside Composting with weekly collection from five-gallon buckets using a pick-up truck. The subscription rate for the service is $6.50 per month (or $78 per year).[15] [16] According to Cliff Martin, one of the principals of Northfield Curbside Composting, the number of residents subscribing is currently at 220 households. Their goal is to reach 500 households to attain adequate route density. The program is based on intensive public education and outreach, including door-to-door, in-person promotion and instructions.[17]

The City of Northfield conducted an earlier pilot curbside organics collection program in 2013 operated by the City's private hauler/contractor (Dick's Sanitation). The pilot was conducted in the northwest part of the City collecting both organics and yard waste commingled in the same cart. The Contractor's price to the City for the organics pilot (listed as the "alternate" program in the City contract agreement) was $5.20 per household per month. This cost was borne by the City and *not* charged to organics pilot program subscribers. In the end, the City decided not to expand the organics collection service city-wide and discontinued the pilot. This decision by the City was due in part to the relatively low participation rate (under ten percent), low organics recovery rate and relatively high contamination levels. Also, many pilot participants used the extra cart solely for yard waste and did not include organics.[18] [19]

There are multiple ways that cities or counties can structure new residential organics collection operations including:

- Contract directly for separate collection of organics (as a separate contract).

- Include organics collection within a trash or recycling contract (as part of the existing contract).

- Require the collection of organics as a condition of city or county hauler licenses (as part of an open hauling structure).

In Dakota County, there were two past examples of residential curbside organics collection systems that were developed but not fully implemented citywide or sustained. The first example was the City of Farmington. The City had developed a proposal for organics collection using the *co-collection with trash* method. The City had proposed to add the organics collection service as part of the trash collection services operated by City crews. Ultimately, the proposal did not get approved and was never implemented. This was in part due to the uncertainty of the future infrastructure for the *co-collection with trash* method of collecting organics as there was no existing sorting facility in the southern Metropolitan Area that could separate the compostable bags from the mixed trash.

In the second example, Waste Management, Inc. was providing a curbside organics collection service for Burnsville residents as part of their trash services within the open hauling legal structure. The current Dakota County Master Plan (page 38) states:

> *Commencing in October 2002, the City of Burnsville worked with 900 households in the North River Hills Neighborhood to collect source-separated organic materials. This voluntary program required participating residents to separate the non-recyclable portion of the MSW stream using identifiable compostable bags. The pilot was approximately six months long and officially ended in March 2003, with 12.5 tons composted. The hauler chose to end the pilot in March 2003 because participation did not make the pilot cost-effective.*

The implications of these Dakota County case studies and other programs evaluated is that curbside organics collection can occur under organized or open trash hauling systems. The more difficult program and policy question is, "What is the best legal collection structure option for Dakota County, and its cities, to use to implement curbside organics systems?" From a technical perspective, using organized organics collection may be the most straightforward.

There are additional legal considerations related to this method of organizing for curbside organics collection services. The League of Minnesota Cities (LMC) produced an Information Memo (*City Solid Waste Management*[20]) that includes a section directly on this point. This LMC Memo states:

> *"It is not absolutely clear whether a city that decides to enter into an agreement for the collection of recyclable materials, including source-separated compostable materials, with one collector or an organization of collectors is required to comply with the procedural requirements in the organized collection statute* (M.S. 115A.94).[21] *The answer likely depends on whether the definition of "solid waste" referenced in the organized collection statute should be interpreted to include recyclable materials.*

The MPCA has taken the position (while advising cities that they should consult their city attorneys) that recyclable materials are not subject to the organized collection statute because they are not a part of solid waste or mixed municipal solid waste once they have been separated out for separate collection and recycling. .....

If a city is considering entering into an agreement for the collection of recyclable materials with one collector or an organization of collectors, it should consult its city attorney to determine whether it must follow the procedural requirements in the organized collection statute."

The issue of whether or not open hauling cities or counties are *required* to use the Minnesota Organized Collection Statute (M.S. 115A.94) in order to implement residential organics recycling contracts remains unresolved. As specific policies and potential contracts are proposed, further legal review should be conducted by the Office of the County Attorney and/or other City attorneys.

The operating assumption used in modeling GHG emissions for this study is that if the collection structure is open for trash, the organics collection structure will also be open. Similarly, it is assumed that if the collection structure is organized for trash, the organics collection structure will also be organized under a contract. This assumption of both material streams having the same legal collection structure helps simplify the GHG emissions analysis.

7 Who Pays for the New Organics Collection Services?

The question of who pays for the new organics collection service is a policy, legal and system design question that should be addressed at the beginning of any program or project. Similar to traditional recyclables collection, the additional cost of organics services could be charged to all residents.

One form of this funding method is to embed the costs of organics into the rates charged for trash or recycling. Under this form of funding, all residents pay for the organics service whether they do or do not subscribe or participate. This "everyone pays citywide" (regardless of who signs up) approach to fund organics recycling is used by many communities with organized trash collection such as Medina, Minneapolis, St. Louis Park, and Wayzata. These case studies charge for such solid waste services through their utility bill that goes to every property owner (e.g., on the water bill). Other sources of financing can also be used (e.g., general fund supported through property taxes, etc.)

Advantages of the "everyone pays, citywide" form of funding include:

- Everyone within the City is treated equally.
- There is no economic barrier or disincentive to participation.
- Complies with the letter and spirit of Minnesota Statute M.S. 115A.93, Subd 3(c), which requires that a customer that recycles does not pay more fees than a customer that does not recycle. [22]

- Easier to administer.

Disadvantages of the "everyone pays, citywide" form of funding include:

- There is a disparity between the populations who will likely use the service compared to who pays for the service (everyone, citywide). This issue is sometimes referred to as "equity" of service funding and delivery. Some municipal officials put a high priority on delivering equitable services as close as possible to a "fee for service" basis of funding.

- Both sets of costs, organics and trash services, are normally incorporated into the rates charged to residents. In the early stages of development of a new curbside organics recycling service, it is difficult to predict the number of households who will participate. Budgeting and setting of rates to be charged residents are initially challenged by the uncertainty of participation and the need to recover fixed costs of service from a limited pool of participants.

- Organics collection operations have fixed costs (capital cost of carts, trucks; administration; collection labor to an extent; etc.) and variable costs (fuel; tipping fees at composting facilities; etc.). It is difficult to predict the variable costs that are dependent on the amount of participation and recovery without more definitive program performance data.

Another option is to charge an additional organics service fee only if a household signs up (or "subscribes") to the service. This "subscribers only pay" approach is a common practice for many of the curbside organics programs in the Metropolitan Area today, especially in open trash hauling communities such as Edina, Loretto, Minnetonka, etc.

The "subscribers only pay" approach was formerly used in Bloomington by two of the residential haulers before the City converted to organized solid waste collection. Citywide *co-collection of organics with trash* is the primary method planned to be implemented as a new service to Bloomington residents as part of the new organized solid waste collection system. Final details of the organics collection system, including sorting/transfer location(s) and prices, have not yet been negotiated between the City and the consortium of Bloomington haulers.

Advantages of the "subscribers only pay" form of funding include:

- This is a direct "fee for service." If a resident wants the additional collection service for organics, they pay the additional service charge. In this regard, this is the most equitable form of funding.

- The variable and fixed costs of the program can be included into the added charge. There is less economic risk due to the uncertainty of the number of participating residents.

Disadvantages of the "subscribers only pay" form of funding include:

- The start-up and final costs are spread out over a smaller number of customers, and initial costs will be relatively higher compared to the "everyone pays, citywide" form of funding.

- Sign-up/participation is clearly price sensitive. The number of households willing to sign-up may be inhibited by the added charge.

- Because a customer with recycling service will pay more than a customer that does not recycle organics, it may not be in compliance with Minnesota Statute (M.S. 115A.93, Subd. 3(c)).

Minnesota Statutes, M.S. 115A.93, Subd 3(c), states that a city or contract hauler may not charge more to residents that recycle versus residents that do not recycle.[23] Organics is defined as a recyclable material. There is not a clear, formal and universal legal opinion whether Minnesota cities can legally set up a permanent system in which residents who subscribe for a new organics collection service will pay more than residents who elect not to subscribe for organics curbside collection.

The City of Minneapolis has always used "everyone pays, citywide" for funding its curbside organics program. In January 2017, the City of St. Louis Park changed to an "everyone pays, citywide" form of funding with the costs of curbside organics recycling embedded within the overall base solid waste rate. Previously, St. Louis Park had a "subscribers only pays" form of funding but the City found that it was a barrier to increasing participation because of the economic disincentive to residents to sign up for the service.

One option is to initially start a pilot program using the "subscribers-only-pays" form of funding with the intent of transitioning to an "everyone pays citywide" form once the pilot period is completed. This pilot program concept would allow the County and partnering cities to first test the technical aspects of organics collection. Plus, other private entities could continue developing the organics recycling infrastructure (e.g., transfer stations, sorting facilities, composting facilities, etc.).

As Dakota County develops more specific policies and programs to promote residential organics collection services, the County officials may also wish to consider the equity issue of ability of residents to pay for the new service compared to how much they actually use the service.

8 Costs and Prices

Foth analyzed the known residential curbside organics collection programs in the Twin Cities Metropolitan Area as of 2017 including an assessment of available information on: city contracts, haulers, collection methods used, sorting/composting facilities receiving the material, who pays, program cost payment methods, monthly rates to residents, sign-up rates, tons diverted, and number of households signed up.

When discussing and analyzing program economics, it is important to distinguish between actual costs of operations compared to market prices. Prices can be defined as rates paid to a contractor by residents in open hauling systems or by the municipality in organized systems with a city

contract. On the other hand, collection operating budgets are based on line item costs such as labor, equipment, and overhead.

Foth evaluated available data from current residential curbside organics programs. Current monthly *costs* for organics collection services where "everyone pays citywide" (e.g., the costs are embedded in the base rate) range from a low of $3.35 to a high of $5.00 per household per month. These "everyone pays citywide" cities are in cities with organized collection. Current extra monthly *rates* charged to residents for organics collection services where "subscribers only pays" range from a low of $4.00 per month (for small, 13-gallon compostable bags) to a high of $7.42 per month (for larger, 33-gallon compostable bags). These "subscribers only pay" programs are most often in cities with an open hauling structure using the *co-collection with trash* method of organics collection.

The Minneapolis organics recycling program is one of the most extensive and well documented curbside collection programs in Minnesota. Minneapolis City staff reported that the rate for all Minneapolis solid waste & recycling customers increased in 2015 by $3.35 per month for the organics recycling services and $0.65 per month for other solid waste and recycling services. The City Solid Waste & Recycling Division purchased organics carts and tasked additional trucks to serve the City's share (50%) of the City's residential customers. The contracted hauler (Minneapolis Refuse, Inc. – MRI) serves the other 50% of the customers. Through a negotiated City contract amendment, MRI increased its contract cost by $3.25 per dwelling unit (DU) per month to provide organics collection services. This MRI contract fee does not include the cost of carts or organics tipping fees as these are paid directly by the City. This MRI fee applies as long as the participation is at or below fifty percent (50%). Appendix C provides a detailed program profile of the Minneapolis organics recycling program.

The City of Farmington developed a proposal in 2015, including cost estimates, for a new organics collection service using the *co-collection with trash* method. Although the proposed program was not approved or implemented, City staff developed detailed cost estimates including:

- Purchase of the compostable bags;
- Kitchen buckets;
- Public education / customer outreach; and
- Sorting / composting fees.

Price quotes from were obtained to provide 60 compostable bags per year to residential customers ($49.95 per year) and for sorting of the compostable bags from the trash ($8 per ton of trash + organics). The City assumed no additional costs of operating the trash collection service since the compostable bags are *co-collected* in the same trash trucks using the same trash route schedule. The City of Farmington operates their own organized trash collection system (i.e., using municipal crews and trucks, etc.). Therefore, current data about the City's solid waste costs, number of residential accounts and trash tonnages are readily available. For this curbside organics collection proposal, the City planned to serve all residential properties including single family homes, townhomes, and apartments. City staff estimated that 40 percent of trash would be recovered as organics. City staff estimated that one-third of the costs of the proposed co-

collection operations could be attributed to organics recovery for purposes of deducting the state Solid Waste Management Tax which is not charged on recycling services. A cost schedule was developed at various assumed participation rates: 5 percent, 10 percent, 15 percent, 20 percent and 25 percent. At the 25 percent participation rate, the added costs for residential customers are calculated at $6.63 per household per month (i.e., if "subscribers only" were charged a subscription fee). At this same 25 percent participation rate, the City estimated that it would cost about $2.00 per account per month to break even if all accounts, both residential and commercial, were charged for the service opportunity (i.e., if "everyone pays citywide" as a utility charge) regardless of who signs up for organics service.

The current tipping fee without a contract for a load of organics only at the SET composting facility in Empire Township is at $60 per ton. This organics processing fee has increased over recent years due to additional costs of sorting and processing. It is estimated that the additional costs for sorting and processing *co-collected* organics in compostable bags within trash loads will be about $8 to $10 per ton of trash + organics. SET is also encouraging its contract organics suppliers to develop compost use programs to help close the recycling loop.

Hennepin County has provided organics transfer services at its Brooklyn Park Transfer Station for many years. Separated organics only are allowed (i.e., supplies of organics that are commingled or co-collected with yard waste or trash are not allowed). The organics tipping fee is now set by the County at $25 per ton, but this is a subsidized price to encourage organics recycling in Hennepin County. The full costs of handling, transfer and composting results in facility tipping fees of about $70 per ton.

Another aspect of the costs of organics collection are the state and local solid waste management taxes. The Minnesota Solid Waste Management (SWM) Tax applies to services for mixed MSW. The residential SWM Tax rate is 9.75 percent of the sales price of the mixed MSW service. As a matter of policy to promote recycling, the State exempts the cost of collection services for recyclable materials, including source-separated organics. Organics that are put in separate waste containers and disposed of at a qualified facility are exempt from the SWM tax.[24]

For the *co-collection with trash* method of organics collection, the SWM tax exemption can be more complicated. Recently the MPCA approved this co-collection program in compliance with state regulations for a SWM Tax exemption when paired with a suitable sorting system. The MPCA and Minnesota Department of Revenue assessed the materials collected using the *co-collection with trash* method and determined this system qualifies as a source separated organics recycling method.[25]

A financial disincentive for the *co-collection with trash* method is that it may be more challenging for residents to downsize to the next smallest trash cart size. The compostable bag of organics, while separated, still occupies about the same space in the trash cart. For example, residents could be billed at the "large" trash cart rate even though a portion of the trash cart capacity is utilized for recycling organics. This may contradict the public education message that recycling organics can save money on your trash bill. In some programs, this problem is mitigated by providing a discount to the next lowest trash cart rate for organics collection subscribers.

9 Mandatory versus Voluntary Organics Separation Requirements for Residents

Counties, cities and/or Townships can adopt mandatory *organics* recycling ordinances similar to other mandatory recycling ordinances for *traditional recyclables*. Such an ordinance would require all residents to separate their designated organic materials for composting. The ordinance would *not* need to specify that residents participate in a curbside organics collection program. Residents would also have the option to compost in their back yards or deliver their organics to a drop-off facility. Sewering food scraps (e.g., using a garbage disposal installed within a sink) would also be an eligible means of disposal of these types of organics. Such a mandatory organics recycling ordinance could also apply to commercial establishments, (but this commercial recycling strategy is outside the scope of this analysis).

This issue of a mandatory organics recycling ordinance is closely aligned but independent from the issue of "Who Pays" (see Section 7 above). The County or any local municipality could develop a voluntary system (without such a mandatory ordinance) and still implement a, "everyone pays citywide" form of funding the organics collection service. The converse of this logic is that to be most practical and effective, a mandatory organics recycling ordinance should be implemented after an "everyone pays citywide" system of funding. If an effective, curbside organics collection service is *not* available citywide, it would not be reasonable to expect compliance with a mandatory organics source separation ordinance (e.g., a prohibition on commingling food scraps with mixed MSW as trash). Therefore, as a best practice, this study pairs mandatory systems only with the "everyone pays citywide" scenarios and not the "subscribers only pay" scenarios.

To be successful, any type of mandatory recycling ordinance (whether including organics or just traditional recyclables) must be planned very carefully with adequate lead time and ample community engagement. The actual timeframe for a mandatory ordinance to be designed, planned, adopted and implemented may take five years or more (including potential for *phases* of implementation).

Important policy questions that should be considered when designing and planning for a mandatory recycling system are the phases and amount of enforcement. Many communities that adopt mandatory recycling ordinances go for one to two years without any form of enforcement, with the intent of simply educating and assisting residents with compliance during this first phase. However, to be most effective, mandatory recycling ordinances require some amount of enforcement; otherwise the mandate is simply a hollow threat.

Monitoring of compliance can range from evaluation of the composition of trash loads (not specific to any household) to inspection of trash carts at the curb or when the trash carts are emptied into the truck. This monitoring will be inherently imperfect, especially for organics, and pilot operations should be tested to fully develop any such protocols.

The severity of penalties for non-compliance with mandatory recycling ordinances can span a wide range:

- No penalties; rely solely on education and technical assistance. Allow the "mandate" on the books to speak for itself in terms of the level of importance the municipality puts on compliance.
- Warnings and compliance notices to offending residents (without any threat of penalty).
- Minor misdemeanor civil offenses with associated penalties for non-compliance.

10 Results and Observations

In order to model the GHG impacts, including differences in organics tonnage estimates based on recovery rate assumptions due to changes in program funding structures and collection methodologies, a series of twelve scenarios were developed. Table 4 displays the twelve alternative organics collection scenarios, along with the "baseline" or current system. Each scenario is characterized by the following system variables:

- Organics collection method (*separate collection* or *co-collection with trash*);
- Collection legal structure (open or organized) for both the trash hauling and the organics hauling systems;
- Funding structure in terms of "Who pays" for the new organics collection service (Subscribers only pay an extra charge versus Everyone pays citywide with the extra costs of organics collection services embedded into the base trash rate) ; and
- Mandatory versus voluntary.

The scenario identification (ID) number is an arbitrary assignment to help facilitate discussion of the twelve different scenarios. The scenario ID numbering sequence is not in any special order.

Table 5 and Table 6 display the organics recovery rate assumptions used for GHG modeling of each of the twelve scenarios; Table 5 is for the eight voluntary scenarios and Table 6 is for the four mandatory scenarios.

The organics "loss" assumed for the *co-collection with trash* scenarios is 20%. This organics "loss" could be due to:

- Improper tying off of the compostable bags by residents;
- The actions of the packer truck loading/unloading the compostable bags within the trash; or
- Handling or sorting operations at the processing/transfer facility.

This loss rate assumption is based in part on actual observations of loss at an organics co-collection compostable bag / trash sorting facility as well as discussions with industry professionals. Future improvements in the *co-collection with trash* method will likely help to further prevent organics loss.

The organics recovery rate in terms of pounds per total household per year shown in Tables 5 and 6 are estimated based on available data. Foth understands that these numbers are variable and will range depending in part on community, season, program maturity, collection method and whether the program is mandatory or voluntary. Foth analyzed how the pounds per total household per year number affected the results and generally found that modeling results are not particularly sensitive to this variable (e.g. reducing the pounds per total household per year variable from 250 pound to 200 pounds for the separate collection, everyone pays mandatory scenario results in a minor change in GHG impacts (approximately a 3% increase) based on material management.)

Table 4
Residential Curbside Collection Scenarios

Scenario ID Number	Organics Curbside Collection Method	Trash Collection Legal Structure	Organics Collection Legal Structure	Who Pays	Voluntary or Mandatory
("Baseline")	[Assume zero curbside organics collections]	Mostly open trash hauling [Except Farmington, Hastings]	N.A.	N.A.	N.A.
1.a	*Separate Collection*	Open trash hauling	Open organics hauling	Subscribers only (extra charge)	Voluntary
1.b	*Separate Collection*	Open trash hauling	Open organics hauling	Everyone, citywide (embedded into base rate)	Voluntary
1.c	*Separate Collection*	Open trash hauling	Open organics hauling	Everyone, citywide (embedded into base rate)	Mandatory
2.a	*Separate Collection*	Organized trash hauling	Organized organics hauling	Subscribers only (extra charge)	Voluntary
2.b	*Separate Collection*	Organized trash hauling	Organized organics hauling	Everyone, citywide (embedded into base rate)	Voluntary
2.c	*Separate Collection*	Organized trash hauling	Organized organics hauling	Everyone, citywide (embedded into base rate)	Mandatory
3.a	*Co-Collection with Trash*	Organized trash hauling	Organized organics hauling	Subscribers only (extra charge)	Voluntary
3.b	*Co-Collection with Trash*	Organized trash hauling	Organized organics hauling	Everyone, citywide (embedded into base rate)	Voluntary
3.c	*Co-Collection with Trash*	Organized trash hauling	Organized organics hauling	Everyone, citywide (embedded into base rate)	Mandatory
4.a	*Co-Collection with Trash*	Open trash hauling	Open organics hauling	Subscribers only (extra charge)	Voluntary
4.b	*Co-Collection with Trash*	Open trash hauling	Open organics hauling	Everyone, citywide (embedded into base rate)	Voluntary
4.c	*Co-Collection with Trash*	Open trash hauling	Open organics hauling	Everyone, citywide (embedded into base rate)	Mandatory

Notes:
N.A. = not applicable

Table 5
Organics Recovery Rate Assumptions Used for GHG Modeling
For Voluntary Scenarios

Scenario ID Number:		(1.a & 2.a)	(1.b & 2.b)	(3.a & 4.a)	(3.b & 4.b)
Scenario Name:	Baseline	Separate Collection, Subscribers Pay (Voluntary)	Separate Collection, Everyone Pays (Voluntary)	Co-Collected with Trash, Subscribers Pay (Voluntary)	Co-Collected with Trash, Everyone Pays (Voluntary)
Organics "loss" (percent of total organics collected)		N.A.	N.A.	20%	20%
Organics recovery rate (pounds per total household per year)	N.A.	50	100	40	80
Organics composted (TPY):					
Mixed Organics (25% of organics separated by residents)	0	706	1,413	565	1,130
Food Scraps (75% of organics separated by residents)	0	2,119	4,238	1,695	3,390
Subtotal of organics composted (TPY)	0	2,825	5,650	2,260	4,520

Notes:
TPY = tons per year

Table 6
Organics Recovery Rate Assumptions Used for GHG Modeling
For Mandatory Scenarios

Scenario ID Number:		(1.c & 2.c)	(3.c & 4.c)
Scenario ID Name:	**Baseline**	**Separate Collection, Everyone Pays (Mandatory)**	**Co-Collected with Trash, Everyone Pay (Mandatory)**
Organics "loss" (percent of total organics collected)		N.A.	20%
Organics recovery rate (pounds per total household per year)	N.A.	250	200
Organics composted (TPY):			
Mixed Organics (25% of organics separated by residents)	0	3,531	2,825
Food Scraps (75% of organics separated by residents)	0	10,594	8,475
Subtotal of organics composted (TPY)	0	**14,125**	**11,300**

Notes:
TPY = tons per year

The organics recovery rate assumptions are based on data from case studies of existing curbside organics collection programs. (See Tables 2 and 3 for more details on organics recovery rates from selected case studies.) The organics recovery rate assumptions are generally on the high end of current recovery rates to reflect the potential for increased growth over time and a more mature system (e.g., after five to ten years of full-scale implementation)..

One of the most important system variables is the funding structure to address the issue of who pays. If "everyone pays citywide" in a *separate collection* system (scenarios #1.b and #2.b), the assumed recovery rate is 100 pounds per total household served per year. If "subscribers only pay" in a *separate collection* system, (scenarios #1.a. and #2.a), the assumed recovery rate is 50 pounds per total household served (including residents who elect not to subscribe) per year. (See Table 5 for more details on the voluntary scenarios.)

Another key system variable is the issue of mandatory versus voluntary. In the mandatory organics scenarios, if "everyone pays citywide", the assumed recovery rate is 250 pounds per total household served per year for the *separate collection* system (scenarios #1.c and #2.c). This results in the most "effective" system in terms of organics collected and recovered. In the mandatory organics scenarios, if "everyone pays citywide", the assumed recovery rate is 200 pounds per total household served per year for the *co-collection with trash* system (scenarios #3.c and #4.c). (See Table 6 for more details on the mandatory scenarios.)

The organics "loss" rate of 20% is then factored into the *co-collection with trash* scenarios. If "everyone pays citywide" in a *co-collection with trash* system (scenarios #3.b and #4.b), the assumed recovery rate is 80 lbs per total household served per year in voluntary systems after factoring in the assumed loss rate. If "subscribers only pay" in a *co-collection with trash* system, (scenarios #3.a. and #4.a), the assumed recovery rate is 40 lbs per total household served (including residents who elect not to subscribe) per year in voluntary systems after factoring in the assumed loss rate. (See Table 5 for more details on the voluntary scenarios.)

The organics "loss" rate of 20% is factored in the same manner to mandatory systems. If "everyone pays citywide" in a mandatory, *co-collection with trash* system (scenarios #3.c and #4.c), the assumed recovery rate is 200 lbs per total household served per year in voluntary systems after factoring in the assumed loss rate. (See Table 6 for more details on the mandatory scenarios.)

It is important to note that the amount of organics composted is based on county-wide curbside service availability. All organics recovery rates are applied to the same, total residential parcel count of 113,000 total households.

To simplify the GHG modeling analysis, the organics recovery rates for "open" versus "organized" collection structures were kept the same for the corresponding scenarios. (See Table 5 and Table 6 for more details.) Actual program results suggest that organized collection structures will likely have slightly higher organics recovery rates based on relevant studies for traditional recyclables.[26] This is due to more consistent public education about resident recycling instructions, more thorough reporting, and more rigorous performance monitoring in organized collection systems.

10.1 Recovery Rates and Collection System Funding Structures

As shown on Table 6, the *separate collection* method in the two mandatory "everyone pays citywide", scenarios (#1.c and #2.c) have the largest amount of organics composted, calculated at 14,125 tons per year (TPY). These scenarios are more effective in recovering more organics due to the assumed higher participation and lack of any loss in the collection/sorting stages. Under these scenarios, there is no additional charge for the organics collection service so there is no financial disincentive to participate.

The *co-collection with trash* method in the two voluntary "subscribers only pay" scenarios (#3.a and #4.a) have the lowest amount of organics recovery estimated at about 2,260 TPY because this system assumes residents must actively subscribe and pay more to receive the organics recycling collection service. Additionally, *co-collection with trash* has the disadvantage of some loss of organics into the mixed MSW stream due to organics bags breaking, improper tying off of the compostable bags, or otherwise prematurely opening before the sorting operation.

10.2 Economics

The costs of residential curbside organics collection will vary between the two collection methods. In general, the costs of *separate collection* of organics are less than the costs of *co-collection with trash.* 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.

The *co-collection* method has the advantage of no additional organics cart or route truck collection costs. But *co-collection* is more expensive due to the:

- Required compostable bags,
- Need to haul all of the trash to an organics sorting/processing facility;
- Additional processing fee for sorting bags of organics from trash; and
- Transfer of the trash (after sorting out the organics bags) for ultimate disposal at a mixed MSW facility.

Co-collection also necessitates a larger trash cart and therefore does not as directly account for savings to residents for downsizing to a smaller trash cart sizes. The avoided solid waste taxes on the organics portion of the *co-collection* service are helpful, but are not as transparent compared to the more visible costs of *separate collection*.

Depending on participation rates and tipping fees, the total prices range from about $4 to $7 per household per month for either collection method. These total prices reflect all costs of the service including:

- Route collection operations (truck, labor, fuel, etc.);
- Separate cart for the separate collection method;

- Trucking to a composting facility;
- Transfer operations for the co-collection with trash method;
- Tipping fee at the composting facility;
- Public education, including any addition organics recycling tools (e.g., compostable bag liners; kitchen buckets; brochures or flyers; etc.)

Current local tipping fees for separate loads of organics (without a contract) are approximately $38 to $60 per ton. The additional costs of sorting *co-collected organics with trash* are estimated to range from about $8 to $10 per ton load of trash + organics. These estimates are preliminary because there is very little experience with independent compostable bag / trash sorting operations.

10.3 GHG Impacts

GHG emissions were modeled to estimate the relative differences in environmental impacts based on collection methodology. Appendix B provides a detailed description of the modeling methods and assumptions. Table 4 identifies the twelve alternative GHG modeling scenarios (including a summary description of the "baseline" or current system). Table 5 and Table 6 itemize the organics recovery rate assumptions used for this GHG modeling based on results from actual case studies currently in operation.

Table 7 and Table 8 list the quantitative results of the GHG modeling for each of the scenarios, including the "baseline" system. Table 7 groups the open hauling scenarios and Table 8 groups the organized collection scenarios.

The MPCA Collection Tool was used to model GHG emissions due to:

- Packer route trash and organics collection miles;
- Long haul miles (e.g., trucking to composting facilities);
- Refuse Derived Fuel (RDF) processing of mixed MSW; and
- Compostable bag sorting operations.

WARM was used to model the GHG emissions from the waste management methods (landfill, mixed MSW processing, composting, etc.) within each of the integrated system scenarios. The "Total GHG Emissions" represents the sum total of each of the above line item GHG emissions. The bottom line is the "Net Emissions Increase (or Reduction)" compared to the Baseline scenario.

Figure 1 and Figure 2 display the graphic representation of the GHG modeling results. Organized versus open collection is the most critical variable in this evaluation of GHG emission reductions. The two voluntary open collection scenarios with *separate collection* of organics (#1.a and #1.b) have the highest net GHG emissions when compared to the Baseline scenario.

Scenario #1.a has an estimated *increase* of about 1,207 metric tons of carbon dioxide emission equivalents ($MTCO_{2e}$) compared to Baseline and scenario #1.b has an estimated *increase* of 653 $MTCO_{2e}$. These GHG emission estimates are both above the Baseline scenario due to the additional packer truck route miles inherent with the *separate collection* method of curbside organics recycling.

The remainder of the GHG modeling scenarios show a net *reduction* in emissions compared to Baseline. The scenario that results in the greatest reductions in GHG emissions is the mandatory, organized *co-collection with trash*, "everyone pays" scenario (#3.c). This scenario #3.c is estimated to *reduce* emissions by about 4,284 $MTCO_{2e}$ per year.

Other conclusions from this GHG modeling analysis indicate that the other organized collection scenarios have the lowest net GHG emissions, especially when coupled with the *co-collection with trash* method. These GHG emission estimates are both well below the "baseline" scenario largely due to the collection efficiency of the organized structure, plus using the same trash packer truck to collect organics.

This analysis indicates that organized collection of organics results in the greatest environmental benefits in terms of reducing GHG emissions. The reductions in GHG emissions due to the other variables are smaller by comparison. For example, changing from a "subscribers only pay" to an "everyone pays" participation have smaller GHG emission differences. See Tables 7 and 8 for more quantitative details and Figures 1 and 2 for the graphic summary of this GHG modeling analysis.

Table 7
GHG Emissions Modeling Results for Open Hauling Scenarios

(In Metric Tons of Carbon Dioxide Equivalents per year)

Scenario ID Number:		**(1.a)**	**(1.b)**	**(1.c)**	**(4.a)**	**(4.b)**	**(4.c)**
Scenario Name:	**Baseline**	**Open, Sep. Colln., Subscribers Pay**	**Open, Sep. Colln., Everyone Pays**	**Open, Sep. Colln., Everyone Pays, (Mandatory)**	**Open, Co-Colln., Subscribers Pay**	**Open, Co-Colln., Everyone Pays**	**Open, Co-Colln., Everyone Pays (Mandatory)**
***MPCA Collection Tool* results:**							
Subtotal of GHG emissions due to packer route trash collection miles	2,769	2,769	2,769	2,769	2,769	2,769	2,769
Subtotal of GHG emissions due to packer route organics collection miles	0	2,582	2,492	2,650	0	0	0
GHG emissions due to packer/transfer trailer long haul miles (to facilities)	1,609	1,595	1,582	1,542	1,690	1,677	1,638
GHG emissions due to RDF Processing at Newport	116	112	108	97	113	110	101
GHG emissions due to compostable bag sorting	0	0	0	0	144	144	144
***EPA WARM Model* results:**							

Table 7 ***(continued)***

Scenario ID Number:		**(1.a)**	**(1.b)**	**(1.c)**	**(4.a)**	**(4.b)**	**(4.c)**
Scenario Name:	**Baseline**	**Open, Sep. Colln., Subscribers Pay**	**Open, Sep. Colln., Everyone Pays**	**Open, Sep. Colln., Everyone Pays, (Mandatory)**	**Open, Co-Colln., Subscribers Pay**	**Open, Co-Colln., Everyone Pays**	**Open, Co-Colln., Everyone Pays (Mandatory)**
GHG emission due to waste management method	19,737	18,380	17,933	16,594	18,469	18,112	17,040
TOTAL GHG Emissions	**24,231**	**25,438**	**24,884**	**23,651**	**23,184**	**22,811**	**21,691**
NET Emissions Increase (or Reduction) Compared to Baseline	**0**	**1,207**	**653**	**(580)**	**(1,046)**	**(1,420)**	**(2,539)**

Notes:
Sep. Colln. = separate collection
Co-Colln. = co-collection

Table 8
GHG Emissions Modeling Results for Organized Scenarios

(In Metric Tons of Carbon Dioxide Equivalents per year)

Scenario ID Number:		**(2.a)**	**(2.b)**	**(2.c)**	**(3.a)**	**(3.b)**	**(3.c)**
Scenario Name:	**Baseline**	**Organized, Sep. Colln., Subscribers Pay**	**Organized, Sep. Colln., Everyone Pays**	**Organized, Sep. Colln., Everyone Pays, (Mandatory)**	**Organized, Co-Colln., Subscribers Pay**	**Organized, Co-Colln., Everyone Pays**	**Organized, Co-Colln., Everyone Pays, (Mandatory)**
***MPCA Collection Tool* results**:							
TOTAL GHG emissions due to packer route trash collection miles	2,769	1,025	1,025	1,025	1,025	1,025	1,025
TOTAL GHG emissions due to packer route organics collection miles	0	561	881	1,029	0	0	0
GHG emissions due to packer/transfer trailer long haul miles (to facilities)	1,609	1,595	1,582	1,542	1,690	1,677	1,638
GHG emissions due to RDF Processing at Newport	116	112	108	97	113	110	101
GHG emissions due to compostable bag sorting	0	0	0	0	144	144	144

Table 8 ***(continued)***

Scenario ID Number:		**(2.a)**	**(2.b)**	**(2.c)**	**(3.a)**	**(3.b)**	**(3.c)**
Scenario Name:	**Baseline**	**Organized, Sep. Colln., Subscribers Pay**	**Organized, Sep. Colln., Everyone Pays**	**Organized, Sep. Colln., Everyone Pays, (Mandatory)**	**Organized, Co-Colln., Subscribers Pay**	**Organized, Co-Colln., Everyone Pays**	**Organized, Co-Colln., Everyone Pays, (Mandatory)**
***EPA WARM Model* results:**							
GHG emission due to waste management method	19,737	18,380	17,933	16,594	18,469	18,112	17,040
TOTAL GHG Emissions	**24,231**	**21,673**	**21,529**	**20,286**	**21,440**	**21,067**	**19,947**
NET Emissions Increase (or Reduction) Compared to Baseline	**0**	**(2,558)**	**(2,702)**	**(3,944)**	**(2,791)**	**(3,164)**	**(4,284)**

Notes:
Sep. Colln. = separate collection
Co-Colln. = co-collection

Figure 1
GHG Emissions Modeling Results for Open Hauling Scenarios

(Net Change from the Baseline Scenario
in Metric Tons of Carbon Dioxide Equivalents per year)

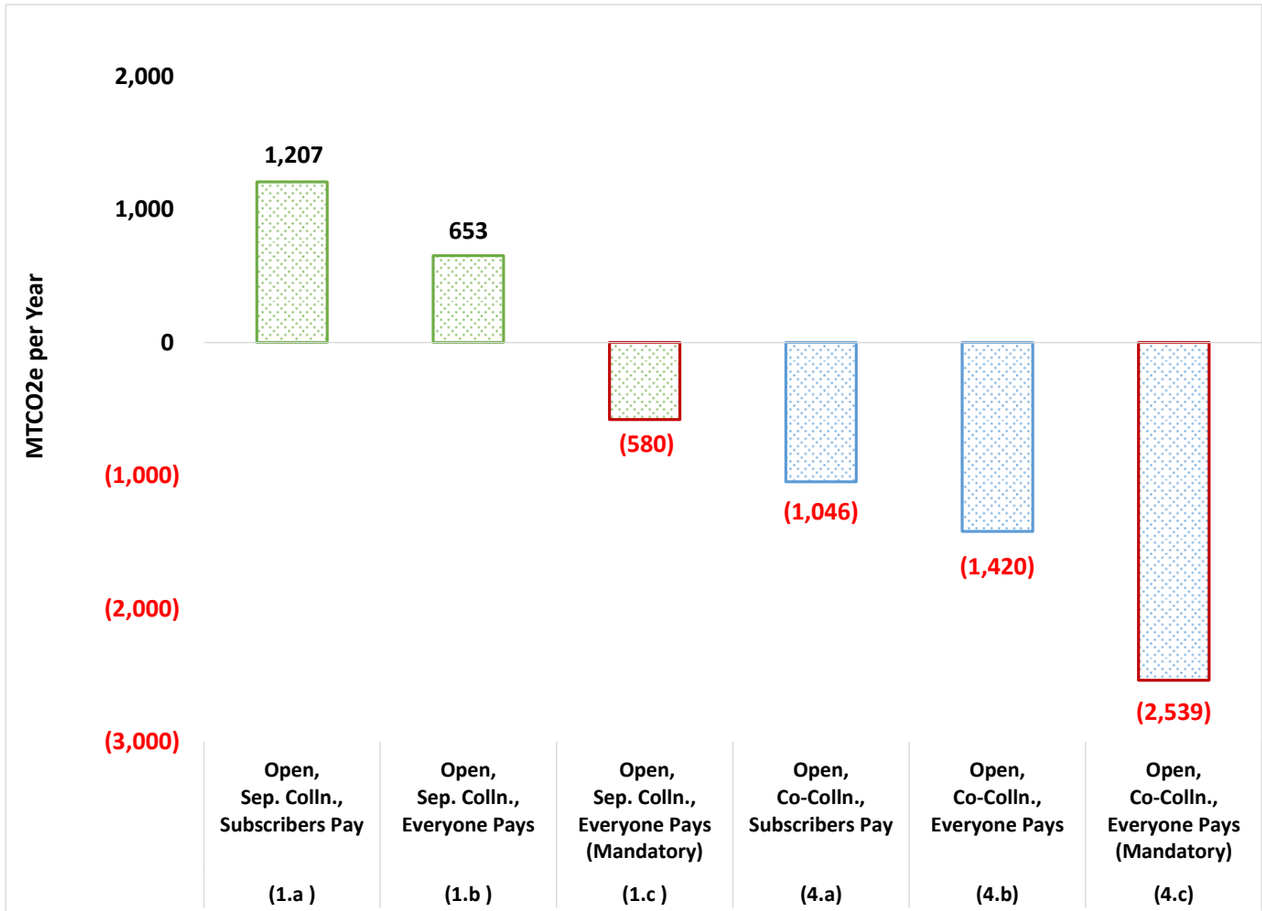
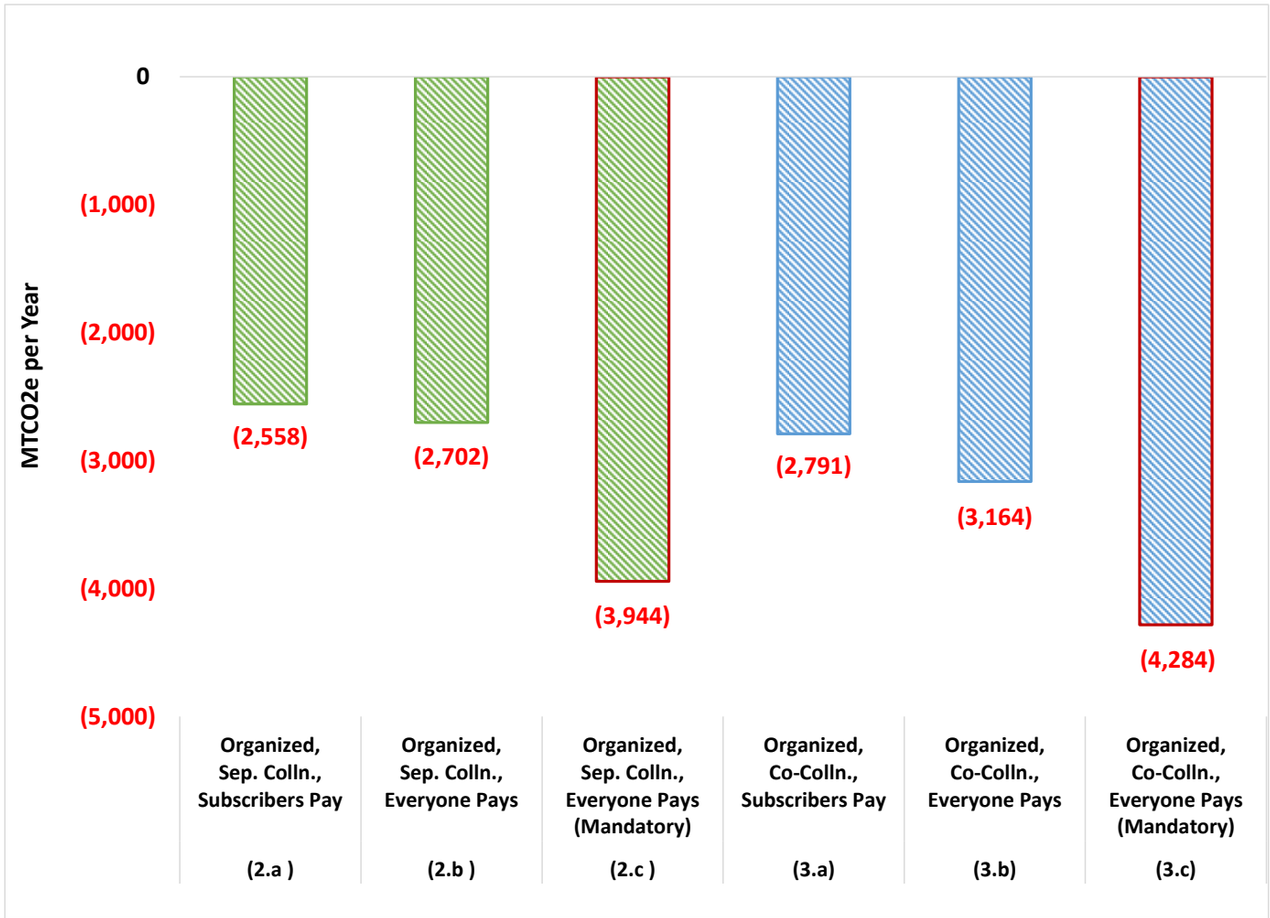


Figure 2
GHG Emissions Modeling Results for Organized Hauling Scenarios

(Net Change from the Baseline Scenario
In Metric Tons of Carbon Dioxide Equivalents per year)



11 Discussion

Two methods of collecting organics (*separate collection, co-collection with trash)* were analyzed and compared in terms of organics recovery rates, costs, GHG emissions and overall ease or complexity of implementation and performance monitoring. Table 9 provides a summary of these system variables as a means to comprehensively evaluate these individual system variables.

The current state (or *"Baseline"*) system has no active residential curbside organics collection operations in Dakota County. The current city and township legal collection structures must be considered as the County decides whether or not to move forward with new organics curbside recycling policies and programs; thirty-one municipalities in the County have open hauling structures and only two have organized structures. Each collection methods has its own set of advantages and disadvantages in open versus organized structures. For example, *co-collection with trash* may be more feasible in the open hauling communities as this method could require less change in legal hauling structures. On the other hand, *separate collection* of organics may be the most cost-effective alternative for the two organized cities (Farmington and Hastings).

The other barriers to the development of new residential curbside organics collection services should also be recognized as part of a thorough planning process. These other barriers include:

- Lack of experience by most residents with separate handling of organics for recycling (e.g., overcoming the perceived "yuk" factor associated with food scraps recycling, etc.);
- Relatively high cost of curbside organics collection systems (due to the costs of additional equipment and compostable bags, etc);
- Lack of an organics transfer station that could serve cities in the western part of Dakota County to help improve collection efficiencies;
- Limited competition between the two composting facilities (SET - Empire and the Shakopee Mdewakanton Sioux Community – Shakopee);
- Limited composting capacity at composting facilities, especially for commingled organics and yard waste; and
- Lack of robust end market demand for the compost end product.

This section itemizes and evaluates feasible strategies for Dakota County to facilitate growth of residential curbside organics recycling and address the barriers listed above.

Table 9
Evaluative Comparison of the Two Alternative Organics Collection Methods

Variable	*Separate Collection of Organics* (Separate carts, trucks and routes)	*Co-Collection of Organics with Trash* (In compostable plastic bags)
Effectiveness	Very effective: ranging from 50 to 250 pounds per household per year, depending on other system variables.	Less effective: ranging from 40 to 200 pounds per household per year, depending on other system variables.
Local Prices	Moderately expensive: at $3.35 per *"total"* household per month (Minneapolis data).	Expensive: ranging from $4 to $7 per household per month, depending on other system variables.
Additional GHG Emissions (Relative to no curbside organics program)	Less emissions (about 3,900 of $MTCO2_e$ per year *reduced*) up to moderate amount of additional GHG emissions (about 1,200 of $MTCO2_e$ per year *increased*), depending on other system variables.	Less emissions (about 1,000 to 4,300 of $MTCO2_e$ per year *reduced*), depending on other system variables
Can the amount of organics diverted be easily measured?	Yes. By definition, this collection method requires separate trucks which haul separate loads of organics. Also, organics set-out rates and participation can be measured with simple route audits.	Not as easy as the *separate collection* method. Organics set out/participation rates during collection may be more difficult because of co-collection method (i.e., the compostable bags of organics may not be visible in the middle of the trash cart).

Table 9 ***(continued)***

Variable	*Separate Collection of Organics* (Separate carts, trucks and routes)	*Co-Collection of Organics with Trash* (In compostable plastic bags)
Complexity of Program	Lowest complexity. One cart with one type of material in it. No uncertainty of the percent of the waste bill attributable to waste versus recycling for State SW Tax purposes since this collection method is a traditional form of source separation (i.e., separate cart, separate truck).	Moderate complexity. Two types of material in one cart; residents *must* have and properly use particular, durable certified compostable plastic bags for organics. Trash carts may be billed at "large" trash rates, potentially sending mixed messages about saving money due to organics recycling. More accounting needed to attribute the amount of trash costs (taxed) versus organics recycling (not taxed).

11.1 Drop-Off Sites and Compost Market Development as Short-Term Strategies:

The option of expanding County–supported organics drop-off sites and promotions may be a viable short-term strategy to increase organics recycling even before curbside organics services get started. The hands-on, practical experience with public education, promotional outreach, and contracting with organics recycling service providers are all valuable program development tools. For example, it is helpful to develop direct relationships with haulers that collect the organics from the drop-off site and the composting facilities that process the materials into a usable compost end product. Dakota County will gain valuable information, knowledge and advice for immediate next steps in the development of curbside organics collection. The County and its residents will benefit if the organics recycling service providers can be treated as partners in this planning and development process.

In addition to expanding collection capacity, the County may wish to also expand the County's use of compost in its own construction projects. Other compost market development strategies and policies should be considered to help assure adequate end use demand. While this end product market development strategy was out of scope of this project, this is a critical immediate next step to develop a long-term, sustainable organics recycling system.

11.2 Public Education and Outreach

Dakota County has developed an initial public education system that supports organics recycling even though the organics collection infrastructure is still at an early stage of development. The resources available to residents are readily available through the County's web site, printed materials, other media and direct personal contact. The County should continue to enhance its public education efforts around all aspects of organics management, including food waste prevention and other non-composting forms of recovery. The recent REC *White Paper* provides a current opportunity to re-examine public education messaging against these consensus-based guidelines. This new technology of organics recycling can potentially be confusing. Dakota County should continue to employ the philosophy of using "plain English" and keeping the message as simple as possible when designing organics recycling public education materials.

11.3 Legal Structure for Collection

Organized collection is an additional tool that may help facilitate the growth of residential curbside organics collection. Residential organized collection could be implemented for trash, recyclables, and/or organics (or a combination of these material streams). For example, the Cities of Bloomington and Saint Anthony Park both recently converted from open hauling to organized collection for all three streams: trash, recyclables, and organics. Maplewood converted to organized trash collection several years ago. The City of Saint Paul is currently in the middle of the statutory process to organize the collection of trash. In both Maplewood and Saint Paul, recyclables collection is already managed under separate recycling contracts. In each case, these cities developed the option for future planning and negotiations to implement organics collection as a contract amendment. But in each case, the organics collection program has not yet been planned or collection/processing standards specified. The lack of implementation has been in part due to:

- The lack of organics transfer and processing infrastructure (e.g., organics transfer stations);

- The lack of consensus among haulers on the best method to collect residential organics; and

- A political willingness to increase rates to residents for the new organics service given that reducing rates was always one of the objectives of organized collection.

In the case of Farmington, a *co-collection of organics with trash* proposal was planned to be operated within the City's municipal trash collection structure, but was not implemented. The residential organics collection proposal was not approved in part due to the lack of secure funding.

In the case of Burnsville, a *separate collection of organics* structure was piloted by one of the private haulers within the City's open hauling system. But this organics collection subscription service option was discontinued due to lack of participation and sustainable funding.

These recent case studies cited above indicate that organized collection can help facilitate the planning and development of residential organics curbside collection, but does not guarantee its implementation. Organized collection has a larger set of objectives and system design variables well beyond organics recycling goals. Therefore, organized collection should be considered as an independent initiative from residential curbside organics collection. Many communities with open hauling systems want to develop new residential organics collection services, but may not want to convert to organized collection.

Section 6 described some of the key legal questions that remain unresolved for communities with an open hauling system that want to contract for a new organics collection service. For example, Cities and counties may be required to go through the formal process as specified within the Minnesota Organized Collection Statute (M.S. 115A.94).

One alternative for cities that have open hauling systems is to require organics curbside collection as a condition of a hauler licenses. This option could also be implemented at the county level. There is little experience with this option in the Twin Cities Metropolitan Area, although some cities are considering such license requirements.

11.4 Who Pays

Dakota County may wish to adopt a policy that favors the "everyone pays, citywide" form of funding for residential organics recycling for permanent collection programs. This policy would be more consistent with Minnesota Statutes (M.S. 115A.93, Subd. 3c) which requires that residents who recycle should not be charged more than residents who do not recycle. Under a policy that prefers "everyone pays, citywide", pilot programs could be allowed to use the "subscribers only pay" form of funding on a temporary basis until the pilot period is finished.

This type of "everyone pays, citywide" policy can be considered as more equitable given that the opportunity to recycle organics is universal to *all* residents; there is no added charge for residents

to sign up and participate (beyond the additional charge assessed to everyone). The curbside organics collection service is thereby funded more like a utility with a set rate for all residents.

Under a permanent "subscribers only pay" policy, the organics service becomes more exclusive to those residents willing and able to pay the extra charge. In this regard, this policy alternative is less equitable than the "everyone pays, citywide" method of funding organics collection service. Nonetheless, there are many officials who favor this type of "fee for service" approach to funding public services.

Ideally under the "everyone pays, citywide" system, the cost of service would be embedded into the base trash rates. This funding approach should be relatively straightforward in the organized cities of Farmington and Hastings from an administrative perspective. In open hauling systems, mandating a funding mechanism by embedding organics recycling costs into the trash rates charged by private haulers to residents will be more challenging. Therefore, other alternative sources of funding (e.g., general fund, solid waste taxes, new citywide recycling fees, etc.) should also be considered when planning for new organics collection services. If the County were to contract directly for curbside organics recycling services, additional alternative sources of funding may be available.

These and other alternative sources of funding will need to be further analyzed if the County considers any type of required organics collection service opportunity. One of the policy strategy options is to require all haulers licensed in Dakota County serving residential customers to offer the opportunity to recycle organics via curbside collection. The feasibility of such a strategy will depend largely on the proposed method of funding. The County may wish to consider matching grant funding directly to haulers based on actual costs per participating household.

11.5 Mandatory Organics Recycling Ordinance (Requiring Source Separations by Residents)

The options for a mandatory, residential organics source separation ordinances, including alternative amounts of enforcement, are described in Section 9. Further contingency planning for such an ordinance could help the County prepare for this strategy. This is a long term strategy that may take five years or more to design, plan, adopt and implement, especially if it implemented in phases (with increasing amounts of enforcement). Nonetheless, a mandatory organics recycling ordinance may be one of the most effective means to increase organics diversion and recovery. But implementing a mandatory *organics* recycling ordinance (i.e., organics alone as the only targeted material) will not be as cost-effective as a more comprehensive mandatory *recycling* ordinance that encompasses both traditional recyclables plus organics.

11.6 Other Implementation and Policy Options

Dakota County's current Solid Waste Master Plan has several directly relevant policies:

- Under "Organics and Yard Waste Management" (page VI within the Executive Summary) it states in part:

"The County's strategic focus is to more fully use the existing capacity at the Empire organics compost facility. …. The County will build on the success of existing public recycling programs to introduce organics diversion programs. …. If significant progress is not being made toward Policy Plan objectives by 2020, the County will evaluate mandatory organics diversion for targeted generators."

- Under "Organics and Yard Waste Management" (within the "County Goals and Strategic Implementation Approach" section, item 4.c, page 36):

  "Dakota County will work with cities and haulers to pilot curbside residential organics collection."

- Under "Organics and Yard Waste Management" (within the "County Goals and Strategic Implementation Approach" section, item 5.d, page 36):

  "Dakota County will pursue the use of finished, solid waste-derived compost in County transportation, parks, and capital landscaping projects and encourage other public entities to use finished compost in development projects."

- Under "Organics and Yard Waste Management" (within the "County Goals and Strategic Implementation Approach" section, item 8.a, page 37):

  "If progress is not made toward achieving the 2020 TCMA Policy Plan objective for organics management, Dakota County will consider Ordinance 110 amendments: …. Dakota County will evaluate and implement options to require commercial and/or residential organics management by waste haulers, such as an element of hauler licensing or a collection provision."

These existing policies within the County Master Plan adopted in 2012 are still relevant today and are worthy of additional review, discussion and consideration at this time within the current context of the new MPCA Policy Plan recently adopted and released in April 2017. Further contingency planning and implementation details are needed to bring these County policies up to date. There has been mixed results towards implementing curbside organics collection services over the past five years in Dakota County as evidenced by little change in overall organics recycling infrastructure (e.g., organics curbside collections, organics transfer stations, etc.).

Dakota County has multiple policy options for implementation of residential organics collection operations. The County's options include, but are not limited to the following strategies:

1. Continue to provide current amount of support for the development of private organics collection, transfer and processing operations while providing public education and outreach about organics recycling;

2. Develop a grant program targeted to cities as a financial incentive to implement city-designed organics collection services;

3. Subsidize the organics tipping fees at transfer stations and composting facilities;

4. Provide matching grants directly to haulers to help pay for the costs of residential curbside organics services;

5. Contract directly with a hauler (or multiple haulers) for residential organics collection services to be implemented within cities that have applied for and signed up for such a program;

6. Adopt a mandatory organics source separation ordinance; and/or

7. Develop new hauler licensing provision to require organics collection service be available to residential customers.

These policy options are not mutually exclusive such that the County could pursue a combination of several strategies at the same time. There are ample precedents in Minnesota of other counties adopting the first three strategies. There is no known Minnesota precedents for county implementation of strategies #4, #5 and #7 as listed above.

A complementary strategy to #3 (subsidizing tipping fees at transfer stations and composting facilities) could be to facilitate private development of an organics transfer station on the west side of the County. This type of facility development activity is largely out of scope for this collection study project and was not modeled in the GHG emissions analysis. Nonetheless, the siting and development of an organics transfer station would help greatly improve hauling efficiencies, reduce associated operating costs, and may reduce GHG emissions associated with organics recycling.

Dakota County could further evaluate the experiences of other counties in the Metropolitan Area to develop a private organics transfer station.[27] The implications of such previous efforts are that there is willingness by private companies to develop private organics transfer facilities. However, given the lack of strong private-only investment incentives, some form of public-private partnership may be needed. Potential developers of organics transfer stations may likely suggest that some form of government financial assistance and public supply development efforts would be needed to make private investments feasible.

12 Conclusions

Dakota County has made notable progress in developing organics recycling systems through the planning and implementation of the County's organics recycling drop-off program at Thompson County Park in West St. Paul. This drop-off program, including the development of service contracts to provide for collection and composting operations, will continue to help the County gain first-hand experience with the private organics recycling marketplace. However, the most significant recovery of residential organics will be accomplished through the development of new curbside recycling services. These new services will take careful planning, design, funding commitments, legal review, implementation, and monitoring to be successful, especially given that 31 of the County's 33 cities are in open hauling structures.

The following conclusions help outline the key results of this study.

1. **Effectiveness** - Based on the assumptions used for modeling in this study, the "Mandatory, *separate collection*, everyone pays" scenario is the most effective in terms of organics composted estimated at about 14,000 tons per year for a county-wide system.

2. **Cost** – Based on data available from local curbside organics recycling programs in the greater Twin Cities Metropolitan Area, the cost of *separate collection* is estimated at $3.35 per *total* household (i.e., everyone pays) based on Minneapolis data and about $4 to $7 per household for *co-collection with trash* depending on who pays and other system variables (e.g., size of the compostable bags, etc.).

3. **GHG Emissions –** The *co-collection with trash* method of organics collection has less GHG emissions than the current system because both types of materials (trash and organics) would be "co-collected" in existing trash trucks/routes. In addition to emissions related to collection, there are modest GHG reductions associated with composting organics instead of landfilling or processing the material for energy recovery. The *separate collection* of organics has less GHG emissions than the current system if it is implemented as part of organized trash collection system.

4. **Resident Instructions –** Dakota County has developed a clear, precise set of resident instructions specifying the list of organic materials that can be included within the County's organics recycling drop-off program. This list is consistent with the guidelines of the Minnesota REC. As one means to monitor local education instructions and messaging, the County could continue to review the development of new REC guidelines about educating residents about the correct organics materials to include for recycling.

5. **Compost Market Development –** Further development of organics recycling systems can be enhanced by the County taking a pro-active role in compost market development and end-use. While these market development activities are outside the scope of this study, they are nonetheless an important part of the overall organics recycling system development. An effective and sustainable compost market development program will require active promotion, education and technical assistance.

6. **Who Pays –** The acceptance and participation in new curbside organics recycling programs is price sensitive. This phenomenon is similar to other services: The more it costs residents to subscribe, the less they will participate. Therefore, the method of funding that addresses the issue of who pays for new curbside organics recycling is critical to the success of achieving higher organics participation and recovery rates. The "everyone pays, citywide" scenarios have the highest amount of organics recovery because this system assumes all residents receive the organics recycling services without additional charges to residents. In the "everyone pays, citywide" method of funding, the costs of the new services are embedded in the base trash rates or paid for via alternative funding sources. Other alternatives funding sources include, but are not limited to: SCORE, general funds, other County solid waste funds (host fees), etc.

7. **Method of Curbside Organics Collections –** Two specific methods of curbside organics collection: *separate collection* and *co-collection with trash* are thoroughly analyzed. Each method has a different set of advantages and disadvantages. Each method has a

different set of advocates and opponents. But it is much more difficult to plan and communicate for multiple collection methods rather than focusing on one method exclusively.

8. **Legal Collection Structure –** Changing to organized collection can be an additional tool to help facilitate the development of new residential organics curbside collection services, but it is not an essential pathway to implement organics collection. Also, if a city has an open trash hauling system in place, there is some uncertainty about the exact amount of legal authority cities currently have to implement new organics services without going through the Minnesota Organized Collection Statute (M.S. 115A.94). One alternative option is for Dakota County or its cities to require organics curbside collection as a condition of a hauler licenses.

9. **Other Legal Questions –** There are a number of other legal questions that have been raised by cities in the Metropolitan Area in regards to implementing new organics collection services. For example, Minnesota Statutes 115A.93, Subd 3(c) prohibits charging more to residents that participate in recycling compared to residents who do not recycle. The application of this statutory requirement to organics recycling has not yet been tested in court.

10. **Implementation Timing and Partner Relationships –** It will likely take 10 to 20 years for organics recycling systems and infrastructure to fully mature. Similar to when yard waste composting was first introduced in the region more than 40 years ago, curbside organics recycling is a new technology for Dakota County. The County may wish to consider further strengthening and broadening its working relationships with its cities, haulers and private composting facility operators as part of strategy to develop sustainable curbside recycling systems.

11. **Direct County Contract for Separate Collection of Organics –** The County could contract directly with a hauler (or multiple haulers) to provide residential curbside collection services within cities that have signed up for such a program. This approach would greatly accelerate implementation. Under this concept, it is most likely that the service would need to "stand alone" from other, existing trash and recycling collection services. Therefore, this concept would most easily be designed, planned and implemented using the *separate collection* method.

12. **Other, Non-Residential County Organics Recycling Contracts** – The County's experience with contracting for organics recycling at its drop-off site at Thompson County Park in West St. Paul provides valuable operations and contracting experience. Also the County contracts for organics recycling at County buildings. These "non-residential" organics recycling contracts can provide valuable precedents for County technical assistance to its cities and townships. It may be possible for the County to amend its contracts with its organics service providers to allow other local public entities in the County to cooperatively purchase off the County's master organics recycling contracts. This type of cooperative purchasing, or contract "piggybacking", may help expedite expansion of organics collection and composting services (e.g., at city municipal buildings; additional drop-off sites; etc.).

13. **Private Organics Transfer Station Planning and Development –** The lack of organics transfer station capacity is a significant barrier to increased organics collection efficiencies. Dakota County could further discuss and evaluate its role in facilitating planning and development of an organics transfer station that could serve the western cities in the County. This type of facility analysis was out of scope of this project, but there is a readily available precedent for this type of work by other Metropolitan Area counties.

14. **Evaluate Options for Hauler License Requirements –** The County or its cities could require curbside *organics* collection as a condition of a trash hauler license. This strategy has little precedence. The closest precedent is requiring curbside collection of *traditional recyclables*. Dakota County could look at a means to phase in such a requirement for organics collection as a condition of County hauler licenses. It would be best if adequate infrastructure (e.g., composting facilities, end use demand for compost products, organics transfer stations, etc.) preceded any such requirement for this strategy to be most feasible. Thus, there is a need for phasing such mandate over time.

15. **County Funding of Local Curbside Organics Initiatives –** Each of the seven Metropolitan Counties have individual approaches to current and proposed future funding curbside organics. One of the challenges for Dakota County is how to fund local curbside organics programs on an equitable basis given the diverse set of legal collection structures and wide variety of municipal needs and priorities. All County grant program options for curbside organics recycling have not yet been objectively analyzed, a step that was beyond the scope of this project.

13 Recommendations

The following recommendations provide a framework for County discussion and consideration of *potential* next steps towards implementing residential curbside organics collection systems.

1. The County should continue to monitor results from municipal curbside organics programs throughout the Twin Cities Metropolitan Area. Actual data from *local* programs (e.g., organics recovery and participation rates, prices, etc.) will be more valuable than other case studies from around the country because of the unique circumstances of this region. Anecdotal information from conversations with program operators (both city staff and haulers) should be used in addition to technical and financial data.

2. The County should help its cities fund pilot projects for curbside organics recycling programs.

3. The County should use its curbside organics recycling initiatives to strengthen public education efforts that encourage other forms of recycling and waste reduction behaviors.

4. The County should reaffirm its policy contained in the current Master Plan to use finished, compost derived from organics and yard waste in County transportation, parks and capital landscaping projects. Ideally any such market development initiative would

be backed by a clear policy directive from the County Board of Commissioners so that all County Departments would be responding to clear priorities.

5. The County should adopt a policy that gives preference to implement the "everyone pays, citywide" form of funding for permanent organics collection services. This policy could allow temporary exceptions for pilot programs to use the "subscribers only pay" alternative form of funding on a limited basis (e.g., the first one to two years).

6. Dakota County should seek its own legal opinion about how Minnesota Statute 115A.93, Subd. 3(c) should be applied to any proposed new residential organics collection method of funding. This legal opinion should review the recommendation immediately above to determine if it is consistent with the letter and intent of this Statute.

7. As specific policies and potential contracts are proposed, further legal review should be conducted by the Office of the County Attorney and/or City Attorneys on the question of whether or not local communities must follow the Minnesota Organized Collection Statute (M.S. 115A.94) in order to add curbside organics collection contracts to an open hauling structure.

8. Dakota County should consider contracting directly with a hauler (or multiple haulers) for separate collection of organics and then offer the service within cities that have applied and signed up for this County-managed program.

9. Dakota County may benefit from an objective comparison of options for assisting with the development of organics transfer stations. Dakota County staff should review the results of work by other Metropolitan Counties and private companies to develop organics transfer stations.

10. Dakota County should continue to evaluate the option of hauler license requiring organics collection service including the parallel analysis of adequate market/infrastructure capacity.

11. Dakota County will continue to plan for how to best fund planning, research, field pilot testing, and implementation for curbside organics recycling. This planning should address how the County will provide financial and technical assistance to its cities and townships for curbside organics programs. Not all communities have the same needs and priorities. A long-term and comprehensive approach will be needed to accommodate the divergent and diverse needs of all 33 municipalities within the County.

Endnotes

[1] Minnesota Statutes, M.S. 115A.03, Subd. 32.a. defines *"Source-separated compostable materials"*

[2] Minnesota Statutes, M.S. 115A.551, Subd. 1(a), further defines "recycling" to include, in part, source-separated compostable materials, and states in part:

> *"For the purposes of this section, "recycling" means, in addition to the meaning given in section 115A.03, subdivision 25b, yard waste and source-separated compostable materials composting and recycling that occurs through …."*
>
> and:
>
> *"…..(b) For the purposes of this section, "total solid waste generation" means the total by weight of:*
>
> *(1) Materials separated for recycling;*
>
> *(2) Materials separated for yard waste and source-separated compostable materials composting; …."*

[3] Dakota County Solid Waste Master Plan web page
https://www.co.dakota.mn.us/Environment/ReportsStudies/solid-waste-master-plan

[4] MPCA *"Metropolitan Solid Waste Management Policy Plan (2016 – 2036)"* as adopted on April 6, 2017:
https://www.pca.state.mn.us/sites/default/files/w-sw7-21.pdf

[5] Dakota County's current Solid Waste Master Plan (2012 – 2030) as adopted and approved in 2012:
https://www.co.dakota.mn.us/Environment/ReportsStudies/Documents/SolidWasteMasterPlan.pdf

[6] Minnesota Recycling Education Committee (REC), *"White Paper"* (Summer 2017).

[7] Op. Cit. Dakota County current Solid Waste Master Plan (2012).
https://www.co.dakota.mn.us/Environment/ReportsStudies/solid-waste-master-plan

[8] Dakota County *"Waste Haler Licensing"* web page:
https://www.co.dakota.mn.us/Permits/WasteHaulerFacilityLicenses/WasteHaulerLicense/Pages/default.aspx

[9] Dakota County *"Ordinance No. 110 – Solid Waste Management"*:
https://www.co.dakota.mn.us/LawJustice/Ordinances/Documents/CountyOrdinance110.pdf

[10] Dakota County *"Rural Directory"*:
https://www.co.dakota.mn.us/Government/PublicEntities/CitiesTownships/Documents/RuralDirectory.pdf
(Includes the rural Dakota County townships of Castle Rock, Douglas, Empire, Eureka, Greenvale, Hampton, Marshan, Nininger, Randolph, Ravenna, Sciota, Vermillion, and Waterford; And includes the rural cities of: Coates, Hampton, Miesville, New Trier, Randolph & Vermillion.)

[11] Dakota County's list of *City-Licensed, Commercial Waste Haulers* (Updated January 2017)

[12] Dakota County's list of *Residential Recycling Service Providers* (Updated September 2016))

[13] City of Minneapolis web page: "Residential organics recycling - Sign Up Now" (as accessed on September 3, 2017).

[14] MPCA report, *Analysis of Waste Collection Service Arrangements* prepared by Foth Infrastructure & Environment, LLC (June 2009): http://www.pca.state.mn.us/index.php/view-document.html?gid=4514

[15] "Northfield Composting" web site:
https://www.northfieldcompost.com/

[16] Northfield News.com article *"Young Northfielders Embark on Curbside Composting Business"* by Philip Weyhe (March 16, 2017): http://www.southernminn.com/northfield_news/news/article_589fd6b1-95d5-542c-b932-8e42f01f6a46.html

[17] Personal communication with Cliff Martin, Northfield Curbside Composting (August 21, 2017)

[18] Personal communication with Dave Bennett, City of Northfield Department of Public Works (August 21, 2017).

[19] Ibid, personal communication with Cliff Martin, Northfield Curbside Composting.

[20] Minnesota League of Cities (LMC) Information Memo, *City Solid Waste Management*, (May 22, 2017): http://www.lmc.org/media/document/1/citysolidwastemanagement.pdf?inline=true

[21] Minnesota Organized Collection Statute, M.S. 115A.04, Subdivisions 1 and 3: https://www.revisor.mn.gov/statutes/?id=115A.94

[22] Minnesota Statutes, M.S. 115A.93, Subd 3(c), states
"(c) A licensing authority shall prohibit mixed municipal solid waste collectors from imposing a greater charge on residents who recycle than on residents who do not recycle."

[23] Ibid.

[24] Minnesota Department of Revenue, web page: "Solid Waste Management Tax" (last updated July 10, 2017): http://www.revenue.state.mn.us/businesses/solid_waste_management/Pages/Tax-Information.aspx; and the Department's fact sheet, "Solid Waste Management Tax" (Revised July 2017): http://www.revenue.state.mn.us/businesses/solid_waste_management/Documents/swmfs1.pdf.

[25] Waste Today magazine (www.WasteTodayMagazine.com) article "Organix Solutions receives letter of approval for co-collection program" (November 28, 2016): http://www.wastetodaymagazine.com/article/organics-solutions-receives-letter-of-approval/

[26] MPCA report, *Analysis of Waste Collection Service Arrangements* prepared by Foth Infrastructure & Environment, LLC (June 2009): http://www.pca.state.mn.us/index.php/view-document.html?gid=4514

[27] Ramsey/Washington Recycling & Energy Board (formerly known as the Ramsey / Washington Resource Recovery Project Board) released a request for expressions of interest (RFEI) to determine the interest of private parties in developing an organics transfer station somewhere in the east Metropolitan Area. Foth memo to Ramsey/Washington County staff: "Preliminary Summary of RFEI Responses for Organic Transfer Capacity" (January 25, 2012).

Appendix A
Dakota County's Residential Organics Recycling Drop-Off Program

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Dakota County's Residential Organics Recycling Drop-Off Program

Dakota County Web Pages and Other Resources:

*"**Organics Recycling**"* (Last updated 1/18/2017):
https://www.co.dakota.mn.us/Environment/Residential/Organics

*"**Organics Drop Off**"* (Last updated: 1/19/2017):
https://www.co.dakota.mn.us/Environment/Residential/Organics/Pages/organics-drop-off.aspx

*"**Residential Organics Drop-off Location Acceptability List**"* (Updated: 6/18/2016):
https://www.co.dakota.mn.us/Environment/Residential/Organics/Documents/OrganicsAccepted.pdf

*"**Organics Recycling** (pilot brochure)"*:
https://www.co.dakota.mn.us/Environment/EducationResources/Publications/Documents/OrganicsPilotBrochure.pdf

*"**Prevent Food Waste**"* (Last updated: 4/28/2017):
https://www.co.dakota.mn.us/Environment/Residential/Organics/Pages/prevent-food-waste.aspx

*"**Composting at Home**"* (Last updated: 3/31/2017):
https://www.co.dakota.mn.us/Environment/Residential/Organics/Pages/composting-at-home.aspx

*"**Yard Waste Disposal**"* (Last updated: 2/14/2017):
https://www.co.dakota.mn.us/Environment/Residential/Organics/Pages/yard-waste-disposal.aspx

Methods of Organics Recycling: Dakota County owns and manages the operation of one unstaffed, residential drop-off location for organics recycling (as of May 2017) at Thompson County Park in West St. Paul. This drop-off site accepts specified organics material only (no yard waste). This organics drop-off site is a fenced, locked enclosure in the south parking lot of Thompson Park. Dakota County residents may use the site for free, but must sign up through the County's organics recycling program either by phone or email. Subscribers will then receive a welcome kit including compostable bags and instruction on how to prepare organics for deposition at the drop-off site. Subscribers also receive the access code to the locked drop-off enclosure.

For informational purposes, Dakota County also promotes the use of nearby commercial composting operations that are open to the public for organics drop-off for a small fee. At this time, the County lists The Mulch Store / Specialized Environmental Technologies (SET) in

Empire Township and the Shakopee Mdewakanton Sioux Community (SMSC) Organics Recycling Facility in Shakopee.

Dakota County has a public education program to encourage organics recycling including web based educational information, promotions at special events, and other local outreach tools (e.g., free compostable bags, etc.).

Date(s) Program Started: 2015

Program History: Dakota County originally described the Thompson County Park organics drop-off site as a "pilot" program.

Organics Items Accepted in the County Drop-Off Program:
(The list below is selected examples only. See Dakota County web pages and other Organics Recycling resources listed above for the complete listing of accepted items.)

- All food scraps including vegetables, fruit, meat, bones, fish, bones, dairy, eggs, grains, bread, pasta, coffee grounds and filters, tea bags, etc.
- Food soiled paper products including paper towels, napkins, tissues, paper egg cartons, dirty paper bags, etc.
- Other compostable items such as Biodegradable Products Institute (BPI)-certified or Cedar Grove certified 'Compostable" cups and utensils.*

  [* Note: The County's education materials include a caution that packaging and compostable table ware must have the logo from the BPI or Cedar Grove on the box or item.]

Items NOT Accepted in the County Drop-Off Program:
(The list below is selected examples only. See Dakota County web pages and other Organics Recycling resources listed above for the complete listing of items NOT accepted.)

- Yard waste.
- Plastic bags.
- Recyclable items (e.g., glass, plastic, metal, clean paper, etc.).
- Cartons (e.g., milk, soup, broth, juice, wine, etc.). These items contain a plastic coating and should be recycled instead.
- Fast food wrappers.
- Frozen food boxes.
- Liquids.

- Styrofoam™.
- Food service items (e.g., utensils, plates, bowls, cups) NOT certified as compostable.*

Hours/Days Open to the Public: The Thompson County Park is open from 5 a.m. to 10 p.m., seven days per week, 365 days per year.

Costs to County: The County pays for organic material hauling, composting service fees, permits and other approvals, compostable bags for residents, "starter kits," and other education/outreach tools. The organics recycling drop-off site at Thompson County Park is not staffed so there are no ongoing labor costs other than administration and public education.

Performance Metrics: The County tracks: the number of organics drop-off program visits (indirectly by how many free compostable bags are given away), tonnages and informal visual quality inspections.

Appendix B
Detailed Description of Greenhouse Gas Modeling Methodology

Appendix B
Detailed Description of Greenhouse Gas Modeling Methodology

1 Introduction and General Assumptions

Foth used a combination of the Minnesota Pollution Control Agency (MPCA) *Collection Analysis Tool* and United States Environmental Protection Agency (USEPA) *Waste Reduction Model (WARM)* emission values to estimate the Greenhouse Gas (GHG) emissions of the two different organics collection methods *("separate collection" and "co-collection with trash")*.

Conceptual waste flow systems were developed for each method. Thirteen (13) scenarios were developed, including the current ("baseline") scenario, based on the two different organics collection methods and two additional system variables:

- Legal hauling structure (i.e., "open" vs. "organized" hauling); and
- Funding method resulting in different financial incentives for residents to participate ("subscribers only pay and extra charge" vs. "everyone pays citywide with costs embedded into the base trash rates")

A number of modeling and waste flow assumptions were used to complete this analysis including:

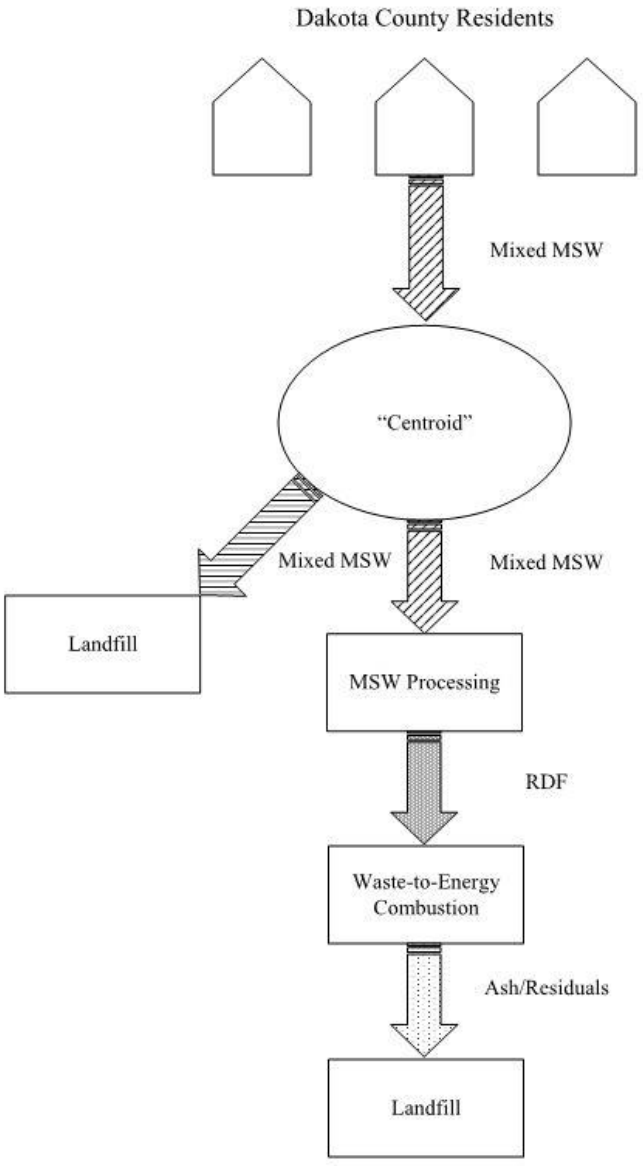
- Residential trash is assumed to be 45% and commercial trash is 55% of total municipal solid waste (MSW) as currently disposed in facilities that receive mixed MSW. This estimate is based on the most recent mixed waste composition studies that provide a split between residential and commercial waste.
- Single-family households up through three-plex only; Multi-unit dwellings four units per building and above are excluded from this analysis and are considered commercial generators.
- For purposes of the GHG modeling, 90% of the trash collected from Dakota County is assumed to be landfilled and 10% of the trash is assumed to be processed at a refuse derived fuel (RDF) facility. This is approximately the split in MSW management based on the County's 2015 Certification Report submitted to the MPCA.
- The private composting facility in Empire Township, owned and operated by SET, is the assumed organics composting facility location for the project modeling. This assumption applies to both the *separate collection* of organics method and the *co-collection of organics with trash* (a.k.a., "Blue Bag") collection method. The SET facility is the assumed location of any compostable bags of organics / trash sorting operations. This Empire Township location placeholder is a modeling assumption only and is not intended to imply a County preference for one composting facility over another.

2 Conceptual Waste Flows by Collection Method

In order to efficiently model the relative GHG emissions of the two alternative organics collection methods, a "centroid" concept for packer truck route modeling was developed. The centroid is the geographic center of Dakota County based on housing density. The centroid simply represents a single, conceptual center point of the County so that changes in haul distances due to the alternative organics collection methods can be calculated.

Figure B-1 displays the conceptual waste flow diagram of the *current ("baseline")* system. The current system has no curbside organics collection in Dakota County. Therefore, Figure B-1

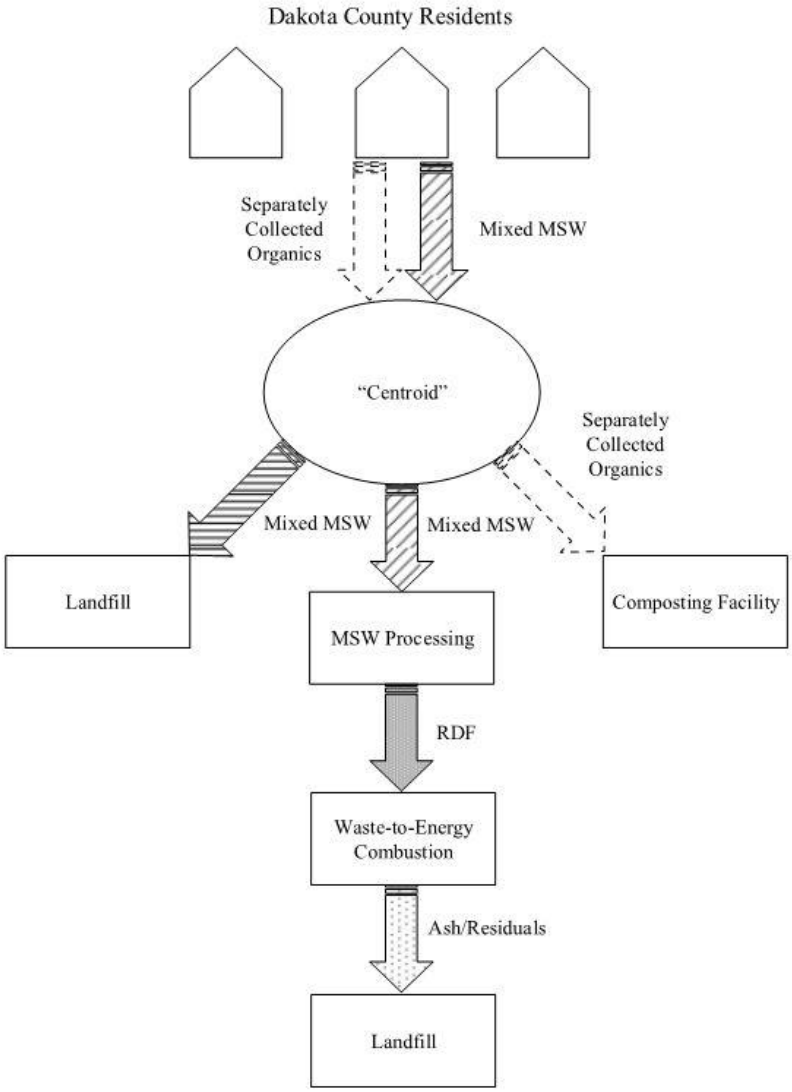
Figure B-1
Conceptual Waste Flows of the *Current ("Baseline")* System



displays the conceptual flow of mixed MSW only. For purposes of modeling the differences in GHG emissions between the alternative collection methods, the conceptual waste flows are simplified. The trash flows from the residential centroid to landfill or mixed MSW processing facility. To calculate haul distances, the locations of the actual landfill (Burnsville Landfill), RDF facility (Recycling & Energy Center - Newport facility [R&E Center]), RDF waste-to-energy/combustion (Excel facility at Red Wing), and ash/residual landfill facilities (Pine Bend Landfill/Red Wing Landfill) were used and held as constants for all conceptual waste flows. These facility locations are modeling "placeholders" and do not imply any type of County preference or waste management policy.

Figure B-2 displays the conceptual waste flow diagram for the *separate collection of organics* system. The same centroid for residential trash collection is used along with landfill, MSW processing and RDF combustion facility locations, but the organics are *collected separately*

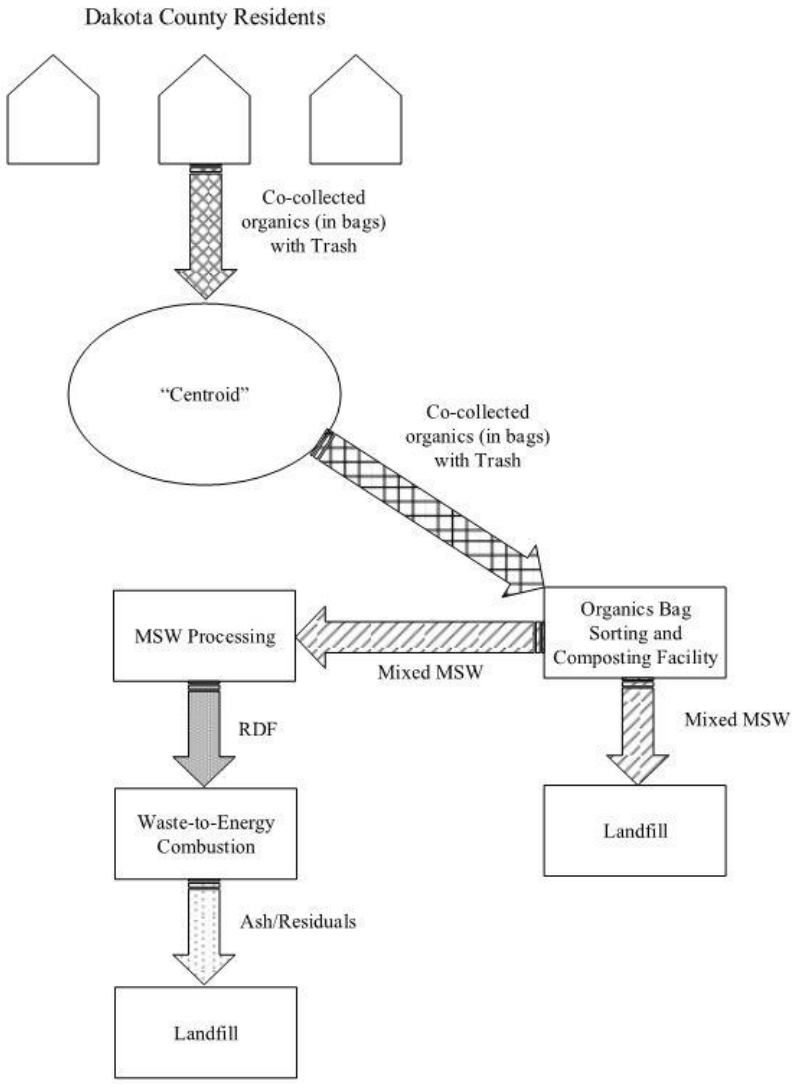
Figure B-2
Conceptual Waste Flows of the *Separate Collection of Organics* System



under the various assumptions of this new residential curbside system. The organics are collected in standard packer trucks and hauled from the conceptual centroid directly to a composting facility. Composting facility residuals are minimal and were not modeled. Furthermore, all composting facility operations emissions were not modeled (i.e., loader operation only) and distribution of finished compost was not modeled. WARM estimates the emissions factors for compost turning to be 0.02 metric tons of carbon dioxide emissions per ton ($MTCO_{2e}$/ton) of material and the compost emissions to be 0.0724 $MTCO_{2e}$ /ton of material. These emissions are typically offset by compost application to soils which creates a carbon sink. However, estimating this impact is difficult and requires considerable analysis of soil and compost properties. For ease of modeling, additional composting facility operation emissions and compost offsets due to carbon sinks when applied to soil were assumed to be equal.

Figure B-3 is a conceptual waste flow diagram of the *co-collection of organics with trash* method. Like the previous organics collection method assumptions, the same centroid for residential trash collection is used along with landfill, MSW processing and RDF combustion facility locations. The organics are *co-collected with trash* in this method under the various assumptions of this new residential curbside system. The co-collected organics and trash are collected in the same, standard packer trucks used today for trash alone and hauled from the conceptual centroid directly to a bag sorting / composting facility. This organics sorting facility is assumed to use a trash sort line to pick out the compostable bags of organics and then truck the regular trash to landfill or MSW processing facility. The sorted, compostable bags of organics are then delivered to the standard composting operations for mixing and windrow composting operations; the bags do not need to be opened.

Figure B-3
Conceptual Waste Flows of the *Co-Collection of Organics with Trash* System



3 Planning Scenarios for GHG Modeling

Table 4 in Section 10 of the *Analysis of Residential Organics Recycling in Dakota County* (*Report*) lists the curbside collection scenarios used for modeling GHG emissions. There are a total of thirteen (13) planning scenarios developed for modeling the relative GHG emissions including the *Current ("Baseline")* System. The two alternative organics collection methods are *separate collection* (scenarios #1.a, #1.b, #2.a and #2.b) and *co-collection with trash* (scenarios #3.a, #3.b, #4.a and #4.b). The other key planning variables for purposes of modeling GHG emissions include: trash collection legal structure (open vs. organized trash hauling); organics collection legal structure (open vs. organized organics hauling); who pays (subscribers only pay vs. everyone pays citywide); and "mandatory" organics separation requirement (i.e., via

ordinance amendment) vs. "voluntary" compliance. These variables are discussed in further detail in the body of the *Report.*

These thirteen (13) scenarios are described and each modeled separately using the various assumptions specified in this Appendix. The design of this GHG modeling analysis is to compare the relative difference in GHG emissions between the scenarios including changes in emissions due to composting organics as opposed to combustion or landfilling. The primary intent is to analyze the comparative GHG emissions between organics collection methods as one of the criteria to evaluate the best alternative for Dakota County planning and policy development.

4 MPCA Collection Analysis Tool and Long Haul GHG Emissions

As part of the MPCA *Analysis of Waste Collection Service Arrangements* study,[1] Foth prepared an Excel spreadsheet tool to estimate GHG emissions due to open hauling and organized collection systems. This MPCA Collection Analysis Tool (MPCA Collection Tool) calculates the total annual fuel consumption and total annual equivalent carbon dioxide emissions (CO_{2e}) based on a series of assumptions.

This MPCA Collection Tool was used to estimate the relative fuel usage for collection trucks (e.g., packer trucks) while on the neighborhood routes in Dakota County. The MPCA Collection Tool includes total miles driven and therefore also includes the non-route, "dead time" to deliver the full loads to a landfill or mixed MSW processing facility.

Open hauling systems allow residents to subscribe to the licensed hauler of their choice and generally result in multiple haulers serving the same geographic area. Contract or "organized" hauling systems require 100 percent of the route to be served by only one hauler. Open hauling systems have additional route truck miles traveled and fuel consumed that contributes to GHG emissions due to the multiple haulers serving the same geographic area.

As the percentage of households served/collected by one hauler ("route density") increases, there is greater efficiency in collection and less drive time (time spent driving without performing collections). To estimate these fuel efficiencies for the MPCA *Collection* study, Foth measured fuel consumption for collection services while actually on a collection route. This data allowed Foth to determine the amount of fuel used per household collected.

To estimate GHG emissions, a CO_{2e} factor of 10.21 kilograms (kg) of carbon dioxide (CO_2) per gallon of diesel fuel (22.51 pounds of CO_2 per gallon) was used, as well as other factors for nitrous oxide (N_2O) and methane (CH_4), based on USEPA emission factors.[2] These factors are

[1] MPCA report, *Analysis of Waste Collection Service Arrangements* prepared by Foth Infrastructure & Environment, LLC (June 2009): http://www.pca.state.mn.us/index.php/view-document.html?gid=4514

[2] EPA (2014) Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2012. All values calculated from Table A-107. http://www.epa.gov/climateleadership/documents/emission_factors.pdf. Accessed 2/15/2015. Last modified 4/4/2014.

used for all on-road diesel fuel use.[3] Fuel is first estimated in ounces per stop and then converted to annual gallons which are used to calculate GHG emissions on an annual basis.

The MPCA Collection Analysis Tool uses the following variables:

- Number of households or receiving collection service.
- Percentage of households or participating in a collection service.
- Frequency of pick up.
- Number of haulers collecting a material in the system.
- Percentage of market share of each hauler.
- Estimated distance between each household.
- Estimated fuel consumption rates.

Long haul miles were calculated separately, not using the MPCA Collection Tool, but using the same emission factors for on-road diesel fuel use mentioned above. The calculations used for determining the GHG emissions associated with the long haul miles is based on the total tons of the material being moved including: trash, organics collected separately, or organics co-collected with trash. Truck capacity was estimated to be 5 tons in standard packer trucks used on the collection routes. Semi-trailer capacity was estimated to be 19 tons per load for transfer loads of mixed MSW, RDF, and ash/residuals transport.

The total number of trips was calculated for each part of the material transport (e.g., MSW to the landfill, separately collected organics to the composting facility, etc.) Each trip was assigned an estimated mileage based on distance to assumed facilities.

For this analysis, a general mile per gallon (MPG) per truck was used based on the type of truck being used to transport the material. For residential collection of trash and organics, a standard side loader type truck was modeled. Side loader type trucks have a typical fuel efficiency rating of 3.0 MPG.[4] Using the estimated miles traveled and the estimated miles per gallon per truck, the total annual gallons of diesel fuel use was calculated.

The amount of GHG's emitted from on-road diesel fuel consumption is based on data provided by USEPA for mobile combustion sources.[5] For diesel fuel use, the GHG emissions factors were:

- 10.21 kg of CO_2 per gallon

[3] Note: The USEPA has different factors for diesel fuel use in the Mandatory GHG Reporting Rule which are applied to stationary sources

[4] Sandhu, Gurdas, et. al. *"Real World Authority and Fuel Use of Diesel and CNG Refuse Trucks."* Presented at 2014 PEMS International Conference and Workshop. April 3-4, 2014. Riversdale, California. Slide 31.

[5] USEPA (2014) Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2012. All values calculated from Table A-107. http://www/epa/gov/climateleadership/documents/emission-factors.pdf. Accessed 2/15/2015. Last modified 4/4/2014.

- 0.0048 grams (g) of N_2O per mile
- 0.0051 g of CH_4 per mile

To convert the N_2O emissions to CO_{2e} required the emissions to be multiplied by the global warming potential (GWP). The GWP for CO_2 is 1; for N_2O the GWP is 298; and for the CH_4 the GWP is 25.[6] Therefore, all transportation GHG emission was converted to carbon equivalents (i.e., CO_{2e}) using the GWP.

The transportation model is not intended to provide a GHG lifecycle emissions of the vehicles used in transport. Rather it looks at fuel usage and compares the GHG generated from fuel usage between the scenarios. The transportation model outputs are provided in Table 6 in Section 10 of the *Report* for each of the scenarios analyzed. All emissions are based on the annual residential tonnage of 91,132 tons. Outputs are in $MTCO_{2e}$ per year.

4.1 Dakota County Collection and Hauling Assumptions

Currently Dakota County has a combination of open collection and organized systems for residential households. Dakota County has an estimated 113,000 residential households. A breakdown of residential parcel counts by city or township is provided in Table B-1.

Table B-1

Residential Parcel Counts

City or Township	Residential Parcel Count[1]
Apple Valley	14,686
Burnsville	14,763
Eagan	18,126
Farmington	6,299
Hastings (Dakota Co. part)	6,349
Inver Grove Heights	8,323
Lakeville	17,868
Mendota Heights	3,624
Rosemount	6,891
South St. Paul	6,366
West St. Paul	4,963
All other cities and townships	4,742
TOTAL	113,000

Notes:

[6] 100-Year Global Warming Potentials, IPCC Fourth Assessment Report. https://www.ipcc.ch

[1] "Residential Parcel Count" is defined by County ordinance as buildings with 1 to 3 units. Data provided by Dakota County staff (email of May 8, 2017)

A review was completed of the licensed residential haulers in each of the largest cities as an estimate of the number of haulers for GHG modeling purposes. The relative market share of residential accounts was assumed based on general averages in open hauling systems. Generic market share estimates were made by city and not applied to specific hauling companies. Apple Valley, Burnsville, Eagan, Inver Grove Heights, Lakeville, Mendota Heights, Rosemont and South St. Paul were modeled using four haulers having a total of 70 percent of the household collection market; each hauler would have a 17.5 percent share of the market. The remaining haulers in each of the cities would have an equal share of the remaining 30 percent of the market.

For example, in Burnsville and Eagan there are a total of seven licensed residential haulers. Four of the haulers would each have a 17.5 percent share of the residential collection (for Eagan, approximately 3,200 households) and the remaining 3 haulers would each have a 10 percent share of the market (approximately 1,800 households). The percent of market share impacts GHG emissions since the model assumes a distance between households and the number of pickups to estimate GHG emissions from the collection vehicle.

West St. Paul has five licensed residential collection haulers so each hauler was modeled to have a 20 percent share of the market (approximately 1,000 households per hauler).

The cities of Farmington and Hastings have organized collection structures. Each city has one hauler for residential trash collection (Farmington uses city crews).

The collection system used to model GHG emissions for residential customers is based on standard, once per week collection of trash and organics at the curb side, 52 weeks per year.

An average distance of 125 feet between households was assumed based on results from previous studies. The MPCA Collection Tool considers the "dead heading" time between stops. For example, if a hauler has 25 percent market share in an open hauling collection city, they will drive past four households or 500 feet for each stop collected.

5 USEPA WARM

WARM was created by the USEPA to estimate GHG emission reductions from several different waste management practices. The latest version of WARM, together with significant background literature research, is downloadable from USEPA's web site and provides a user-friendly GHG analysis and planning tool.[7] One of its greatest advantages is that WARM has become the standard GHG modeling tool within the discipline of integrated solid waste management planning.

WARM was created as a tool to compare GHG emissions and reductions for various solid waste management scenarios. WARM estimates GHG emissions for baseline solid waste systems and

[7] WARM and background information is available on USEPA's website at: http://www.EPA.gov/warm.

various alterative scenarios. Emission factors for various solid waste materials and options are available in WARM background documents.

The composting, mixed MSW processing, and landfill components of the overall Dakota County system were modeled using emissions factors from WARM background data and determining appropriate emission factors. Therefore, WARM was used for analyzing facility GHG emissions only. Even though WARM can also consider transportation of materials, WARM travel distances were set to zero. For this Dakota County study, GHG emissions from transportation are analyzed using the MPCA Collection Tool (route miles) and GHG emissions for long haul miles were calculated using the same emission factors.

A series of detailed assumptions about the composition of organics were made based on readily available studies. WARM definitions were compared to standard definitions used within local waste composition studies to derive the best fit for this analysis. Foth used 75 percent "food waste" and 25 percent "mixed organics" as defined by WARM to represent the working definition of source separated organics (referred to simply as "organics" in this study).

For the landfill option, emissions factors were estimated based on a landfill with active landfill gas (LFG) recovery converted to energy (electricity). Emissions factors consider landfill equipment emissions, fugitive (uncollected) LFG emissions, engine/generator emissions and an estimate of grid power offsets (e.g. the reduction of GHGs from not using coal to produce the same amount of electricity).

GHG emissions for RDF processing were calculated using the annual electric use at the R&E Center. To estimate the GHG emissions associated with RDF production, Foth used the available data based on electric use for the R&E Center to determine the estimated kilowatt hours (Kwh) needed per ton of processed waste. The electrical usage of the plant has remained consistent year to year, so the estimate of electrical use for the facility is valid for the systems modeled. Based on the information, an estimate of 25.27 Kwh is required per ton of material processed.

WARM does allow for specific materials to be entered into the model. Foth evaluated the waste composition study results from several sources. In 2013, MPCA published the *Statewide Waste Characterization* study. Foth evaluated both the statewide aggregated results and the mixed MSW composition as sorted at the Pine Bend Landfill in Inver Grove Heights. These local results were then compared them to the mixed MSW composition provided by WARM background documentation. Table B-2 provides a summary of results from the comparison. WARM used the USEPA national waste composition and laboratory studies to determine GHG emissions. Foth used the default mixed MSW category in WARM for determining GHG emissions for the composition of the remaining residential mixed MSW material after removal of organics by residents.

Table B-2

Waste Characterization Comparison
Warm Model Mixed MSW

Category	USEPA 2003	USEPA 2008	Pine Bend 2013	Statewide 2013
Paper & Paperboard	34.3	31.0	23.3	24.5
Glass	5.2	4.9	2.0	2.2
Metals				
Ferrous	6.1	6.3	0.3	0.7
Aluminum	1.3	1.4	0.5	0.4
Other Non-Ferrous	0.7	0.7	2.3	3.3
Plastics	11.5	12.0	20.0	17.9
Rubber & Leather	2.9	3.0	5.3	4.7
Textiles[1]	4.4	5.0	NA	NA
Wood	5.6	6.6	5.9	5.7
Other[2]	1.7	1.8	12.0	15.3
Food Scraps	11.8	12.7	16.2	17.8
Yard Trimmings	13.0	13.1	2.4	2.8
Misc. Organic Wastes	1.5	1.5	9.8	4.7

Notes:
All values are in percent.
[1] Textiles and leather were combined in the Minnesota studies and are included in the rubber and leather category.
[2] For the Minnesota studies, the other category included waste not categorized in the USEPA studies.

Appendix C
City of Minneapolis Residential Organics Recycling Program Profile

Appendix C
City of Minneapolis Residential Organics Recycling Program Profile

Web Pages: City of Minneapolis

Residential Organics Recycling (program home web page):
http://www.ci.minneapolis.mn.us/solid-waste/organics/index.htm

Questions and Answers web page:
(Frequently asked questions – FAQs)
http://minneapolismn.gov/solid-waste/organics/WCMS1P-136943

Residential Organics Drop-Offs web page:
http://www.minneapolismn.gov/solid-waste/organics/WCMS1P-131996

Organics Recycling Drop-Offs PDF brochure:
http://www.minneapolismn.gov/www/groups/public/@publicworks/documents/webcontent/wcms1p-149134.pdf

What are organics? web page:
(Acceptable/Not Accepted web page)
http://minneapolismn.gov/solid-waste/organics/acceptable-organics

Detailed "Yes and No" List PDF list:
http://minneapolismn.gov/www/groups/public/documents/webcontent/wcmsp-171524.pdf

Logo:

Methods of Organics Recycling: *Separate collection* using dedicated organics carts supplied. Also, the City operates seven (7) organics drop-off locations.

City and contract crews haul dedicated loads of curbside collected organics to the SKB Environmental (SKB) Malcolm Avenue Transfer Station located in southeast Minneapolis (630 Malcolm Avenue SE). (For more information on this private transfer station and their organics recycling services, see the SKB web page "Organic Waste" at http://www.skbinc.com/processing-recycling/organic-waste.html.)

The organics are then transferred to the SET/The Mulch Store composting facility in Empire, MN. (For more information on the SET – Empire facility and their organics recycling services,

see The Mulch Store's "Organics Recycling" web page at: http://www.mulchstoremn.com/organics.html.)

Key Dates: The Minneapolis pilot curbside collection programs started October 2007. The first drop-off locations opened April 2014. Promotion of citywide curbside collection began January 2015, with the first phase of the citywide roll-out of curbside organics collections beginning April 2015. The second and final phase of curbside organics collections roll-out began in the spring of 2016. The first full month of citywide organics collections began in July 2016.

Program History: The Linden Hills neighborhood requested that the City begin organics collection as part of a Linden Hills Power and Light initiative. The neighborhood agreed to pilot the organics program. The pilot program was successful in proving the concepts of education and sign-up methods, participation, and sustaining curbside organics collection in an urban environment. Two additional neighborhood pilot areas, East Calhoun Community Organization (ECCO) and Seward, were added in 2009 to test the program with different demographics.

Several reports/presentations were prepared to evaluate and discuss the City's options for moving forward with curbside collection of organics:

- In October 2013, Foth Infrastructure & Environment, LLC completed a study for the City, *Assessment of Residential Source Separated Organics Collection Options* (http://www.ci.minneapolis.mn.us/www/groups/public/@publicworks/documents/webcontent/wcms1p-121817.pdf).

- On March 18, 2014, a presentation by City staff, *Organics Collection in Minneapolis*, was produced for the City Council Transportation and Public Works (T&PW) Committee (http://www.minneapolismn.gov/www/groups/public/@clerk/documents/webcontent/wcms1p-122108.pdf).

In March 2014, following a County requirement that cities of the first class provide organics collection services, Minneapolis developed a plan for citywide curbside organics collection services. The first phase of the curbside collection roll-out was completed in September 2015. Seven drop-off locations were installed in 2014 and 2015. The second phase of the curbside program roll-out occurred between March and July 2016.

On March 3, 2015, Minneapolis staff presented an Organics Recycling *Strategic Communication and Outreach Plan* to the City Council T&PW Committee (http://www.ci.minneapolis.mn.us/www/groups/public/@publicworks/documents/webcontent/wcms1p-149447.pdf).

On October 8, 2015, Minneapolis staff presented the *Citywide Organics Recycling Roll-Out: Education, Outreach and its Impacts* - Staff presentation at the Recycling Association of Minnesota (RAM) and Solid Waste Association of North America (SWANA) Conference (http://www.ci.minneapolis.mn.us/www/groups/public/@publicworks/documents/webcontent/wcms1p-150386.pdf).

On May 3, 2016, Minneapolis staff presented the *Organics Recycling Ad Campaign and Program Rollout Status* by Angela Brenny, Kellie Kish, and Bridgette Bornstein.

News Coverage: The Minneapolis program has attracted ample new coverage, most notably the following articles in the *Star Tribune* newspaper that help summarize the program design and performance to-date:

> "Four things to know before you get your new Minneapolis organics bin" by reporter Erin Golden (January 29, 2016)
>
> "Minneapolis seeks to increase organics recycling" by reporter Erin Golden (May 8, 2016)
>
> "Minneapolis curbside composting yields high interest, less organic waste than expected" by reporter Steve Roper (July 14, 2017)

Items Collected: The City has extensive lists of organics that are acceptable and not acceptable (see Minneapolis web page links above). Items that are prohibited from the City's curbside organics collection program include (but are not limited to):

- Yard waste (collected separately);
- Traditional recyclables that should go into the City's blue, single-stream recycling cart (such as paper, plastic, glass, metal and cartons);
- Plastic lined paper products (such as ice cream tubs, microwave popcorn bags, hot and cold take-out cups, Chinese take-out food containers, etc.);
- Items labeled "biodegradable";
- Pet waste, litter or bedding;
- Items that have chemicals on them (such as cotton swabs used for nail polish application or removal, cleaning wipes, etc.);
- Diapers, baby wipes and feminine hygiene products; and
- Polystyrene foam (a.k.a., Styrofoam™).

Recently dryer lint and vacuum bags were added to the City's "Not Acceptable" list. These and other fabric items that contain synthetic fibers do not break down in the composting operations.

Service Levels: Weekly curbside organics collection at participating single family homes with a 32- or 64-gallon cart is standard. Properties with more than two dwelling units receive a 64-gallon cart. A larger cart (95-gallon) is available for any customer.

The curbside program uses the *separate collection* method. It is also described as an "opt-in" design whereby residents must sign up for the extra curbside organics collection service. There is no additional charge for signing up or participating because all customers citywide pay the increased rate for the organics services regardless if they sign-up or not. Participation in both the organics and recyclables collection programs are voluntary.

Residents of any property in the City can sign up to participate in the drop-off program. Drop-off customers receive instructions on using the drop-off containers or can drop off organic's at the South Transfer Station during station business hours. (See Minneapolis web page links above.)

Rates to Residents: City staff reported that the rate for all Minneapolis solid waste & recycling customers increased in 2015 by $3.35 per month for the organics recycling services and $0.65 per month for other solid waste and recycling programs. (Presentation at the October 2015 RAM/SWANA conference; see links under Minneapolis program history above.)

Costs to City: The Minneapolis 2015 solid waste and recycling division budget increased from the previous year due to the implementation of citywide source separated organics recycling program and other new solid waste and recycling costs. The City's 2015 budget document states:

> "The implementation of a citywide source-separated organics recycling program scheduled for 2015 estimated to cost $6.0 million in the first year, with $5.1 million of the costs being one-time in nature for program start-up."
>
> (Source: 2015 Minneapolis City Council Budget, as adopted by the City Council on December 10, 2014; City Council Departments: Section F – Operating Departments: Public Works: Solid Waste and Recycling Division, "Financial Analysis – Public Works Solid Waste & Recycling" [page F-236]; http://www.ci.minneapolis.mn.us/www/groups/public/@finance/documents/webcontent/wcms1p-137075.pdf).

The City Solid Waste & Recycling Division purchased additional trucks to serve the City's share (50%) of the City's residential customers. The contracted hauler (Minneapolis Refuse, Inc. – MRI) serves the other 50% of the customers. Through a negotiated City contract amendment, MRI increased its contract cost by an additional $3.25 per dwelling unit (DU) per month in 2015 to provide organics collection services (there have been modest annual CPI adjustments to this price since then). This MRI contract fee does not include the cost of carts or organics tipping fees as these are paid directly by the City. This MRI fee applies as long as the participation is at or below fifty percent (50%).

Funding Sources: Customers are billed for the cost of solid waste services as part of their, quarterly utility bill. All customers pay for organics, solid waste and other recycling services regardless of use or participation. The Minneapolis Solid Waste and Recycling Division is an enterprise operation similar to other utilities (e.g., water, sewer, etc.).

The City also receives State of Minnesota Select Committee On Recycling and the Environment (SCORE) funds as passed through from Hennepin County to be used in the recycling programs, including organics recycling. In 2015 the City received $120,000 in extra SCORE funds for

organics programs. Given the new Hennepin County grant funding formula, Minneapolis was projected to receive an extra $316,000 for its organics recycling programs in 2016.

Performance Metrics: The City tracks number of sign-ups, sets-outs by signed-up residents, issues with organics set-outs (non-acceptable material, organics not bagged, use of non-compostable bags), number and type of educational contacts, number of carts removed for excessive trash, number of carts removed at the request of residents, tons of material collected, personnel, trucks devoted to program, number of customer calls regarding program, and other operations data.

In a recent phone interview (May 16, 2017), City staff have stated that the 10-month (July 2016 through April 2017) average organics tonnage amounts was 374 tons per month or the equivalent of about 4,487 tons per year. This calculates to about 84 pounds per *TOTAL* household per year (or the equivalent of about 200 pounds per *PARTICIPATING* household as of May 2017).

"As of Monday August 28, 2017, 43.11%, of Minneapolis Solid Waste & Recycling customers (46,132 households) have signed up to participate." (City web page: "Residential organics recycling - Sign Up Now"). A Star Tribune newspaper article discussed this sign-up rate and the amount of organics composted ("Minneapolis curbside composting yields high interest, less organic waste than expected" by reporter Steve Roper, July 14, 2017.)

Hennepin County Organics Recycling Resources: For more information on Hennepin County's current organics recycling program, see the County's "Organics Recycling" web page at: http://www.hennepin.us/business/recycling-hazardous-waste/organics-recycling#composting-haulers.

Appendix D
City of Wayzata Residential Organics Recycling Program Profile

Appendix D
City of Wayzata Residential Organics Recycling Program Profile

Web Pages: **City of Wayzata:**

Garbage, Recycling & Organics web page:
http://www.wayzata.org/170/Garbage-Recycling-Organics

Wayzata Organics Program web page:
http://www.wayzata.org/189/Wayzata-Organics-Program

Organix Solutions:
(City organics recycling partner)

Blue Bag Organics Subscription Program web page:
http://www.organixsolutions.com/blue-bag-organics/blue-bag-organics-program

GOOD STUFF for Blue Bag Organics Recycling
(List of acceptable and not acceptable items)
http://www.organixsolutions.com/blue-bag-organics/guide-composting

Randy's Environmental Services:
(City's solid waste/recycling contractor)

General Randy's brochure:
http://www.wayzata.org/DocumentCenter/View/182

Logo:

Methods of Curbside Organics Recycling: The City of Wayzata organics recycling program currently uses the *co-collection with trash* method of curbside collection. Residents hand-tie the Blue Bag Organics™ can liner containing the household's organics and place the secured Blue Bag™ in the trash cart. The City's solid waste/recycling contractor, Randy's Environmental Services, separates the Blue Bags™ from the trash at their facility in Delano and transports the Blue Bag™ material to a composting facility.

Date(s) Program Started: The current curbside organics collection program using the *co-collection with trash* method started in January 2013.

Program History: The City of Wayzata conducted a pilot project for a curbside collection of organics from April 2003 through June 2005 using the *separate collection* method. The City's original organics pilot program received a grant from Hennepin County.

During the pilot study, the organics material collected from residents included food scraps and non-recyclable paper. Residents separated the acceptable organics materials from the rest of their trash. Each resident was provided with a sealable food "kitchen bucket" to collect food scraps on a daily basis. Residents were also provided with a dedicated organics cart to keep and set out next to their regular trash cart.

Residents set out their organics cart next to their trash cart for collection on a weekly basis. After separate collection of the organics, the material was taken to the Hennepin County Brooklyn Park Transfer Station (BPTS). Organics loads were tipped and inspected to ensure that non-compostable contaminants were below acceptable levels. After the material was inspected, it was transported by Hennepin County to the SET composting facility in Empire. The organics that Wayzata residents placed out on the curb was turned into compost, returned to the City and used in its community gardens.

During the pilot program, over 70 percent of the households (1,200 total households) in the City participated. The amount of material collected weekly was typically between 1.5 to 2.0 tons. Weekly set-out rates were between 42 percent and 48 percent. The organics recovery rate ranged from 87 to 173 pounds of organics per total household serviced per year (including all households in the city, even those not participating in organics recycling).

When the pilot project ended in 2005, the City of Wayzata permanently added organics collection service to the City's residential curbside collection program through a sole-sourced contract with Randy's. Wayzata was the first city in the Twin Cities Metropolitan Area to offer curbside collection of organics to all its residents.

The costs associated with the organics collection program included: curbside collection, transfer, transportation, and composting ("tipping") fees. To cover these additional costs, the City increased trash and recycling fees. To help residents offset this additional cost, the City encouraged downsizing of trash service levels and offered the new option of every-other-week (EOW) trash collection.

Through 2012, the organics were picked up using the *separate collection* method. In January 2013, under the current contract, Randy's and the City switched to the "Blue Bag™" program (*co-collection with trash*).

Items Collected: The list of collected items is referenced on the Organix Solutions web page (see web page and list cited above). Items excluded from other residential organics programs are included such as waxed paper, parchment paper, wax-coated paperboard packaging/containers, refrigerated foods/frozen food packaging (non-plastic).

Service Levels: The Blue Bag Organics™ are put into the residents' 35-, 65- or 95-gallon trash carts.

Rates to Residents: The costs for the curbside organics collection service are included in the City's recycling fee. The City's total recycling charge to residents is $8.00 per month per household (Wayzata 2016 Fee Schedule: http://www.wayzata.org/documentcenter/view/1345). According to City staff, this total includes curbside recycling of traditional recyclables, organics collection, the City's spring clean-up program, fall leaf collections, and the Christmas tree pick-up in the winter. The $8.00 has been the fixed price, without any annual escalators, since the beginning of the new contract term in 2013.

Wayzata residents are encouraged to recycle as much as possible and switch to a lower level of trash service to save money. The City also offers an EOW option at each of the three trash cart size service levels.

Blue Bag™ Organics Supplies Delivered to Residents: According to the City's web page, "Composting & Recycling FAQs" (http://www.wayzata.org/190/Composting-Recycling-FAQs), when Wayzata residents sign up for the service, Randy's will deliver a starter kit including:

- 32-gallon Blue Bags Organics™ can and lid;
- 60 of their 32-gallon Blue Bag Organics™ compostable can liners per year;
- Ventilated kitchen compost bucket; and
- Coupon for a complimentary bag of Blue Bag™ Premium Compost.

See the City's web page for more details including the stated value of these starter kit items.

Costs to City: The most recent Wayzata – Randy's contract includes a line item of $5.00 per month per household as the estimated added recycling cost for the Blue Bag Organics™ collection services and supplies listed above. The balance of $3.00 can be allocated to the other recycling costs such as traditional recyclables curbside collection.

Funding Sources: All Wayzata residents served under the contract pay the full cost of recycling and solid waste services through their bi-monthly City utility bill. In addition, the City receives State of Minnesota SCORE funds passed through from Hennepin County, including an added amount dedicated to organics recycling, which may be used for education and promotion of recycling services and education programs.

Performance Metrics: Randy's provides the information to the City to complete the annual SCORE report including organics tonnages, subscription and participation rates.

Appendix E
City of Coon Rapids, MN and Walters Recycling & Refuse
Organics Recycling Program Profile

Appendix E
City of Coon Rapids, MN and Walters Recycling & Refuse
Organics Recycling Program Profile

(Pilot program to Walters' residential customers in the City of Coon Rapids)

Web Page: **City of Coon Rapids:**

Organics Recycling web page:
http://www.ci.coon-rapids.mn.us/398/Organic-Recycling

CTN Studios (Community access cable TV):
City Connections program:
"Organics and Styrofoam Recycling at the Coon Rapids Recycling Center" video story by Stephanie Ring
(Published on YouTube on September 18, 2015)
https://www.youtube.com/watch?v=A477jOw1sWQ

Walters Recycling & Refuse:

Blue Bag Organics™ web page:
https://waltersrecycling.com/blue-bag-organics/

Jackie Edwards (Walters) presentation at the 2015 RAM/SWANA conference, October 8, 2015:
"Organics Education: Our Journey to Organics and What We Have Learned":
http://recycleminnesota.org/wp-content/uploads/2015/11/RAM-Conf2015_SessionIII_OrganicsEduc_JackieEdwards.pdf

Logos:

Methods of Organics Recycling: Blue Bag Organics™ program (*co-collection with trash)* for Walter's residential Coon Rapids trash customers only. (Coon Rapids is open hauling for trash.)

Residents collect organics material by placing the items in the Blue Bag™, hand tie the bag in a knot at the top of the bag and place it into their Walters trash cart. On trash day, it is collected with the trash and brought to the new Walters Recycling Center and transfer station in Blaine (10191 Xylite Street) to be sorted. The sorted Blue Bags™ are then transferred to SET – Empire for composting.

When Coon Rapids residents sign up for organics service with Walters they receive:

- A one year's supply of the 13-gallon Blue Bags™ (60 bags).
- Literature shipped directly to their residence.
- If they are one of the first 500 organics customers in Coon Rapids to sign up with Walters Recycling and Refuse, Walters will send a voucher to be redeemed at the Coon Rapids Recycle Center for a free kitchen counter compost bucket and a roll of the 3-gallon bags that are used in the kitchen bucket.

Complementing the Walters pilot curbside program, the City of Coon Rapids provides an organics drop-off site. The City's "Organics Recycling" web page (see web link above) provides the list of acceptable organics and clear participation instructions. The organics drop-off site is part of the Coon Rapids recycling center, is open to the public during specific scheduled days and hours, and therefore is supervised by City staff.

Walters is now providing commercial organics recycling using green bags. This commercial system is similar to the residential Blue Bag Organics™ program, only using a "Green Bag Organix™" colored compostable bag. In early 2015, Walters helped launch the commercial organics recycling operation at CHS Field, "Home of the Saints" in Saint Paul. Walters has provided organics collection and recycling at special events for the:

- City of Blaine;
- Christ the King Lutheran Church in New Brighton;
- City of Nowthen; and
- City of Spring Lake Park.

Date(s) Program Started: In February 2015, Walters introduced residential organics recycling in Coon Rapids as a pilot program. According to City of Coon Rapids and Walters staff, the program is still referred to as a "pilot" program even though it is now been in service for over two years.[8]

Program History: Walters opened a new transfer station and Recycling Center in July 2014. In 2015 they began implementing organics recycling programs.

[8] Personal communication, Colleen Sinclair, City of Coon Rapids Recycling Coordinator, May 5, 2017.

Items Collected: Uses the standard Blue Bag Organics™ program (see the Walters web page cited above). The Walters web page lists the "Good Stuff for Blue Bag Organics Recycling" including some items not acceptable in other programs: waxed & parchment paper, wax-coated paperboard packaging & containers, dryer lint/dust bunnies, and take out and "To Go" boxes (instructing residents to remove metal handles).

Service Levels: Walters offers three standard trash cart sizes: 38, 68 and 94 gallons. Trash collection is generally provided weekly.

Rates to Residents: Walters charges $74.93 per year per household for organics collection services. This is equivalent to $6.24 per month per household.

Costs to City: Walters bills their trash customers directly so the costs of organics recycling operations are not borne by the City. The City helps promote organics recycling through its organics drop-off site at the City's recycling center and by mentioning the independent Walters Blue Bag Organics™ pilot program.

Funding Sources: Residential customers pay the cost of the Blue Bag Organics™ collection service directly to Walters.

In addition to other City funding, Coon Rapids receives State of Minnesota SCORE funds passed through from Anoka County which may be used for education and promotion of the organics and other recycling programs.

Performance Metrics: City staff indicated they do not receive separate organics tonnage reports from Walters as the Blue Bags are co-collected with the trash and weighed within the same load.

Appendix F
City of St. Louis Park Organics Recycling Program Profile

Appendix F
City of St. Louis Park Organics Recycling Program Profile

Web Pages: **City of St. Louis Park:**

Organics Recycling web page:
https://www.stlouispark.org/services/garbage-recycling/organics-recycling

Organics Acceptable Materials List web page:
https://www.stlouispark.org/services/garbage-recycling/organics-recycling/organics-acceptable-materials

Organics Recycling FAQs web page:
https://www.stlouispark.org/services/garbage-recycling/organics-recycling/organics-recycling-faqs

Organics Recycling Sign Up web page:
https://www.stlouispark.org/services/garbage-recycling/organics-cart-selection-form

Yard Waste web page:
https://www.stlouispark.org/services/garbage-recycling/yard-waste

Collection Rates and Fees web page:
https://www.stlouispark.org/services/garbage-recycling/collection-rates-fees

Methods of Organics Recycling: The City of St. Louis Park implemented organics co-collection with yard waste. The cart is provided for residents who sign up for organics recycling service and can be used for both organics and yard waste.

Participation in the St. Louis Park organics recycling program is encouraged, but not mandatory. Organics are placed into a BPI-certified[9] compostable bag, tied shut, and placed in the organics cart with loose yard wastes for weekly collection at the curb. Yard waste may be placed in the cart, but does not need to be bagged inside the cart. Organics/yard waste carts have a brown lid. All City carts have the same color body.

Residents that want only yard waste service (not organics) are instructed to use compostable bags or their own containers. The City-provided cart is intended for organics subscribers only.

[9] Certified compostable bags are listed by the Biodegradable Products Institute (BPI) at http://www.bpiworld.org/BPI-Public/Approved.html

And the "Bags" section of the "Certified Products Catalog":
http://products.bpiworld.org/companies/category/bags

The City of St. Louis Park web page links to an education video, "What Happens to My Organics" (https://www.youtube.com/watch?v=OAVA8eT-Zcw&feature=youtu.be), produced by BizRecycling®, a program of the Ramsey/Washington Recycling & Energy Board that explains the organics recycling process, from kitchen to composter and back into the community again as nutrient rich compost.

Date(s) Program Started: The residential curbside organics recycling program began in St. Louis Park in October 2013.

Program History: The City provides single-family residential organics recycling and yard waste collection through a contract with Advanced Disposal. Residential trash and recycling collection is provided through a separate contract with Waste Management. The City procured these solid waste services through a request for proposal (RFP) process. The RFP was released in November 2012 and the services associated with the new contracts started in October 2013.

From 2013 through 2016, the City's program was on a "subscribers only pay" form of funding. During this phase of the program, the extra rate charged to customers for organics recycling was $10 per quarter (or $3.33 per month). This was changed in 2017 to help encourage more participation in the organics program.

Items Collected: The acceptable organics materials are listed in the City's web page (see link cited above). Yard waste items are also acceptable such as grass and plant trimmings, seasonal greens, twigs, wood, woodchips and yard trimmings. Items not accepted include rocks, kitty litter, animal feces, microwavable popcorn bags and grease or oil.

Service Levels: Organics carts are available in 30-, 60-, and 90-gallon sizes. An annual supply of compostable bags is provided by the City to residents who sign up for organics recycling. Additional bags can be purchased at the St. Louis Park Municipal Service Center. (See the City's "Collection Rates and Fees" schedule web page link above for more information about trash and organics rates.)

Rates to Residents: As of January 2017, the City changed the program to an "everyone pays, citywide" form of funding such that residents are not charged extra to participate in the organics recycling program (above and beyond the amount assessed to all residents).

There is no additional charge for pickup of yard waste if it is set out properly during the regular growing season, which is approximately April through November each year, depending on the weather. Similar to the new organics funding method, the cost of regular yard waste collection is included as part of the base services provided in the resident's standard trash collection rate.

The City bills residents for all solid waste services on their quarterly utility bill. This includes trash and recycling. The standard trash collection rate depends upon the size of trash cart residents choose.

Costs to City: The City of St. Louis Park currently pays their organics/yard waste contractor, Advanced Disposal, $3.39 per household per month for organics/yard waste collection services. This is a fixed contract price based on all 12 months of the year and is the same for yard waste

alone or yard waste commingled with organics. In addition, the City pays for additional organics/yard waste tipping fee costs for commingled organics plus yard waste.

St. Louis Park owns the brown-lidded organics carts. The Foth estimate of costs attributable to provision of the cart are about $0.50 per organics household per month.

The City pays Advanced Disposal $4.00 per cart for initial cart assembly and distribution. The City also pays its contractor $3.18 per "cart touches" for replacement cart distribution services (for example, for residents that switch organic cart sizes).

Funding Sources: Customers pay the City directly via municipal utility bills. Charges for all solid waste services, including organics recycling, are now included in the base rate. In addition, the City receives State of Minnesota SCORE funds passed through from Hennepin County, including an added amount dedicated to organics recycling, which may be used for education and promotion of recycling services and education programs.

Performance Metrics: The City's contract requires reports from Advanced Disposal including information on:

- Material tonnage by: commingled organics/yard waste, yard waste alone, or organics alone (including collection at special events);
- The number of households who participate in the organic recycling collection program;
- Trends in the organics/composting industry; and
- Tons of prohibited materials collected.

Other information is also required to be reported; such as methods to reduce process residuals, and recommendations for program improvement.

Appendix G
City of Portland, Oregon

Appendix G
City of Portland, Oregon

Web Pages: **City of Portland:**

Portland Recycles! Plan web page:
https://www.portlandoregon.gov/bps/43052

Portland Composts! web page:
https://www.portlandoregon.gov/bps/article/402972

Approved Liners web page:
https://www.portlandoregon.gov/bps/article/402972#approvedliners

Residential Garbage, Recycling and Composting Guide (English) PDF:
https://www.portlandoregon.gov/bps/article/368864

Standard Rates for Residential Garbage, Recycling and Composting Service web page:
https://www.portlandoregon.gov/bps/article/492501

Service Options and Container Set-out Information web page:
https://www.portlandoregon.gov/bps/article/402981

Residential Curbside Collection Service Rate Study PDF:
https://www.portlandoregon.gov/bps/article/404493

City of Portland Policy Document: ENN-2.02 – *"Residential Solid Waste, Recycling & Composting"* as part of the Administrative Rules Adopted by the Portland Bureau of Planning and Sustainability (Latest published amendment effective June 1, 2015)
https://www.portlandoregon.gov/shared/cfm/image.cfm?id=194946

Methods of Organics Recycling: The City of Portland offers weekly pickup for organics (commingled with yard waste) and recycling and every-other-week service for trash. All solid waste services are provided through an organized collection "franchise" system of private haulers in designated collection zones. The City's franchise rules and agreements with haulers require that each hauler provide solid waste, recycling and organics/yard waste collection services. Organics are collected commingled with yard waste in a separate cart.

Program History: In 2007, Portland's City Council enacted its "Portland Recycles! Plan" which aimed for a 75 percent waste diversion rate by 2015. In 2009, Portland started an organics collection pilot study with 2,000 homes. In October of 2011, City of Portland rolled out its citywide organics collection program. Weekly trash pickups were reduced to every other week pick-ups.

Items Collected: The acceptable organics/yard waste materials are listed in the City's web page. Items collected include: food scraps, yard debris, and compostable paper. Also on the City's website includes a list of unacceptable items. These items include, but not limited to, plastic, waxed paper, coffee cups, household garbage, etc.

Service Levels: Standard organics/yard waste carts are available in 60-gallon roll-carts. If a resident forgets to put out their cart they can call their hauler and pay $7.95 for a special pick-up the following day. The most common trash service level is a 35-gallon roll cart collected every other week for $29.15 per month.

Rates to Residents: Solid waste rates are dependent on the resident's trash container size. The City has a very comprehensive "pay-as-you-throw", volume-based rate schedule service. Trash containers come in 20-gallon, 35-gallon, 60-gallon, and 90-gallon sizes. The base rates for all solid waste service ranges from $24.50 to $41.50 per household per month. Rates are set every year through the Bureau of Planning and Sustainability rate review. This review includes analysis by an economist and independent certified public accountant. Different rate impacts are evaluated to determine the annual cost of providing service including labor, equipment, fuel costs and the average weight of trash in each can size. Proposed rates are reviewed by the Portland Utilities Review Board (PURB). Following the review by the PURB, the rates are forwarded to the City Council for final approval.

Funding Sources: There are approximately 14 franchised residential haulers in the City of Portland. Each resident is responsible for calling their hauler and setting up organics service. Likewise, each resident pays the hauler for the service.

The City's Solid Waste and Recycling Staff includes 22 full-time positions to administer the program. The City collects both permit and tonnage fees from all permitted haulers and a franchised fee from franchised haulers. The residential franchise fee is 5% of gross residential revenue received by the franchisees. The commercial permit fee is $350 per year. The annual revenue in 2016 was approximately $3.5 million. This revenue is directed in a "Solid Waste Management Fund" with its sole purpose to "implement and administer Solid Waste, recycling, composting and sustainable development policies approved by the Council" and it is not mixed with Portland's General Fund monies.

Performance Metrics: City staff track quantities collected from hauler-reported curbside recycling and composting services. From these quantities the City calculates a recovery rate that aligns with the Oregon Department of Environmental Quality methods.

- 158,000 households are currently signed up for recycling and organics/yard waste collection services.
- In 2016, approximately 170,100 tons of organics/yard waste were collected.

Appendix H
City of Seattle, Washington

Appendix H
City of Seattle, Washington

Web Pages: **City of Seattle:**

Solid Waste Management Plan web page:
http://www.seattle.gov/util/MyServices/Garbage/AboutGarbage/SolidWastePlans/SolidWasteManagementPlan/index.htm

Zero Waste Resolution (30990) web page:
http://www.seattle.gov/util/cs/groups/public/@spu/@garbage/documents/webcontent/02_015860.pdf

Seattle Public Utilities: 2016 4th Quarter Organics Report PDF:
http://www.seattle.gov/Util/cs/groups/public/@spu/@garbage/documents/webcontent/1_051719.pdf

2012 Seattle Public Utilities: Organics Stream Composition Study PDF:
http://www.seattle.gov/util/cs/groups/public/@spu/@garbage/documents/webcontent/01_028560.pdf

Cart Start Up Service & Cost web page:
http://www.seattle.gov/util/MyServices/FoodYard/BldgOwnersManagers_FoodYard/CartCostSize/index.htm

Seattle's ***"Cart Size (Rate) Calculator"*** web page,
http://www.seattle.gov/util/MyServices/FoodYard/HouseResidents/CartSizeCalculator/index.htm

Methods of Organics Recycling: Seattle offers weekly pickup for organics/yard waste and recycling and every-other-week service for trash. Organics/yard waste recycling is required and specified organics materials are banned from the trash.

Program History: In 2004, the City of Seattle began developing their Zero Waste Resolution. By 2007, the resolution was adopted by the full City Council establishing new recycling goals for the City of Seattle and provided direction on waste-reduction programs and solid waste facilities. All single-family customers are required to have organics/yard waste curbside collection unless the customer requests a waiver and is actively composting in the yard. A tiered cart rate was implemented for trash, recycling and organics/yard waste pick-up. By 2009, all organics were banned from single family home trash collection. Multi-family organics collection was expanded to be a voluntary service available to all customers no later than April, 2009. In 2012, Seattle started its first in-depth evaluation of the City's organics stream.

Items Collected: Beginning January 1, 2015, all organic/yard waste materials are banned from trash. The acceptable organics materials are listed in the City's web page. Items collected include: food scraps, yard debris, and compostable paper.

Service Levels: The current collection frequency is weekly pickup. All single family residents are required to sign up for organics/yard waste service or request exemption if they have a backyard food waste composting.

Rates to Residents: For a 13-gallon organics/yard waste cart, residents currently pay $6.05 per month. For a 32-gallon organics/yard waste cart, residents pay $9.10 per month. For a 96-gallon organics/yard waste cart, residents pay $11.65 per month. Recycling is "free" at no extra charge to residents, even with two recycling carts collected weekly. While the recycling costs are embedded into the base trash rates, the organics/yard waste costs are an extra charge.

Seattle has permitted two hauling companies to serve residential customers: Waste Management and Cleanscapes. Residents are allowed to choose organics service through a different hauler outside of these two City contracts.

Performance Metrics: Seattle has a total population of 620,778 people and 147,654 single-family households. From the 2012 Organics Stream Composition Study: Year-end Report and 2012 Organics Tonnage Report, approximately 140,919 households participated (for a participation rate of 95%) in organics/yard waste collection to collect a total of 80,211 tons of yard waste and organics. Based on composition studies, approximately 26.2% of the yard waste + organics total is organics. Therefore, 298 pounds of organics per *participating* household per year (which is equivalent to 285 pounds of organics per *total* household per year) is collected from the City of Seattle single-family homes.

Appendix I
King County, Washington

Appendix I
King County, Washington

Web Pages: <u>King County</u>:

Sustainable Solid Waste Management Study PDF:
https://your.kingcounty.gov/solidwaste/about/Planning/documents/Sustainable-Solid-Waste-Management-Study-Final-July-2014.pdf

King County: 2015 Organics Characterization Report PDF:
https://your.kingcounty.gov/solidwaste/garbage-recycling/documents/Organics-Characterization-report-2015.pdf

King County: Compost More web page:
https://your.kingcounty.gov/solidwaste/garbage-recycling/recycle-food.asp

King County: Curbside Food Scrap Collection web page:
https://your.kingcounty.gov/solidwaste/garbage-recycling/food-collection.asp

Waste Management for City of Sammamish: Rates/Service/Billing Information web page:
http://wmnorthwest.com/sammamish/service.html

Republic Services for Clyde Hill Rate Examples PDF:
http://local.republicservices.com/site/washington/Documents/ClydeHill/clyde-hill-rates.pdf

Methods of Organics Recycling: Several hauling companies offer weekly curbside collection service for organics (commingled with yard waste) in the summer and every-other-week in the winter months.

Program History: In February 2007, King County began a Sustainable Curbside Collection Pilot in the City of Renton to determine the impacts and potential waste diversion of bi-weekly trash, recycling, and organics/yard waste services. Since then the program has expanded to include more residents.

Items Collected: The acceptable organics/yard waste materials are listed in the County's web page. Items collected include: food scraps, yard debris, and compostable paper.

Rates to Residents: King County covers many different cities with their own haulers and contracts. Recology, Waste Management, and Republic Services provide the majority of hauling services. The haulers report to cities who report to the County and State. Rates for service differ between the cities hauler contracts, as well as pick up service type.

Performance Metrics: King County has 321,964 households that are eligible to subscribe to curbside organics/yard waste collection service. Of those households, 232,193 have subscribed to the organics/yard waste service (72%). Approximately 119,912 households (37%) "set-out" their organics/yard waste container and participate. Only 61,829 (19%) of the households include food scraps in their organics/yard waste cart. Approximately 162,594 tons per year of organics/yard waste are collected in King County (including yard waste).