

RECYCLING TECHNICAL ASSISTANCE
Project #528

FINAL REPORT

MILLCREEK TOWNSHIP
ERIE COUNTY, PENNSYLVANIA

MILLFAIR COMPOST FACILITY EVALUATION
INCREASING ORGANICS DIVERSION



GANNETT FLEMING, INC.
HARRISBURG, PENNSYLVANIA

FEBRUARY 2013

**Sponsored by the Pennsylvania Department of Environmental Protection through the
Pennsylvania State Association of Township Supervisors**

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**MILLCREEK TOWNSHIP
ERIE COUNTY, PENNSYLVANIA**

**MILLFAIR COMPOST FACILITY EVALUATION
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Project Completed By:



Gannett Fleming

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1.0 STATEMENT OF PROBLEM

This study was conducted for Millcreek Township (Township) under the Recycling Technical Assistance program that is sponsored by the Pennsylvania Department of Environmental Protection (PADEP) through the Pennsylvania State Association of Township Supervisors (PSATS). The Township operates the **Millfair Compost & Recycling Center** - a joint effort between Millcreek and Fairview Townships. The facility is open six (6) days a week from April through December and processes leaves and woody wastes into finished mulch and compost. The Township requested a solid waste expert to evaluate the ability of the Township to increase quantities of incoming organic material by accepting additional compostable feed stocks, including curbside-collected leaf waste, grass, food wastes, and possibly mortality waste. The Township would like to evaluate the use of an in-vessel system alternate technology to process additional and new feed stocks.

2.0 SUMMARY OF WORK

The following subsections summarize the work conducted by Gannett Fleming under the approved project tasks.

2.1 Millcreek Compost & Recycling Center Operating Overview

The Millfair Compost & Recycling Center processed over **6,100 tons** of brush, leaves, and Christmas trees in 2011. Approximately **17,800 visitors** or customers used the compost facility in 2011. Both participation and total organics processed are trending upward annually. The compost facility has received no formal complaints from public or regulatory entities regarding odors or other site issues.

The 2012 Recycling Department Budget, including revenues and expenses is provided in **Table 1**. As shown in **Table 1**, the projected operating budget yields an operating deficit exceeding \$168,000. The bulk of 2012 expenses included the cost for a rotary composter estimated to be \$100,000 and to be partially funded by a Section 902 Grant submitted in 2012. In 2011, Millcreek was awarded \$140,000 in Act 101, Section 904 Performance Grants that is placed into Millcreek's General Fund. The General Fund is used to allocate monies to the Recycling Budget and used as needed to supplement any annual operating deficits.

The facility is staffed with Millcreek and Fairview Township employees. Millcreek employees include one (1) full time equipment operator and four (4) part-time operators (Refer to **Appendix A, Millfair Staffing Schedule**). Three of the part-time operators work Monday, Tuesday and Wednesday and one (1) operator works only on Monday and Wednesday. Fairview employees include three (3) part-time employees who work two (2) to three (3) days per week, primarily for customer processing. Summer help may be recruited to staff the visitor booth.

Table 1
Millfair Compost & Recycling Center
Annual Recycling Department Budget

<i>EXPENSES</i>	
<i>Proposed Rotary Composter</i>	\$100,000
<i>Millfair Compost & Recycling Center Operating Expenses</i>	\$65,130
<i>Millcreek Wages</i>	\$65,000
<i>Fairview Wages</i>	\$20,000
Total Expenses	\$250,130
REVENUES (estimated)	
<i>Compost/mulch Sales & Brush Receiving</i>	\$75,000
<i>Commercial Season Rate</i>	\$7,000
Total Revenue	\$82,000
Total Annual Operating Deficit (estimated)	(\$168,130)

2.2 Food Waste Processing & Composting

The benefits of adding food waste as a feedstock at the Millfair Compost & Recycling Center include: improved nutrient content and compost quality; additional or new compost products for consumers (added revenue); a new eco-friendly food waste disposal alternative for local food waste generators; and, decreased landfilling of food waste which produces methane (a potent greenhouse gas). The methods employed to accelerate food waste composting will increase the total processing capacity of the compost site.

Food waste requires special handling due to its unique characteristics: high liquid content; rapid decomposition; and, potential for odors, pathogens and vectors. Accepting food wastes will require changes to the Millfair Compost & Recycling Center operation. Site configuration, equipment and infrastructure needs will change and new permitting may be required by the Department of Environmental Protection (PADEP).

In the proposed food waste program, food waste will be separated at the point of generation (e.g. grocery store), removing nonorganic items such as plastic, metal and glass. Source separated food waste may include both preconsumer and postconsumer food waste. **Preconsumer food waste** has not been served (e.g. kitchen prep waste, food past its sell date, etc.) and is often divided into vegetative and non-vegetative (e.g., meat, dairy, fish) categories for clarification of potential pathogen and vectors. **Postconsumer food waste** is served food that has not been consumed (e.g., food scraps and salad bar contents). Some critical considerations regarding managing food wastes include:

- **Securing food waste generators** willing to source separate food wastes from their operations for delivery:
 - Agreements with the Township (compost facility) and food waste hauler
 - Educating generators regarding the proper on-site management procedures

- Contamination and quality control
- Operational challenges: odors, container management, and additional labor
- Supply sufficient quantities of clean food waste
- **Securing a qualified contractor/food waste hauler**
 - Competitive bid and resultant agreement to define:
 - Compensation structure
 - Quality control (e.g. reject contaminated load)
 - Collection schedules meeting generator needs while satisfying compost processing needs.
- **Compost Permit Requirements**
 - Will accepting food wastes require a new permit or permit modification?
 - Can enhanced composting be completed initially as a PADEP-approved pilot study for a period of at least 2 years?
- **Compost Facility Impacts**
 - Financial impact and sustainability
 - Equipment requirements and operation
 - Staff utilization and schedules
 - Odor and leachate management
 - Safety; pathogens and cross-contamination from incoming feed stocks
 - Finished products (e.g. food wastes can improve compost quality)
 - Compost facility capacity (e.g. will additional incoming material negatively impact overall facility operational efficiency)
 - Site configuration and site work flow
 - Increased vectors (e.g. flies)

2.3 Grass and Mortality Waste Feed Stocks

Gannett Fleming does not recommend that grass be accepted at the Millfair Compost & Recycling Center due to the potential introduction of herbicides, pesticides, fertilizers or other chemicals that may negatively impact finished compost quality. If approved by PADEP, mortality wastes including deer, pigs, cows, and poultry could be safely and effectively composted using an in-vessel system. Mortality composting should not be attempted in aerated static piles under this pilot. Mortality waste should be managed in a manner that fully contains all liquids and solid wastes throughout processing.

2.4 Evaluation of Food Waste Composting Technologies

Gannett Fleming evaluated “in-vessel” composting and mechanically aerated static pile composting technologies. These technologies may be employed at the compost site to increase the types and volume of feed stocks received, and additionally to improve the quality of finished compost. Millcreek Township provided information on a “Rotaposter” by Rotary Composters, LLC. Gannett Fleming recommended aerated static composting for evaluation. Both in-vessel composting and aerated static pile composting methods, when conducted properly, are proven to be safe and effective ways to compost food waste. Equipment information, costs and specifications are provided in **Appendix B**, including additional information from compost equipment vendors contacted during this analysis.

2.4.1 In-Vessel Composting - Rotoposter by Rotary Compost, LLC.



Rotoposter – Model 1040
Photo Source: rotarycomposters.com

“In-vessel” composters are enclosed, temperature and moisture controlled systems. Organic materials are fed into a hopper by a front end loader and processed within a rotating cylinder. Temperature, moisture, mixing and aeration are controlled to optimize composting. In-vessel composters process large amounts of waste within a small footprint as compared to many other compost technologies, but are expensive. Because feed stocks are contained, in-vessel composting is suitable for most organic wastes (e.g., meat, animal manure, biosolids, and food scraps). The Rotoposter 1040 (3,022 cu. Ft.)

was recommended by Rotary Composters, LLC (see photo). This is their largest rotary composter, and was originally designed to handle large volumes of mortality (e.g. swine carcasses). Finished compost is produced in 2-3 weeks (additional curing required). The Model 1040 can compost **10,000(+)** lbs. per week of mortality waste and costs **\$150,000** (installed). Some in-vessel composters can be operated year round without being covered or enclosed by a building. After 2-3 weeks of active composting, compost must be screened and moved to curing piles for 1-2 months to allow microbial activity to stabilize compost.

2.4.2 Mechanically Aerated Static Pile Composting

In mechanically aerated static pile composting, incoming feed stocks (e.g. food waste) are mixed with a carbon amendment (e.g. shredded leaves or woodchips) prior to composting. Pre-mixing reduces odors and accelerates active composting. By weight the target ratios are 25 to 30 parts carbon to 1 part nitrogen or by volume, 1 part nitrogen (food waste) to 2-4 parts carbon. Mixed organic material is placed over an aeration system (e.g. perforated pipes). Active compost is covered with a 1-2 foot thick “compost blanket” (i.e. finished compost) to reduce odors and maintain optimal compost temperature. Air is forced through pipes in intervals (e.g. every 20 minutes for 1-5 minutes) using a blower connected to the pipes. The introduction of airflow accelerates the active compost phase considerably when compared with turned windrow composting of leaf waste. Active composting will take 4 weeks. This method is not effective for processing large quantities of meat. Following active composting, material should be screened and moved to curing piles for 1-2 months.



Aerated Static Pile Composting.
Two Particular Acres.
Photo Source: Gannett Fleming (2007)

2.4.3 Mixer - Premixing Feedstock and Carbon Amendment

Thoroughly mixing incoming food waste prior to adding to an in-vessel composter is recommended to accomplish the following: size-reduction, size uniformity, and increased surface area. Thorough mixing with a carbon amendment (e.g. shredded leaves) improves microbial activity and promotes active composting through establishing proper pH levels, moisture content and carbon to nitrogen ratios. Pre-mixing can increase in-vessel compost throughput by 30 percent or more and substantially accelerates aerated static pile composting.

2.4.4 Customized Food Waste Roll-off Container

Transporting food waste from generators (e.g. grocery stores) requires a specialized collection container. The container must be water tight and must have a mechanical lift system to prevent manual loading of heavy containerized food wastes. The roll-off container in the photo to the right was utilized by the Berks County Solid Waste Authority in a food waste pilot program. Sixty-four (64) gallon totes, weighing approximately 150 lbs. each, are rolled onto the load bucket and then dumped hydraulically.



3.0 SOLUTIONS

The following subsections describe recommended solutions and implementation steps for Millcreek Township to consider as it moves forward with evaluating and implementing food waste composting within its existing compost operation.

3.1 Gannett Fleming's Preliminary Opinion - Food Waste Composting Strategy

Millcreek Township's implementation of a food waste composting program will be a complex operation that requires careful planning, education and execution by multiple stakeholders. The decision to move forward with managing and processing food waste by Millcreek Township should be considered very carefully. Managing food waste at the Millfair Compost & Recycling Center will impact operations, costs, labor utilization, schedules, facility permitting requirements, and infrastructure. Certain capital cost and operational impacts cannot be accurately projected this time, thus there are risks associated with handling this new waste stream. A focus of our recommended base-line strategy is to minimize risks to Millcreek Township and Fairview Township. GF recommends Millcreek Township use a "pilot study" approach over a trial period of 2 years to test both in-vessel composting and mechanically aerated static pile composting technologies at the Millfair Compost & Recycling Center. This strategy provides a platform to learn the food waste collection and composting business and determine feasibility, equipment needs, operational scale and cost per ton, and best management practices for long term success.

3.2 Recommended Solutions/Course of Action

The components of the recommended pilot study strategy include:

- **Written authorization by PADEP** of the proposed “pilot” program.
- **Issuance of a bid solicitation for a qualified waste hauler to conduct a food waste collection route once per week**, on Fridays, and delivered to the Millfair Compost Facility. The bid agreement should specify operating details, quality control procedures, and carefully clarify roles and responsibilities and administrative functions (e.g. billing).
- **Identification of at least five (5) “large food waste generators”** located within 20 miles and committed to participate in the pilot program. **Appendix C** contains data from a similar food waste pilot study that shows potential incoming feedstock quantities. A starting diversion target of 2 tons per week of food waste, with a plan to increase incoming food waste to a level that optimizes equipment should be established. Millcreek Township should advertise and host an educational meeting for prospective food waste generators (see **Appendix D, Example Food Waste Generator Meeting Invite**). Participating Generators should execute an agreement with the compost facility that includes provisions for quality assurance (e.g. prohibit plastics and other contaminants from delivery to the compost site).
- **Satisfy equipment needs** for the food waste collection and composting program in a manner that is consistent with a reduced risk, “pilot study” approach as follows (see **Appendix B, Equipment**):
 - **Food Waste Roll-off Container** – Work with PADEP and the Berks County Solid Waste Authority to secure a specialized food waste roll-off that was originally paid for by Act 101, Section 902 Grant Funds, but is not currently in use. It is anticipated the roll-off could be acquired by paying the Berks County Solid Waste Authority match costs estimated at \$4,000 required by PADEP. If the contracted hauler can utilize this roll-off, they will be responsible for the hook-lift truck and totes provided to food waste establishments, thus lowering operational costs and fees billed to generators.
 - **Mixer** – Utilized to thoroughly pre-mix food wastes and carbon amendment prior to in-vessel and aerated composting.
 - **In-vessel Rotary Composter** – Instead of procuring a composter initially, enter a lease or lease to buy option with an in-vessel composter vendor. The hands-on trial period and equipment operation will confirm sizing, operation, and throughput and overall feasibility for long term implementation. A key factor during the pilot will be determining actual weekly quantities of incoming food waste from committed food waste generators and the amount of carbon amendment that will be added.

- **Mechanically aerated static pile composting** - Employ mechanically aerated static pile composting over a total area approximately 100' by 50' as described in **Appendix E, Mechanically Aerated Static Pile Compost Pilot**.
- **Optimize operational synergies between the in-vessel and aerated static piles** by locating these technologies in adjacent areas on the site (See **Appendix F, Proposed Technology Configuration**). Some of the synergies include:
 - All incoming food waste should arrive, be pre-mixed and processed in the same area of the site, and somewhat away from other site activities.
 - Power supply is needed to serve aeration blowers, mixer, and composter.
 - An impervious surface is required for food waste tipping or spillage to enable effective leachate management and is preferable for loader and equipment activity. A concrete pad is required for the in-vessel composter.
 - Adjacent technologies promote operational flexibility and efficiency. If the in-vessel composter is down temporarily or at maximum capacity, incoming food waste could be introduced into the static piles.
- **Permitting Requirements** - Accepting new feed stocks including food waste and possibly mortality waste may require changes to compost permitting requirements, and operational procedures. A pilot study can be an effective strategy to fine tune best management practices and to showcase actual on site handling and processing procedures to PADEP to assure methods are consistent with PADEP policies and permitting requirements. If Millcreek Township is required to submit a new permit, there may be additional site improvement and infrastructure requirements that may be cost prohibitive or operationally infeasible.
- **Economic Sustainability** - The existing compost facility is clearly a very popular and valuable community resource. However, it is recommended the facility improve its financial sustainability and identify a strategy to continue operation if all grant funding ceased. At this time, roughly \$140,000 of Act 101, Section 904 Grant Funds enter the General Fund and support the annual operation of the facility. Historically, much of the composting equipment has been paid for by Act 101, Section 902 Grant funds. Reliance on these funds presents heightened financial risk, particularly as competition for grants increases while the total available funding decreases. The facility should sustain operations while responsibly managing costs that are passed on to residents through taxes. It is recommended that this financial strategy be a 3 year plan, with 2016 being a target for implementation of an improved financial structure.

4.0 CONCLUSION

At the current time, the demand for compost from the Millfair Compost & Recycling Facility exceeds compost production. Leaf waste compost piles accumulate on site and take 18-24 months from delivery to removal off site as a finished product. It is Gannett Fleming's opinion that the proposed pilot study is the preferred platform to test the feasibility of aerated static pile composting and in-vessel composting technologies for food waste composting, and possibly other approved feed stocks. With proper equipment and

best management practices (BMP's), both technologies can be conducted in an operationally and environmentally safe manner. It is expected that each technology will substantially accelerate active phase composting and improve the quality (amount of available nutrients) of finished compost products. By accelerating composting through the use of mechanical aerated and/or rotary composter technologies, Millcreek Township should be able to increase the total annual processing capacity and the total annual revenues generated through compost sales. The annual labor costs to operate these technologies are not expected to exceed the financial benefit from potential additional revenues. Compost sales remain critical to financial sustainability of the facility and help to offset the required tax subsidy by participating residents. Importantly, the procurement of a rotary composter at this time remains cost prohibitive unless grant funding can be secured. Establishing agreements with local food waste generators will be critical to the overall feasibility of rotary composting.

APPENDIX

Appendix A – Millfair Compost & Recycling Center Staffing Schedule

Appendix B – Equipment Info, Specs, & Estimated Costs

Appendix C – Food Waste Compost Pilot Data (Weekly Quantities)

Appendix D – Example Food Waste Generator Meeting Invite

Appendix E – Mechanically Aerated Static Pile Compost Pilot

Appendix F – Proposed Pilot Study Configuration (concept)

Millfair Compost & Recycling Center

Staffing Schedule (11/5/12)

	Monday 8am - 7pm	Tuesday 8am - 7pm	Wednesday 8am - 7pm	Thursday CLOSED	Friday 12pm- 7pm	Saturday 9am - 5pm	Sunday 12 - 5pm
8:00am	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve				
	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve				Corey
9:00am	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve			Jim Debbie Cary	Corey
	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve			Jim Debbie Cary	Corey
10:00am	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve			Jim Debbie Cary	Corey
	Cliff Ron Steve Corey Matt	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey	Jim Debbie Cary	Corey
11:00am	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey	Jim Debbie Cary	Corey
	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey	Jim Debbie Cary	Corey
12:00pm	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
1:00pm	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
	Corey Matt	Corey Steve	Corey Matt		Corey Jim	Jim Debbie	Corey Jim

	Cliff Ron Steve	Cliff Ron	Cliff Ron Steve		Debbie Cary	Cary	Debbie Cary
2:00pm	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
3:00pm	Corey Matt Cliff Ron Steve	Corey Steve Cliff Ron	Corey Matt Cliff Ron Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
	Corey Matt Steve	Corey Steve	Corey Matt Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
4:00pm	Corey Matt Steve	Corey Steve	Corey Matt Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary?
	Corey Matt Steve	Corey Steve	Corey Matt Steve		Corey Jim Debbie Cary	Jim Debbie Cary	Corey Jim Debbie Cary
5:00pm	Corey Matt	Corey Steve	Corey Matt		Corey Jim Debbie Cary		Corey
	Corey Matt	Corey Steve	Corey Matt		Corey Jim Debbie Cary		Corey
6:00pm	Corey Matt	Corey Steve	Corey Matt		Corey Jim Debbie Cary		
	Corey Matt	Corey Steve	Corey Matt		Corey Jim Debbie Cary		
7:00pm							

➤ Jim – Off Fridays from Mid-April to Beginning of October

VENDOR INFORMATION

IN-VESSEL COMPOSTERS

Rotary Composters, LLC.

<http://www.rotarycomposters.com/>

Tom Gresh

814-873-5199

tjgresh@gmail.com

Pat McCready

724-462-4960

cpatmccready@windstream.net

Rotary Composters, LLC Response to Gannett Fleming (Steve) Inquiry Regarding Equipment

Steve,

I understand you spoke to Kevin on the phone. We are excited to have the opportunity to work with you and Millcreek Township in solving their composting needs. As you know, there are many variables when it comes to composting, like feedstock's, feedstock mass, bulking material/carbon source, moisture level (very important), oxygen levels, etc. We also know that composting is naturally occurring event that happens with any given organic material. The process is very simple yet somewhat intricate. The Rotoposter is simply a piece of equipment that speeds up that process with a rotating vessel which introduces oxygen to the mix. This then speeds up the process given the proper recipe. The following is a list of variables to be considered when sizing a unit:

- **Rotoposter basics** – you mentioned “batch” and asked how soon more material could be added. The Rotoposter is a continuous flow system with a loading hopper on one end and a discharge at the opposite end, so material can be added daily. As the matter inside the vessel tumbles, it naturally levels itself and since the loading hopper is higher than the discharge, the product works its way down the vessel until it exits at the opposite end. It has flexibility in that if you go a couple of days (like a weekend) without loading product in, the overall volume will be reduced to below maximum operating levels and then can accept above daily average inputs (until filled to capacity) when you start loading. This is why we like to discuss throughput in terms of weekly vs. per day.

- **Premixing** – is it necessary?
Premixing (and grinding) will definitely speed up the process and allow for more throughput in the vessel. By mixing and reducing the size of the mass/particles and getting the carbon

source particulates mixed into the organic matter, the process will be sped up significantly. Example, our estimate for retention time in the vessel with food waste is 5-7 days vs. 3-4 days (not mixed / mixed). Another added benefit of premixing is the ability to monitor moisture before conveying the product into the vessel. This is especially important when dealing with inconsistent input material. Note, we do not build mixers or conveyors, but recommend the Enviro Series from Supreme International*.

□ **Moisture levels**

After combining your feedstock and carbon source/bulking material, the moisture level must be between 50-65%. If it goes above or below that, it will be difficult to generate heat and the composting process will be slowed down immensely.

□ **Carbon/Nitrogen ratio** – needs to be between 25-40/1

Note, the carbon needs to be available carbon, large chunks of wood are not considered available

□ **Recipe**

When formulating a recipe, all of the above information needs to be considered. In general, you can figure that for each cubic yard of feedstock, you will add 2-3 cubic yards of bulking material. Moisture and available carbon in the mix will help determine the desired recipe.

□ **Foundational load** information can be found in the upper left hand corner of the attached document.

The chart below is **estimated** volumes per week for composting food waste assuming a recipe of 1 part food waste to 2.75 parts bulking material. Note, the weekly input #'s are food waste only, the bulking material would be in addition.

Model #	Operating Capacity Cubic Yards (65% full)	Weekly Input (Not Mixed) Cubic Yards 6 day retention	Weekly Input (Mixed) Cubic Yards 3.5 day retention	Estimated Price (Installed) (NOT insulated)	Closed Cell insulation option
1040	72	30.5	51.5	\$150,000.00	\$11,500.00
1032	60	25.5	43.5	\$144,500.00	\$10,500.00
748	43	18	31	\$125,000.00	\$9,000.00
740	37	15.5	27	\$122,000.00	\$8,000.00
732	29	12	21	\$119,000.00	\$7,000.00

So figuring food waste there is approximately 1500 lbs. in a cubic yard and 1.33 cubic yards in a ton and it is premixed (food waste and bulking agent) your weekly input increases. For a year of non-mixed food waste you could see 2,109 tons processed or with mixed product approximately 3,560 tons of food waste it will all depend on the mix, carbon and moisture content which we will help provide consulting on getting the mix correct.

As for the lease to buy option, we have built enough units to know that they work. Even though we do not have experience in food waste per say, I would reiterate the fact that composting is a natural, proven process and we are providing equipment that simply and safely speeds up that process. Since this equipment becomes attached (lagged to concrete) to the property, it makes repossession very difficult (almost impossible with a government entity). So in light of that, we are only interested in selling our equipment.

Kurt Good
Rotary Composters, LLC
503 School Rd.
Denver, PA 17517
717-445-5776
717-468-2639 mobile
WWW.ROTARYCOMPOSTERS.COM

Eco Value Technology, Inc.
Direct Contact: (248) 419-5351
Cell Phone: (248) 469-3596
Email contact: tomwo@ecovaluetech.com

Recommended Demo



Ecovally composters require only a simple single phase power receptacle to plug into and it is ready to go. A pad of concrete is desirable as well as consideration of any other regulations in your state for which the user would be responsible for meeting. The controls are simple to use and flexible through use of timers for rotation and air control. The pull-out loading door is 30" x 30" which is nearest the mechanical housing. There are (3) probe ports (see photo above) for simple manual temperature readings by removing a plug and measuring the temperature with a compost thermometer.

We currently do not have any rental equipment for mixing. Mixing the materials could be done in several ways. You could simply mix in a concrete bunker with a tractor bucket or you could use an Ag feed mixer like those produced by Patz and others designed for composting. A tractor bucket can also act as a volume measuring device. There may be an Ag equipment dealer in your area that could offer that option or sell a used mixer that would meet your criteria. Another idea for possibilities could be a simple input by alternating totes of food and carbon amendments. Manual loading of one tote of food then 1-2 totes or so of carbon amendment could allow easy input and measurement of materials without large costs. The composter rotates and will also help mix during processing.

B W Organics, Inc.

Rt. 8, Box 729 / CR 2300

Sulphur Springs, Texas 75482

903.438.2525 office

903.438.2626 fax

bworganics@neto.com

Steven,

Thanks for your interest in our in-vessel composter. We designed the composters for daily composting of waste. According to your numbers, the 2 tons of food would only be loaded once a week. You would have approximately 4 Cubic yards of food and would need at least 4 cubic yards of carbon which would be 8 cubic yards per week.

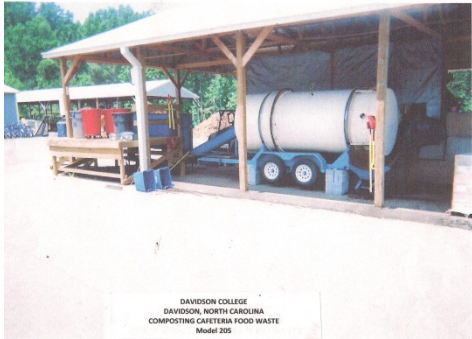
I would recommend our Model 405 which will hold 12 CY total. When you discharge the weeks run of 8 or 9 yards of compost, leave a yard or 2 in the composter to inoculate the fresh supply. On food waste you need to grind the food mix with wood shavings and ground leaves to get moisture of 40% to 60% and check the food for PH. If it is old and beginning to get a vinegar smell, you would need to add a small amount of lime to raise the Ph to 6.5 to 7.

The Model 405 is on a trailer and can be towed to the location. You would need a slab at the loading end for the loading conveyor to set on and I would recommend a cover over this to keep out the rain and snow while loading. The slab should be a 6' X 10' or larger. You could move the material from the discharge end with a skid steer and place in a curing pile since it is hot when discharged.

I make the following proposal and include a picture of a trailer model similar to the one quoted:

1 – Model 405 with 1/3 HP drive motor on trailer.....\$44,950.00
 1 – Model 910 Loading Auger with 2 HP drive..... 3,967.00
 1 – Model 101 Mixer to mix the ground food
 and ground carbon and discharge into
 loading auger had 2 HP drive..... 10,292.00 (not needed with separate mixer)
 Total price of unit FOB our plant.....\$59,209.00

You could pick up the unit here and tow to your place or we can give you a delivered price.



We have 2 or 3 leasing companies we work with that does lease purchase plans.

John Willis
 888-293-0033

MIXER (for mixing feed stock with carbon amendment)

*The Supreme International dealer in Pa is Hooper Inc. they have dealerships in Chambersburg, McAlisterville and Intercourse PA. the Enviro Series can be fitted with conveyors, you can learn more @ <http://www.supremeinternational.com/processor-enviro.htm>



Based on the many variables mentioned in your email, we suggest going with a size that is large enough to have excess capacity initially so that it allows them to bring on more food waste generators as time goes on.

3-phase Power Supply Specs for Stationary Mixer (smaller, single phase mixers are available)

460 Volts

60 hz

75 hp motor 86.9 full load amps

AERATED STATIC PILE SUPPLIES

LEE SUPPLY CO. INC.
PENNSYLVANIA OFFICE
1-800-353-3747
(724)-483-3543
(724)-483-0577 (FAX)
JBUMM@LEE.SUPPLY.COM

COST ESTIMATE 12-6-12

480', 4" HDPE Pipe (6, 40' lengths) (the 4" is the black pipe in the photo)
SDR 11 2.40 PER FOOT

5, 4' sections of 6" HDPE (6" is what I assumed for the larger dia. HDPE from the photo).
SDR 11 5.19 PER FOOT

2, 6" HDPE Elbows
90 SDR 11 37.34

6, 6" HDPE to 4" HDPE tapers
SDR REDUCER 26.00 ea.

6, 2' Sections 4" Flexible Pipe NQ
(Sdeasy estimate, \$12.00 based on lowes 4" corrugated HDPE, 10' lengths)

30 Hose Clamp fasteners NQ
(Sdeasy estimate,\$36.00 based on Grainger Supply 10pk)
JEFF DUMM
Jdumm@leesupply.com

APPENDIX B

Millcreek Township Millfair Compost & Recycling Center, Erie County PILOT STUDY - Capital Improvements & Lease Costs - Cost Estimate (2012-2013)			
Item	Estimated Capital Cost	Estimated Monthly Lease Costs	Notes
IN-VESSEL COMPOST SYSTEM			
Composter	\$50,000 - \$150,000	\$1,500.00	\$1,500/mo. Based on Eco Valley DEMO (6.25 cy)
Composter Concrete Pad	\$2,500.00	NA	
Mixer	\$45,000 - \$75,000	(info pending)	
single-phase electric	\$500.00	NA	Single Phase ready. Lease NA
New 3 phase power	\$18,000.00	NA	3-Phase Upgrade. Lease NA
Interlocking Retaining Wall Block	\$2,200.00		22 blocks (foodwast & leave staging area)
IN-VESSEL SUBTOTAL	\$136,700 - \$247,700		
MECHANICALLY AERATED STATIC PILE			
Aeration Piping and Fittings	\$1,040.00	LEASE NOT APPLICABLE	Mixer shared/assumed under In-vessel cost 1 blower, 1 back up
Mixer	\$0.00		
2 HP Blower (2)	\$500.00		
Materials Delivery	\$250.00		
AERATED STATIC PILE SUBTOTAL	\$1,790.00		
ESTIMATED EQUIPMENT TOTALS	\$122,290 - \$231,500		

APPENDIX C

BERKS COUNTY SOLID WASTE AUTHORITY - FOOD WASTE COLLECTION QUANTITY DATA

Food Waste Generator	# of 64 gallon Totes Collected Per month	# of 64 gallon Totes Collected Per Week	Pounds Collected Per Month (Aug 2012) (est. 150 lbs. per tote)	Pounds Collected Per Week (Aug 2012) (est. 150 lbs. per tote)	Tons Collected Per Week (August 2012)
Weis Market - Kutztown	78	16	11,700	2,340	1.17
Weis Market - Reading	11	2	1,650	330	0.165
Weis Market - Wyomissing	13	3	1,950	390	0.195
Weis Market - West Lawn	15	3	2,250	450	0.225
St. Joseph Hospital	14	3	2,100	420	0.21
Total (totes and weights)	131	26	19,650	3,930	1.965



1000 South 4th St., Hamburg, PA 19526
(p) 610.562.8336 (f) 610.562.8381
www.couglesrecycling.com



January 18, 2011

We would like to invite you to a breakfast seminar on February 15th (snow date of February 17th) to launch our food waste composting initiatives. We are working in association with Cogle's Recycling, Inc. to implement commercial food waste composting programs. These programs aim to reduce waste costs and divert landfill bound material.

We will be discussing the details of the program as well as some important information on composting food waste in general. Breakfast will be provided. We do ask that you please RSVP by February 1st, to swa@countyofberks.com or by phone at 610-478-6362.

**Please join us: Tuesday, February 15 @ 7:30am – 8:30am Presentation
Q&A Session to follow**

**Berks Career and Technology Center
1057 County Welfare Rd.
Leesport, Pa. 19533**

At the preview, you'll get to explore the possibilities of taking another "green" step and its potential savings! This is an invitation-only event, not open to the general public. Attending companies who decide to try this service will receive reduced container and program rates. We do have a limited supply of food waste totes at the reduced rate so participation at the special "launch" prices will be limited while supplies last. We hope to see you there.

Best Regards,

A handwritten signature in black ink that reads 'Jane Meeks'. The signature is written in a cursive, flowing style.

Jane Meeks
Executive Director

**MECHANICALLY AERATED STATIC PILE COMPOSTING
PRELIMINARY PROPOSED PILOT STUDY**

PILOT STUDY

The following information is not intended to be detailed or provide all equipment options or specification or detailed implementations steps. It is a basic overview of the size, materials and general approach to conducting an aerated compost pile pilot program at the Millfair Compost & Recycling Center. The purpose of this pilot is to evaluate aerated static pile composting and determine the feasibility of using this technology at the existing compost site. The pilot will provide information on processing throughput for feed stocks and carbon amendment, costs, operational impacts and feasibility, and compost quality. This pilot study is based off the aerated static pile methods and equipment used at an on-farm compost facility, Two-Particular Acres. Refer to the On-Farm Composting Handbook (NRAES-54), 1996, for operation and design details on aerated static pile composting.

SCALE

Pilot Study Area- 100' x 50'

Aerated Pile Area (active composting) - 75' x 25'

MATERIALS

480', 4" HDPE Pipe (6, 40' lengths)

- Perforated (drilled on site in the 8 o'clock and 4 o'clock positions, every 6" - 12")

5, 4' sections of 6" HDPE

2, 6" HDPE Elbows

6, 6" HDPE to 4" HDPE tapers

6, 2' Sections 4" Flexible Pipe

30 Hose Clamp fasteners

Duct Tape

Chain (to pull HDPE pipe from beneath compost)

EQUIPMENT

1 Blower (backup recommended); 2 horsepower (3,450 rpm) blower with interval timer

Mixer (to pre-mix all food waste prior to constructing aerated piles)

Front End Loader

2 hp blower, back up recommended

PILE CONSTRUCTION

Place two 80' lengths of perforated HDPE on ground/paved surface, parallel, 4' apart (two 40' duct taped together).

Place 1' woodchips or woodshreds over the length of HDPE pipe (to promote air flow)
Add pre-mixed feedstock (food waste) and carbon amendment (e.g. shredded leaves), covering approximately 70' of the pipe, leaving 4' of HDPE pipe exposed at each end of the aerated pile.

Construct the aerated pile to a height of 8'. Add a 1'-2' compost blanket (i.e. cured compost) over the active compost pile to reduce odors and contain heat.

The above process will be repeated, covering two (2), 80' lengths of HDPE pipe at a time (The 4' space between pipe still allows the loader room to cover the pipes with material using the bucket without running the aeration pipe over).

As each section of the aerated pile is constructed, connect and configure the HDPE piping elbows, T's, flexible pipe, and blower as shown in the photos at the end of this document.

PILOT OPERATION

Incoming food wastes should be managed and contained throughout this pilot study in a manner that eliminates the formation of leachate that would mix with storm water or otherwise require treatment. For the proposed pilot the following basic operation guidelines are recommended. Enclose 3 sides of pilot area with compost/woodchip berm.

- Throughout the pilot, maintain accurate logs of feed stock and carbon amendment quantities (volume and weight), compost parameters, issues, etc.
- Incoming feedstock (food wastes) will be added directly to a mixer, not mixed in a bunker or on the ground.
- Shredded leaves or other suitable carbon amendment will be added to the pre-mix at a volume ratio of approximately 1 food waste to 2 carbon amendment or 1:2. This ratio will vary, and must be optimized based on temperature, moisture, and other indicators of active compost.
- After the feed stock and carbon amendment are mixed uniformly, transfer the mix to a frontend loader and begin constructing the piles (8' height) over the aeration system (i.e. perforated pipe with 1' wood chips over pipe). Add compost blanket.
- Active composting should take approximately 4 weeks. To move active compost to a curing area, disconnect the blower and 4" HDPE pipe and attach a chain to the 4" 80' long section. Pull each pipe from beneath the piles using a loader and chain.
- Place compost into a curing pile for 1-2 months.
- After curing, submit samples of the compost to a lab for compost analysis.

Photos: Two Particular Acres, Royersford PA. Photo Source: Gannett Fleming, 2007.





Note: Proposed system modifies below configuration to use one (maybe two) blowers connected to a section of HDPE pipe that runs perpendicular pipe shown.

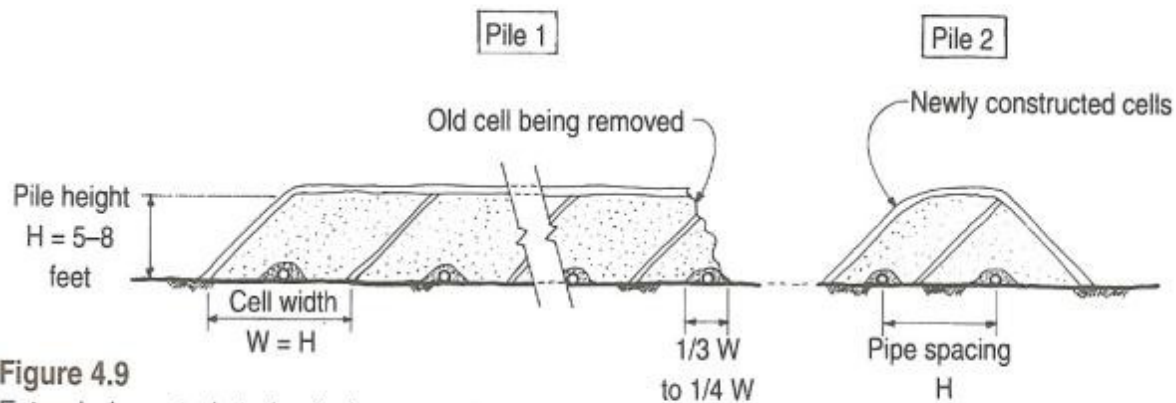
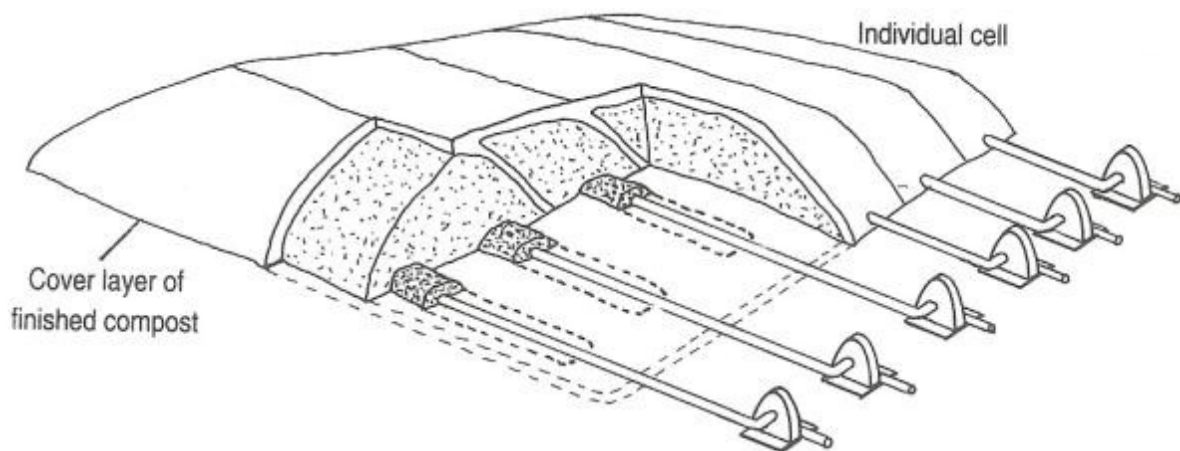


Figure 4.9
Extended aerated static pile layout and dimensions.

Adapted from Willson, *Manual for Composting Sewage Sludge by the Aerated Pile Method*.

Appendix F
Millfair Compost & Recycling Center
Conceptual Layout
Proposed Aerated Static Pile and Rotary
Composting Pilot



Active Leaf
Compost Windrows

Compost
Curing

Mulch
Curing

2301 Millfair Rd, Erie, PA 16506, USA

Drop-off

Grinding/
Screening

Aerated Static
Pile Composting

Mixer

Compost/
woodchip Berm

Millfair Rd

In-Vessel composters