

The New York City Department of Sanitation

Local Law 42: A 2012 Assessment of Composting Opportunities in NYC



Department of Sanitation Compost Site on Staten Island



sanitation

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Introduction

A. Review of Local Law 42 Mandates

Mayor Michael Bloomberg signed Local Law 42 (LL42) on August 16, 2010. LL42 requires that DSNY, in conjunction with the Mayor's Office of Long-Term Planning and Sustainability, issue a report on possible methods of composting a larger portion of the organics in NYC's waste stream. The law stipulates that this report:

1. Study the viability of a curbside collection program for household and institutional compostable waste including, but not limited to, cost considerations and any concerns regarding siting;
2. Identify existing private and public facilities within 300 miles of the City that accept waste for composting, and determine a) their available capacity, b) the cost to deliver compostable waste to them, and c) any relevant siting considerations;
3. Review the capacity of putrescible solid waste transfer stations both permitted by the City and within 60 miles of the City, and determine whether any such stations are capable of accepting a) source-separated compostable waste for consolidation and transportation, b) the cost to deliver such compostable waste to them, and c) any relevant siting considerations;
4. Explore opportunities to expand the composting capacity of existing City sites or, in conjunction with the study required by section 16-316 of this chapter, explore opportunities to develop one or more new composting facilities in or within 60 miles of the City, referencing opportunities to work with other entities in their development and any siting considerations;
5. Compile a comprehensive list of sites around the City, such as botanical gardens and greenmarkets, that accept household and institutional organic waste on a voluntary basis, and recommend methods to encourage and expand options for voluntary composting; and
6. Provide a plan to study the viability of a food waste composting program for the residential or commercial waste stream, to be completed within two years of the issuance of a report.

This report will address each of these directives by developing an overall picture of the current status of composting in NYC and demonstrating the challenges and opportunities the city faces in achieving the goals of the Solid Waste Management Plan.

For more details on the programs summarized in Local Law 42: 2012 Assessment of Composting Opportunities in NYC, please refer to the following DSNY reports:

New York City MSW Composting Report, Summary of Research Project and Conceptual Pilot Facility. Bureau of Waste Prevention, Reuse and Recycling, NYC Department of Sanitation, January 2004.

Composting in New York City: A Complete Program History. Bureau of Waste Prevention, Reuse and Recycling, NYC Department of Sanitation, August 2001.

Backyard Composting in New York City: A Comprehensive Program Evaluation. Bureau of Waste Prevention, Reuse and Recycling, NYC Department of Sanitation, June 1999.

Chapter 1: Curbside Collection and Other Organic Waste Diversion Programs for Households and Institutions

MANDATE 1
Study the viability of a curbside collection program for household and institutional compostable waste including, but not limited to, cost considerations and any concerns regarding siting composting facilities to conduct such a program.

Since 1991, DSNY has directed a number of research projects to evaluate the feasibility of collecting compostable material from NYC’s household waste. A few of the programs are discussed in greater detail below.

A. Brooklyn Intensive Zone Pilot, 1991-1996

In 1991, DSNY chose Park Slope as one of the locations for the Brooklyn Intensive Zone Pilot, a multi-pronged recycling program that included curbside collection of organic material. DSNY chose Park Slope based on its housing density (30% medium-density) and the fact that its residents were known to embrace environmental initiatives.

To carry out the study, DSNY asked 3,500 Park Slope residents to separate their food scraps and other organic materials, such as spent plants and flowers, food-soiled paper, and yard waste, from their regular trash. DSNY collected the waste and transported it for windrow composting to the Fresh Kills Compost Site.

At set-out, the organic waste collected averaged at 4.1 tons per week; it stabilized at 3.7 tons per week by the end of the pilot. The average capture rate for food waste over the course of the study was 41%. This is lower than—but comparable to—that same rate for other recyclables.

The program ran until 1996, but its truck tonnages were ultimately too low to justify its continuance. The cost of transportation in conjunction with the added environmental impact of adding a fourth, inefficient truck route to NYC’s waste collection system outweighed the benefit of collecting the organic material.

In 1993, DSNY began another Intensive Zone Pilot in high-rise apartment buildings in Starrett City, Brooklyn. All participating buildings had ideal garbage set ups, including utility rooms on each floor for source-separated collection, large elevators that allowed maintenance to wheel recyclables off each floor, and sufficient space behind the building for special collection dumpsters.

DSNY collected organic waste from six buildings, servicing approximately 600 households. Food scraps were placed in plastic grocery bags in the “organic waste” bins on each floor. The maintenance staff collected organic material with Schaffer carts to deposit in the outdoor dumpsters.

In 1996, the pilot was eventually terminated as what little material was captured at Starrett City was so contaminated with plastic that it could not be composted. In addition, the overall diversion rates were significantly lower in Starrett City than in Park

Slope. Residents were reluctant to store food waste in a utility room due to concern over potential pests, despite the availability of sealed bins.

Maintenance staff also had reservations about the program; since DSNY only collected trash once a week, they were inclined to dispose of food as refuse. Buildings without sufficient storage space for organics had an even lower diversion rate due to fear of odors and vermin.

B. Staten Island Institutional Pilot, 1993-1996

This pilot was another organic diversion effort aimed at capturing institutional food waste from twelve large food waste generators in the City. Participating institutions included sites such as Sea View Hospital, Staten Island College, Wagner College, and Staten Island Zoo. These sites had to permit waste collection from DSNY and provide space for an additional dumpster.

Each institution received a starter kit that included a two-cubic yard dumpster, indoor collection buckets and bags, a range of educational materials, and trainings for kitchen personnel and other staff. DSNY collected all solid food, including meat and dairy, and any non-recyclable paper products in the kitchen and cafeteria. Due to swill concerns, DSNY did not accept liquids such as oils, milk, and soup.

The average tonnage per collection was very low for two primary reasons. First, participation was voluntary; institutions lacked incentive to separate food waste without payment. Second, institutions viewed the program as extra work for those who had to handle the waste and train kitchen staff.

Additionally, the collection route proved ultimately inefficient. Very few institutions could host the necessary extra dumpster, forcing trucks to travel long distances between collection sites. Improving the program would require many costly endeavors, such as a change in collection methods, smaller food waste receptacles, and retrofitted collection vehicles. It would also need to conduct labor negotiations to assign unionized sanitation workers to the project.

C. Staten Island Spring Yard Waste Collection Pilot, 2007-2008

In 2007, DSNY conducted a pilot to test the feasibility and effectiveness of collecting yard waste for composting on Staten Island. The pilot estimated that 3,000 tons of organic material existed in Staten Island's waste stream. During the first year of the program, DSNY collected a total of 380 tons of yard waste accumulated over a four-week period. Trucks drove long routes yet still returned to the garage less than full, causing an average cost per ton four times higher than that of regular recycling collection.

Due to a suburban environment, Staten Island traditionally generates the most yard waste of any borough. Because the capacity for a composting site is heavily constrained outside of Staten Island, DSNY decided to discontinue the pilot in the other boroughs in 2008.

The goal of the 2008 pilot was to determine whether participation rates would improve as the program and its requirements became routine for Staten Islanders. From this standpoint, the pilot was a success—a total of 765 tons were collected for composting, an increase of over 100% from 2007.

D. Mixed Waste Pilot, 2001

Mixed solid waste composting occurs when an entire, non-separated waste stream is sent to a facility that recovers the degradable fraction.

In 2001, DSNY ran a mixed waste pilot on Staten Island that sent 50 tons of solid waste to the Bedminster composting facility in Marlborough, Massachusetts. DSNY chose Staten Island's District Two as the pilot area because its recycling rate was close to the citywide average. The Bedminster facility recovered 100% of the degradable material. The compost created from this waste achieved a Class One Department of Environmental Conservation designation.

1. RESULTS OF NEW YORK CITY COMPOSTING TRIALS

Quality

The sample compost produced from NYC residential and institutional waste met New York State Department of Environmental Conservation (DEC) Class I compost standards, as well as its current pollutant-limit and product-use criteria (in effect as of March 10, 2003).

Recovery Rate

The Marlborough facility recovered 50 percent of the sample waste used during the trials. This rate is in line with those achieved by the other MSW-composting facilities surveyed for this report. This makes sense given the degradability of 55.6% of the NYC sample waste.



E. Fall Leaf Collection Program, 1999-2007

DSNY operated a large-scale seasonal leaf collection program from 1999 to 2007. Sections of the Bronx and Brooklyn piloted the program in 1991 and 1998 respectively; all Queens's districts joined in 1999. During the program, DSNY collected leaves and yard waste from 37 community districts and converted it into high-quality compost.

The Fall Leaf Collection Program was suspended in 2008. During the suspension, DSNY continued to encourage residents to compost leaves and other yard waste whenever possible. DSNY collects this

waste with regular household refuse on scheduled days. Several community gardens also accept bagged leaves from the public throughout the month of November and early December. DSNY's efforts sparked a mandated return of the program in 2010.

F. Other Relevant DSNY Pilots

1. BACKYARD COMPOSTING PILOT, 1998

In 1998, DSNY conducted a pilot study to assess the effects of backyard composting on the City's residential waste stream. The study involved backyard composters in targeted neighborhoods, as well as a control group with the same characteristics but no program publicity.

NYC Compost Project personnel encouraged roughly 1,000 residents with backyards in the Bronx, Brooklyn, Queens, and Staten Island to participate in the program. It sold interested households compost bins at nominal fees. Each participant received a botanical garden membership. NYC Compost Project staff set up a Compost Helpline for questions and comments and made follow-up visits throughout the study to answer questions and check on bins.

In total, less than 10% of those eligible for the program chose to participate. Those who did participate diverted two and a half pounds of waste per week, for a total of 109 tons per month, or 5,668 tons per year.

DSNY determined that backyard composting managed by NYC residents could not serve as a reliable waste management strategy. That said, DSNY believes that large institutions with access to the right machinery might be successful in diverting large amounts of organic waste at a reasonable cost.

G. In-Vessel Aerobic Digestion Pilot, 1996-1997

In 1997, DSNY purchased and installed Earth Tub—a small-scale, in-vessel composting unit—at the Queens Hospital. The Earth Tub allowed the hospital to reduce its waste-carting bill and secure compost for the grounds. The unit reached temperatures high enough to kill weed seeds and pathogens, and odors did not pose a problem. However, labor costs associated with food scrap separation increased the overall waste bill. Without a subsidy for the equipment or free labor, in-vessel composting was not economically attractive.

In 1996, Wright Environmental Management installed an in-vessel composting unit at City College in Manhattan. They removed the unit in January 1997 due to odor problems. Again in 1997, Wright installed a different in-vessel compost unit at St. Barnabas Hospital in the Bronx. Despite intensive staff training, the system yielded high rates of contamination from plastic plates, trays, and utensils.

The Earth Tub and Wright systems proved to be sound technologies. However, both up-front and associated operating costs made in-vessel composting units unattractive to most institutions and the efforts were dismantled after a year.

Chapter 2: Large Compost Sites Within 300 Miles of NYC

MANDATE 2

Identify existing private and public facilities within 300 miles of the City that accept compostable waste and determine their available capacity at the cost of delivery to such facilities, as well as any siting considerations concerning such facilities.

A. Large Scale DSNY-Managed Facilities

1. STATEN ISLAND COMPOST SITE

The Staten Island Compost Facility is a 24-acre site at the entrance of the former Staten Island landfill. The facility uses open-air windrows to compost organic material. The site is currently permitted to accept leaves, brush, grass clippings, horse manure, Christmas trees, wood chips, stumps, and logs.

Upon arrival to the site, collection trucks bring food waste to a segregated area and dump it onto a prepared bed of woodchips. The waste is covered with another layer of woodchips that work to control liquid runoff and reduce odors. Machines then blend the waste and chips together, allowing the organic material to achieve the proper carbon/nitrogen ratio. A layer of finished compost is used to cover the windrows and act as a bio-filter for the actively composting piles. A self-propeller turns the windrows each week, and workers regularly record their temperatures.

The compost is screened when the material is finished decomposing. This screened material is left to cure for several months, allowing additional time for greater degradation, and resulting in a more chemically stable end product. Once it has finished curing, the finished compost is stored and distributed throughout the City for various greening initiatives.

DSNY holds a pilot permit to process food waste and other organics accepted at the Staten Island Compost Facility. The current pilot permit allows for DSNY to process approximately 35,000 cubic yards of food waste per year and expires in June 2013. DSNY is applying for an extension to increase the capacity to 55,000 cubic yards.

2. RIKERS ISLAND COMPOST FACILITY, 1996-PRESENT

The Rikers Island compost facility was opened in 1996. It boasts key elements required for a successful on-site composting operation.

There are approximately 17,000 inmates and 7,000 officers at the Rikers Island correctional facility, generating 20 tons of food waste per day. DSNY constructed a fully enclosed composting site at the facility with agitated bay technology to manage all of the organics and other waste streams from the island.

Inmates collect food waste in specially marked, 44-gallon plastic containers. Cafeteria staff members use dollies to bring these containers outdoors, where they empty food waste into separate yellow dumpsters. DSNY then transports the dumpsters to the composting facility and empties their contents onto the receiving floor.

The facility operators mix food waste with a prescribed amount of wood chips. They then move the materials into narrow, concrete bays, where they use agitating equipment to blend them. They draw air through the floor of the bays via a computer-controlled, temperature-regulated system.

On average, the site processes 178 tons of material per month from four different prison kitchens and the Rikers bakery. 100% of the food waste delivered to the facility is processed into finished compost.

The Rikers Island composting facility proves that operating a compost site in close proximity to an area where food waste is produced reduces transportation and collection costs. However, costs must still be allocated to hire labor to separate food waste and complete maintenance tasks, such as cleaning food waste receptacles. On-site composting also requires the necessary space for a large composting facility, food waste dumpsters, and an outdoor curing area.

3. SOUNDVIEW COMPOST FACILITY

Soundview Compost Facility, constructed in 1999, is a seven-acre site built on an inactive section of Soundview Park in the Bronx. DSNY will supply Soundview Park with approximately 22,000 cubic yards of compost and approximately 11,132 cubic yards of sand or soil.

4. SPRING CREEK COMPOST FACILITY

The Spring Creek facility is located on the Brooklyn-Queens border in a 20-acre area of Spring Creek Park. It is adjacent to the water treatment facility run by the NYC Department of Environmental Protection.

DSNY received an operating permit for this facility from NYSDEC Region Two on December 20, 2002. While the permit was pending, NYSDEC received several letters of opposition to the site. An Administrative Law Judge assigned by NYSDEC in Albany ensued a protracted adjudicatory process. NYSDEC Region Two staff continued to support giving DSNY the operation permit for the Spring Creek composting facility. As of July 1, 2012, DSNY still has not received a verdict about the Spring Creek composting facility.

B. Other Large Scale Composting Facilities Not Managed By DSNY

DSNY is seeking additional space to create new facilities and expand NYC's large-scale composting efforts as close to the city as possible. NYSDEC regulates all statewide composting and waste processing facilities. It requires a distance of at least 200 feet between composting facilities and the nearest body of water, residence, or business (up to 500 feet depending on the density and environmental sensitivity of the location). These requirements, coupled with community concerns, make it difficult to site a facility in or around NYC.

Due to space limitations in NYC, private food waste collection carters have partnered with commercial facilities up to 125 miles outside of the city to drop-off their organic material. At this time, only three commercial facilities within 100 miles of NYC are able to accept large volumes of food waste due both to economic feasibility and state regulatory limitations. Beyond a certain distance, the transportation costs and greenhouse gas emissions would lead to both significant financial losses and a negative environmental impact.

Regionally, a number of small-scale facilities, such as farms and municipal composting sites, process food waste from local sources. However, these sites lack the capacity to process the high volume of waste generated by NYC. Some of these small-scale facilities may qualify to register with fewer restrictions than a full permit offers. The quantity of material they process annually amounts to less than seven percent of the food waste generated in NYC daily. (Emily Rubenstein, 2012)

The Wilmington Organic Recycling Center (WORC) in Delaware uses a covered aerobic composting system to process organic waste. Private carters have delivered the majority of NYC's source-separated food waste since 2010 to this site. While the Wilmington facility does have some capacity for additional material, the entire operation represents a small fraction of the more than 3,500 tons of food waste produced in NYC daily.

C. Feasibility of Using Large Facilities to Compost Food Waste in NYC

DSNY is seeking ways to overcome challenges faced by large-scale food waste processing facilities in NYC. Sites that employ lower-tech methods, such as traditional windrow composting, can have a difficult time obtaining an expensive state permit. These operations are often incapable of handling highly contaminated post-consumer food waste. Plastic, Styrofoam, metals, glass, and even biodegradable bags and some compostable ware in the waste stream can cause equipment malfunction, create flying debris, and lower the quality of finished compost.

Even medium-tech operations that possess the special equipment necessary to aerate windrow piles and capture odors and run-off leachate face many issues. Sites that are managed improperly will have their permits revoked and be shut down. Advanced technology facilities such as anaerobic digestion plants may have lower environmental concerns, but they incur heavy costs with a low rate of return and lack extended pay-back periods.

As food waste diversion becomes the norm in NYC, better practices continue to emerge. Urban communities are beginning to embrace the benefits of processing their food waste close to home. DSNY is still researching ways to decrease the cost associated with new food waste infrastructure projects. Expanded grant programs for on-farm composting and an increase in the return on energy production for emerging technology plants are some proposed ideas. DSNY is still working to change attitudes toward composting and make improvements in technology to assert their full impact.

Chapter 3: Storing Compost at Local Transfer Stations

The regulations in Part 360 of New York State’s Solid Waste Management Facilities Regulations, or 6 NYCRR, deems the State’s authority to set standards and operational criteria for all of its solid waste management facilities.

According to the NYSDEC website, as of May 2012 there were 168 regulated and 361 registered waste transfer stations operating in New York State. Each registered station can legally accept a maximum of 12,500 tons of household waste per year. In 2010, these stations handled approximately 907,000 tons of solid waste, while the regulated stations boasted approximately 9.9 million tons. (Emily Rubenstein, 2012)

The waste transfer stations within 60 miles of the City span three states: New York, New Jersey, and Connecticut. New York hosts 46 of them; New Jersey, 55; Connecticut, six. Long Island City hosts the one station within city limits. (Emily Rubenstein, 2012)

Labor and fuel for in-City solid waste collection unofficially costs between 75 and 100 dollars per hour, or 600 to 800 dollars per standard eight-hour shift. Between 10 and 16 tons of waste are speculated to be collected during each shift. (Emily Rubenstein, 2012) Given these projections, in-City collection would cost between 38 and 80 dollars per ton.

A 2010 NYCEDC feasibility study on anaerobic digestion at Hunts Point in the Bronx, estimated that the commercial putrescible transfer station tip fee would fall between 65 and 80 dollars per ton. The fee covers the cost of handling the material at the station, estimated between 4 and 10 dollars per ton. It also covers the cost of shipping it to the landfill and the subsequent landfill tip fee, falling somewhere between 130 and 160 dollars per ton. NYC waste haulers are only permitted to charge a maximum of 208 dollars per ton.

MANDATE 3
Review capacity at putrescible solid waste transfer stations permitted by and within 60 miles of the city, and determine whether a) any such stations are capable of accepting source-separated compostable waste for consolidation and transportation b) the cost to deliver waste to such facilities, and c) any siting considerations concerning such facilities.

Chapter 4: Expanding Existing Compost Sites and Creating New Ones

MANDATE 4

Explore opportunities to expand the currently available capacity to compost at existing sites within the city or, in conjunction with the study required by section 16-316 of this chapter, explore opportunities to develop one or more new facilities in or within 60 miles of the city for composting, including, but not limited to, opportunities to work with one or more entities for development and any siting considerations concerning such a facility.

A. Compost Facility Siting Task Force

The 2006 Solid Waste Management Plan commissioned DSNY and the City Council to form a Compost Facility Siting task force. This task force was composed of individuals knowledgeable about composting, representatives of the Borough Presidents, and other elected officials. Its stated purpose was to “serve the dual purpose of finding sites for additional composting facilities and for new technology facilities in each borough.”

A staff member of the Economic Development Corporation (EDC) formed and chaired the task force; a Deputy Commissioner from DSNY was the co-chair. Representatives of the Department of Citywide Administrative Services (DCAS) and the Parks & Recreation Department (Parks) also participated.

The members of the task force toured DSNY’s existing leaf and yard waste compost sites and the Rikers Island composting facility to get a sense of what type of facilities and new technologies were needed.

After an extensive search, the task force could identify no potential sites for new leaf and yard waste composting facilities. EDC’s new technology consultant did, however, present a number of alternative technologies for possible pilot testing on a portion of the NYC waste stream. EDC’s consultant also found a number of NYC sites that could be the possible siting of a new technology pilot facility, upon further investigation. Thanks to this effort, DSNY released a new technology RFP in the spring of 2012.

B. Opportunities to Expand the Current Composting Capacity at Existing City Sites

To identify expansion opportunities for existing NYC composting facilities, DSNY must evaluate three major criteria: defining feedstock, siting issues, and the distance between waste generation and its final destination.

1. DEFINING FEEDSTOCK

DSNY must consider the quality of NYC’s organic waste stream before exploring possible expansion opportunities. It must evaluate where the waste material is coming from (i.e. residents, schools, landscapers, food industry, parks); what organic matter is being targeted (i.e. food scraps, yard waste, etc.); and what potential contaminants are in the material.

DSNY must also examine the production capacity of the generator at existing facilities. Can it produce the desired amount of feedstock in the required condition and set it out for collection on a consistent basis?

Once these aspects are determined, DSNY must decide on the method of collection it will use to capture the feedstock, whether or not this method will add to or control contamination, and what level of collection efficiency can be achieved at what cost per ton.

It is increasingly difficult and costly to craft a contaminant-controlled system for numerous reasons. The more contaminated the material is, the harder it becomes to produce a useful and marketable end product. In such cases, the disposal cost for contaminated materials will increase as well.

DSNY must decide which of the desired inputs it will produce sufficiently and consistently enough to warrant the associated tip and processing fees. Knowing the answers to quantity, quality, and feedstock regularity are essential to minimizing risk for both publicly or privately financed facilities.

2. CONSIDERING SITING ISSUES

Both self-directed volunteers on small-scale community gardens and larger-scale activities managed and funded by DSNY perform community composting in NYC. While they differ greatly in size and impact, these facilities all face many of the same challenges, such as the limited amount of available real estate and the close proximity of neighbors.

DSNY has begun a dialogue with NYSDEC representatives to revise the regulations and troubleshoot the constrained composting activity in NYC. NYSDEC fully recognizes the impediments their regulations impose upon urban composting efforts; they have begun a comprehensive review of the existing regulations with intent to add greater flexibility where feasible.

However, given the present DEC regulations, opportunities for expansion of existing citywide composting are limited. The most promising opportunity is at The Staten Island compost site, DSNY's largest leaf and yard waste facility. The facility is large enough to process a great amount of organics, with the help of appropriate capital investment. It has the potential to accept most of the organics generated on Staten Island, both residentially and commercially. However, due to borough-based self-sufficiency, it is likely that the site will be confined to accept only organics produced on Staten Island. This political reality combined with the lack of potential sites in the other boroughs and the low priority of composting sites in general means that any new or expanded compost facility will most likely reside outside of the City. Relatively simple open-air techniques such as windrow composting can be used to compost leaves and yard waste on a large scale. Food waste, however, introduces additional regulations, infrastructure investment, and operating expenses. Food waste processing sites must be designed in an enclosed area with leachate and odor controls. And, they require some kind of system to sort out contaminants that accompany the food waste in order to process the material and

create a decent end product. The dirtier the inputs, the more elaborate and costlier the front-end system.

3. EVALUATING TRANSPORTATION COSTS

Whatever system is designed to accept NYC's organics must allow for organics consolidation facilities within City limits. This is because the highest cost associated with recycling in general is the cost of collection. A significant portion of that cost is transportation. The further a collection truck must travel to the dump location, the greater the transportation cost overall. These costs can skyrocket in a place like NYC filled with density and traffic. DSNY has experienced this issue in past refuse and recycling collection efforts.

This means that DSNY must either build the needed composting processing infrastructure within the city's limits, or create an organics transfer station that can aggregate and ship out organics collected to facilities outside of NYC. DSNY believes that the latter presents optimistic opportunities.

C. Potential New Technologies

DSNY's BWPRR is assessing the viability of new technologies that process municipal organics, with consideration to costs and siting. These technologies include mixed waste composting, small in-vessel units, anaerobic digestion, and co-digestion using anaerobic digestion. BWPRR is still working to overcome challenges in the feasibility of much of the technology. Mixed-waste composting is reviewed below.

1. MIXED-WASTE COMPOSTING FACILITY ANALYSIS

In 2001, DSNY surveyed three successful mixed solid waste composting facilities in North America: Groupe Conporec Inc. in Quebec, Canada; TransAlta Corporation in Alberta, Canada; and Rapid City Regional Recovery and Landfill Facility in Rapid City, South Dakota. Each facility recovered between 49% and 70% of the organic material, with tipping fees competitive to other disposal options. All the sites maintained good neighbor relations. Only one site produced compost with concerning pollutant levels.

The research suggested that a centralized mixed-waste composting system with the proper design could process and recover 100% of the waste stream's degradable material. With these findings, DSNY created a proposal for an MSW-composting facility in NYC that could process 300-tons of organics per day. DSNY used the Trials' results to predict the organics recovery rates and ask various facilities to come up with a design for the new facility.

According to the MSW Composting Trials, successful facilities maximized recovery rates by increasing "desirable" outputs—or quality compost, marketable recyclables, and loss of water vapor. On the same token, they decreased "undesirable" outputs, or residual items that require disposal.

The theoretical pilot facility design incorporates these two notions of success, as well as two principal operational features: intensive, front-end materials recovery and extended, active composting. These features would distinguish it from current MSW-composting facilities and enable it to achieve a maximum amount of success.

Employing front-end, materials-recovery equipment and manual sort lines would maximize the recovery of non-degradable, marketable recyclables from the waste stream. Such equipment would remove recyclables before the MSW-composting process begins, decrease residue disposal costs, and produce cleaner compost.

The pilot facility would also contain space for 51 days of active, on-site composting. This is more than twice the amount of time that material was actively composted at the Marlborough facility, where the NYC Composting Trials occurred. With more time, the decomposing material would lose a greater amount of mass and produce a better final product.

The three primary goals of the recovery process would be to:

- Send as much paper and paper products through the composting process as possible.
- Prevent as much non-degradable material, especially glass and film plastic, from entering the facility as possible.
- Recover as many non-degradable, recyclable items as possible.

Based on a detailed analysis of how each material fraction would move through the facility, the process is predicted to achieve a 70% recovery rate.

This study also sought to develop an estimated cost-per-ton to compare MSW composting to current and future export and disposal options. DSNY submitted many scenarios about a hypothetical pilot facility to a financial analyst experienced in the economics of commercial-scale MSW-composting and other MSW-handling facilities. The analyst calculated the per-ton costs for the projected lifecycle of the facility. Appendix J of this report presents the full, 30-year analysis. The costs include:

- Capital development (including permitting and design work)
- Facility financing (such as debt service)
- Annual operation and maintenance (such as residue disposal and electricity)

The financial analysis concluded that processing MSW in a hypothetical pilot facility in the first year of operation would cost approximately \$75 per ton.

2. SUMMARY EVALUATION OF EXISTING FACILITIES

Quality

Each of the surveyed facilities produced a finished compost product that met DEC Class I compost standards. The compost from each facility, except one, met the DEC's current pollutant-limit and product-use criteria. Compared to MSW-composting facilities that use a less mechanized approach, facilities that

actively manage their compost for extended periods of time (50-plus days) using mechanized means produce a better final product.

Odor

The facilities are designed to successfully avoid odor problems with their neighbors.

Tipping Fees

The four surveyed facilities charge tipping fees between \$45 and \$85 per ton. These prices are competitive with other disposal options in the respective facility locations.

Recovery Rates

The facilities recover between 49 and 70% of the solid waste that they process, with the balance disposed of as residue.

Potential For Improvement

The facilities could improve their performance by placing more emphasis on the removal of non-degradable items in the waste stream before it enters the MSW-composting process. This would increase the recovery of recyclable items, decrease residue disposal costs, and produce cleaner final compost with a wider application value.

3. FEASIBILITY OF MIXED WASTE COMPOSTING FOR NYC IN CONTEXT

The 2006 Solid Waste Management Plan sets forth a long-term solid waste management strategy for NYC. It relies upon the export of the City's residential and institutional waste to out-of-state landfills and waste-to-energy facilities. The key components of this strategy are reliability, cost stabilization, and borough equity, accomplished through the long-term contracting of services with private sector partners.

Many people complain that long-term arrangements preclude innovation and limit DSNY's flexibility to adopt new methods for waste management. While it is true that long-term contracts can limit or cause early termination, such provisions usually focus upon and run concomitant with the initial pay down period of the arrangement. In some contracts this may be ten years or more.

DSNY's export contracts are structured to allow for changes in waste stream quantities over time due to waste reduction, increased recycling, changes in product packaging, and more.

Given the lead times associated with releasing an RFP for a pilot facility, negotiating a contract with the selected vendor, building the facility, and testing it, the City's existing contracts for waste disposal do not preclude the further investigation of alternative waste management technologies, including mixed waste composting.

Chapter 5: Expanding Volunteer Sites

A. Current City Programs that Encourage Organics Diversion for Composting

DSNY manages several programs to encourage on-site, community-based composting to divert organics from NYC’s waste stream, including the citywide NYC Compost Project, Greenmarket® collection sites, and other community drop off sites.

1. A HISTORY OF THE NYC COMPOST PROJECT (1993-PRESENT)

The NYC Compost Project emerged out of several DSNY pilot studies that assessed citywide opportunities to encourage composting. With respect to food waste, DSNY determined that it was more cost effective to encourage home-based composting than to facilitate composting-specific collection services. DSNY identified existing institutions and non-profits that could advance community composting by providing trainings and workshops, and by building strategic partnerships with other community groups and institutions—such as community gardens and parks—interested in composting. DSNY partnered with various botanical gardens around the City as well as the Lower East Side Ecology Center (LESEC) in Manhattan to see this through.

The Bronx NYC Compost Project is hosted at The New York Botanical Garden; the Brooklyn Project at the Brooklyn Botanic Garden; the Manhattan Project through the Lower East Side Ecology Center; the Queens Project at the Queens Botanical Garden; and the Staten Island Project at Snug Harbor Cultural Center & Botanical Garden.

In FY12, the Compost Projects attended over 500 composting outreach activities collectively, where they interacted with over 10,000 people throughout NYC. Each Compost Project regularly offers over 200 workshops of its own annually—reaching over 4,000 attendees—on topics like outdoor and indoor composting, compost bin building, mulch mowing, and natural lawn care. The Projects perform extensive community outreach and provide technical assistance, operational support, and physical resources to interested or active sites.

The Compost Helpline connected to 311 answers frequently asked composting questions, including how to get free compost, where to buy compost bins and accessories, and what the Master Composter Program involves. There were 1,800 calls to the Compost Helpline in FY12. In that same year, the project sold over 362 bins at low cost to promote home composting.

The Projects encourage on-site composting in a wide variety of environments, including schools, community gardens, residential buildings, and institutions. In FY12, the NYC Compost Project was directly involved with 174 community compost sites. Of those, 133 are engaged in composting food scraps. The Projects work with these sites to a) determine the composting system best suited to their needs, b) assist with or

MANDATE 4

Compile a comprehensive list of sites around the City, such as botanical gardens and greenmarkets that accept household and institutional organic waste on a voluntary basis, and recommend methods to encourage and expand options for voluntary composting.

manage the building of that system, and c) guide the overall management of the site's composting operations. The Project creates signs that outline a basic list of what can be composted for each community site in outdoor, urban settings, as well as six essential bin maintenance tips for outdoor composting.

2. THE MASTER COMPOSTER CERTIFICATE COURSE

In addition to developing compost sites, each Project conducts the annual Master Composter Certificate course. The course trains community members to create and manage their own community-based compost sites. It consists of 18-23 hours of classroom instruction, two field trips, 15 hours of supervised community training, and 15 hours of independent community service projects that seek to advance NYC's on-site composting effort. Each year, approximately 15 to 20 Master Composters are trained in each borough. They become the leaders and advocates for community composting in their neighborhoods and schools, conducting over 400 outreach activities and reaching thousands of people annually.

3. THE DEMONSTRATION SITE PROGRAM

The Demonstration Site Program is a way for the NYC Compost Project to recognize community-based compost sites that have exemplary on site composting. Demonstration sites must fulfill a certain amount of outreach and education each year to maintain their Demo Site status. There are approximately 50 Demonstration sites in NYC that hosted a total of over 300 activities in FY12.

These sites display a variety of bins, which help visitors determine what kind of system would be best suited to their community. The program encourages interested sites to expand and heighten their composting efforts. NYC Compost Project staff help community compost sites meet the exemplary composting standards needed to become a Demonstration Site.

4. COMMUNITY OUTREACH EFFORTS IN NYC SCHOOLS

The NYC Compost Project offers a range of workshops on indoor and outdoor composting that specifically service NYC schools. "Wormshops," held for teachers by Compost Project staff, showcase fun, hands-on ideas for teaching students about decomposition, the food chain, organic recycling, and other natural systems. During these sessions, teachers learn to set up and maintain a worm bin and can purchase one for their classroom.

Some borough Projects offer hands-on classes for first through eight grade students that focus on the importance of recycling and composting. These classes include informative handouts, interactive projects, and a live worm bin that demonstrates active composting. Schools are invited to visit the various Compost Demonstration Sites across the City.

Some NYC Compost Projects offer service-learning opportunities in which school groups can help community compost sites with a range of services such as chopping, mixing, and sifting. In turn, students learn techniques for managing their own outdoor compost sites in the future.

5. ONSITE COMPOSTING AT NYC SCHOOLS

Brooklyn

The NYC Compost Project has worked diligently to implement composting efforts at schools in each borough.

Matt Sheehan was a teacher at the Brooklyn New School when he took the Master Composter Certificate Course in March 2009. His project, called “Feed a Worm, Not a Landfill,” initiated the schools’ effort to vermicompost its food waste. He won a grant from Clorox’s Green Heroes program and used the money to build large outdoor worm bins to process the food waste generated by his school’s cafeteria.

The Brooklyn New School’s Green Team is staffed by third, fourth, and fifth grade students and monitors food waste drop-off bins in the cafeteria during lunchtime. The students help transfer the collected food scraps to the compost area at the school’s playground.

The “Feed a Worm, Not a Landfill” program has been successfully running for several years. The school uses its finished compost to fertilize its container garden.

The Bronx

Raymond Pultinas, a teacher at DeWitt Clinton High School in the Bronx, was accepted into the 2011 Master Composter Course for his interest in composting his school’s food prep waste. During the course, he created an indoor worm bin to divert food scraps collected by his students at home. The program expanded to also process the materials generated by his school’s vegetable garden.

Ray purchased a Garden Gourmet and received “What to Compost” sign from NYC Compost, designating the DeWitt Clinton High School Garden as a Bronx Community Compost Site. As the school’s garden developed, it outgrew the Garden Gourmet. The NYC Compost Project helped the school construct its very own 3-bin wood-and-wire compost system. As the DeWitt club continues to master community composting, they will be considered for a promotion to Demonstration Site status in the fall of 2012.



Queens

Maggie Ornstein, a Certified Master Composter from Queens, started a community compost site at the Garden School in Jackson Heights. She trained teachers and staff in all elements of the composting process and encouraged them to develop an outdoor system to manage the organic waste from the school’s vegetable garden. The school agreed to install two outdoor compost bins and one leaf bin in the garden area.

Maggie’s efforts were a success. Students work in the garden, learning how to compost its waste. Interested and trained teachers contribute their food waste to the

bins. Leaf bins accept fallen leaves scattered throughout the school's campus. Maggie regularly monitors the compost bins to ensure the system is functioning properly.

Manhattan

The NYC Compost Project in Manhattan has worked with PS 11 to establish both indoor and outdoor composting systems. After teachers and students were trained in the basics of outdoor composting, they placed a compost tumbler and a 2-bin composter in the student-run school garden. Students and teachers manage the bins, turning their food waste and garden trimmings into healthy, rich soil.

The NYC Compost Project in Manhattan also led "wormshops" that encouraged many classrooms to build their own worm bins. This allowed students to see, touch, and even smell the decomposition process.

PS 11 also works closely with the the NYC Compost Project in Manhattan to run a program in the fall that accepts neighborhood leaves and used Halloween pumpkins for composting.

Staten Island

The NYC Compost Project on Staten Island works directly with PS 57 to promote composting in and out of the classroom. Several classrooms have built and maintain active worm bins to process some of their own organic waste. The Project helps teachers develop innovative composting workshops. It also has plans to build a school garden on the public space across the street from the school.

6. NYC COMPOST PROJECT LOCAL ORGANICS RECOVERY PROGRAM SITES

The NYC Compost Project Local Organics Recovery Program (ORP) was launched early in the spring of 2012. It provides NYC residents with a wider range of food scrap drop-off opportunities for local composting. The program's three primary community partners are Western Queens Compost Initiative (WQC), Earth Matter NY (EM), and the New Amsterdam Market.

Local Organics Recovery Program personnel staffed 15 food scrap drop-off sites throughout the City, including Greenmarkets, libraries, public parks, community gardens, specialty food markets, and Community Supported Agriculture collection sites. In total, the program accepted approximately 82,240 pounds of food waste.

Western Queens Compost Initiative and Earth Matter NY processed the organic material at their sites in Queens and Manhattan, and on Governors Island. In FY12, 490 Volunteers assisted with turning, chopping, and sifting the food scraps. The program offered NYC residents yet another opportunity to get involved in composting.

7. NYC COMPOST PROJECT COMMUNITY SITES

The NYC Compost Project has worked hard to cultivate numerous community compost sites in various locations throughout the City. Each site is encouraged to begin by composting leaves and yard trimmings. By the end of FY12, the NYC Compost Project successfully guided 141 sites in composting leaves; of those sites, 39 accepted leaves from the general public. Serving as public drop-off sites, allowed community composting operations to heighten public awareness about the importance leaf composting, as well as secure a valuable source of browns for their operations.

As sites gain skills, momentum, and confidence, they are encouraged to begin composting food waste as well. Some sites with advanced systems accept food scraps from their local communities. At the end of FY12, there were 133 compost sites processing food scraps in NYC; 30 of these sites accepted food waste from the public. The sites diverted approximately of 629,271 pounds of food scraps from the larger NYC waste stream.

B. DEC Regulatory Reform for Community-Based Sites

The NYC Compost Project's efforts in each borough over the last two decades have inspired a community of New Yorkers to compost food scraps and yard waste locally.

However, there remain many challenges to composting in an urban environment like NYC, chief among them the limited amount of space and the close proximity to neighbors. NYSDEC's present composting allowances for small-scale community-based composting operations are not sufficient for wide scale composting in an urban environment like NYC. DSNY and NYSDEC are currently engaged in a dialogue to resolve this issue.

Chapter 6: Continuing to Study the Viability of Composting in NYC

MANDATE 6

Provide a plan to study the viability of instituting a food waste composting program for NYC's waste stream, to be completed within two years of the issuance of such report.

A. Greenmarket® Food Waste Drop-Off Program, April-June 2012

GrowNYC's Office of Recycling, Outreach, and Education (OROE) began a food scrap collection pilot program at selected Greenmarket® locations in March of 2011. The collection and composting portion was funded by a one-time grant provided by NYC Council Speaker Christine Quinn.

Based on the successes of previous drop-off programs, DSNY and GrowNYC's OROE developed a plan to extend collection sites to additional Greenmarket® locations. Starting on April 21, 2012, an additional 14 Greenmarket® locations were added to the program. In addition, two of the original 7 Greenmarket® locations were added to the DSNY-serviced route.

DSNY collected food scraps with 64-gallon two-wheeled carts. The empty carts are dropped off before Greenmarket® operations began and pre-loaded with wood chips that help absorb liquids and prevent odor. The vehicles then service their respective routes throughout the collection hours, picking up full containers and dropping off additional empty carts as needed. Collected materials are then weighed and transported to Staten Island for composting.

The expansion sites have seen consistent growth since the program began. Over the first 17 weeks of the program, the weight of food scraps collected has increased by almost 10% per week.

Chapter 7: Recommendations

A. Continued Support for the Greenmarket® Food Waste Drop-Off Program

DSNY will continue to support and grow the Greenmarket® food waste drop-off program thanks to the additional pounds of food scraps it has been able to divert for composting.

B. School Food Waste Pilot, 2012-

DSNY and the NYC Department of Education are exploring more opportunities to collect food waste from NYC public schools. DSNY will establish a distinct curbside collection route active during the school week. This program has the potential to divert tens of thousands of tons of organic waste from the landfill every year.

C. Residential Pilot on Staten Island

Starting in May of 2013, DSNY will offer a new collection service to approximately 3200 single-family residences in a portion of the Westerleigh neighborhood in Staten Island. Each home will receive a brown organics bin, a small kitchen container, and a sample supply of compostable liners.

Residents will be asked to separate their organic waste from other household trash and recyclables. DSNY will collect the organic material from these homes each week on the neighborhood's recycling day.

D. Recommendations Summary

DSNY will monitor each of these programs throughout their durations and evaluate the results. Participation, contamination rate, setout rate, capture rate, and various other factors will guide the development and evolution of a broader organics program.



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