

**CITY OF PETERBOROUGH**  
**Compost Facility Siting Study**

**ORG – R1- 01**

**Prepared with funding from the Ontario Waste Diversion Organization**

**March 2001**

## **EXECUTIVE SUMMARY**

The City of Peterborough has operated a windrow yard waste facility since 1990. Originally a leaf composting site, the Certificate of Approval was expanded to include all yard waste in 1993 and to accept yard waste from the Counties of Victoria and Peterborough in 1998. The City is now working towards implementing a full organics composting program (EXTREME GREEN). This program would include food waste, pet faeces, tissues, paper towel and waxed cardboard/boxboard. Although the existing compost site is meeting current needs, staff anticipate requiring a site more isolated from houses and meeting higher environmental standards to accommodate the quantity and quality of waste that would be collected once a full organics program is implemented.

The purpose of this project was to examine the City's options for gaining access to a local, licensed compost facility capable of handling the organic waste from an expanded program. A secondary purpose was to determine the options for composting organics collected in a pilot starting in 2001. The project involved: examining the pros and cons of the options available to the City, tours of other facilities with a wide range of technologies employed, assessment of the potential of the current site to accommodate food organics from the a pilot and full scale.

The analysis indicates that an amendment to the Certificate of Approval that would allow the existing site to accept food waste from a pilot at 600 homes for one year is feasible. The site may be able to accommodate the full scale program from a technical perspective, but the preferred option is likely to build a municipal facility adjacent to the current landfill. Integrating waste management facilities reduces overall administration and operating costs and allows resources to be better focused.

The City is applying for an amendment to the Certificate of Approval at the existing composting site and will assess next steps once the pilot is underway and landfill siting and approvals issues are resolved.

# **Compost Facility Siting Study**

## **City of Peterborough – Final Report**

### **INTRODUCTION**

The City of Peterborough has operated a windrow composting facility since 1990. Originally a leaf composting site, the Certificate of Approval was expanded to include all yard waste in 1993 and to accept yard waste from the Counties of Victoria and Peterborough in 1998. The City is now working towards implementing a full organics composting program (EXTREME GREEN). This program would include food waste, pet faeces, tissues, paper towel and waxed cardboard/boxboard. Although the existing compost site meets current needs, staff anticipate requiring a site more isolated from houses and meeting higher environmental standards to accommodate the quantity and quality of waste that would be collected once a full organics program is implemented City-wide.

The purpose of this project was to examine the City's options for gaining access to a local, licensed compost facility capable of handling the organic waste from a City-wide food waste composting program. The secondary purpose was to determine the options for composting organics collected in a pilot starting in 2001.

### **METHODOLOGY**

The project involved: examining the pros and cons of the options available to the City, tours of other facilities with a wide range of technologies employed, assessment of the potential of the current site to accommodate food organics from the pilot and full scale. The facilities that were examined include those in Port Colborne, Bracebridge, Halifax, Prince Edward Island, Colchester County, and Lunenburg.

### **RESULTS**

#### **Discussion of Options Available**

- The current site has potential for use as a food waste composting facility, but may not be the preferred site due to proximity of neighbours and environmental factors
- A private land and business owner just outside City is interested in operating a facility. This option could be desirable because responsibility for licensing and operation would belong to another party. Potential disadvantages would be: little control over site management, City would be without a site if it closed, costs would be difficult to control as there would be one choice only. With a City facility, some or all aspects of the operation could be tendered and municipal forces could do the work if private costs were not competitive.
- Another option is to build a facility in the buffer lands adjacent to the City's landfill. The positive attributes of this site would be: isolated from residents, close proximity to the landfill so equipment and administration could be shared, would increase the viability of co-collection, there is more than adequate land available, and leachate collection system

is in place already. The initial examination identifies this as the preferred option. The disadvantage is that there is an application being reviewed by the MOE for the expansion of the landfill site and an application for another waste management facility in the area will not be submitted until the landfill issue is resolved.

- The discussion of the options available to the City was critiqued and enhanced with a brainstorming session held with three members of REIC.
- Initial discussions with the Ministry of the Environment indicate support for composting the waste from the pilot project at the existing site.

## **Tours of Other Facilities**

### **Halifax**

A tour of the two composting facilities and the second-generation landfill in Halifax was provided as part of the Canadian Waste Management Conference. All these facilities were very impressive and overall, Halifax is doing an excellent job of diverting recyclables and organics from landfill. The population is 360,000 and there are 100,000 households. Garbage is collected in garbage bags and organics are collected in green carts. Recyclables are collected in blue bags, one for containers and one for fibres. Residential collection is alternating weeks for garbage and organics and weekly for recyclables.

### **Otter Lake Solid Waste/Resource Facility**

This facility receives all residual waste from the Regional Municipality of Halifax. It includes weigh scales, small vehicle transfer area, a large processing building and a double lined landfill. The facility, which opened in 1999, receives 140,00 tonnes/year and cost \$44 million to build. Annual operating costs are \$7 million and it is privately operated. New cell construction costs are in addition to costs listed above. The tipping fee is \$110/tonne.

All material is received in the processing building. Only the contractor for the facility brings material to the landfill. In the receiving area, hazardous materials are separated out for proper disposal, large inert objects are removed for landfill and scrap metal is removed for recycling. Each load is inspected for organics. Unsorted waste is not accepted at the facility. At the receiving area, there were very few odours, indicating minimal organics in the materials being received.

The material is then debagged to prepare it for screening. Screened material smaller than 6" is composted so that it is inert when landfilled. There are many small bits of garbage and plastic mixed in with the compostable bits of paper and organics, so the product is landfilled. An in-vessel agitated bed composting system is used. The material is composted for 14 days. Materials larger than 6" are sorted and recyclables are removed including ferrous, corrugated cardboard, bottles and plastic bags. Organics are also removed. Recyclable materials are baled and sold and stabilized waste is landfilled.

At the landfill itself, there were no gulls. They do have sound makers and if a gull is spotted, they are used thereby discouraging gulls to make a habit of coming to the site whether there are organics or not. The facility operates 6 days a week, 24 hours a day and employs 130 people, 45 on any given shift.

Of the materials received at the facility, 40% is stabilized by composting (about 20% is actually organics and paper), 20% is large inerts (not processed), and 40% is sorted to remove recyclables and organics (2-5% is recycled and the remainder is smaller inerts that are directly landfilled). The diversion rate in the Region of Halifax is over 50%. The Region owns all the infrastructure and equipment and the facility is operated by Mirror Nova Scotia. It was possible to site the landfill due to the up-front processing of waste the Region committed to doing.

Very little construction and demolition waste is brought to the facility because private operators have facilities that charge only \$55/tonne. Residuals from the construction and demolition recycling companies come to the Otter Lake facility. For cover material, a variety of materials are used including plastic mats, construction and demolition waste and tarps. The facility is called an RDF for Residuals Disposal Facility. Collected leachate is trucked to a wastewater treatment facility.

### **New Era Farms - Composting Facility**

New Era Farms is one of the two composting facilities accepting organic materials in the Halifax area. It is located in an industrial park on the Halifax side and uses the Stinnes Enerco container composting technology. This is one of two systems like it operating in Canada. The other one is in Colchester County. This is a modular system consisting of 24 containers that are each connected to the aeration system and the biofilter. The facility is capable of handling 25,000 tonnes a year of organics. The facility is currently receiving 21,000 tonnes/year from Halifax as well as material from the Annapolis Valley. Daily tonnages received have ranged between 74 and 174. Three commercial haulers bring in about 20 tonnes per day, with the residential sector producing the rest of the tonnage received. The capital cost was \$8 ½ million and the tipping fee, set by the Region, is \$68/tonne.

The class A compost which is produced is sold in bulk to topsoil blenders. There have been some problems with odour, which is a concern given their location in an industrial park. Some odour has been caused by the tracking of waste from collection vehicles after dumping and driving out. The contract with the Region specifies that the facility must operate without generating odours. There is a high volume of paper in the feedstock and this has contributed to the generation of odours and slowed the composting process. The finished product is filled with long stringy fibres from the decomposed paper.

The composting process is as follows:

1. Trucks offload their waste in an indoor receiving area. Contaminants are removed and the material is shredded.
2. Material is loaded indoors into containers, which hold about 25 tonnes each. A special full-sized truck is used to move the container, which has a total weight of 40 tonnes loaded, outside where it is connected to the ventilation system. Material is composted in the containers for 7-10 days. There are pipes connected at the top and bottom of the container and air can be pulled one way or the other. The direction of airflow is reversed hourly to moderate temperatures in the containers. Air that has been circulated through the containers is pumped into the biofilter which consists of six containers that hold a mix of compost, bark and wood chips. This bio-filter

removes odours from the air from the containers. The bio-filter material must be replaced every 2-3 weeks.

3. Material is moved to the curing building. It is a large Cover-all building with windrows inside, negative air pressure and is vented to another bio-filter. Material is turned about once a week and cured for 6-8 weeks. There is floor aeration.

4. Material is screened with a star screener. The advantages the operator identified with this type of screener included good success in screening out film plastic and screening relatively wet material. Currently, overs account for about 25% of the material produced. All leachate collected is pumped back into the system.

### **Miller Composting**

This 25,000 tonne per year facility receives organics from the Dartmouth area. It employs the Ebara wide bed technology developed in Tokyo. This facility is the largest of the 30 composting facilities of this type worldwide. Three of these facilities are in Nova Scotia - 5,000 t/year in Pictou County and Lunenburg. Miller owns the Dartmouth facility which cost \$8 million to build. Operating costs are \$40/tonne and the contract with the Region is for 20 years, with a guaranteed annual tonnage of 20,000. The tipping fee is set by the Region at \$68/tonne. The facility employs eight people and operates Monday to Friday on one shift. All compost is sold in bulk.

The high amount of carbon from the fibres in the residential stream is causing process problems including slow composting and odour. Boxboard is collected in the organics carts throughout the Region. One of the most common contaminants is plastic bags which are coming in the residential carts. Like the New Era Farms facility, the Miller Composting facility has also received odour complaints and with 1,000 people on two of their borders every day, these complaints are taken quite seriously.

Material is processed as follows:

1. Material is weighed in and received at one of two shipping doors. Trucks do not enter the plant. The shipping doors close within 30 seconds (very high speed) to prevent the escape of odours. Trucks dump from outside to a pit inside. This prevents the tracking problem as experienced at New Era Farms.
2. Contaminants are removed, including plastics and material is then shredded. The residuals bin is located outside the building at this point and it is a source of odour.
3. Materials are moved out of the receiving part of the plant via a conveyor into the main vessel area where material stays for 28 days. The main vessel is one continuous mass of organics about 200' wide by 800' long and 8' high. Material is turned every night with a computer driven wheel assembly which is used to rotate, agitate, aerate and advance the material through, gradually, to the discharge end of the composting vessel. The turning process takes eight hours. All process air is scrubbed through biofilters that control the odours of the air being released. Leachates are collected and reused in the process, as well as rainwater from the roof. The facility is a net user of water.
4. Material is then transferred to the outside curing area where it stays for 60 days. Sometimes, material is shipped off-site to finish curing. At the time of the tour, the "finished" product was in windrows and covered with a layer of sawdust, likely to keep odours down.
5. Material is screened with an Aarron star screen and sent to market.

### **Prince Edward Island - East Prince area (west 1/3 of island)**

In Prince Edward Island, the western part of the province is on the Waste Watch program. This program extends to all sectors, including food processing, commercial, fast food establishments and the residential sector. Our tour included the facilities where materials are processed, as well as collection points of various kinds.

### **Cavendish Farms**

Located near Summerside, we were given a plant tour (with full garb on) of this potato processing plant. Most of the fries made for fast food chains are produced at his plant (except for MacDonald's). The plant is huge, spanning both sides of the highway and processes about a billion pounds of potatoes a year. The plant sorts their waste at every waste station into: waste, recyclables, and compostables. Food waste suitable for animal feed is separated out at appropriate points as well.

### **Waste Watch Slide Show**

We were given a slide show that describes the Waste Watch program and documents the results to date. In summary, this is how the program works:

- all material must be source separated from all sectors into three streams: garbage, organics and recycling
- the municipalities no longer collect waste, a new Crown corporation does, and associated costs are broken out on property tax bills, which are issued by the province. The cost of the carts is charged to each property owner on their property tax bill.
- collection is provided to the residential sector only
- each household must take one black cart for garbage and one green cart for organics (picked up on alternating weeks) and recyclables are collected in blue bags once per month
- boxboard is accepted with the organics and the entire program is mandatory
- 65% diversion has been achieved

There was initially resistance to the program, mainly due to the cost on the tax bill, which was a hidden cost previously.

### **Gallants Recycling**

At this facility, which is privately owned and operated by Wayne Gallant, about 170 tonnes of recyclables are processed per month from 16,000 households. All material must be debagged and then sorted, as it comes in blue bags. They have two trucks for collection (originating from Kingston) and the cost to the province is \$11/household per year. Generally, the facility showed good spirit and was nostalgic as it was like the old recycling days in Ontario, same equipment etc. All soft drinks in P.E.I. are sold in refillable bottles and are reused an average of 27 times. The recycling rate is much less than in Ontario. The focus is much more on organics, likely due to the limited markets available in their geographic region.

### **Residential Collection System**

The carts used for garbage and organics collection are quite attractive at the curb and seem well accepted. Carts are laid down after collection so they won't blow in the wind. Although drivers are supposed to check in each cart before emptying, often they were not. Each stop was the same and involved no lifting for the operator, with stop times of about 11 seconds. The truck progressed quite quickly down the street. Three trucks cover 3700 homes for organics collection in a day. There is less garbage and the same trucks are used and finish earlier in the day.

### **Separation at Athena School, Shopping Mall and Fast Food Outlets**

At Athena School, every classroom and the cafeteria have three bins. They were using colour coded plastic bins that are the same as the ones used for fine paper within Peterborough City Hall. All containers were lined with clear plastic bags.

Tim Hortons, Wendy's, Mr. Sub and each store in the mall had separate bins for waste and organics, listing carefully the types of waste specific to their restaurants and where the materials belong. Recycling seemed to be somewhat overlooked, but the separation of all organics, whether it be food waste or paper, was exceptional. There were a lot of plastic grocery bags being used in the carts at the retirement home that we visited.

### **Wellington Waste Management Facility**

This facility includes a new landfill, indoor windrow composting facility, HHW facility, recycling depot and scrap metal recycling area. No mixed loads are accepted. A mixed load would include recyclables and/or organics mixed with it. The tipping fee for sorted waste is \$36/tonne and it is \$90/tonne for unsorted waste. \$62/tonne is charged for asbestos. Soil is \$5/tonne from residents and \$36/tonne from the commercial sector. The HHW facility is open all the time that the facility is open. There is an area for reusables as well. They receive 10,000 tonnes per year of garbage and 10,000 tonnes per year of organics.

The composting facility is quite simple, using windrow technology in a building that is closed on three sides and open on one. Material is composted turned regularly for 40 days inside and then cured for two months outside. The compost sells for \$6/yard. The material is on site for 9-12 months in total. About 20% of the material comes out as overs after screening.

### **Colchester County (Truro area)**

Five stars for system and facility design should go to this County. The tour guide, Alanna Nelson, explained the backdrop provincial regulations for waste management that have been instrumental in diverting a high percentage of organics from landfill in Nova Scotia. All organics are banned from landfill. There is a stewardship program for tires. The \$3 fee for each tire purchased covers recycling costs. Every retailer is required to take back four tires per year from any resident. There is a 10-cent deposit charged on all beverage containers and when they are returned 5 cents is redeemed. The milk distributors have reached an agreement to contribute \$300/tonne towards recycling programs for their packaging. The province just announced that the goal of 50% diversion by the year 2000 has been reached.

The Colchester County waste programs serve 50,000 people, one third of them live in Truro. No diversion programs were provided until 1996 and the County has already achieved 50% diversion. All municipal waste management facilities are at this one location including a recycling centre, composting facility, balefill operation (including processing building and fill area), and construction and demolition landfill and education room. The site is remote and is designed for private waste handling/recycling businesses to move to as well.

Collection is provided in split body packers that pick up recyclables (fibres and containers) in blue bags one week and garbage and organics (in green carts) the next. Green carts are used in only half of the county (8900 homes) because Council did not approve the next phase of the rollout. Home composting is promoted in the rest of the County. Other municipalities are rolling out their programs all at once because they don't want to be caught in this same situation. . The garbage limit is 6 bags every 2 weeks and no businesses are provided with collection. Only apartments with three units or less are provided with collection services.

The Colchester County recycling facility is extremely well designed by Porter-Dillon. The hoppers from both lines feed to a central conveyor that leads to the baler. The biggest problem is all the plastic bags at the beginning of the line, due to the collection of material in blue bags. To achieve maximum revenue, there are 21 sorts on the container line to keep deposit and non-deposit material separate. There are 6 sorts on the fibre sorting line. This is the only area visited that recycles boxboard rather than composting it. Bags on the fibre sorting line are broken by hand and on the container line an auger breaks them. On the fibre sorting line, news is the default.

There is a separate receiving building for organics and garbage. Garbage is accepted in the middle of the building. Scrap metal, tires and wood are separated out for recycling. One or two people are inspecting and sorting through loads being received at all times. All sorted garbage is then baled and transferred to the balefill filling area. Every bale is covered and they are stacked 75' high. There is an estimated 20% space saving using this method. This landfill was to last 35 years and now, with the balefill operation and their diversion programs, the landfill is expected to last 70 years. The balefill site was quite neat and no gulls were seen. The BOD in their landfill leachate is 200 mg/l whereas a typical landfill is 1000 mg/l. The tipping fees are \$60/tonne for waste, \$30/tonne for compost, \$100/tonne for asbestos, \$45/tonne for recyclables.

The composting facility uses the same technology as the one at New Era Farms, only on a smaller scale. All organic materials are received at one end of the receiving building, run along a small conveyor and then through a shredder. One person inspects all the material prior to shredding. There are 24 containers that the waste is placed in for 8-10 days before it is transferred to a Cover-all shelter that is open at both ends and filled with windrows of curing compost. The material cures for three months in the covered windrows, then outside in windrows for a few months and then screened. The outdoor curing pad was required because the covered one was not sufficient in size.

Yard waste, fruit and vegetable waste, meat, fish, bones, and kitty litter are all accepted in the Colchester County program. The incoming feedstock was similar to what the Peterborough

feedstock would be like because Colchester County recycles boxboard rather than composting it like other municipalities in Nova Scotia. There have been problems with the ventilation and leachate system in the winter because of the lines freezing. This could be prevented by using plastic with an internal heating wire. The site is operated by municipal staff and staff report poor service from the manufacturers of the Stinnes-Enerco composting system and find that they usually have to manually check readings instead of relying on the computer controlled system. Staff don't recommend using in floor aeration systems because they plug up very quickly. Overall, the compost material and site smelled less than the other ones visited and the material had broken down much better. The finished compost is mostly sold to local residents.

Currently, 3,000 tonnes of organics are processed annually and the composting facility is designed to for up to 6,000 tonnes per year.

### **Lunenburg County**

A population including Lunenburg, Bridgewater and Lunenburg County of 40,000 is served by the Lunenburg waste management facility. The cost of the facility was 9 million dollars. Four waste streams are collected every two weeks: news, blue bag, organics cart and garbage in bags. Each town contracts its own collection services. The collection vehicles were recycling trucks with no compaction, some carrying all four waste streams. In Bridgewater, two streams are collected on alternating weeks and there is no compaction on their trucks. The cost of the organics carts used in the organics collection are included in the general levy. Carts are distributed to new homes as they are occupied and the cost is charged to the homeowner.

Originally, the Lunenburg facility was designed to process source separated organics, source separated recyclables and garbage bags (to remove recyclables and stabilize the waste prior to landfilling by composting it). The processing of garbage was terminated three years ago. The garbage bags often did not open sufficiently to process adequately. There were also problems with the compost turner, being used for both garbage and source separated organics, bringing garbage into the source-separated organics. All the functions, recycling processing and composting, are carried out in the same building and air quality problems have resulted in workers requiring respirators. The facility is the first one of this kind in Nova Scotia and others have benefited from learning from Lunenburg's experiences.

The composting technology used is the wide-bed Ebara system. The bed is 90' x 200' and about 5,000 tonnes per year is composted. 60% of feedstock is from the residential sector and 40% is from the commercial sector. All material is inspected for contaminants in the receiving area where trucks dump into a pit from the outside. One of their biggest challenges are the plastic grocery bags that people put in their carts. Staff suggest that the Bio-solo and Bio-corp biodegradable plastic bags seem to decompose well. Once inspected, material is ground and conveyed to the wide bed for composting. Material is initially kept inside for 24-30 days and ideally is cured for another 4-5 months. The material seems to require additional curing, so staff have been putting the material through the in vessel system for another few days. One third of the composting facility is separate from the other two thirds because this is where the waste used to be processed and this is where the second round of composting occurs. The compost is now sold as a grade A. They originally had problems with high copper levels.

The building is corroding quite badly due to the compost off gases. The facility is operated by municipal staff. Staff recommend using aluminum for construction or Wasser coatings. The computer system for the turner was down for a long time so they had to manually do the turning. They have recently found a new programmer and have resolved the problem. Staff advised against the use of any pits for conveying organics due to the high moisture content.

### **Potential of the Current City Composting Site**

Compost Management was hired to assess the feasibility of composting food waste from the pilot area (Phase 1) and the full scale program (Phase 2) at the existing composting facility. The assessment concludes that the site could be readily used to compost the material collected from the pilot, providing the application to amend the Certificate of Approval is accepted by the Ministry of the Environment. The City has just completed the public notification process and is planning to submit the application by the end of March.

The assessment of the site's potential to compost waste from a full-scale food waste composting program was completed as well. It appears as though the site could be used for the full-scale program if capital was invested to improve the site's functionality. The proximity of neighbours is not ideal, but potentially workable. By doing the pilot project at this location, the City will gain experience in the windrow composting of food waste, be in a position to better evaluate the merits of the current site and buy some time to see if a site could be created adjacent to the existing landfill.

### **Next Steps**

The City is applying to amend the Certificate of Approval at the existing site to allow the composting of food waste from a pilot at 600 homes for one year. Once the pilot is underway, the City will prepare an Application for a Certificate of Approval to amend the existing Certificate of Approval, or for a Certificate of Approval adjacent to the landfill. At this point, the site adjacent to the landfill is preferred. If neither of these options is feasible, the private landowner will be consulted to work on developing a privately owned site.

### **TRANSFERABILITY TO OTHER REGIONS/MUNICIPALITIES IN ONTARIO**

- Although the initial siting of a facility is challenging, a City owned facility would provide the most program security, operational control and options for creating an on-going competitive bidding environment for operating the site.
- Of the various composting technologies examined, there were none that seemed ideal to place in close proximity to neighbours.
- Strong odours seemed more prevalent at the closed systems, particularly the wide bed systems. All systems would benefit from a large area to allow curing of product in windrows.
- Windrow composting, managed and located well, appears to be an efficient and effective method of composting. If any aspect of the operation needs protection from weather, it seems the receiving and curing areas would benefit the most. Wet material is very difficult to screen effectively and a presort of materials would benefit the quality of the

finished product. The technology is simple and equipment is relatively easy and inexpensive to maintain.

- Most of the jurisdictions in Nova Scotia that are using carts have a high percentage of boxboard in the mix because it is not recycled there (except in Colchester County). The mix in the cart would look very different in municipalities that recycle boxboard rather than compost it, likely much moister, and therefore more odourous.
- Boxboard in the compost mix seems to cause serious odours in the composting process and take a long time to break down. The finished compost is very stringy, not light and fluffy like the yard waste compost familiar to Peterborough staff.
- The Cover-all shelter used for curing material in Colchester County was inexpensive and effective.

**Summary of Costs**

Compost Management – Phase 1	\$4,875.14
Compost Management – Phase 2	\$10,856.00
REIC Perth	\$572.45
Aberdeen Tours (Halifax facilities)	\$89.70
Various travel expenses, invoices provided (N.S., PEI tours)	\$741.23
Sub-total	\$17,134.52
Staff time	\$6,500.00
Mileage	\$720.04
Plane flight to Halifax (for 2, can't find receipt)	\$700.00
Sub-total	\$7,920.04
<b>Total project costs</b>	<b>\$25,054.56</b>