CARVER COUNTY
DEMONSTRATION PROJECT
FINAL GRANT REPORT

TO THE
MINNESOTA POLLUTION CONTROL AGENCY

CONTINUATION & EXPANSION OF THE COMMERCIAL & RESIDENTIAL CO-COLLECTED ORGANICS COMPOSTING PROJECT
November 27th, 2012

Submitted by:

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Executive Summary:

In August, 2010, Carver County Environmental Services received a $100,000 grant for their proposed project -Continuation & Expansion of the Commercial and Residential Co-Collected Organics Composting Project. The partners of the project include: Specialized Environmental Technologies, the University of Minnesota Landscape Arboretum, and the Minnesota Pollution Control Agency. The goals of the project were to:

1) Re-establish an organics composting site on the University of Minnesota Landscape Arboretum property to allow for the continuation/expansion of established co-collected residential/commercial organics collection programs.
2) Demonstrate that with modest modifications to the operational plan such as the use of forced aerated static piles, limits on commercial organics and increased buffers, the operators can effectively avoid operational issues which results in a significant reduction in complaints.
3) Supplement existing data collected by Carver County in previous demonstration projects.

The County worked closely with the Minnesota Landscape Arboretum and Specialized Environmental Technologies to finalize the location of the new site. The partners agreed on the old Arboretum brush burning location which provided good access from Highway 5. The main benefit of the site was its significant buffer from neighboring properties. The projected was delayed for a little over a year while the County worked with the Minnesota Department of Transportation to obtain a MnDOT access permit to Highway 5. Details on site selection and development can be found in the summary of Objective 1: Finalize Site Selection and Hire Staff and 2: Complete Preliminary Site Development tasks found on pages 3 - 7.

The majority of the grant dollars were utilized for site preparation which included pad construction, improving the service road and installing a contact water collection system. A summary of site preparation tasks can be found in Objective 3: Site Preparation & Development found on pages 7-12.

The site began accepting material in September of 2011 from several haulers including Vintage Waste, Verikant Disposal, Randy's Environmental Services and Organics Disposal. In addition, the Arboretum delivered material collected from their cafeteria located on the same property. The majority of the material delivered wasfrom primarily residential co-collected routes located in Carver and Hennepin counties. The Emerald Ash Borer quarantine had a large effect on volume of co-

collected material delivered to the site because several haulers collected material in Hennepin County which is quarantined.

Testing began at the site with the collection and analysis of soil samples for the purpose of determining background levels of 503 metals, pH, total organic carbon, total nitrogen, conductivity and several other parameters. One key finding was the arsenic levels in soils from the 12-18 inch depth were found to be higher than the Minnesota residential soil reference value. It is a reasonable assumption that soil at this depth has naturally higher arsenic.

Contact water was collected through the use of lysimeters (refer to a diagram of lysimeter locations on page 11)on ten separate dates starting on November 14, 2011 through June 20, 2012. Samples were taken from both underneath and around the piles containing co-collected organics and yard waste as well as yard waste only. The sample parameters included Nitrate, TKN, 503 metals, Mercury and Potassium, Total Phenolics, pH, Total Coliform & E-coli, TDS and TSS. Two key findings showed arsenic concentrations in two samples to be above drinking water standards. These arsenic samples were taken from down gradient of the yard waste only piles. Again the arsenic is naturally higher in Carver County soils which likely affected contact water moving through the soil horizons.

In addition to the lysimeter sampling, one sheet flow sampling event was conducted on May 3, 2012, at two different locations on the site. The sheet flow sampling results indicated higher than drinking water standards for arsenic and lead. The Class V aggregate used for the pad is from a quarry in Carver County that may have the elevated levels of arsenic and lead. Additional testing will be done to confirm this hypothesis. A complete description of results for all testing can be found in the summary of Objective 4: Implementation and monitoring found on pages 13-23.

In the first full year of operation, 2,686 yards of material was delivered to the site for composting. Waste sorts were conducted to determine the composition of typical co-collected load. It was found that between 20% and 25% of material by weight was source separated organics while the remaining 75% to 80% was yard waste. The overall percentage of material collected the first year was 78.7% yard waste and 21.3% organics. A complete overview of the waste sorts can be found in Objective 5: program Evaluation found on pages 23-32.

Conclusions

Carver County shares the MPCA's goal of moving organics material management up the waste management hierarchy through the creation of site design standards that provide regulatory relief while protecting the environmental. Information gathered as part of this research has been used to formulate Carver County's comments to the MPCA for their Compost site rules change process. Those comments are summarized in Appendix I of this report. Additional research will be conducted at the demonstration site to help answer any further questions related to environmental effects of composting co-collected organics.

Objective 1: Finalize Site Selection and Hire Staff

Task A: Hire a temporary part-time staff to assist in design, implementation and monitoring of the project.

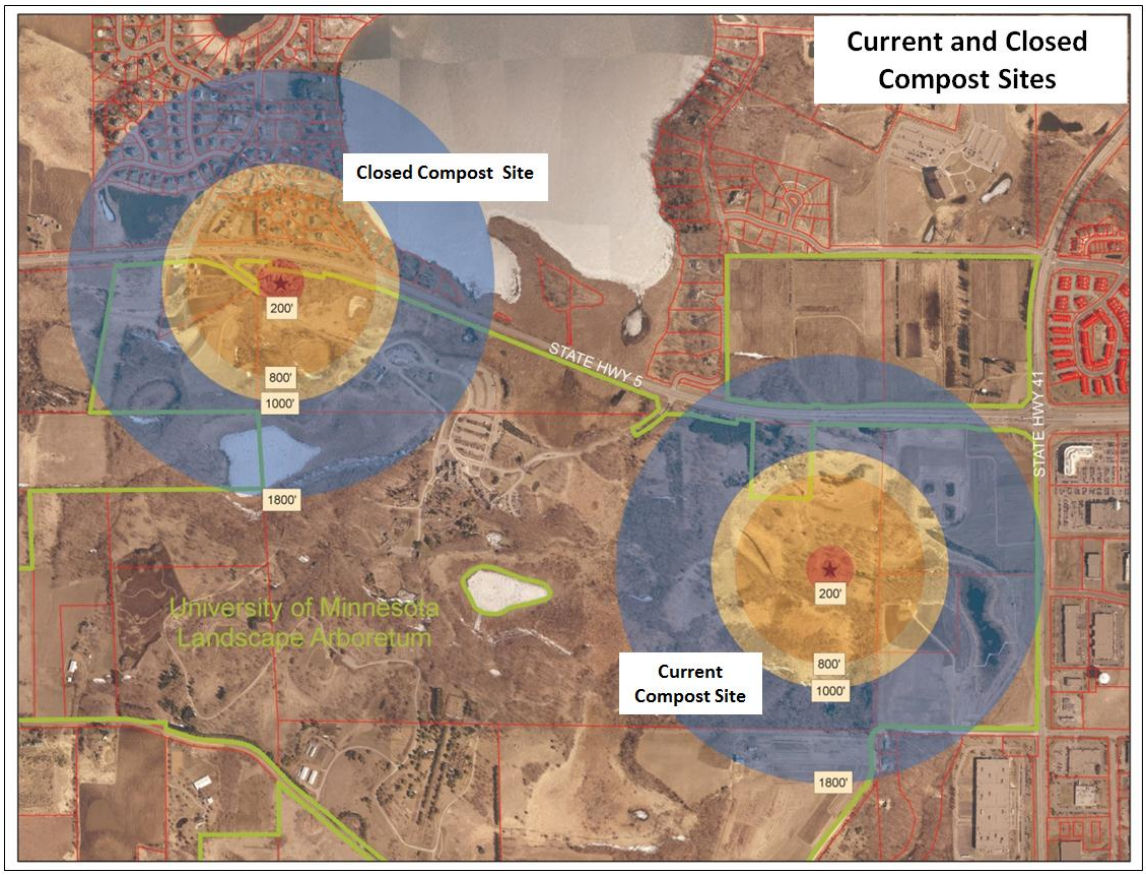
Kellie Kish was hired on May 26th, 2011 as a part-time temporary employee for Carver County Environmental Services to manage the Commercial and Residential Co-Collected Organics Composting Project. Ms. Kish was selected due to her prior experience working as an Environmental Assistant with Carver County. While in that position, she assisted in the day to day operations of the initial Minnesota Landscape Arboretum compost site which operated from 2007 to 2009. In this report the first site will be referred to as Site 1.

The design of the new facility, hereafter referred to as the SET (Specialized Environmental Technologies) site, was completed in the Fall of 2010. A major delay to constructing and opening the SET site was obtaining a road access permit from the Minnesota Department of Transportation (MnDOT). This alone held the project up for over a year. Wenck Associates was hired by Carver County to design a turn lane and complete the MnDOT access permit application. The Access Permit was approved on March 29th, 2011. A copy of the permit can be found in Appendix A.

Task B: Work with the University of Minnesota Landscape Arboretum to finalize location for compost site.

As Site 1 developed, it began creating nuisance odor issues for neighboring properties. The odors were exacerbated by close proximity to neighboring homes which were within 350 feet from the site. The SET site is located over 1,800 feet from the nearest residential home with the exception of two houses owned by the Minnesota Landscape Arboretum. An aerial map showing the current, SET, compost site versus the closed compost site, Site 1, can be found on the top of the next page. This map was utilized to discuss alternative locations during meetings with concerned neighbors. The result of these meetings ended in an agreement that the alternative site would be relocated to continue composting at the Arboretum.

The SET site was previously used as the Arboretum's burn pile. The location is well suited for composting since it is screened from highway 5 and highway 41 as well as its distance to neighboring properties.



Sub-task 1: Obtain Minnesota Pollution Control Agency approval for Demonstration Project.

On August 6th, 2010 Carver County was awarded a grant from the Minnesota Pollution Control Agency to implement its project proposal: Continuation & Expansion of the Commercial and Residential Co-Collected Organics Composting. The executed Grant Agreement was signed on December 2nd, 2010.

Prior to beginning work on the new organics composting facility, the County applied for demonstration site approval from the MPCA.

Carver County obtained the Demonstration Project agreement on June 8th, 2011. The agreement can be found in Appendix B.

Sub-task 2: Complete lease agreement between Operator and the University of Minnesota Landscape Arboretum for use of the property as compost site.

The site operator, SET, and the Minnesota Landscape Arboretum created a lease agreement that allows SET to use the area where the compost site is located for the duration of the project. The lease was signed on June 16th, 2011.

Objective 2: Complete Preliminary Site Development Tasks

Task A: Finalize Standard Operating Procedures and Equipment.

Sub-task 1: Work with the Operator to finalize operational practices and equipment selection process.

The Operations Plan for the demonstration site mimics SET's standard operating procedures utilized at their Empire site located in Dakota County. This site is similar in that they both utilize forced aeration systems. The standard operating procedures outlined in the Operations Plan include the following information:

a. Day to day operations
b. Housekeeping and nuisance management
c. Contingency action and emergency response
d. Personnel training
e. Closure plan

The Site Operations Plan can be found in Appendix C.

Sub-task 2: Determine processing requirements for site including: site layout and volume limits

Site 1 at the Minnesota Landscape Arboretum developed odor issues once the operator began accepting large volumes of nitrogen rich commercial organics. In addition, the operator created piles higher than recommended that also did not contain the proper amount of carbon feedstock. To alleviate the odor issue, the SET site set a lower annual capacity and set a cap on the volume of organic material accepted.

For comparison, Site 1 was permitted to have 20,000 yds^3 of material on site at any given time and had an annual through put of 60,000 yds^3 per year. The SET site has an annual volume of 13,000 yds^3, of which only 20% of the material can be organic waste. In addition, the SET site utilizes forced aeration equipment and processes materials within 24 hours of being delivered to the site.

Task B: Meet with potential project partners to solicit support and assistance in project expansion. Partners included: Participating cities, select haulers, Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, and neighbors located adjacent to the site.

Sub-task 1: Ensure compliance with local solid waste regulations.

Ensuring compliance with local solid waste regulations including those of City of Chanhassen where the site is located as well as Carver County is an on-going project priority.

Sub-task 2: Enlist support for promoting project.

Haulers that utilized the first site were given priority to deliver materials when the SET site opened on September 1st, 2011. The haulers who initially began delivering materials to the SET site included: self haul from the Arboretum grounds and cafeteria, Vierkant Disposal, and Vintage Waste.

With approval from the MPCA, Randy's Environmental Services began delivering source-separated organics to the site. Once the average volume of materials delivered by these three haulers was determined, additional haulers were allowed to deliver materials to the site.

Starting in October 2011, Organics Disposal began delivering co-collected organics to the site.

Objective 3: Site Preparation & Development

Task A: Complete compost site preparations.

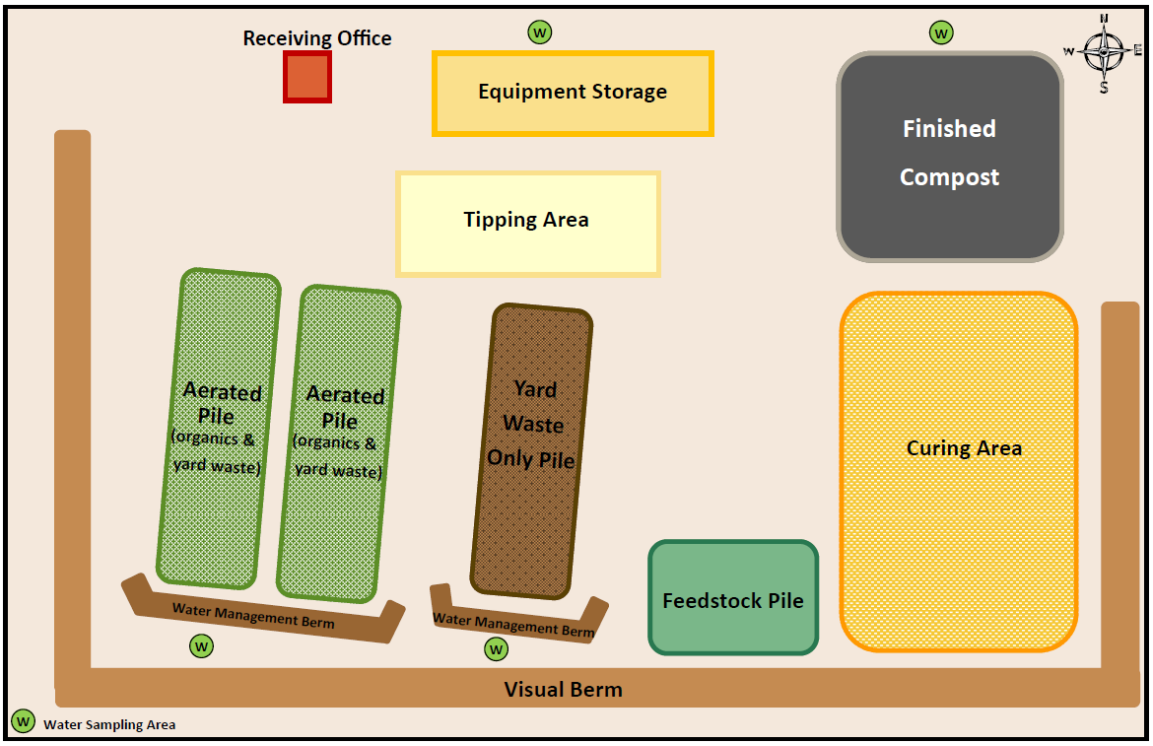
Sub-task 1: Grade site to ensure adequate slope for proper drainage.

The site naturally slopes to the south-west. The pad was graded to ensure that rain and contact water would drain toward the water management berms and compost socks before leaving the site.

A silt fence was installed to prevent erosion and run-off during the construction of the pad. The silt fence was later removed.

Left: Silt fence being installed for site grading.

Right: Grading the site and starting the visual berm.



Above: Aerial site layout.

Below: Visual of the active composting area of the site once it was up and running.

Sub-task 2: Upgrade service road and install rock pad for tipping area.

Once grading was completed, 500 cubic yards of gravel was delivered to the site. Carver County Public Works Department delivered the rock to minimize costs. One and a half inch minus limestone was used as the base and class V was spread on top of the pad. In total there was a depth of 6 inches of rock used for the pad. All extra gravel was used to upgrade the road servicing the site.

Above: Gravel covering active composting areas of site.

Once completed, gravel covered the tipping pad, the processing area, and the active composting portion of the site. The curing area, finished compost area, and the equipment storage area remained on compacted soil only.

In December 2011, additional gravel was purchased to cover the remainder of the site with 6 inches of class V to ensure an all-weather working surface suitable for ease of operation all year round.

Sub-task 3: Construct visual berming and connect electricity to site.

Visual Berm:

A visual berm was constructed around the southwest and east site of the site to screen the piles from Arboretum visitors. Once the grading was finished, the berm was seeded with a fescue grass mix and oats.

Above: Visual berm being constructed. **Below:** Laying seed and hay on visual berm.

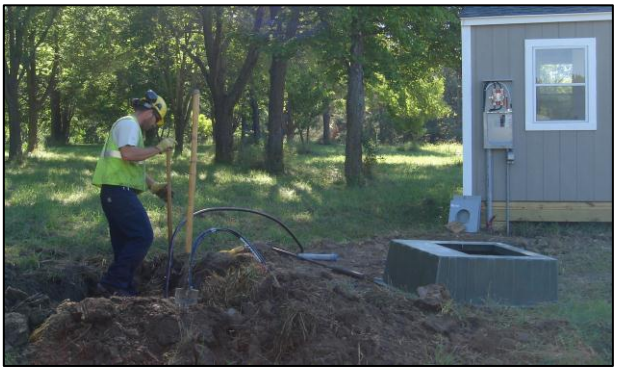
Connecting Electricity:

Installing electricity was a task that took significant amount of time. On May 5th, 2011, electrical contractors met on site to get an overview of what was needed to prepare bids.

Minnesota Valley Electrical Cooperative (MVEC) brought power to the site by trenching 700 feet from the nearest transformer.

Before Minnesota Valley could complete their task, the electric meter needed to be installed by the contractor, Robb's Electric. In addition to the meter, Robb's Electric installed two electrical outlets on a post near the berm on the south-east side of the site. These outlets were installed so long extension cords would not be needed to plug in the aeration equipment. Outlets were also added inside the receiving house to plug in computers and the weather station and one on the top of the outside of the receiving house for an external light for added safety.

Robb's Electric installed the meter and electrical outlets on August 25th, 2011 and electricity was finally brought to the site by Minnesota Valley Electric Cooperative on August 31st, 2011.



Above (left): Minnesota Valley Electrical Cooperative trenches cable along the service road of the site.
Above (right): An MVEC employee preps the electrical box by the shed.

Sub-task 4: Install contact and surface water collection system.

The compost site was designed to capture contact water through ceramic suction tubes, called lysimeters, placed underneath and in front the active composting piles. Lysimeters are reverse pressurized to allow them to collect water as it travels through the ground nearby. Lysimeters are buried three feet below the surface of the facility pad.

Four lysimeters were designated for the yard waste only pile and four were designated for one of the organics and yard waste piles. Lysimeters were strategically placed to collected data on contact water that runs through the piles and contact water that runs off the piles. Additional lysimeters were added to collect data regarding the effectiveness of using mini-berms to keep contact water from leaving the site.

Thomas Halbach, a Professor from the University of Minnesota Department of Soil, Water and Climate, aided in planning lysimeter placement locations, and also oversaw the installation of the collection tubes. Lysimeters are coated to ensure a good seal within the soil profile and to keep particulates from making their way down the tubes. The lysimeter tubes were trenched to convenient collection points located around the site. PVC pipe was used to provide extra protection from the heavy machinery that operates on the site.

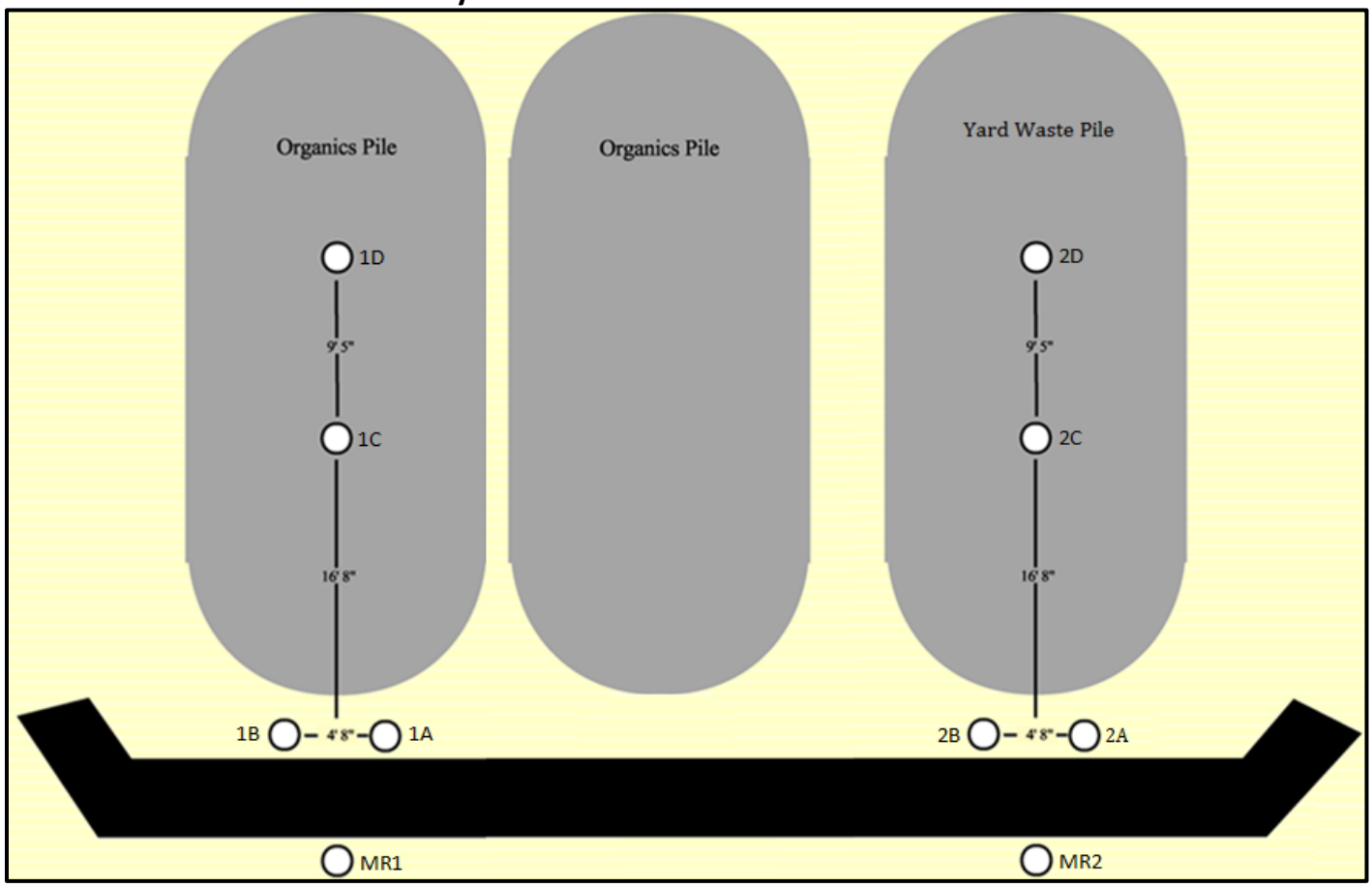
Above: A graduate student from the UMN and SET staff use augers to make holes for the lysimeters.

Above (left): View of a lysimeter in a 3' deep hole. **Above (middle):** A UMN graduate student pours the sealant into the lysimeter hole. **Above (right):** SET staff place lysimeter tubes in PVC pipe for added protection.

Lysimeters are buried three feet below the ground at the following locations:

1. Two lysimeters located underneath the piles
2. Two lysimeters located down slope and in front of the water management berms. (The water management berm was recommended by the MPCA including a 3" seeded compost blanket to help absorb storm water running off the piles.)
3. One lysimeters was added down slope behind the compost water management mini-berm to test their effectiveness in absorbing storm water running off the piles.
4. There are three lysimeters (not pictured in the diagram below) that are used as controls on the site as well. Refer to the site map on page 6 for these lysimeter locations.
    a. Control A is on the south side of the visual berm and was selected to confirm the effectiveness of the big berm in keeping water on site.
    b. Control B was selected as an under tree cover control location
    c. Control C had no tree cover to stop rain water from reaching the ground.

Lysimeter Locations and Location IDs:



Contact water was collected from the ceramic tubes following significant rainfall events (>.5 inches) between September and December 2011. During this timeframe many of the samples resulted in no liquid at all or in volumes that were too small to undergo the range of testing discussed in the sampling plan. This can be explained by the fact that the compost piles readily absorb moisture for use in the composting process.

A rain gauge is kept on site to quantify rainfall received on site. Carver County, and SET staff have been trained on sample collection procedures by Mr. Halbach. Qualitative and quantitative characteristics of compost water generated from the commingled organics pile were compared to that collected from the yard waste only pile.

Due to the relatively warm winter, samples were able to be collected starting in March of 2012. Throughout the duration of the project, nine lysimeter sampling events occurred. Storm water was collected and analyzed via sheet flow samples from different areas of the compost site. The storm water samples were compared to the lysimeter water samples.

Sub-task 5: Purchase and install force aeration system.

The SET site utilizes a forced aeration system underneath static piles. Two 40 feet long plastic tubes are attached to each blower. The tubes are punctured to provide evenly distributed air throughout the pile.



Above (left): Aeration tubes lined up on the pad. **Above (middle):** Aeration tubes coming out of a pile. **Above (right):** Blower and aeration tubes entering the pile.

When the site opened, the blowers ran 24-7 on designated time intervals. Different time intervals were tested to determine the most effective interval for this site. Commonly, the aeration equipment runs for thirty seconds every fifteen minutes.

The time intervals of the blowers were adjusted depending on the size of the pile and on atmospheric conditions.

Due to the dry conditions in 2012, the aeration equipment was not consistently running.

Objective 4: Implementation and Monitoring

Task A: Haulers begin delivery of organics to compost site.

September 1st, 2011 Vintage Waste was the first hauler to deliver materials to the site. During the fall and the leaf pick up time of the year, deliveries ranged from 5 – 9 load of material per week. During the winter, deliveries reduced to 2 – 4 loads of material per week. Spring increases delivery frequency again, but when the Emerald Ash Borer quarantine begins, deliveries remain consistent with 4-6 per week.

Sub-task 1: Respond to resident questions on program participation.

Responding to resident questions is an ongoing task. Whenever a question, comment, or concern is expressed, immediate action will be taken to address the resident's question, issue, etc.

To date, there have been no concerns from the public regarding the site.

Sub-task 2: Address issues with collection and processing organics.

Emerald Ash Borer Quarantine:

The Emerald Ash Borer (EAB) quarantine resulted in large effect on the quantity of materials delivered to the site. Several haulers who deliver co-collected residential materials to the SET site have routes that cross the border between Hennepin County which is quarantined and Carver County that is not quarantined. During the EAB quarantine, no yard waste can cross that boarder and as a result, less material was delivered to the SET site. In fact, one hauler, Vierkant Disposal, did not deliver any materials to the SET site during the EAB quarantine in 2012.

Staffing Changes:

When the SET site first opened, staff was on site throughout the work day to receive incoming materials from haulers. Since the site is small and hauler delivery times became quite predictable, SET had the truck drivers call a main phone number when they were approximately 30 minutes from the site. That gave County and SET staff sufficient time to leave their office and meet the truck when it arrived to the site. Changing to this method of receiving materials allowed staff time to be saved by not having to staff the site during the entire work day.

To cut down on staff time required at the site, haulers were allowed to deliver materials to the site three days a week: Mondays, Wednesdays, and Fridays. Even with the reduced delivery days, Carver County or SET staff still had to visit the site daily to record temperatures of the piles. This is an issue that was alleviated in June 2012.

With extra site construction funds, Compost Data Loggers from ReoTemp were purchased to make site operations more effective. Compost Data Loggers can take and electronically store temperatures from intervals as often as ten seconds to as little as one reading per two hours. In addition, the compost data loggers allowed Carver County and SET staff to easily track and graph the heating and cooling of a compost pile throughout the composting process.

Above: Reo-Temp Compost Data Logger purchased to electronically record temperatures.

Unacceptable Materials:

As part of the Operations Plan, a load containing 10% contamination must be rejected from the compost site. It is the haulers responsibility to remove the materials if it is rejected. Throughout the course of the project, staff did not have to reject a load of material.

Effective January 1st, 2010, certified compostable bags meeting the ASTM D6400 certification by the Biodegradable Products Institute were required for yard waste pick up or drop off at composting facilities throughout the Minnesota. The law also prohibited the labeling of any bag that implies it will biodegrade unless the bag meets the ASTM D6400 certification for compostable plastic films. A penalty exists for the manufacturer, distributor, or wholesaler of the bag, but there is no penalty to the resident who uses the bags.

Above: Biodegradable plastic bag that is not accepted at the SET site.

When a hauler delivers a load of materials to the site, staff walk around the load and look for visual contamination. During Fall 2011, a particular bag labeled as biodegradable was found. Staff photographed the bag, send the photograph to MPCA for them to follow up with the manufacturer, distributor, and/or wholesaler, and asked the driver if he knew where the bags were coming from. Certified compostable bag samples were provided to the driver to leave at the customer's house along with an educational piece informing the resident why certified compostable bags are required and where they can be purchased. There have been minimal issues with non-certified compostable bags being delivered to the site since.

Processing Issue:

Litter created by the windrow turner generated the main processing issue. After materials are delivered to the site, the front end loader lines up the material so the windrow turner can be run over the materials. The windrow turner rips open bags and blends the yard waste and food waste.

To alleviate this issue, SET purchased an Allis-Chalmers 7020 tractor and is finalizing their selection of a Supreme Mixer. The tractor – supreme mixer combo was used at Site 1 and proved to create a homogenous mix of materials while generating no litter.

Above (left): Windrow turner going over a pile of delivered materials.
Above (right): Supreme mixer that was purchased for the site.

Task B: Staff begins testing of contact and surface water as well as finished compost.

Sub-task 1: Conduct sampling.

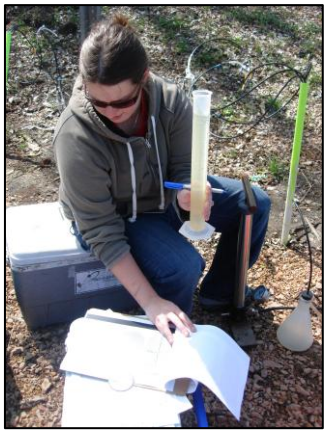
To gather background information on the soils at the compost site, two soil borings were completed near the Control B sampling location on October 28th, 2011. Soil was taken from four different depths for analysis. Samples were analyzed for selective 503 metals, pH, total organic carbon, total nitrogen, the carbon nitrogen ratio, conductivity, and several other parameters. The Minnesota Residential Soil Reference Values, the World Wide Average, and the United States Mean concentration of 503 metal results are also provided for comparative purposes. The selected 503 metal results are on the following page.

503 Metals - Soil Sample Results (mg/kg)									
Comparable Values		As	Cd	Cu	Pb	Mo	Ni	Se	Zn
Soil Reference Value - Residential*		9	25	100	300	n/a	560	160	8700
World Wide Average**		6.83	0.41	38.9	27	1.1	29	0.44	70
United States Mean**		7.2	>.01-41	25	19	0.97	19	0.39	60
Average of both samples locations		6.59	0.07	9.54	7.98	0.38	14.75	<.01	46.05
Sample 1									
Sample Depth	Sample ID	As	Cd	Cu	Pb	Mo	Ni	Se	Zn
0"-6"	S098 cc-01	3.67	0.12	8.39	6.21	<0.01	14.28	<0.01	40.60
6"-12"	S098 cc-02	3.15	0.09	7.96	9.11	0.39	13.77	<0.01	41.60
	S098 cc-02DUP	4.63	<0.01	7.85	9.16	0.37	13.93	<0.01	39.00
12"-18"	S098 cc-03	6.53	0.01	8.43	8.94	<0.01	14.60	<0.01	41.40
	S098 cc-03DUP	5.87	<0.01	9.21	6.90	<0.01	16.26	<0.01	45.80
18"-24"	S098 cc-04	7.48	<0.01	10.73	6.44	<0.01	15.43	<0.01	47.30
Sample 2									
Sample Depth	Sample ID	As	Cd	Cu	Pb	Mo	Ni	Se	Zn
0"-6"	S098 cc-06	5.45	0.21	7.16	7.77	<0.01	13.45	<0.01	36.50
	S098 cc-06DUP	6.32	<0.01	7.77	10.42	<0.01	15.54	<0.01	41.40
6"-12"	S098 cc-07	7.81	<0.01	9.70	7.09	<0.01	15.85	<0.01	48.40
	S098 cc-07DUP	8.00	0.02	9.85	5.24	<0.01	15.50	<0.01	48.80
12"-18"	S098 cc-08	9.18	0.04	11.63	7.02	<0.01	14.44	<0.01	53.30
	S098 cc-08DUP	12.09	<0.01	12.09	6.34	<0.01	16.55	<0.01	57.90
18"-24"	S098 cc-09	8.26	<0.01	13.83	10.37	<0.01	13.78	<0.01	47.70
* Minnesota Soil Resident Soil Reference Values were taken from the Minnesota Pollution Control Agency.									
** The World Wide Average and the United States Mean Soil values were taken from Alina Kabata-Pendias. "Trace Elements in Soils and Plants." Fourth Edition. CRC Press: Taylor & Francis Group. 2011. p.41-42.									

The arsenic results highlighted above from the 12" – 18" depths are below the level of biologically active top soil, and are assumed to be naturally occurring arsenic. The full soil analytical results can be found in Appendix D.

The SET site water sampling plan was designed to be able to compare the differences between composting yard waste and co-collected organics and yard waste. This was attempted by placing separate sets of ceramic water collection devices under the different pile types. Water samples are pulled from the lysimeters by using a reverse pressurized pump to pull the water from the lysimeter to the collection points on the site. Equipment used collect and measure the sample volumes are sterilized between each sample. Images showing how water sampling is conducted are on the following page.





Above (left): Water samples being extracted with the reversed pressurized pump.
Above (middle): Measuring volume of water pulled from the lysimeter.
Above (right): Determining what parameter to analyze the sample for based on volume collected.

Typically contact water is collected for testing April through October, but due to the warm winter, samples were able to be pulled in November and December 2011.

Following the warm winter and an early, very rainy spring, contact water samples were able to be pulled starting in May 2012. A summary of the analytical results can be found on the following pages. Water analytical results charts can be found in Appendix E and the full analytical reports from Pace Analytical are in Appendix F.

Listed in terms of testing priority, the parameters contact water was analyzed for included:

Parameter	Standard Method	Min. Volume
BOD_5	5210B	600 mL
Nitrate (as N)	FM4500 NO_3-H	60 mL
TKN	EPA Method 351.2	25 mL
Phosphorus (P) & COD	EPA Method 365.4	60 mL
TDS/TSS & pH		200 mL
Total Coliform & E-coli	Standard Method 9223B	100 mL
503 Metals, Mercury, & Potassium	EPA Method 200.7	75 mL

The 503 Metals analyzed were: arsenic, cadmium, copper, lead, molybdenum, nickel, nitrate, selenium, and zinc.

Since rain water is readily absorbed and utilized in the composting process, only small volumes of liquid were collected from many of the lysimeters making it unfeasible to run analysis for all of the parameters listed in the Operations Plan. As there are no current standards for compost water, drinking water standards are used to compare the analytical results.

Lysimeter Collection Volumes by Date (in mL)											
Sample Locations	Organics & Yard Waste					Yard Waste Only			Control		
Date	1A	1B	1C	1D	MR1	2A	2B	MR2	A	B	C
11.14.11	15	14	3	8	215	129	73	212	0	0	0
11.29.11	0	trace	0	trace	255	13	5	238	0	0	0
12.16.11	0	72	0	47	0	0	0	325	0	0	0
3.23.12	130	255	0	trace	180	170	200	260	0	0	76
4.17.12	96	350	0	2	252	234	267	280	194	0	298
5.1.12*	186	178	0	2	252	234	267	280	23	0	219
5.4.12	152	211	0	trace	252	67	225	270	192	0	204
5.11.12	194	0	0	4	290	trace	150	290	150	0	174
5.29.12	185	238	0	trace	267	236	250	238	248	7	203
6.18.12	185	255	0	0	194	180	240	212	330	0	252
6.20.12	149	72	0	trace	237	206	280	230	280	0	107
7.13.12*	138	trace	0	0	0	0	trace	186	0	3	trace
* Dates when lysimeters were drained but no samples were taken for analysis.											

The volumes shown on the above from locations 1C and 1D, the two locations directly underneath the organics pile, verify the fact that water is readily absorbed and utilized in the composting process. Location 1D, at the end of the pile, was not always covered during rain events as piles grow in length from the aeration equipment toward the north side of the site as material is received on site. This can explain the minimally larger volumes collected at location 1D.

The minimal volumes found from locations 1A, on 11.29.11 and 12.16.11, and 1B on 5.11.12 tell us that the pile was most likely covering those lysimeters during the rain events that preceded the water sampling.

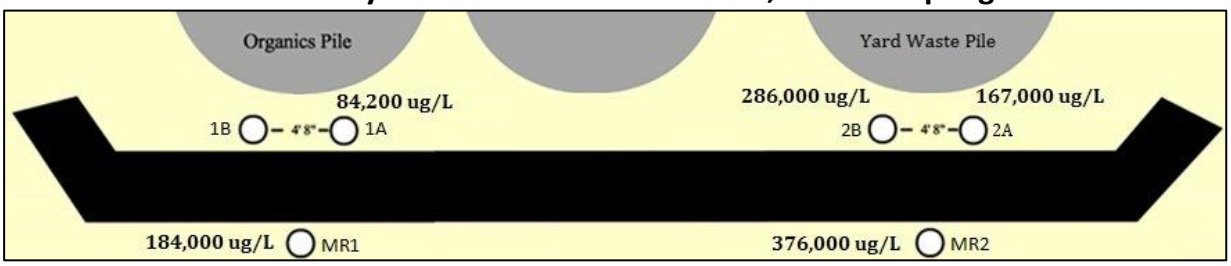
Although water was collected and analyzed from the lysimeters located underneath the yard waste only pile, the analytical information is not included in the report as there are inconsistencies that occurred throughout the project resulting in incomparable data. When the site first opened, there was no material on top of the yard waste only pile lysimeters. For a short period of time there was finished compost over this area, and when yard waste was delivered on site to cover the lysimeters, large volumes of liquid were being collected from each of the sampling locations. Because liquid is utilized in the composting process, the large volumes of water that were being pulled from the lysimeters under the yard waste only pile confirmed that the pile was not correctly located on top of the lysimeters. For these reasons, the analytical data from under the yard waste only pile is not comparable to the lysimeters data from under the mixed organics and yard waste pile.

Due to minimal volumes of water traveling the three feet down to the depth the lysimeters are buried at, BOD was not able to be analyzed. Below is a chart showing how many times each parameter was run for analysis from each sampling location.

Samples Collected by Parameter by Sampling Location												
Parameter	Organics & Yard Waste					Yard Waste Only			Controls			Min Volume
Sample Location	1A	1B	1C	1D	MR1	2A	2B	MR2	A	B	C	Required
BOD5												600 mL
Nitrate	3	3			5	3	3	4	3		2	60 mL
TKN	3	2		1	4	2	3	3	3		3	25 mL
Phosphorus & COD*	5	3			5	3	4	5	2		2	60 mL
TDS, TSS, & pH		2			2	1	2	3	2		2	200 mL
pH					1	2		1				60 mL
Total Coliform & E-coli	2	1			3	3	3	3	2		1	100 mL
503 Metals, Mercury & Potassium	2	2			4	2	1	4	3		1	75 mL
Total Phenolics*	1	1			1	1	1	1	1		1	70 mL
* COD and Total Phenolics were sampled during the 6/20/12 event only.												

During the grant period, Minnesota Pollution Control Agency staff expressed interest in obtaining analysis for Chemical Oxygen Demand (COD) and Total Phenolics. These two parameters were sampled during the June 20th, 2012 sampling event. Total Phenolics were not detectable from all sampling locations. COD analysis returned results varying between non detectable and 376,000 ug/L. COD was not detectable from Control A. Location 1A, in front of the organics and yard waste pile returned a COD result of 82,400 ug/L compared to locations 2A and 2B in front of the yard waste pile that resulted in 167,000 ug/L and 376,000 ug/L respectively. Locations MR1 and MR2, on the other side of the water management berm, resulted in COD concentrations of 184,000 ug/L and 376,000 ug/L respectively.

COD Analytical Results from June 20th, 2012 Sampling



503 metal analyses found arsenic concentrations that were above drinking water standard in two locations. They found in lysimeters 2A (up gradient of the yard waste only pile) and location MR2 (down gradient of the water management berm). Both locations are from the yard waste only side of the site.

Since arsenic is found naturally in higher concentrations in Carver County soils, an assumption can be made that these higher than drinking water standard arsenic concentrations could be a result of heavy rain moving the soil particles near the lysimeter. Below is an overview of the 503 metals sampled for that returned detectable concentrations.

503 Metal Analytical Data (ug/L)

Parameter	Arsenic					Copper					Nickel				
MDH HRL	10					1,300					100				
Location	#	# ND	min	max	avg	#	# ND	min	max	avg	#	# ND	mix	max	avg
MR1	4	4	ND	ND	ND	4	0	21.3	35.3	27.3	4	4	ND	ND	ND
1A	2	2	ND	ND	ND	2	0	21.6	22.4	22	2	0	29.3	34.7	32
1B	3	3	ND	ND	ND	3	2	ND	46.5	15.5	3	0	83	205	138
MR2	4	3	ND	32.7	8.18	4	1	ND	42.9	25.5	4	1	ND	68.5	34.38
2A	2	1	ND	23.3	11.7	2	1	ND	20.9	10.5	2	1	ND	43.4	21.7
2B	1	1	ND	ND	ND	1	0	73.5	73.5	73.5	1	0	39	39	39
Control A	2	2	ND	ND	ND	2	2	ND	ND	ND	2	2	ND	ND	ND
Control C	1	1	ND	ND	ND	1	1	ND	ND	ND	1	1	ND	ND	ND

Parameter	Selenium					Zinc				
MDH HRL	30					2,000				
Location	#	# ND	min	max	avg	#	# ND	min	max	avg
MR1	4	3	ND	21	5.2	4	0	28.4	131	64.3
1A	2	2	ND	ND	ND	2	0	37.2	41.7	39.5
1B	3	2	ND	26	8.67	3	1	ND	116	50.6
MR2	4	3	ND	25	6.2	4	0	46.4	113	76.7
2A	2	2	ND	ND	ND	2	0	25.1	29	27
2B	1	1	ND	ND	ND	1	0	104	104	104
Control A	2	1	ND	21	10.5	2	1	ND	29.2	14.6
Control C	1	1	ND	ND	ND	1	0	171	171	171

ND = not detected in sample

The results above show that metals have not been a concern at the SET site.

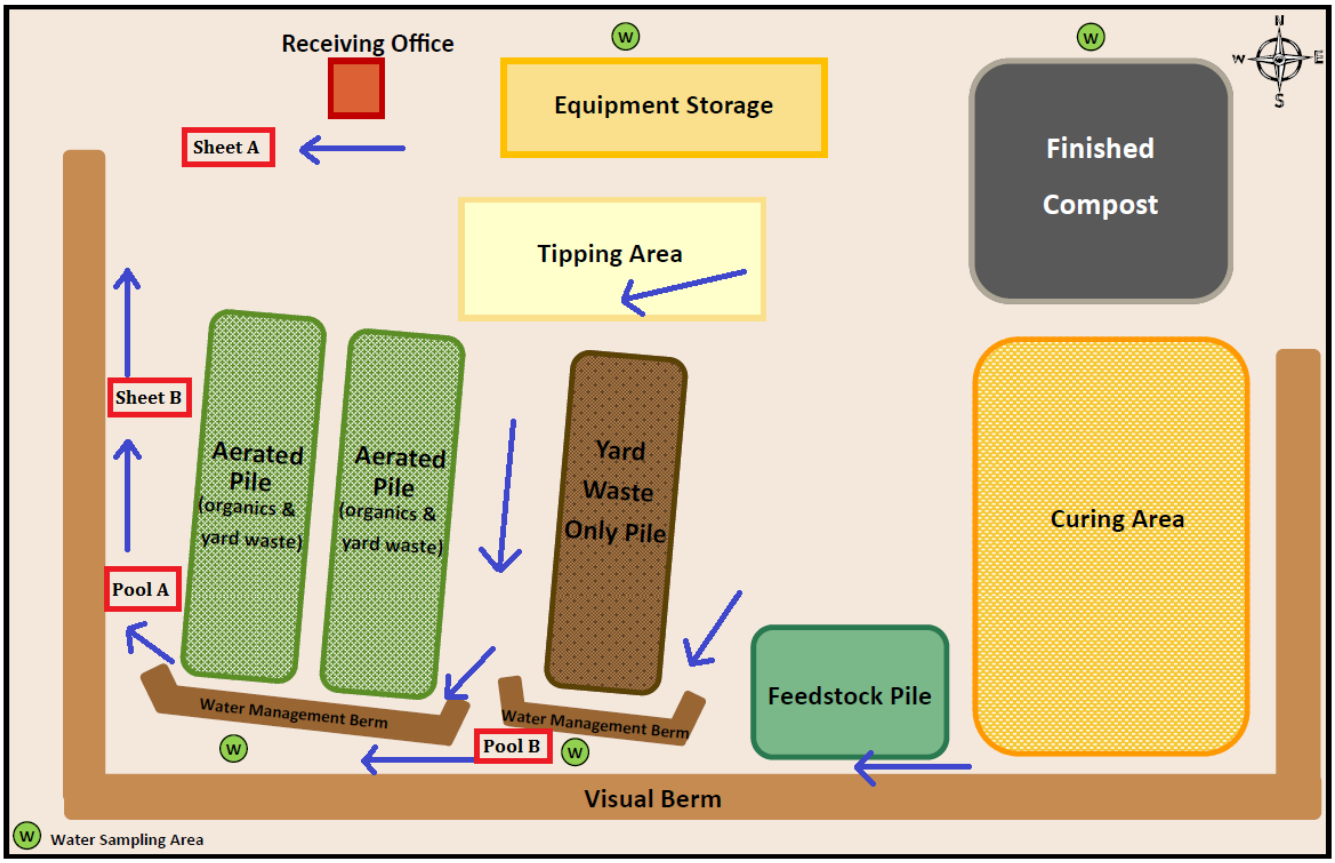
It was observed that one lysimeter (MR2) located down gradient of the water management berm of the yard waste only pile, detected elevated Nitrates above the drinking water Human Risk Limit (HRL) standard for the Minnesota Department of Health.

Argonomic Constitutents Analytical Results (ug/L)										
Parameter	**Nitrates**					**Phosphorus**				
MDH HRL	**10,000**					No HRL Set				
Location	#	# ND	min	max	avg	#	# ND	min	max	avg
MR1	4	2	ND	6,400	1,830	5	2	ND	180	67.2
MR2	3	0	110	39,800	14,670	6	4	ND	110	27
1A	2	1	ND	2,400	1,200	5	5	ND	ND	ND
1B	1	1	ND	ND	ND	3	2	ND	110	36.67
2A	2	0	4,100	4,400	4,250	3	2	ND	78	26
2B	2	1	ND	4,500	2,250	5	5	ND	ND	ND
Control A	3	3	ND	ND	ND	2	2	ND	ND	ND
Control C	3	1	ND	240	116.67	3	3	ND	ND	ND
Parameter	**Potassium**					**TKN**				
MDH HRL	No HRL Set					No HRL Set				
Location	#	# ND	min	max	avg	#	# ND	min	max	avg
MR1	4	0	27,200	52,100	37,700	4	1	ND	5,500	3,200
MR2	4	3	ND	22,800	5,700	4	1	ND	12,600	5,425
1A	2	0	53,800	60,000	56,900	3	0	2,900	4,700	3,766.67
1B	3	0	59,000	693,000	274,300	3	0	26	8,100	7,446.67
1D						1	1	ND	ND	ND
2A	2	2	ND	ND	ND	3	0	3,700	4,200	3,900
2B	1	1	ND	ND	ND	3	0	2,100	8,000	5,700
Control A	2	2	ND	ND	ND	4	4	ND	ND	ND
Control C	1	1	ND	ND	ND	3	3	ND	ND	ND
ND = not detected in sample										

In addition to the lysimeter sampling and analysis, one storm water sampling event was conducted during a .59" rain event on May 3rd, 2012 to analyze storm water from different locations at the site. Two storm water sheet flow samples were collected one near the entrance to the site (Sheet A) and one on the west side of the active compost piles (Sheet B). Two additional samples were pulled from pools of water that formed during the rain event. The first pool was on the inside of the visual berm on the west side of the site (Pool A) and the other was from the inside of the visual berm on the south side of the site (Pool B).

The locations were chosen by observing the movement of water during the rain event. Sheet A was to analyze storm water running primarily off the gravel of the pad alone, and sheet B analyzed storm water running off the mixed yard waste and organics pile. Pool A and Pool B were chosen as the water forming Pool B was that from the Curing Pile and the Yard Waste Pile only and Pool A was a combination of water moving between the two active mixed yard waste and organics piles that joined with the water from Pool A. A diagram showing the movement of the water (in blue arrows) and the sample locations can be found (in red boxes) below.

Movement of Storm Water on Site during May 3rd, 2012 Rain Event and Sheet Flow Sample Locations



Carver County and SET staff had hoped to collect more sheet flow samples, however, the dry climactic conditions did not allow for additional sampling. Results from the sheet flow sampling conducted on May 3rd, 2012 can be found on the following page.

Sheet Flow Analytical Results from May 3rd, 2012 Sampling (ug/L)					
Parameter	Sheet Flow		Pooled Water Collection		MDH HRL
Sample Location	A	B	A	B	(ug/L)
Arsenic	44	40.6	22	ND	10**
Cadmium	ND	ND	ND	ND	4
Copper	46.6	40.8	32.6	16.1	1300*
Lead	34.4	31.8	19.3	8.3	15*
Mercury	ND	ND	ND	ND	2
Molybdenum	ND	ND	ND	ND	No HRL Set
Nickel	54.6	45	28.9	ND	100
Selenium	ND	ND	ND	ND	30
Zinc	157	127	85.2	39.8	2,000
Nitrate	590	420	400	840	10,000
Phosphorus	860	100	1,700	1,300	No HRL Set
Potassim	12500	20,600	52,200	57,000	No HRL Set
TKN	6,200	11,300	13,300	6,600	No HRL Set
Total Coliform	Present	Present	Present	Present	
(Level)	<50 CFU/100mL	<50 CFU/100mL	<50 CFU/100mL	<50 CFU/100mL	
E-Coli	n/a	n/a	n/a	n/a	
TDS	204,000	208,000	392,000	483,000	
TSS	755,000	985,000	1,000,000	172,000	
BOD5, C	16,000	68,100	15,000	32,000	
ND = not detected in sample					

The sheet flow sampling results indicated in higher than drinking water levels for arsenic and lead. The class V gravel used on the pad is from a quarry in Carver County that may have naturally high levels of arsenic.

The results from the sheet flow sampling confirm that storm water management is of greater concern than that of agronomic constituents, such as nitrogen, phosphorous, and potassium, moving through the piles and into the soil profile. Additional sheet flow samplings will be conducted at this site in the future to support these findings.

Objective 5: Program Evaluation

Task A: Review compost site operation throughout the entire project timeline. Detail best management practices.

Sub-task 1: Analyze operational and environmental performance of site.

Daily litter pick-up was required, especially with heavy fall and winter winds. During the first couple months, staff was spending a significant amount of time picking up litter due to the way the windrow turner broke open bags and shredded the materials. Litter pick up had to increase during the fall due to heavy winds. As significant staff time was spent picking up litter, the service was contracted out to adults with disabilities.

Additional thermometers (3) were purchased in December 2011 to allow temperatures to be taken from the exact same spot in actively composting piles. Purchasing additional thermometers not only reduced time required to take temperatures, but it also allows the same spot to be monitored throughout the duration of the PFRP process.

To continue to save staff time to record pile temperatures daily, new compost data loggers were purchased from Reo-Temp in June 2012. Compost data loggers are thermometers that store temperature data inside the head of the probe and data is removed by connecting the probe to a computer. These new thermometers have the capability of taking temperatures at very short (every .02 seconds) to very long (1 reading per day) intervals. Through the use of these new thermometers, a full image of how each pile heats up and cools down can be derived.

Sub-task 2: Collect and analyze pre-determined program data for measuring program participation, quantities of material collected, and overall program effectiveness including collection and processing costs.

Waste sorts were conducted to determine the composition of a typical residential co-collected load. Two waste sorts were conducted in September to determine the average summer volumes of materials received. It was found that between 20% and 25% by weight of the material from co-collected residential loads was source-separated organics and the remaining 75% - 80% was yard waste.

Above: Material is sorted into bins.
Below: Bins are weighed and recorded.

The first waste sort was conducted of 7.4 yards of material delivered by Vintage Waste on September 20th, 2011. Carver County and SET staff, along with several volunteers from other Counties and the MPCA sorted materials into three categories: yard waste, organics, and contamination. Each material type was weighed and recorded.

Above: Materials sorted by type. The pile on the left is organics and the pile on the right is yard waste. Contamination filled one 22 gallon bin located in the middle of the two piles.

Vintage Waste Sort Results:

Material Type:	Weight:	Yards:	Percent by Weight:
Organics	879 lbs	1.97 yards	23.4%
Yard Waste	1,527 lbs	6.32 yards	75.3%
Contamination	15 lbs	.11 yards	1.3%

A second waste sort, of Vierkant Disposal's co-collected residential organics, was conducted on September 26th, 2011. The results were similar to that of the Vintage Waste waste sort.

Above: Organics and yard waste are separated.

Vierkant Waste Sort Results:

Material Type:	Weight:	Yards:	Percent by Weight:
Organics	2,318 lbs	6 yards	35%
Yard Waste	4,200 lbs	12 yards	64%
Contamination	43 lbs	.17 yards	<1%

Above: Results from the Vierkant waste sort. The pile on the left is yard waste, the middle bin is contamination, and the pile on the right is organic material.

When inspecting incoming loads, it was clear additional education and new visual aids were needed at the Arboretum's cafeteria to reduce contamination making its way to the site. Ms. Kish worked with Arboretum dining staff to update their signage and convert as many plastic products as possible over to certified compostable plastics. This has drastically reduced the contamination from the Arboretum's cafeteria.

The SET site began accepting materials on September 1st, 2011. From September 1st, 2011 – December 31st, 2011 1,735.5 yd^3 of material were delivered to the site. The majority of the material came from co-collected residential loads. When SET received approval to accept materials from Randy's Environmental Services Blue Bag Organics program, SET had Randy's transfer yard waste from one of SET's other facilities to the Arboretum site to use as carbon feedstock for the Randy's organic material.

Materials Delivered to the SET Site (9/1/11 – 12/31/11)		
Material Type:	**Volume (yd^3)**	**Percent of Total Yd^3**
Organics	369.5	20%
Yard Waste	1,210	66%
Yard Waste Feedstock	256	14%
TOTAL	1835.5	100%

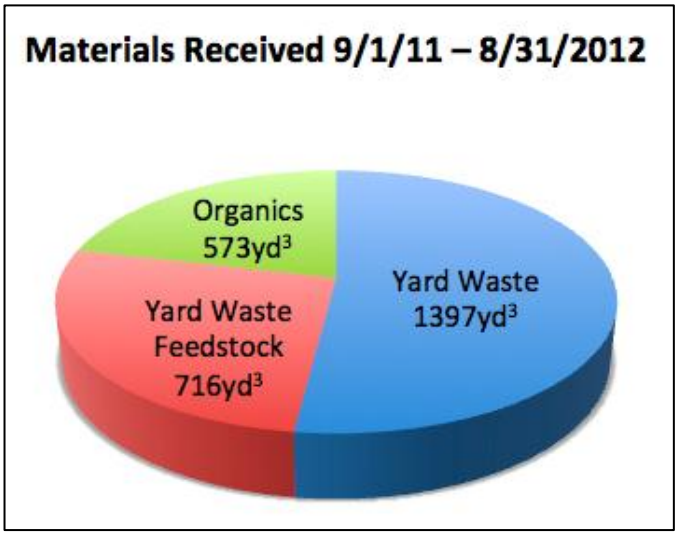
From January 1st, 2012 – August 31st, 2012 850.5yd^3 were delivered to the SET site. The significant change in materials between these time periods is due to winter resulting in minimal yard waste, and the Emerald Ash Borer quarantine in the Spring.

Materials Delivered to the SET Site (1/1/12 – 8/31/12)		
Material Type:	**Volume (yd^3)**	**Percent of Total Yd^3**
Organics	303.5	35%
Yard Waste	187	22%
Yard Waste Feedstock	360	42%
TOTAL	850.5	100%

In the first year of operation the SET site accepted 2,686yd^3 of material. The overall percentage of yard waste to organic is as follows:

Residential yard waste and feedstock material transferred to the site = **78.7%**

Organics (non-recyclable paper and food waste) = **21.3%**



Sub-task 3: Analyze finished compost using MPCA testing protocol to determine quality.

The lack of rain in 2012, has slowed the composting process and has resulted in no finished compost available for testing. An amendment to this report will be made once the compost is finished curing and has been analyzed.

Above (left): SET staff tears down a pile from the active composting area of the site after it met PFRP. **Above (right):** SET staff creates a new pile in curing area of the site with the material that has met PFRP in the actively composting area of the site.
Below: Compost in the curing stage from the first year of operations at the SET site.

Task B: Survey of residents to determine participation rates, acceptance, and generation rate.

Two haulers who deliver materials to the compost site were chosen to survey their customers. Randy's Environmental Services was selected as they just entered into a city-wide contract with the City of Watertown to provide waste, recycling, and organics services. Organics Disposal, was selected since they have a wide customer base that spans urban and rural areas.

The Randy's Blue Bag Organics program allows customers to collect their organics in a special blue compostable bag manufactured for the program and place the bag with their garbage on pick-up day. Organics Disposal also offers their customers a

choice between participating in their established yard waste only collection or their yard waste and organics collection.

Different surveys were designed for each hauler to address the differences in the programs offered. Surveys addressed current garbage container size, how residents currently dispose of their organic waste and yard waste, recycling practices, and barriers to participating in an organics collection program. Organics Disposal added a survey question to determine whether their customers would be interested in every other week garbage collection as some of their customers already only put their garbage out every other week. Randy's Environmental Services had questions specifically related to their Blue Bag Organics Program. Copies of both surveys and summarized results can be found in Appendix G.

To increase response rate, Carver County purchased Sure-Close kitchen pails to be given out to the first 50 respondents from each hauler. In addition to the kitchen pail, Carver County partnered with GLAD to provide samples of their new kitchen pail sized compostable bag, and Carver County created a magnet for quick reference of what can and cannot be included in an organics collection program. Lastly, a handout showing retail outlets and examples of certified compostable bags that can be purchased locally was included with the pail. The handout and magnet can be found in Appendix H.

Above: Kitchen pail and educational information provided to the first 50 respondents from each hauler.

Sub-task 1: Analyze results of surveys and prepare a report on resident participation and acceptance of program.

All surveys received back from either hauler were from single family homes. The Randy's survey resulted in 49 responses and Organics Disposal survey resulted in 87 responses.

Randy's customers' homes primarily consist of only one to two people (68% of respondents). Families consisting of three to four members represented 23% of respondents, and 9% of respondents had families of five or greater.

Of the Organics Disposal customers who responded to the survey, 48% live in one to two person households, 41% have three to four members, and 10% have five or more members in their household.

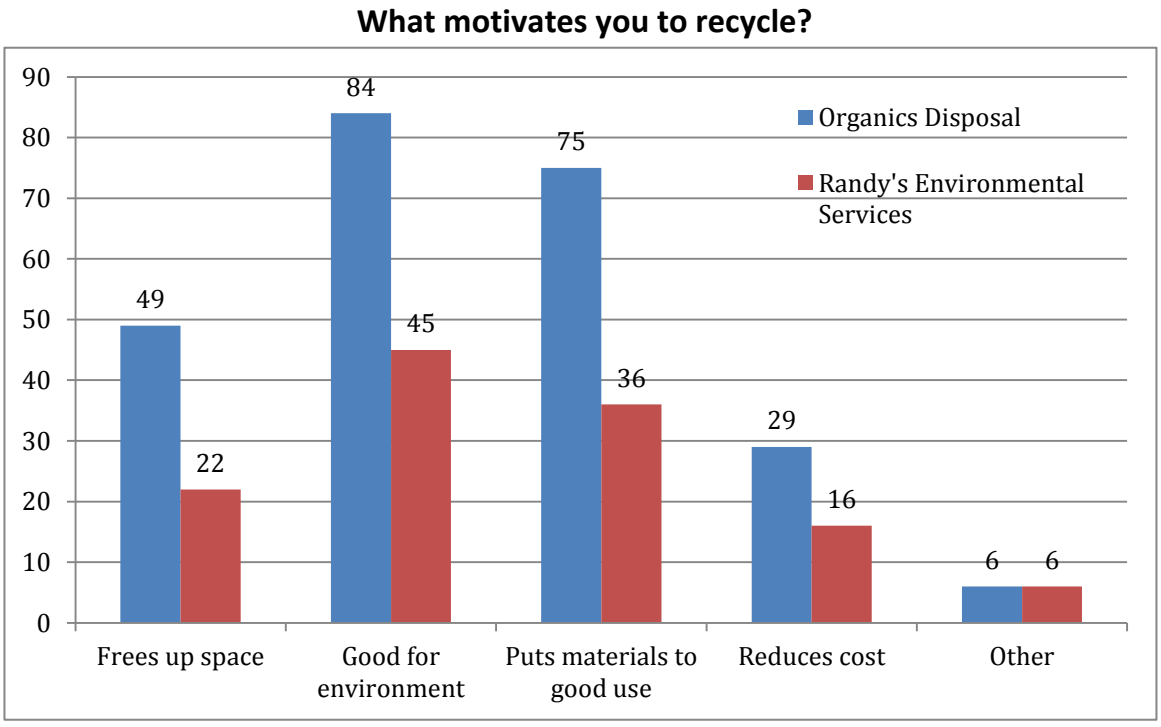
GARBAGE OVERVIEW

The majority of respondents from each hauler, 49% from Randy's, and 62% from Organics Disposal, claim to have the smallest garbage can available. Those who have larger carts appear to have larger families and make more meals at home each week. Another interesting fact was that often those with medium to large size garbage carts set it out to the curb when it is not entirely full.

Organic's Disposal customers were also asked if they thought every other week garbage collection would be sufficient, and if so, how often they'd want it to start. Over 50% of those who responded agreed that having their garbage picked up every other week was sufficient, and approximately 75% of those people said they'd like to start every other week garbage pick up right away. There were several respondents who said they already are only setting their garbage can out every other week. There were also a few respondents who said they are open to every other week garbage pick up but they may have to increase their garbage cart size to make it feasible for their household.

RECYCLING OVERVIEW

When asked about their recycling habits, almost all respondents from both surveys participate in their city/hauler's recycling program. When asked what motivates them to recycle, respondents from both surveys answered similarly. Respondents were allowed to select all motivations to recycle that applied to them. The results are graphed below.



YARD WASTE OVERVIEW

Respondents were asked to break down how yard waste from their home was managed. The options provided included:

a. Backyard compost bin
b. Leave trimmings and leaves on lawn to decompose
c. Set at curb for collection
d. Take waste to drop-off facility
e. Hauled away by yard maintenance business
f. No answer

Both hauler's customers selected the same three options as their primary yard waste management option. These included: 'backyard compost bin', 'leave trimmings on the lawn to decompose', and 'take waste to a drop-off facility'. Randy's Customers primarily take their yard waste to a drop-off site (68%) and/or leave them on the lawn to decompose (49%). Organics Disposal customers first leave trimmings and leaves on their lawn to decompose (77%) followed by putting them in their backyard compost bin (44%).

ORGANICS OVERVIEW

Randy's survey was mailed out near the kick off of the program in Watertown. Of the 47 respondents, 10 replied 'Yes' to participating in the organics program at the start. Fifteen replied 'No', 20 replied 'Not Sure', and 2 respondents did not answer the question. Randy's rolled out the program in Watertown in March, 2012. As of November, 2012 there are 14 households in Watertown participating in the Blue Bag Organics program.

Organics Disposal's survey was mailed out to all of their residential customers. Some of their customers already participate in the organics program and some only received garbage and/or recycling services from Organics Disposal. Of the 87 surveys returned, 59% (51 respondents) already participate in the organics program.

Those who do not currently participate and those who are uncertain if they will participate were asked to select why they are undecided on participating in their hauler's organics program. By allowing respondents to select multiple options, it informs haulers and County staff on what misconceptions need to be better addressed to get more households to participate in organics collection programs.

Survey respondents were provided the following reasons to select why they do not or are undecided on participating in an organics program:

a. Lack of time for separating organics
b. Lack of space for sorting separated organic waste
c. Lack of knowledge of what can go into organics
d. Concerns about cleaning storage container
e. Odors from source separated organic waste
f. Household pests attracted to organic waste stored indoors
g. Pests and animals attracted to organic waste stored outdoors
h. I am currently composting food waste
i. I am currently putting food waste down my garbage disposal unit in the sink
j. I do not see any benefits of separating organic waste
k. Other

Other was selected by fifteen of Randy's customers, the greatest number of any category. Items cited by those who selected other included: cost (7), too little waste (4), and inconvenient (3) as their concerns. Twenty Organics Disposal customers who do not currently participate and are uncertain if they will participate selected 'lack of knowledge of what can go into organics' as their barrier to participation. In both cases, 'odors from source separated organic waste' was selected as the second most common concern with 14 respondents from each hauler. Also in both cases, the least selected barrier was "I do not see any benefits of separating organic waste".

In general, customers appear to be very invested in recycling. Some customers understand the benefits of organics recycling and others may not have enough information on what can be composted and how easy it is to participate in an organics collection program.

It also appears that many people compost organics in a backyard bin or pile. Randy's customers surveyed resulted in 21 respondents composting a portion of or all of their organic waste in a backyard bin compared to 12 of Organics Disposal's customers who responded.

Organics Disposal customers were also asked if participating in the organics program has or would reduce their home composting practices. Results indicate that participating in Organics Disposal's organics program will not decrease backyard composting practices for the majority of their customers. Several surveys noted that they include more materials in their organics cart during the winter months when it is difficult to keep a backyard bin active.

The survey respondents commented that additional knowledge about collecting organics, making the service cost-effective, and making the service simple would motivate them to participate in an organics program. It also appears people are more inclined to start participating in an organics program if they are given a free kitchen pail to collect materials.

Task C: Prepare report on program operations and effectiveness.

Sub-task 1: Based on project results recommended revised MPCA permit requirements allowing food waste to be composted with yard waste.

Carver County staff has actively participated in the MPCA rule change process. Staff has submitted comments to the Minnesota Pollution Control Agency's request for comments published October 17th, 2010. In addition, the Carver County made a presentation to the MPCA staff during the February 10, 2012 public meeting. The comments that were provided were based on the work conducted at the demonstration site and the presentation provided to MPCA and can be found in Appendix I. County staff have also met several times with MPCA staff to assist in the rule change process.

Objective 6: Reporting.

Task A: Track project grant and matching funds and expenditures.

Sub-task 1: Compile and organize invoices.

Invoices were organized as they came in to be paid for services or items purchased. See Appendix J for the project budget.

Sub-task 2: Pay bills.

Bills were paid as invoices were received.

Sub-task 3: Obtain in-kind documentation.

In-kind documentation in the form of SET site prep work and purchases, assistance from other County departments in the form of making signs and trucking gravel were obtained. Lastly, Carver County utilized non-grant funds to purchase the kitchen pails, magnets, and cover the printing and mailing cost of the surveys.

Sub-task 4: Prepare information for regular reports.

Regular reports were submitted during the first year of the project to update MPCA staff as to the progress made in preparations for site development. Carver County and SET staff also spoke with MPCA staff regularly on barriers to beginning site development.

Task B: Will submit an Interim report within 1 year of execution of the grant agreement or at 50% completion of the project, whichever comes first.

Interim report was submitted on February 28th, 2012 that included two change requests to transfer grant funds from sections that utilized grant funds for program staff time to Tasks of the grant as Ms. Kish was not hired until work on the site development was about to begin.

In June, 2012 an additional change to transfer $20,000 from in-kind matching funds to grant funds was requested and approved to allow the County and SET to continue work on the site past the deadline of the grant agreement. The Interim Report and the amended Interim Report can be found in Appendix K.

Task C: Miscellaneous office duties and activities.

Sub-task 1: Track office overhead, travel, and other administrative, grant-related expenditures.

All grant related expenditures were continuously tracked throughout the project. The budget for the project are located in Appendix J.

Task D: Will submit a final report 1 month prior to the end of the grant agreement or at 100% completion of project, whichever comes first.

This final report was updated with new information and findings every couple months of the project. This final report was submitted past the deadline as Carver County had applied for and received an additional grant from the MPCA to expand testing parameters and continue to conduct research on water characteristics and the environmental impact of source-separated organic composting facilities.