



TECHNICAL MEMORANDUM

DATE: October 11, 2018

TO: Tom McGlasson, Executive Director, Monroe County Solid Waste Management District

FROM: Ryan Graunke & Peter Engel, Kessler Consulting, Inc.

SUBJ: Organic Waste Assessment: Background Research (Tasks 1 – 3) Technical Memorandum

PROJ #: 207-01

Introduction

The Monroe County (County) Solid Waste Management District (SWMD) contracted with Kessler Consulting, Inc. (KCI) to conduct an assessment of organic waste recovery options and provide recommendations regarding organics recovery program development. The first phase of this assessment entailed researching and evaluating current organic waste activities in the County and in similar communities. This consisted of:

- Case studies of organics recovery in similar communities
- Estimates of organic waste generation and recovery in the County
- Profiles of existing organic waste collection and composting in the County

Organic Waste Case Studies in Similar Communities

KCI conducted 6 case studies of college towns of approximately similar size to the City of Bloomington (City) and the County: Fayetteville, Arkansas; Orange County, North Carolina; West Lafayette, Indiana; State College, Pennsylvania; Boulder, Colorado; and Madison, Wisconsin. For these case studies, we conducted online research and telephone surveys focusing on organics programs at the city and/or county level and the university. Some of the information we gathered were collection methods, service providers, participating facilities, any contractual arrangements, quantities handled, and program costs. Not all information was available for all case studies.

The detailed case studies are included in Attachment A. Based on the profiles, other college communities are employing a wide variety of options to implement and increase organics diversion. Below is a summary of some of the main points and lessons learned from these case studies:

- Fayetteville operates a city-owned composting facility and is conducting an ongoing pilot of commercial/institutional food waste, currently partnering with the University of Arkansas and public schools. While successful, the pilot initially received less food waste than anticipated due to fewer restaurants and institutions implementing organics collection than planned. One of the key issues was the lack of a comprehensive program to promote the pilot and provide technical assistance and educational support to generators in the commercial sector.

- Orange County provides organics drop-off to its residents and pays for the collection of commercial organics by a private hauler from businesses in the county. Public schools and the University of North Carolina – Chapel Hill also have their own organics collection. Over 2,000 tons per year of organics from the county are composted at a private, out-of-county compost facility; this does not include tonnages that the county or university do not oversee.
- West Lafayette has an award-winning partnership with Purdue University for anaerobic digesting food waste from the campus dining hall at its wastewater treatment plant and producing biogas for generating electricity. Not all wastewater treatment plants have an anaerobic digester (AD) that can handle food waste, so this model cannot be replicated in many places.
- State College provides residential curbside organics collection in which organics and yard waste are collected in automated roll carts. It collects about 1,400 tons of organics and yard waste per year. They have their own compost facility at which all material is composted. Penn State University also has organics collection and a compost facility; it collects about 1,600 tons of organics per year. Centre County provides technical assistance to its municipalities for starting an organics program.
- Despite open market collection, Boulder, Colorado mandates universal collection of organics at all residential and commercial properties in the city. It collects almost 32,000 tons of organics and yard waste each year for composting at a private facility. Boulder County requires residential organics collection in its most urban zone and the University of Colorado – Boulder has its own organics collection. In addition, the county provides \$150 grants for businesses to implement organics collection. This example shows the impact a mandate can have on significantly increasing tonnage.
- Madison was running a residential curbside organics pilot but ended it last year. They were collecting food waste in carts and were anaerobically digesting it in a private AD facility. At its peak, it included 1,100 households and 40 businesses and was collecting about 270 tons of food waste annually. It ended because increasing contamination was problematic for the digester, which resulted in increased tip fees that were not sustainable for the city. The lesson with this example is to ensure that collection and processing systems are compatible and to carefully monitor and control contamination.

Organic Waste Generation and Recovery Assessment

Previously in 2017, KCI conducted a Materials Processing Feasibility Study that estimated waste generation from major sources in the County and conducted a waste composition study (WCS) of those sources, which included the SWMD Drop-off Centers, City residential collection program, Indiana University (IU), and private haulers who collect waste from businesses, institutions, multi-family residences, and households. The WCS measured the percentage of these waste streams that are food waste and other potentially compostable materials.¹ Using the total tonnage generated from these sectors in 2016 (based on data from the Indiana Department of Environmental Management (IDEM) and research conducted in the feasibility study), KCI estimated the tons of potentially compostable materials within these mixed waste streams, as shown in Table 1.

¹ Note on terminology: In this technical memo, “organics” is meant to include all organic waste, excluding source-separated yard waste. “Food waste” is discarded food in the waste stream. “Other compostables” is primarily compostable paper products, but may include pet waste, clean wood waste, and yard waste.

Table 1: Estimated Generation of Organics Using 2017 WCS Data (Tons/Year)

Source	Tons of Mixed Waste	Type of Organics	% by Weight	Tons of Organics
Private Haulers	103,720	Food Waste	22%	22,300
		Other Compostables	17%	17,530
Bloomington	4,930	Food Waste	27%	1,310
		Other Compostables	20%	1,010
Indiana University	6,540	Food Waste	18%	1,200
		Other Compostables	21%	1,400
SWMD Drop-Off	2,880	Food Waste	20%	580
		Other Compostables	18%	530
Totals	118,070	Food Waste	22%	25,390
		Other Compostables	17%	20,470

Note: tonnage estimates in this technical memo have been rounded to the nearest 10 and totals may not appear to add due to rounding.

Table 1 includes other compostables; however, it must be noted that including compostable materials other than just food waste in an organics recovery program typically results in higher levels of contamination. Contamination can cause operational problems at composting and AD facilities and negatively impact their ability to produce high quality products. While the inclusion of other compostables can be attractive in terms of increasing overall recovery rates, most composting facilities (especially those using basic composting methods without significant capital investment in processing and screening equipment) are resistant to accepting other compostable materials and non-compostable contamination.

Estimated Recovery

Private Haulers

As shown in Table 1, private haulers that collect waste from commercial generators, among other sources, are a major potential source of organics. Within the broad range of commercial and institutional generators, certain types are known to have significant amounts of food waste in the waste stream (see Table 2). For each one, KCI compiled econometric data regarding the number and size of facilities in the County, and industry-standard food waste generation factors. These data were used to estimate the amount of food waste generated from these business types, which are summarized in Table 2. Note: the tonnage estimate in Table 2 is a subset of the Private Hauler estimate in Table 1. Figure 1 maps these locations around the County

Table 2: Estimated Food Waste Generated by Significant Non-Residential Sources (Tons/Year)

Generator Type	Number of Locations	% Food Waste ⁵	Tons Food Waste ⁵
Restaurants¹	84	47%	5,260
Grocery Stores¹	10	30%	2,200
Food Manufacturing¹	7	46%	180
Nursing Homes²	20	20%	170
Schools³	20	30%	170
Hospitals⁴	3	20%	40
	Total		8,010

¹ Generation is based on number of employees as reported by ReferenceUSA. Only grocery stores and restaurants with more than 15 full time employees and food manufacturing with more than 12 full time employees were included.

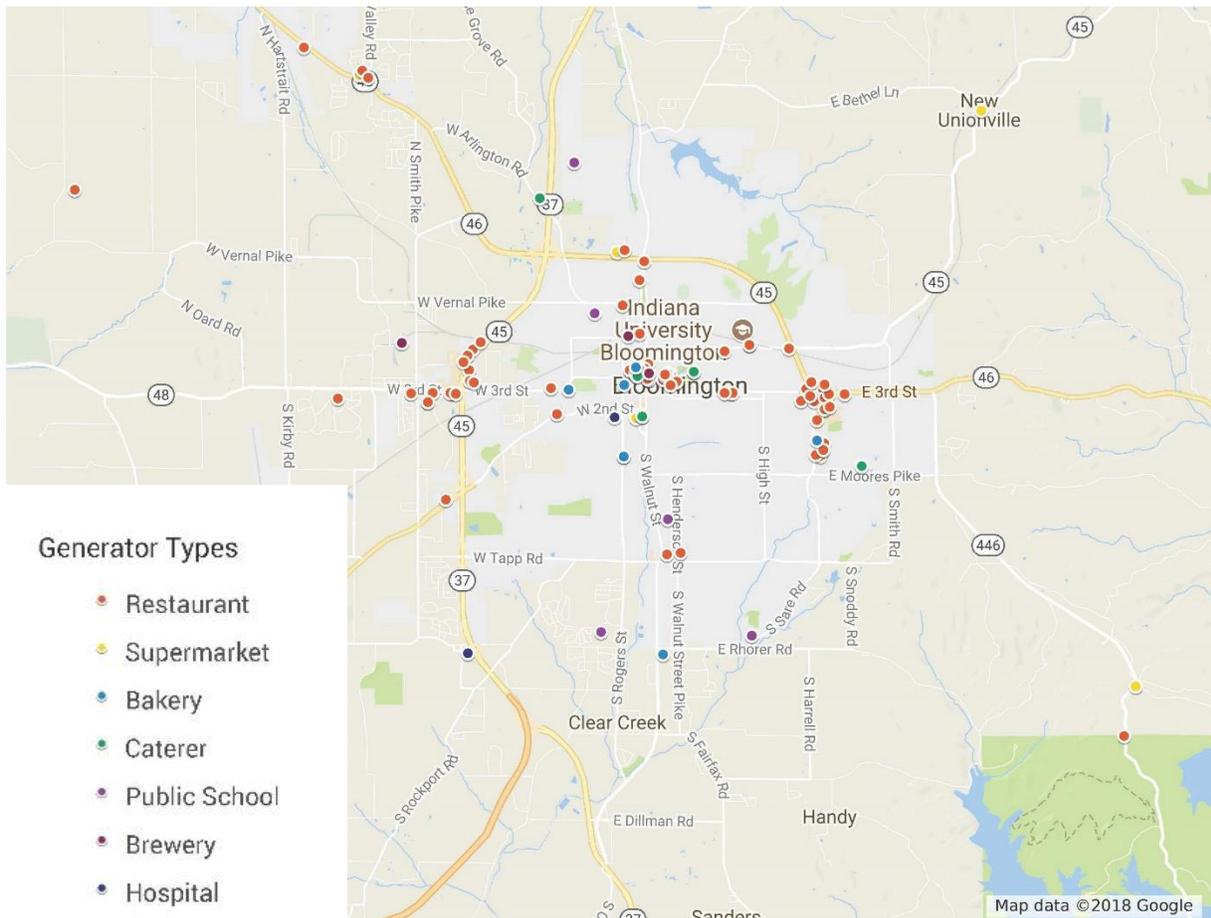
² Generation for nursing homes is based on the number of beds as calculated by the age 65+ population in the County and metrics from the Centers for Medicare & Medicaid Services.

³ Generation for schools is based on the student counts in the Monroe County Community School Corporation and Richland-Bean Blossom Community School Corporation.

⁴ Generation for hospitals is based on number of beds at the County's major hospitals as reported in the American Hospital Directory.

⁵ Food waste generation rates are from CalRecycle's 2014 Generator-based Characterization Study.

Figure 1: Map of Significant Commerical Food Waste Generators in Monroe County



Based on this research, we estimate that approximately 8,010 tons per year of food waste is generated by these major food waste generators. Restaurants and grocery stores alone account for 93 percent of food waste from these major generator types and 33 percent of food waste collected by private haulers.

It is difficult to estimate how much of the 8,010 tons could be recovered because much depends on how the collection program is implemented, how many generators participate, and how much food waste they separate. Assuming that commercial food waste collection would be voluntary, and an effective outreach and technical assistance program is implemented, a 40 to 50 percent recovery rate is a “high-end” estimate based on KCI’s experience². Based on these assumptions, a collection campaign targeted at the major generators in Table 2 could recover as much as 3,200 to 4,010 tons per year of food waste. Based on the ratio of food waste to other compostables as measured in the WCS for Private Haulers, 2,520 to 3,150 tons of other compostable could be recovered if included in the program.

Bloomington

Bloomington is considering options to recover organics from the residential customers it serves. This could be undertaken by a contracted service provider or City crews through either a voluntary subscription-based service or a city-wide residential service. Recovery rates would depend greatly on how the program is implemented and supported by the City. Based on KCI research, a full-scale program could recover in the range of 225 to 270 pounds of organics per household per year. Bloomington serves approximately 10,400 single family households, so this tonnage translates to 660 to 790 tons of food waste and 510 to 610 tons of other compostables per year. This does not include yard waste that could be collected in this program.

Indiana University

As described later in this memo, IU recently expanded its organics collection programs to major food waste generation points throughout the campus. At the time of the WCS, KCI estimated approximately 2,800 tons of organics were in the mixed waste stream. Based on studies at other universities, organics could have recovery rates in the range of 40 to 50 percent, or between 1,040 to 1,300. This does not include any organics that were being diverted at the time of the WCS. According to IU staff, the program was collecting approximately 5 tons per week at the end of the previous school year (during the middle of which the WCS was conducted). In addition, with the recent expansion of the organics program, a portion of the tonnage estimated from the WCS data is likely already being diverted from the mixed waste stream. IU staff estimates it will double the amount of organics it collects as IU is transitioning to greater amounts of compostable serviceware. The tonnage diverted is expected to continue to increase as the program expands further and matures.

SWMD Drop-off

KCI’s WCS estimated that 580 and 530 tons per year of food waste and other compostables, respectively, were disposed in Orange Bag waste at the SWMD’s Drop-Offs. Organics could be collected separately at these locations using dedicated collection containers provided by the SWMD or a contracted organics collection service provider. SWMD facilities serve two general types of customers: those who bring recyclables only and those who bring both recyclables and Orange Bag waste. An organics drop-off would likely receive organics from both. For the purposes of this assessment, it is

² Organics recovery rates are highly variable and performance metrics are very program-specific. For the purpose of this assessment, KCI is utilizing recovery rates that could be achieved by a program that has high levels of participation by the various types of generators served.

assumed that a high-performing SWMD Drop-Off programs could capture 230 to 290 tons of food waste and 210 to 270 tons of other compostables.

Summary – Estimate of Potential Organics Recovery

Based on the estimates above, an organics collection program that addresses the four major sources of waste in the County could recover as much as 8,000 to 10,000 tons per year of organics (See Table 3). This represents approximately 40 to 50 percent of the target sources of food waste and 18 to 22 percent of food waste generation in the County. Recovering this amount will depend largely on how extensively major commercial generators like restaurants and grocery stores implement food waste collection.

Table 3: Estimated Potential Organics Generation and Recovery by Sources (Tons/Year)

Source	Generation	Low Recovery	High Recovery	Low Recovery	High Recovery
Food Waste					
Significant Generators	8,010	40%	50%	3,200	4,010
Bloomington	1,310	50%	60%	660	790
Indiana University	1,200	40%	50%	480	600
SWMD Drop-off	580	40%	50%	230	290
Subtotal	11,100			4,570	5,690
Other Compostables					
Significant Generators	6,300	40%	50%	2,520	3,150
Bloomington	1,010	50%	60%	510	610
Indiana University	1,400	40%	50%	560	700
SWMD Drop-off	530	40%	50%	210	270
Subtotal	9,240			3,800	4,730
Total	20,340			8,370	10,420

Achieving recovery rates higher than what is projected in Table 3 would largely depend on a broader segment of private haulers' customer base implementing food waste collection (e.g., other businesses than significant generators, multi-family residential buildings, and single family residents served by private haulers).

Existing Organic Waste Collection and Composting Assessment

KCI conducted interviews with the organics collection services and composters operating in the County. The purpose of this study is to not only understand the activities currently taking place in the County, but also to understand the interest and capacity of the current players to expand in the future. Through the course of these interviews, KCI also learned about minor food waste diversion activities in the County, such as small-scale on-site compost operations at food banks (Mother Hubbard's Cupboard and Hoosier Hills Food Banks) and restaurants (Upland Brewpub). These latter activities are not discussed in detail since they only handle their own waste and are not in a position to serve other sources of organics.

Collection Services

Indiana University Organics Collection

IU has substantially expanded its organics collection program in the past year. What started as collecting food waste at select dining halls 6-7 years ago, has now expanded to cover all major food waste generation sites on campus. IU Dining, which oversees the program, now collects organics at 9 residential dining halls, 15 satellite (quick-service) facilities, the Memorial Union, and IU catering. In addition, the Athletics Department oversees the collection of organics at their athlete dining hall (Hoosier Room) and various sports venues. Starting in the Fall of 2018, all of IU Dining and Athletics facilities have a commitment to become zero waste, which includes switching to all compostable serviceware.

With these expansions, IU anticipates doubling the amount of organics they collect. At the end of the spring semester in 2018, they were collecting an average of approximately 5 tons per week; they anticipate collecting about 10 – 12 tons of organics per week in the fall, which may increase more as the program matures and expands. Based on a 32-week fall/spring semester and 12-week summer semester and assuming a third of the generation rate in the summer (based on enrollment numbers), these rates equate to 180 tons of organics per year for the previous school year and 360 to 430 tons per year for the current school year.

All organics collected at IU are hauled to Green Earth by JB Salvage. They collect material twice weekly, although IU is working with them to transition to three times weekly because they don't have enough containers to keep up with the amount of organics they collect. To do this they are also switching from rolls carts to 2 cubic yard (cy) dumpsters that can be serviced by JB Salvage's rear loader.

JB Salvage

JB Salvage is a waste and recycling hauler based in the County. They have recently started working to haul the organics from IU and the Boston Scientific offices in Spencer (Owen County). They haul all the organic material to Green Earth for composting. They see organics as the next frontier in waste hauling and are open to expanding and becoming more involved in the organics collection industry, but also recognize their limitations as a small business and do not want to get in over their head. They did not provide specific tonnage, but as reported by Green Earth, they are hauling equal amounts from Boston Scientific and IU (prior to the current increase in tonnage from IU). Therefore, JB Salvage is assumed to be hauling approximately 540 to 610 tons of organics per year with IU's expanded collection.

Green Camino

Green Camino is currently the only entity providing residential collection of organics in the County. They are a grassroots company that started in November of 2017. Their service provides kitchen pails and 5-gallon buckets to subscribers to collect food waste, food soiled paper, and certified compostable materials. They pick up the full buckets in a pickup truck either weekly or every other week (for compost without meat and dairy) and replace it with a clean bucket. The full buckets are hauled to Fable Farms' compost site (discussed further below) where they are emptied and sanitized to be used in subsequent collections. They monitor for contamination when they pickup the buckets, but it hasn't been a significant issue. They also operate a drop-off location at Bloomingfoods East where subscribers can bring their food waste for residents not in the city limits (their boundary for curbside service) or in apartments. In addition, they have collected organics from 5 zero waste events in Bloomington.

Costs for weekly service are \$32/month or \$364/year. For every other week service, the cost is \$20/month. Cost for drop-off subscription is \$15 for 6 buckets. They currently have 32 residential curbside subscribers and 17 drop-off subscribers. They have recently started working with City Hall and 3 commercial customers: Invisage, Cook Medical, and Bloomington High School South.

As of the beginning of August 2018, they had collected 14,734 pounds of organics since inception. Of that total, they collect:

- About 350 pounds per week from their curbside customers
- 293 pounds from the drop-off location since May 2018 (three-month period)
- 102 pounds from City Hall since June 15, 2018 (six-week period)
- 167 pounds from Invisage since July 16, 2018 (two-week period)

This puts them on track for an average collection of approximately 12 tons per year. Green Camino's business has been growing substantially in the past year, and they recently hired their first employee. They have a strong desire to expand their business but are running into a collection capacity issue, since they collect the buckets in a pickup truck. They are currently in the process of looking to purchase a larger and more practical vehicle to expand their collection abilities. They also understand that the capacity of Fable Farms to receive the organics may be limited at the moment.

Compost Facilities

Green Earth Compost

Green Earth is currently the largest food waste composter in the County based on KCI's research. They are located at 7323 W Gifford Road. Kevin Huntley, the owner of Green Earth, primarily works in excavating and land clearing, but started his compost operation a few years ago as a side project. He is now receiving all of IU's food waste, as well as food waste from Boston Scientific. Kevin has recently purchased a new grinder with which he grinds the food waste along with yard waste he receives from landscapers that bring the material to his site. He then constructs windrows from the ground material and turns the windrows weekly with his loader or excavator. He typically will hold material in the windrows for 3 to 4 months (in the summer) before moving to a curing pile. He sees longer retention times in the winter. His goal is to purchase a compost turner which will make turning the windrows easier and potentially increase the speed of the compost process. He uses most of the compost produced in the excavation business to construct bioswales.

The facility receives about as much food waste from Boston Scientific as IU, prior to the recent major expansion of IU's organics program. However, Boston Scientific's tonnage is more consistent, since IU's is seasonal. Using IU's tonnage as an estimate, Green Earth is composting approximately 540 to 610 tons of food waste per year with IU's estimated increase in organics diversion. He is fully able to compost the compostable serviceware that IU has started using at its food service locations. Contamination has been an issue with some of IU's material especially the stadium material, which can have glass bottles in it. Once glass bottles are put through the grinder, it is nearly impossible to separate glass from the finished compost.

Kevin currently has 10 acres of his 50-acre property dedicated to the compost operations, the remainder of the property is for his excavation business. He would like to buy more land to expand the compost operation but has run into hurdles with permitting. Based on general industry standards for food waste composting with turned windrow technology and assuming 6 of the 10 acres are dedicated to active composting (the remaining 4 acres used for curing, materials handling, grinding, and screening), Green Earth could handle up to 6,000 to 7,000 tons per year of food waste, if it was to become a fully operational compost facility using optimized composting methods.

Fable Farms

Fable Farms is the County's newest composter. Located between Bloomington and New Unionville, the farm started composting in February 2018. They are currently composting all the organics that Green Camino collects. In addition, they are piloting their own collection at a few businesses around the City. They had a pilot with Buffalouie's but collection proved difficult, so they are no longer collecting from them. They also collect twice weekly from 4 to 5 coffee shops and Rainbow bakery, as well as collecting from the weekly Food Truck Friday. They have an ongoing pilot with a sorority house with weekly collection and provide organics collection at weddings and other catered events. All organics are collected in 5-gallon buckets or 50-gallon trash cans for the events. They use a pickup truck to collect materials (in a similar fashion to Green Camino), charging \$15 per pickup (except for the coffee shops, which are collected for free). They do not charge Green Camino a tip fee. Yard waste, which they grind as a bulking agent for the compost, is received from landscape companies in the area.

Fable Farms is currently composting about 600 pounds per week (approximately 16 tons per year). They estimate that most of the organics is delivered by Green Camino, while the remainder they collect themselves. Their compost operation is currently occupying a limited area of their 4.6 acre farm. They started with turned windrow composting but are now experimenting with the aerated static pile (ASP) method with a positive forced-air blower system. The ASP method works better for them with limited space and limited capital to buy larger equipment needed to turn piles. They have a few 3-cy piles for the ASP system that they have in 30-day batch compost trials. Any excess material is still composted in their turned windrow. They have had success with the ASP method; although they are having issues with certain compostable serviceware and may not accept it in the future. They currently have a plan to implement the system in a full-scale compost operation. Their plan is to have a 7-acre facility using the ASP system in large windrows. Based on their proposed plan, KCI calculates their capacity to be close to 4,000 cubic yards of material (organics plus bulking agent) every 2 months. Assuming an average density of food waste and a standard 3:1 mix ratio of food waste to bulking agent, this equates to a capacity of approximately 2,800 to 3,200 tons per year. Fable Farms does not currently sell their compost to the public, but they plan on doing so once they expand. Ryan and Andrea, the owners of Fable Farms, recently attended a United State Composting Council (USCC) training session and are very passionate about expanding their compost operation but recognize a number of factors limit the timing and ability to expand.

Good Earth Compost

Good Earth is another compost facility located at 650 E Empire Mill Road. They are currently only composting leaves and grass using a passive composting pile. They also grind limbs and branches, which they sell as mulch. Material is mostly received from customer drop-off, both residential and commercial, and occasionally the City will drop off material. Good Earth has considered adding food waste to their compost but at the time they felt the regulatory requirements were too burdensome; they aren't especially interested in starting to compost food waste.

Gap Analysis

Utilizing the information presented above, KCI developed a gap analysis to compare potential future recovery versus the existing organics recovery system and to identify gaps in services and infrastructure that would be needed to support expanding organics recovery in the County. The results are summarized in Table 4.

Table 4: Gap Analysis: Monroe County Organics Recovery System Estimates (Tons/Year)

	Low	High
Potential Organics Recovery		
Food Waste	4,570	5,690
Other Compostables	3,800	4,730
Total	8,370	10,420
Current Organics Collection		
IU/JB Salvage*	360	430
Green Camino	10	20
Fable Farms	6	8
Total	376	458
Current Food Waste Composting		
Green Earth*	540	610
Fable Farms	16	28
Good Earth	0	0
Total	556	638
Potential Organics Composting Capacity		
Green Earth	6,000	7,000
Fable Farms	2,800	3,200
Good Earth	n/a	n/a
Total	8,800	10,200

*JB Salvage collects approximately 180 tons of organics per year (assumed based on interview with JB Salvage) from Boston Scientific (out-of-county) that is composted at Green Earth.

Two major conclusions can be drawn from the gap analysis. First, the current organics collection system would need to expand significantly to handle potential organics recovery. Second, while existing organics composting capacity is very limited, two facilities are interested in expanding capacity and together appear to have or will have sufficient land available to handle the combined potential recovery of both food waste and other compostables. Each is discussed further in the following paragraphs.

Collection

JB Salvage has stated their interest in expanding as well as caution about becoming over extended. As an experienced waste hauler, JB Salvage likely has the knowledge and expertise to scale-up organics collection. Green Camino faces a different set of challenges. As a grass-roots start up, the company may be facing a significant learning curve both in terms of how to operate waste collection and how to manage and finance its growth.

Access to the capital necessary to expand depends on a number of factors, most significantly a business must be able to assure financial backers that a reliable revenue stream will come in that is sufficient to sustain the business and provide return on investment. The business must also be in a good financial position. The issues to the collection model “penciling out” financially are having sufficient assurances that customers want organics collection and are willing to pay a reasonable fee.

Green Camino and JB Salvage have fundamentally different business models that target distinct sectors of the market place. Each has unique needs and opportunities to grow their business, and it is likely that they can both co-exist and thrive in the County. Looking broadly at the collection sector, the SWMD has

a number of opportunities to close the gap by helping increase organics collection and support matching growth in availability of collection services. These include the following:

- Survey potential generators to help establish information regarding potential collection growth opportunity.
- Facilitate peer-to-peer communications for JB Salvage and Green Camino with comparable businesses in other communities.
- Develop outreach and education materials to encourage businesses and residents to recycle organics and make them aware of collection services being provided.
- Establish drop-off organics collection at the SWMD facilities.
- Utilize the Green Business program to promote organics collection or offer rebates or grants to businesses for establishing organics collection.

Composting

Ryan and Andrea at Fable Farms and Kevin at Green Earth are all very passionate about their work in the compost industry and have expressed interest in expanding their operations. Fable Farms is currently a small-scale operation but have stated they plan to expand and use the ASP composting method. Based on KCI's estimates from the description of their planned facility, they would be able to compost approximately 3,000 tons of organics per year. Meanwhile, the 10 acres that Green Earth has available for composting could compost between 6,000 to 7,000 tons of organics per year with a fully dedicated, optimized composting facility.

It cannot be understated that these tonnages are enormous increases over the existing tonnages handled by the facilities – 10 to 100 fold increases. While the owners are passionate, for all of them composting is currently a side project. If they are to become full-scale composting facilities operating at or near their capacity, they must have full-time dedicated staff that are trained as professional composters as well as the appropriate composting equipment. Ryan and Andrea recently attended the USCC training course and Kevin has and will be purchasing dedicated composting equipment. While these are important first steps, they will likely need additional assistance along the way. Some of the challenges facing a full-scale compost facility include financing, regulatory compliance, staffing, capital and operating cost of equipment, proper material handling, monitoring, and testing procedure, odor controls, and marketing the finished compost.

The SWMD could play a key role in providing assistance as appropriate to help these facilities grow at a manageable and sustainable rate and as desired by the owners. Some ways in the which the SWMD can assist in growing these facilities:

- Provide technical assistance in proper permitting with IDEM.
- Facilitate procurement of funding sources for equipment, e.g., Indiana Recycling Market Development Grants.
- Provide funding for the operators to attend USCC or other compost training courses.
- Assist with developing markets for compost.

KCI sees an environment where both facilities can thrive, continuing to partner with their respective haulers. As Green Camino and JB Salvage increase the amount of organics collected, so too should Fable Farms and Green Earth increase capacity. These partnerships will overcome one of the primary challenges that organics recovery programs face: collection programs without a viable facility and

facilities unable to get the tonnages they need. With the SWMD assistance on both fronts, the County could see significant increases in its organics diversion rate.

Summary and Next Steps

KCI's assessment of organic waste generation and feasible recovery analysis indicates that upwards of 8,000 to 10,000 tons of organics could be composted in the County with a robust organics collection and composting program. The County currently has 2 haulers collecting organics (Green Camino and JB Salvage) that each haul material to a separate compost facility (Fable Farms and Green Earth, respectively). All players are in the nascent phase of developing their organics program, and an estimated 560 to 640 tons of food waste per year are being composted in the County (although a portion of that is collected out of County). However, the current and planned compost facilities owned by Fable Farms and Green Earth can have potentially sufficient capacity with optimized composting techniques to process the amount of organics that could be collected from a comprehensive recovery program in the County.

Based on this preliminary assessment KCI does not feel it is necessary for the SWMD to develop their own compost facility, although it could still be a possibility. Rather the SWMD could play a critical role in assisting, promoting, and incentivizing the development and growth of the existing program, as well as implement organics collection at its facility and through the Green Business program. Next steps in this project entail SWMD staff and KCI outlining different scenarios, KCI analyzing those scenarios, and presenting the results in a work session with the SWMD.

ATTACHMENT A: ORGANIC PROGRAMS CASE STUDY

Fayetteville, Arkansas

The City of Fayetteville in Northwest Arkansas is home to the University of Arkansas. Fayetteville has a population of 73,580, and the university has a student population of 27,558 undergraduate and graduate students. Arkansas has a landfill ban on yard waste and the city has a goal of 40% waste diversion from landfills. The city provides its own residential and commercial collection of mixed waste, recycling, and yard waste (residential only), as well as 2 recycling drop-off facilities. The city is located in Washington County; the county has open market collection and does not have organics collection beyond yard waste.

The city owns and operates a 3-acre compost facility at which it composts yard waste its collects. In 2015, the city launched a food waste compost pilot that focused on commercial vegetative (non-meat) food waste. The pilot received food waste from the university, local restaurants and markets, and grade schools. At the university, food waste is collected from 5 dining hall locations around campus. The pilot had a capacity of composting 10 tons of food waste per week but received 3 to 5 tons per week. The pilot is ongoing but is presently receiving about 156 tons food waste per year from the university and schools only. In addition, the city estimates it composts about 7,500 tons of yard waste. The city collects food waste 3 times weekly (MWF) in 35-gallon locking carts with a compostable liner. The facility uses the modified static aerobic pile composting method. The pilot is currently free for participants, but the city will be conducting a rate study to determine if a fee is appropriate. The city sells its compost in bulk (at \$8/cy) or bagged (\$4/bag). The city does not provide organics collection for residents.

Orange County, North Carolina

Orange County, located in central North Carolina, has a population of 57,233. The county includes the University of North Carolina – Chapel Hill, which is one corner of North Carolina’s Research Triangle. The university has a population of 29,911 undergraduate and graduate students. The county provides curbside collection of solid waste and recycling in the unincorporated county through its franchise haulers. The municipalities provide collection themselves or through a private hauler. The county also operates five drop-off locations that accept special waste, recycling, and yard waste. Two of the drop-off locations also accept food waste and food related paper waste (e.g. napkins). The county has a temporary food waste drop-off location at the weekly farmers market during season; the farmers market received 10 tons of food waste last year. The county has partnered with Brooks Contractors, an organics hauler and compost facility located in neighboring Chatham County, for transporting and composting food waste from the drop-offs. One of the county’s major efforts for organics diversion is to promote commercial collection by paying for the collection from restaurants and grocery stores. The county subcontracts with Brooks Contractor, paying them \$80/ton to collect food waste from these large-scale generators. It is currently working with 45 restaurants and grocery stores, from which 1,300 tons per year were collected last year. In the past year, the county has been transitioning larger grocery stores such as Food Lion and Whole Foods to pay for the collection themselves. In addition, 18 public schools in the county partner with Brooks for food waste collection; the county does not pay for the school collection. About 200 tons of food waste were collected from schools last year. The county receives finished compost from Brooks and sells it in bulk (\$30/cy) and in bags (\$5.50/cubic foot).

The university has had an organics collection program since the early 1990’s, partnering with Brooks Contractor. Organics are collected from around campus in carts and are aggregated at a central collection site. At dining halls, food waste is collected by a separate collection provider, Compost NOW,

due to logistics at the loading dock. Compost NOW is a third party private organics collector that delivers organics to Brooks Contractor's compost facility. Approximately 700 tons of food waste were collected at the university in FY17. The university has piggybacked on the county's contract with Brooks and is paying the \$80/ton tip fee plus \$2/cart rental fee. However, it is transitioning to a \$9-12 per cart tip fee in lieu of the \$80/ton.

In addition to the organics collection provided by the county and the university, Compost NOW and Food FWD are private organics collectors that provide food waste collection to residents and businesses in the county. Both companies deliver the food waste to Brooks Contractors for composting.

West Lafayette, Indiana

The City of West Lafayette, with a population of nearly 30,000, is home to Purdue University, which has a student population of 41,573. The city provides residential collection of mixed waste, recycling, and yard waste. While in the unincorporated county, mixed waste collection is open market and recycling and yard waste are collected at drop-offs. The city or county does not have a residential or commercial organics collection program.

The city does, however, have a partnership with Purdue that started in 2011 to receive food waste from its dining halls for digesting in the anaerobic digesters at the city's waste water treatment plant. Pre- and post-consumer food waste is shredded and collected in totes, then transported to the digester on a daily basis where it is fed to the digester. In FY17, the university collected 232 tons of food waste, while in FY18, it collected 145 tons. The university is not sure why the drop in tonnage happened. Approximately 75% of the food waste is post-consumer, while the remainder is pre-consumer food waste from the kitchen. The food waste, along with the fats, oils, and grease, that the university provides to the digester has been able to substantially increase the biogas production at the treatment plant. Using micro-turbines to produce electricity from the biogas, the city is able to produce about 20% of the plant's electricity needs. The city is now considering composting the digestate to make a more usable end product.

State College, Pennsylvania

The Borough of State College, located in Centre County in central Pennsylvania, has a population of 42,034. It is home to Penn State University, which has a student population of 46,606. The City provides for the curbside collection of mixed waste, yard waste, and organics, while it contracts recycling collection to the county. The curbside organics program started in the borough in 2010 as a pilot program and was expanded borough-wide in 2013. Food waste, compostable paper, yard waste, and certified compostable bags and products are collected weekly in automated carts. The program is optional and available to residential and commercial customers. It does not have a separate fee; the cost is included in the monthly refuse fee. The program collects about 1,400 tons of organics and yard waste per year. The borough owns and operates a 3-acre compost facility, where the organics are delivered and processed. In addition to the borough's organics, the facility has contracts with other municipalities in the area. They charge a \$40/ton fee for these municipalities to tip at the facility. The borough sells compost in bulk directly to residents and to third party vendors which sell in bag or bulk.

The university also has a separate organics program. Organics are from all locations around campus, with the majority of organics collected from dining halls. The university owns and operates its own compost facility on campus. In 2017, the university composted nearly 1,600 tons of organics and 2,700 tons of yard waste. The facility also receives fall leaves from the borough.

Centre County does not have an organics program, but does provide technical assistance to boroughs and townships in the county for organics program. For example, it has recently worked with a consortium of 5 townships for developing a contract for a new organics collection program. It has also developed an RFP for a compost facility for this new program.

Boulder, Colorado

Boulder, Colorado, located in Boulder County, has a population of 97,385, while the county has a population of nearly 320,000. The University of Colorado – Boulder has a student population of 33,426. All waste collection in the city and county is open market; however, the city has a universal zero waste ordinance and a goal of 85% diversion rate from landfills by 2025. The ordinance requires all residents and businesses to have adequate trash, recycling, and organics collection services. The city does not control rates, but requires that material is collected every other week, at a minimum. The program accepts all food waste and certified compostable materials. In 2017, 31,800 tons of organics and yard waste were collected in the city. A1 Organics is a privately owned and operated compost facility in neighboring Weld County that receives all organics collected in the city. The city does not have any agreement or contract with the facility.

The county does not have a universal zero waste ordinance, but it does have a zero waste resolution (goal) by 2025. It has 4 zones for residential collection based on services provided. In the most urban zone, organics collection is required to be provided by the haulers, which is open market. In more rural and mountainous zones, organics collection isn't feasible. The county does operate 2 rural drop-off locations that accept organics. In 2017, the county collected 36 tons of organics at these drop-offs. The county does not have mandatory commercial organics collection but does offer businesses a \$150 grant to help set up organics collection with a private hauler. Since the program started in 2010, the county has distributed nearly 150 of these grants. All material collected at the county drop-offs and by private haulers is composted by A1 Organics.

The university's compost program started in 2004 at its dining halls and has since expanded to include quick food service locations with compostable serviceware, deskside bins, restrooms (for paper towels), and residence halls. In 2015, 572 tons of organics were collected from food service locations and 107 tons were collected from other buildings around campus. All material is ultimately collected and delivered to A1 Organics.

Madison, Wisconsin

The City of Madison in Dane County has a population of 233,000 and is home to University of Wisconsin – Madison with a student population of 38,883. The city provides residential collection of mixed waste, recycling, and yard waste, as well as commercial yard waste collection. From 2010 to 2017, the city was operating a pilot curbside organics collection program. For the pilot, organics (food waste and soiled paper) were collected in 35-gallon carts. The pilot started with about 500 households and expanded to 1,100 and 40 businesses by the time it ended in 2017. The pilot collected about 270 tons of organics in its last year. Organics were delivered to a private anaerobic digester, GL Dairy Biogas, in Middleton, WI. The tipping fee started at \$50/ton but due to increasing and persistent contamination in the organics, the tip fee increased to \$200/ton for the digester to install a container screen to remove these contaminants. This high tip fee (by comparison the landfill tip fee is \$50/ton) was ultimately the reason why the pilot ended and didn't move to full scale. The city is now reevaluating its options for organics diversion in order to meet its zero waste goal by 2050. Three private organics collection providers still currently operate in the city. Dane County does not currently have an organics collection program.

The university has its own organics collection at its housing and dining buildings that started in 2008 as a student driven initiative. Food waste is collected in roll carts and dumpsters delivered to the GL Dairy Biogas digester, paying a tip fee of \$50/ton. The university also collects yard waste that is composted at an on-campus compost facility. In 2017, 194 tons of food waste and 174 tons of yard waste were collected.