

Hingham Public Schools
Interim Report
August 7, 2015

This report will update progress in the four main activities supported by the Grant: the organics pilot project at East School, single stream recycling pilots, tray collection for composting, and Middle School waste management. Costs and savings related to recycling, composting, and waste management scheduling changes are discussed. Finally, the plans for the remaining budget are outlined.

East School Organics

The organics separation program at East was very successful in the 2014-2015 school year. The program was embraced by the administration and the students. The assistant principal introduced the separation process to the students in a step-wise manner. She followed up with frequent checks and information at school meetings. The parent-teacher Green Team was very involved in getting the students going and a system for monthly student compost monitors was very popular. This program was showcased in a public access TV spot called "The Superintendent Spotlight". The link to see this show is https://youtu.be/5CceAt1Y6WY?list=PLYfedrfujpt3_7j5uPUx6q5qxU711Nw6f

Paper Towels

We piloted adding paper towels from the bathrooms to the organics collection in the last two months of the school year. The custodial staff was very easy to work with on this. The paper towels were collected in large recycling barrels in the bathrooms which were then dumped into a collection barrel and then on top of the daily food and tray waste.

The Recycling Coordinator (RC) visited over 30 classrooms in the period of 2 days to introduce paper towel separation. The subject was mainly what goes in the paper towel container and what does not. Special attention was paid to the health and safety of the children. The RC emphasized that the children should never reach into the paper towel container to take out something that doesn't belong. In kindergarten and 1st grades, we discussed what paper towels are made of. In second and third grades, we were able to talk about composting and what is needed to make compost. In 4th and 5th grades, we were able to make estimates of the amount of paper towels used by the whole school.

Recovery Numbers

The food and tray waste and later the paper towel waste at East School were collected in 10, 64 gallon rolling recycling carts. Starting in January, the custodians were asked to estimate the levels of each item in each cart. Figures 1 and 2 are examples of the data collection logs. The resulting data is in Table 1 and 2. Table 1 is data collected before we added paper towels to the collection. Table 2 includes paper towels. You can see that some days the level of food waste and trays was less than $\frac{1}{4}$ of a cart. That means that the true level of the food waste and of the trays was not reported. The level of food plus trays and paper towels was measured by pushing down the paper towels before

recording the level. Next year, the RC will work with the head custodian to see if we can refine the data collection.

Organic Collection Log
East School
Tuesday 1/26/15 through Monday 1/26/15

Cart	Level of food				Level of food plus trays			
	1/4	1/2	3/4	1	1/4	1/2	3/4	1
1	✓				✓			
2	✓				✓			
3	✓				✓			
4	✓				✓			
5	✓				✓			
6	✓				✓			
7	✓						✓	
8	✓						✓	
9	✓				✓			
10	✓				✓			

Figure 1. East School Data log for Food Waste and Trays

Organic Collection Log
East School
Tuesday 5/5/15 through Monday 5/11/15

Cart	Level of food				Level of food plus trays, Towels			
	1/4	1/2	3/4	1	1/4	1/2	3/4	1
1	✓						✓	
2	✓						✓	
3	✓					✓		
4	✓					✓		
5	✓						✓	
6	✓						✓	
7	✓						✓	
8	✓						✓	
9	✓					✓	✓	
10	✓						✓	

Figure 2. East School Data Log for Food Waste, Trays, and Paper Towels

The recovery of food waste and trays is about 1 cubic yard per week and when there are 5 lunches in a week. Adding paper towels to the collection doubles the volume collected. The district is continuing the organics program at East and has requested Grant funding to support a Recycling Coordinator and start-up costs of expanding the organics program to the other three elementary schools for the 2015-2016 school year.

Table 1. Organics Data East School

	Food			Trays			Total	Full Weeks
	Carts	Gallons	Cubic Yards	Carts	Gallons	Cubic Yards	cubic yards	
1/26/15	2.5	160	0.79	1	64	0.32	1.11	full
2/2/15	1	64	0.32	0.5	32	0.16	0.48	snow
2/9/15	1.5	96	0.48	0.5	32	0.16	0.63	snow
2/16/15	1.5	96	0.48	0.5	32	0.16	0.63	snow
2/23/15		0	0.00		0	0.00	0.00	vacation
3/2/15	2.5	160	0.79	0	0	0.00	0.79	full
3/9/15	2.5	160	0.79	0	0	0.00	0.79	full
3/16/15	2.5	160	0.79	0.5	32	0.16	0.95	full
3/23/15	2.5	160	0.79	1	64	0.32	1.11	full
3/30/15	2.5	160	0.79	1	64	0.32	1.11	full
4/6/15	2	128	0.63	0	0	0.00	0.63	1/2 day
4/13/15	2.5	160	0.79	0.5	32	0.16	0.95	full
4/20/15	2	128	0.63	0.5	32	0.16	0.79	holiday
4/27/15	0.5	32	0.16	0	0	0.00	0.16	vacation

Table 2. Organics Data East School including Paper Towels

	Food			Trays and Paper Towels			Total	Full Weeks
	Carts	Gallons	Cubic Yards	Carts	Gallons	Cubic Yards	cubic yards	
5/4/15	2.5	160	0.79	3	192	0.95	1.74	full
5/11/15	2.5	160	0.79	4.5	288	1.43	2.22	full
5/18/15	0	0	0.00	0	0	0.00	0.00	missing data
5/25/15	2	128	0.63	4	256	1.27	1.90	holiday
6/8/15	2	128	0.63	4.5	288	1.43	2.06	full

Single Stream Recycling

We piloted Single Stream Recycling at the East School and the High School.

At the East School, we removed the American Paper Recycling dumpster and replaced it with an 8 cu. yd. Single Stream container serviced by Troupe. The driving factor for this was the desire to recycle the milk cartons that are emptied and separated by the students at lunch. We estimate that about 0.85 cubic yards of milk cartons are recovered per week. That is about 4.5% of the total waste stream at East School and 7% of the as yet unrecovered waste.

East School fills their Single Stream container with bottles, cans, paper and milk cartons every other week. Cardboard is still collected by Gilbert and taken to the Transfer Station for recycling.

The custodians at East School and the High School appreciate the ease of use of their Single Stream containers.

At the High School, they fill their 6 cubic yard Single Stream container with cans and bottles and paper lunch bags every other week. This dumpster is serviced by All State Waste. They still are not collecting milk cartons from the cafeteria.

Tray Collection

The compostable trays used in the district are dumped and stacked at all of the schools except for the Middle School. Some of the elementary schools had parent volunteers who took the trays to the transfer station for composting. The High School Green Team takes their trays to the transfer station each Friday. The trays at the East School are collected with the food waste by Troupe.

Grant funds were used to buy rolling carts for collection of trays at the other three elementary schools. The Recycling Coordinator collected the trays from the schools for 4 weeks and delivered them to the transfer station. Collection was quick and easy and took 1-2 hours depending on whether the RC also collected from the high school and how long she spent talking to the custodians and the transfer station staff. The RC felt more connected with what was going on at each school by getting a glimpse of their waste and recycling dumpsters and talking with staff.



Figure 1. Tray collection cart at South Figure 2. Tray collection carts at Foster



Figure 3. Full tray collection cart



Figure 4. Collection cart too heavy



Figure 5. Back of RC's truck on one collection day.

The collection carts are lined with leaf bags. The transfer station requires that the trays be brought to them in leaf bags to keep them together at the transfer station until they can be ground and mixed with yard waste. Figure 4 has a collection cart that is too full for the RC to pull the bag out. She had to partially unload the bag, but this was not a difficult problem. Figure 5 shows a load of

trays in the RC's truck. PRS has not collected the trays in bags because they were basically clean. The transfer station accepted the trays.

The RC searched for the labels for the tray collection bins and then decided to print them with labels for upcoming equipment purchased. The paper signs on them are temporary.

Tray management at the transfer station.

The Hingham Public Works department agreed to try processing all of the trays at their composting facility. The trays present some challenges. They must be delivered in leaf bags to keep them from blowing around until they can be ground and mixed with the yard waste. Initial processing is with an Allu bucket shredder. Often the trays just pass through the bucket shredder in compressed small stacks.

The transfer station keeps the trays in the area with larger sticks and grinds them with a hired commercial grinder 3-4 times a year. They come through the 4' screen in a manageable size for composting.



Figure 6. Hired Grinder at Transfer Station



Figure 7. Ground tray piece



Figure 8. Ground Stack of Trays



Figure 9. Size of Ground Stack of Trays

Middle School

It has been difficult to affect a change at the Middle School without promise of long-term commitment of resources. The RC will evaluate possible changes in the cafeteria waste management set-up with the new lunch scheduling. She will be able to give long-term support to those changes if the new grant to the DEP is funded.

We applied to the Hingham Education Foundation for grant money to support staff in the Cafeteria to oversee recycling. This did not get funding, but resulted in the PTO funding a stipend for a teacher to lead a Green Team and funds for creating PSAs to promote recycling. The RC will support the administration in finding a Green Team leader and support their initiatives. She will also work with the Media Specialist to get the PSAs produced.

Costs/Trash Pick-up Schedule/dumpster resizing

The efforts under this grant have greatly increased the understanding of the waste production, waste management resources, and choices available. Some cost savings have been found with resizing and rescheduling waste pick-ups. These do not off-set the cost of collecting organics. However, the district chooses to continue their recycling and composting efforts while continuing to look for increased efficiencies.

The district has a unique position of having free collection of commingled containers and cardboard through a local waste hauler. They also continue to have free collection of paper through American Paper Recycling. The custodians appreciate the ease of using a Single Stream dumpster, but this is at an additional cost. The district continues to evaluate options to make the process efficient, easy and cost effective.

The costs of different disposal, recycling and composting contracts for the current two haulers used by the district are evaluated in Table 3. The per cubic yard costs in these tables are calculated based on the containers being full when emptied. This emphasizes the benefit of sizing and scheduling efficiently.

Table 3. Waste, Recycling, and Organics Hauling Costs Based on Full Containers

	Trash		Single Stream		Organics		
	\$ per pick-up	\$ per cubic yard	\$ per month (\$ per pick-up*)	\$ per cubic yard	\$ per month (\$ per pick-up)	\$ per cubic yard (full)	\$ per cubic yard food and trays only**
1.9 cubic yards (4, 96 gallon totes weekly)			80 (20)	10.53			
3.8 cubic yards (8, 96 gallon totes weekly)			149 (37.25)	9.8			
3.8 cubic yards (8, 96 gallon totes weekly)			83 (41.5)	10.92			
3.2 cubic yards (10, 64 gallon carts weekly)					215 (53.75)	16.8	35.83
6 cubic yards weekly					150 (37.5)	6.25	25.00
6 cubic yards bi weekly					79 (39.5)	6.58	
6 cubic yard	26	4.33	28	4.67			
8 cubic yard	35.75	4.47	28-40	3.50-4.13			
10 cubic yard	40	4.00	28-45	2.80-3.70			

*This is based on 1/4 of the monthly charge.

**This is based on hauler's estimate of 1.5 cubic yards of organics collected weekly.

Table 4. Waste, Recycling, and Organics Cost Based on Actual Volumes

	Trash		Single Stream		Organics		Total
	\$ monthly	\$ per cu yd actual	\$ Monthly	\$ per cu yd	\$ Monthly	\$ per cu yd	\$ monthly
East	286	5.96	80	5	215	26.88	581
South	312	6.00					312
Foster	312	5.57					312
PRS	312	5.57					312
Middle	858	6.70					858
High	792	3.67	56	4.7			848

The actual cost of disposal, recycling, and composting for each school is presented in Table 4. The volume of waste generated weekly for each school is estimated based on daily reporting of the levels of dumpsters reported by the custodians. Two examples of waste logs are presented in Figures 10 and 11. It is tricky estimating the waste volumes from the logs because the time of day for each reading is not always the same and the time of day of the waste collection is not always the same. It was easier to make estimates of weekly volumes from the two schools who reported morning and evening waste levels. By putting the date in a spreadsheet with the days of the week. A best estimate of the weekly waste volume was made by looking at when the waste levels dropped. The hauler schedule is Monday, Wednesday and Friday. It seems that the current data collection system might result in some over reporting of waste levels because the lowest amount that could be checked off was $\frac{1}{4}$ full.

Table 4 costs represent the changes in hauling schedules that were made as a result of the project. The cost of waste hauling at East school was \$429 a month and \$8.94 a cubic yard and that decreased to \$286 a month and \$5.96 a cubic yard when the hauling schedule was dropped to twice a week. The cost of waste hauling at the High School was \$1104 a month and \$5.11 a cubic yard before we removed one 6 cu. yd. dumpster.

The other three Elementary Schools are close to the border line of being able to move to a twice a week schedule based on having 6 cubic yard dumpsters. If we can get down to twice a week hauling on their 6 cubic yard containers their monthly disposal costs would be \$208 and per cubic yard disposal costs would be \$4.33. This would save \$104 a month at South, Foster, and PRS. If we moved to a 6 cubic yard container at East, the savings would be \$78 a month over their current twice weekly haul of an 8 cubic yard container (\$221 a month savings over three times a week haul of an 8 cubic yard container).

The district is considering changing to 8 cubic yard containers for the 3 elementary schools. However there is a fee to change them. For now, they are waiting to see if they get the grant to support expansion of the organics program. If they do, they may be able to go to twice a week collection of waste with 6 cu. yd. dumpsters.

An interesting thing to note from Table 4 is that the per cubic yard disposal costs for Single Stream recycling are comparative or less than the actual per cubic yard disposal costs for waste. If the district did not have the option of free hauling with a local hauler, the single stream option would clearly be a good one.

Per cubic yard disposal costs for organics are high and the volumes are not great. So, organics separation and collection is seen as a significant cost at this time. The district intends to re-bid it's waste hauling contract at the end of this school year. If all of the elementary schools have organics separation programs in place, a waste hauler that provides complete services (waste, single stream, and organics) is expected to come in with a bid that is less than the sum of what the district is seeing under individual contracts. That is because the single hauler

would realize a lower tipping fee of waste because of the removal of organics from that stream.

The Public Works Department has been interested in the numbers coming out of the organics collection at East. They are interested in evaluating whether or not they could process the organics and paper towels from the district's schools in their composting facility. The RC is providing estimates to them of volumes and helping them evaluate the feasibility of processing these streams at the Hingham facility. The Public Works Department does not have vehicles that can collect organics. They are familiar with Troupe and think that we could possibly work out a solution with them to bring only Hingham Public School organics to the transfer station. The RC is continuing to work with the Public Works Department to evaluate this option.

Date	Morning				Evening			
	1/4 Full	1/2 Full	3/4 Full	Full	1/4 Full	1/2 Full	3/4 Full	Full
11/19/2014		✓			✓			
11/20/2014	✓					✓		
11/21/2014		✓			✓			
11/22/2014								
11/23/2014								
11/24/2014	✓				✓			
11/25/2014	✓						✓	
11/26/2014			✓		✓			
11/27/2014								
11/28/2014								
11/29/2014								
11/30/2014								
12/1/2014	✓				✓			
12/2/2014	✓						✓	
12/3/2014			✓		✓			
12/4/2014	✓						✓	
12/5/2014			✓		✓			
12/6/2014								
12/7/2014								
12/8/2014	✓				✓			
12/9/2014	✓						✓	
12/10/2014			✓		✓		✓	
12/11/2014	✓				✓		✓	
12/12/2014		✓			✓		✓	

Date	Morning				Evening			
	1/4 Full	1/2 Full	3/4 Full	Full	1/4 Full	1/2 Full	3/4 Full	Full
9/8/2014								
9/9/2014		✓						
9/10/2014			✓					
9/11/2014		✓						
9/12/2014			✓					
9/13/2014								
9/14/2014								
9/15/2014		✓						
9/16/2014	✓							
9/17/2014			✓					
9/18/2014		✓						
9/19/2014							✓	
9/20/2014								
9/21/2014								
9/22/2014		✓						
9/23/2014	✓							
9/24/2014			✓					
9/25/2014								
9/26/2014								
9/27/2014								
9/28/2014								
9/29/2014	✓							
9/30/2014		✓						
10/1/2014			✓					

Figures 10 and 11. Examples of Dumpster Logs

The district will continue to evaluate hauling options and strategies to increase waste diversion while keeping waste management efficient in the schools. All of the players express desire for continual improvement of recycling while keeping the schools safe and clean for learning.

Remaining Budget

Equipment

There is \$2795.20 left in the equipment budget.

If the East school decides to continue separating paper towels along with the food waste and trays, we will request purchasing 9 new tall slim recycling containers for the bathrooms. These make the system look much cleaner and neater than the large barrels that we used for most of the bathrooms under the pilot. Prices range from 47-70 dollars on the FAC 87. The estimated cost at this time is \$540.



The Middle School needs 1 more recycling container per classroom to help the classroom recycling move more smoothly. 10 gallon bins cost about \$15 each and 80 are needed. The estimated cost at this time is \$1200.

Some cardboard is being thrown away because there is not a good place to store it at some of the schools. The RC will work with the Custodial Supervisor to find good solutions for these schools and we will then provide cost estimates.

Labels need to be printed for the tray collection carts and all upcoming equipment purchased under the grant. This could cost \$100.

Troupe's collection of organics will begin on September 15. 6 weeks of collection costs is approximately \$320.

Personnel

There are currently about 140 hours (\$2100) left in the personnel budget.

East School will be adding full day kindergarten this year and expects needing extra help with the Kindergarten and first graders in the lunchroom to continue the organics. This could be 1-2 hours a day and needs to be determined with East School. The cost will be from \$589 to \$1178 for the 38 to 76 hours needed in September and October.

The RC has estimated about 80 more hours of her work are needed to complete the project. So, these personnel numbers are lining up pretty nicely.