

Abstract

WASTE MANAGEMENT SOLUTIONS FOR THE 21ST CENTURY: LESSONS LEARNED FROM AN INNOVATIVE AND COMPREHENSIVE REGIONAL SOLID WASTE MANAGEMENT SYSTEM IN THE UNITED STATES

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Topic: Regional & City Solutions for Waste Management

Introduction

Recently, there has been a growing emphasis throughout the world for environmentally friendly solid waste management practices and innovative financing mechanisms. In the United States, the current priorities in solid waste management – waste prevention and recycling – have spurred a movement to explore arrangements and methodologies that go beyond landfilling and other traditional forms of waste disposal. However, while pursuing these priorities, and facing challenging economic circumstances, local governments in the US are also tasked with reducing costs and providing more cost-effective services. A wide array of tools and approaches are available to local governments to maximize and improve solid waste collection and disposal services, reduce service costs and provide more efficient and cost-effective services to the public.

Description of Case Study

The Rockland County Solid Waste Management Authority, located 25 miles north of New York City in Rockland County, New York, is a regional solid waste management system providing comprehensive services to more than 300,000 users that has developed innovative service and financing mechanisms that can be a model to other communities around the globe. This case study will explore the Authority's extensive solid waste management system that incorporates traditional landfilling operations, while encouraging and incentivizing users to increase their recycling and waste reduction efforts. Comprised of three transfer stations, a materials recovery facility, a recyclables pre-processing facility, a hazardous household waste facility, a biosolids cocomposting facility, and a concrete and asphalt crushing facility, the Authority services every waste management need for its users. In addition, the Authority's innovative financing mechanisms which have combined user and ad valorem charges, flow control mechanisms, and revenue sharing principles have reduced its operation costs and created a financially sound system that exceeds the needs of its residents.

Conclusions and Findings

The presenter, Teno West, has worked intimately with the Authority as its special counsel since it was created in 1994, helping to implement the cutting edge policies and practices that have enabled the Authority to thrive even during the recent economic downturn. Based on his experience with the Authority, and representing solid waste entities throughout the US, Mr. West will provide a detailed analysis of the lessons learned from this comprehensive solid waste management system. The presenter will focus on both the operational and innovative financing mechanisms that have led to the Authority's success and provide useful solutions and suggestions to meet the solid waste management needs of any local government

Lessons Learned From An Innovative And Comprehensive Regional Solid Waste Management System In The United States

Recently, there has been a growing emphasis throughout the world for environmentally friendly solid waste management practices and innovative financing mechanisms. In the United States, the current priorities in solid waste management – waste prevention and recycling – have spurred a movement to explore arrangements and methodologies that go beyond landfilling and other traditional forms of waste disposal. However, while pursuing these priorities, and facing challenging economic circumstances, local governments in the US are also tasked with reducing costs and providing more cost-effective services. A wide array of tools and approaches are available to local governments to maximize and improve solid waste collection and disposal services, reduce service costs and provide more efficient and cost-effective services to the public.

The Rockland County Solid Waste Management Authority, located 25 miles north of New York City in Rockland County, New York, is a regional solid waste management system providing comprehensive services to more than 300,000 users that has developed innovative service and financing mechanisms that can be a model to other communities around the globe. The Authority executes an extensive solid waste management system that incorporates traditional landfilling operations, while encouraging and incentivizing users to increase their recycling and waste reduction efforts. Comprised of three transfer stations, a materials recovery facility, a recyclables pre-processing facility, a hazardous household waste facility, a biosolids cocomposting facility, and a concrete and asphalt crushing facility, the Authority services every waste management need for its users. In addition, the Authority's innovative financing mechanisms which have combined user and ad valorem charges, flow control mechanisms, and revenue sharing principles have reduced its operation costs and created a financially sound system that exceeds the needs of its residents.

The Authority is governed by a board consisting of 17 members, which board appoints the officers of the Authority generally from its membership. Eight members shall be members of the County legislature with five of the eight being appointed by the chairman of the County legislature and three being appointed by the minority leader of the County legislature. Five members are the elected supervisors of the five towns located within the County. Two members are appointed by the County Executive. Two members are mayors of villages within the County and shall be appointed by the County Legislature upon the recommendation of the Rockland County conference of mayors. The Chairman of the Authority is Christopher P. St. Lawrence, who is also currently the elected Supervisor of the Town of Ramapo.

In 1992, the New York State Department of Environmental Conservation (“NYSDEC”) approved the County's *Final Integrated Solid Waste Management Plan and Generic Environmental Impact Statement* (the “Plan”). Under the Plan, the County is responsible for developing several recycling facilities and a long-term plan for non-recyclable municipal solid waste. The Authority was created by the State Legislature in 1994 at the request of the County to implement certain provisions of the Plan and to develop the necessary solid waste management facilities. The Plan is currently being updated and continues to be implemented within the framework of the hierarchy required by State law. The goals of the Plan are to maximize waste reduction, recycling, and reuse. The Plan focuses on recovering recyclable paper, glass, metal and plastic containers; compostable materials; sewage sludge; construction and demolition debris and bulky wastes. The Plan does not provide for any changes in the existing

patterns of municipal responsibility for basic collection and disposal of municipal solid waste other than recyclables.

Currently each of the five towns and nineteen villages within the County has responsibility for municipal solid waste, as well as for recyclables, collection and disposal. Four villages provide for municipal collection and disposal services with their own employees. Except for the few villages which maintain their own municipal collection, such activities are generally undertaken by private haulers pursuant to contracts with the towns and villages. Through the late 1980's, most if not all municipal and commercial solid waste within the County was landfilled at in-County or nearby landfills. However, with the advent of the State's landfill closure law and regulations designed to protect drinking water sources, municipalities and commercial haulers began to put in place facilities and contracts to transfer and haul municipal solid waste to out-of-County disposal facilities. All of the municipal landfills within the County have since been closed.

The municipal solid waste generated in each of the towns and villages within the County is disposed of by transfer out-of-County through the Hillburn Transfer Station, the Bowline Transfer Station, and the Clarkstown Transfer Station.

Currently, all municipalities in the County are mandated by law to have provisions for collection and hauling or drop-off of various recyclable materials. Commingled recyclables are currently hauled by contracted private haulers under contracts with the towns and villages, or by employees of the five villages.

Additionally, The Authority has agreements for sludge processing with the Joint Regional Sewer District, the Rockland County Sewer District No.1, the Town of Stony Point, the Village of Suffern Wastewater Treatment Plant, and the Town of Highlands. The Authority also has a sludge management agreement with the United States Military Academy at West Point.

In 2008, the County of Rockland enacted County-wide flow control. County-wide flow control has and continues to increase the volume of solid waste managed by the Authority so that alternative waste processing technologies can be implemented in the County with the goal of reducing waste disposed in landfills. Under the Flow Control Act it is a violation for any hauler to take yard waste, solid waste, construction and demolition debris, scrap metals, and/or designated recyclables to any facility other than a publicly owned solid waste facility and/or any solid waste facility owned or operated by the Authority, and designated by the Authority for acceptance or disposal of such waste, including but not limited to transfer stations, materials recovery facilities, drop-off centers, and resource recovery facilities. The recycling provisions of the Flow Control Act will not apply to any commercial entity administering an Authority-approved recycling program. Further, the landscaper provisions of the Flow Control Act will not apply to any landscaper, tree service company or green waste recycler administering an Authority-approved green waste recycling program. Additionally, the Flow Control Act will not prohibit private non-commercial composting of yard waste or mulching of leaves, grass-clippings and cuttings.

The Authority has eight designated facilities:

ROCKLAND COUNTY FLOW CONTROL MAP

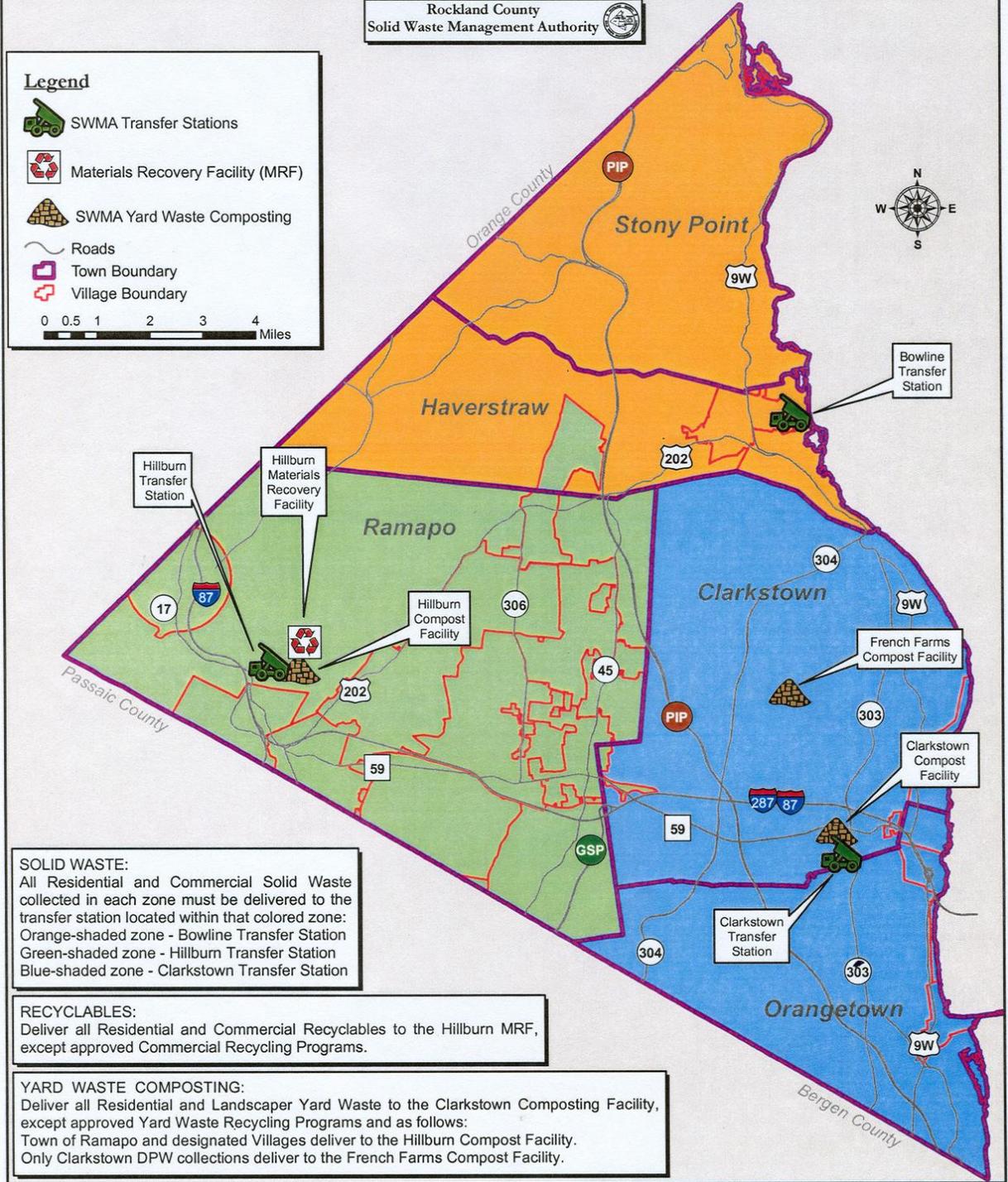
JANUARY 2009

Prepared in Accordance with Chapter 350 of the Laws of Rockland County

Rockland County
Solid Waste Management Authority

Legend

-  SWMA Transfer Stations
 -  Materials Recovery Facility (MRF)
 -  SWMA Yard Waste Composting
 -  Roads
 -  Town Boundary
 -  Village Boundary
- 0 0.5 1 2 3 4 Miles



SOLID WASTE:
All Residential and Commercial Solid Waste collected in each zone must be delivered to the transfer station located within that colored zone:
Orange-shaded zone - Bowline Transfer Station
Green-shaded zone - Hillburn Transfer Station
Blue-shaded zone - Clarkstown Transfer Station

RECYCLABLES:
Deliver all Residential and Commercial Recyclables to the Hillburn MRF, except approved Commercial Recycling Programs.

YARD WASTE COMPOSTING:
Deliver all Residential and Landscaper Yard Waste to the Clarkstown Composting Facility, except approved Yard Waste Recycling Programs and as follows:
Town of Ramapo and designated Villages deliver to the Hillburn Compost Facility.
Only Clarkstown DPW collections deliver to the French Farms Compost Facility.

Transfer Stations

Solid waste collected from residences, businesses, and government buildings are delivered to the transfer stations of the Authority by municipal and commercial haulers and private citizens. The waste is tipped onto the floors of the transfer stations, from where they are loaded into 80 – 100 cubic yard capacity transfer trailers. The trailers haul the waste to permitted disposal facilities located outside the County. All of the Authority's transfer stations are operated by a private contractor, while weigh scale operations for all Authority facilities are conducted by Authority staff. Prevailing Market Rates and the stabilization of incoming materials have allowed the Authority to set its tipping fee at \$76.00 per ton for all acceptable waste loads regardless of origin. Scrap metal is accepted at no charge. Car tires can be dropped off for \$2.00 each and truck tires for \$10.00 each. Truckloads of tires are accepted for \$200.00 per ton.

The Hillburn Transfer Station and its scale and scalehouse were purchased by the Authority from the Town of Ramapo on August 12, 1998 and have been operated by the Authority since that date. During 2000 – 2001, the Authority made improvements to the Hillburn Transfer Station, which increased its capacity and subdivided its physical layout in order to install the Recyclables Pre-Processing Facility. The Hillburn Transfer Station Part 360 Permit issued by the NYSDEC was renewed in March 2013 and expires on March 25, 2020. Under the Hillburn Transfer Station Permit, the Hillburn Transfer Station may receive 200,200 tons per year of municipal, commercial, and institutional solid waste (“municipal solid waste”), construction and demolition debris, and pre-processing recyclable materials.

Tonnages delivered vary from year to year due to a variety of factors, including competition and economic conditions. The quantity of solid waste from the Village of Haverstraw, Village of New Hempstead, Village of Slootsburg, Village of Spring Valley, and County Government agencies, which are contractually required to be delivered to the Hillburn, Haverstraw or Clarkstown Transfer Stations, total approximately 19,000 tons per year. The remaining solid waste is not under contract and has been delivered to the Hillburn, Haverstraw or Clarkstown Transfer Stations in response to the competitive tipping fees established by the Authority.

The Bowline Transfer Station began operations in 1988. The Bowline Transfer Station was acquired by the Authority from Bowline Realty Corp. on June 13, 2008, and serves the northern portion of the County. The tonnages (inbound) received in 2011 and 2012 were, respectively, 29,604 and 24,367. The primary sources of waste received at the Bowline Transfer Station are waste collected under municipal contracts and commercial wastes. The wastes collected under municipal contracts are the Town of Haverstraw, Town of Stony Point, the Village of Haverstraw and the Village of West Haverstraw. The contract specifications contained in collection agreements awarded to local haulers by these municipalities designate the Bowline Transfer Station as the disposal location for solid waste collected in their respective jurisdictions.

The Clarkstown Transfer Station was constructed by a private firm on behalf of the Town of Clarkstown and commenced operations in 1990. The Clarkstown Transfer Station has been operated by Clarkstown Recycling Center, Inc. from 1990 to the present date. In 2006, the Town of Clarkstown conducted a competitive procurement for a contract operator, and awarded the contract to Clarkstown Recycling Center, Inc. Shortly thereafter, the Town of Clarkstown began negotiations with the Authority for the

purchase of the transfer station and adjacent solid waste facilities, and pending the outcome of those negotiations, the Town of Clarkstown extended the term of the original agreement. The Town of Clarkstown and the Authority executed an agreement for the acquisition of the Clarkstown Transfer Station and adjacent solid waste facilities on November 13, 2008, and certain ancillary agreements, including an assignment of the facilities operations agreements, to the Authority. The Clarkstown Transfer Station accepts municipal solid waste and construction and demolition for processing. A NYSDEC Part 360 Permit has been issued to Clarkstown Recycling Center, Inc. to allow the Clarkstown Transfer Station to process 800 tons per day of municipal solid waste and construction and demolition debris. The permit (described below) also provides for the receipt and storage of no more than 1,000 tires in closed containers at the site and the handling of recyclables to include glass, wood, plastic, metal, paper, and cardboard. The current permit was issued in October 2005 and expired in October 2010 and provides for operation of the facility 5½ days per week at a weekly facility capacity of 4,400 tons and an annual facility capacity of 228,800 tons.

Yard Waste Facilities

The Hillburn Yard Waste Composting Facility is an approximately one acre composting site located on the closed Town of Ramapo Landfill. It was designed by the Authority and constructed in 2007. All operations occur outdoors. Deliveries are seasonal occurring primarily in the fall and secondarily in the spring. The Hillburn Yard Waste Composting Facility receives only leaves. Deliveries of grass and brush are not permitted. Leaves are received from municipal crews and private landscapers. The leaves are formed into windrows. The windrows are agitated periodically using a front-end loader. The composting process results in substantial volume reduction. Finished compost is provided at no charge to the municipalities that deliver leaves to the facility, or it is sold to landscapers.

The Hillburn Yard Waste Composting Facility began receiving leaves for composting in the fall of 2007. It is capable of handling approximately 1,300 tons per year. The Hillburn Yard Waste Composting Facility operates under a NYSDEC Registration. Unlike permits, registrations have no expiration date.

The Clarkstown Yard Waste Composting Facility is located adjacent to the Clarkstown Transfer Station. It occupies approximately eight acres, including a 5.5 acre asphalt pad on which yard waste composting operations are conducted. The Clarkstown Yard Waste Composting Facility began operating in its present location in 1997.

The Clarkstown Yard Waste Composting Facility receives approximately 55,000 tons per year of yard waste for composting. The yard waste received at the Clarkstown Yard Waste Composting Facility is comprised of approximately 64% leaves and grass and 36% percent brush. The NYSDEC permit for the facility allows for the processing of 110,000 cubic yards per year of leaves and grass and 120,000 cubic yards per year of brush and logs which equates to approximately 22,000 tons of leaves and grass and 30,000 tons of brush. The permit expires on March 9, 2014 and will be incorporated into the umbrella permit for the Clarkstown Solid Waste Facilities discussed above upon issuance of that permit. The Town of Clarkstown owns a second yard waste composting facility, for leaves only, at another location known as the French Farms site (“French Farms Site”). The French Farms Site receives approximately 12,000 tons per year of leaves. The permit for the French Farms Site allows 38,000 cubic yards of leaves per year (approximately 7,600 tons). The Town of Clarkstown permit expires on September 29, 2015. While the Authority did not acquire the French Farms Site, the Authority is licensed as the French Farms

Site operator by the Town of Clarkstown. All of the municipally-collected and much of the privately generated yard waste in the County is currently delivered to the Clarkstown Yard Waste Composting Facility, the French Farms Site and the Hillburn Yard Waste Composting Facility. Trees and tree parts may be retained by landscapers and tree service firms for processing at private sites and for sale in accordance with the Flow Control Act. Green waste recyclers that have a green waste recycling program in place and who apply and qualify for an exemption under the Flow Control Act may also retain certain types of yard waste for processing at their own yards.

The Material Recovery Facility

The Materials Recovery Facility processes commingled containers and commingled paper to produce marketable recovered materials. Commingled containers include green, amber and clear color glass containers/bottles, aluminum cans, tin and bi-metallic containers, plastic containers, aluminum foil/pie plates, milk cartons, and drink boxes. Commingled paper includes newspaper, corrugated containers, magazines, white and color ledger paper, computer printout paper, chipboard/boxboard, telephone and paperback books, junk mail, and kraft paper. The Materials Recovery Facility processes all of the residential commingled recyclables generated within the County, as well as certain recyclable materials originating outside the County, and delivered in accordance with a contract with the Authority. The Materials Recovery Facility has the capacity to process, on average, approximately 300 tons of commingled recyclables per day, in a single shift (76,960 tons per year). Operation of the facility on multiple shifts and weekends would proportionately increase the processing capacity.

The Materials Recovery Facility includes a tipping floor, processing area, maintenance area, spare parts storage, and an administration wing. It contains two (2) processing lines, one (1) each for commingled paper and commingled containers. The Materials Recovery Facility was originally equipped with one (1) baler that was used for all compactable paper and container recyclables. Improvements carried out in 2005 upgraded the containers sorting system, and added a glass crushing system and a second baler. These improvements increased the daily processing capacity of the Materials Recovery Facility to the levels stated above.

Biosolids Cocomposting Facility

The Biosolids Cocomposting Facility began operations in June 1999 and has the capability to compost the dewatered biosolids (sludge) generated by all of the municipal wastewater treatment plants within the County, as well as certain municipal wastewater treatment plants located outside the County. The quantities of biosolids processed have ranged from 17,500 to 26,415 tons per year.

The Biosolids Cocomposting Facility's operations have been successful in processing the biosolids, and converting them to compost on an uninterrupted basis since the initiation of operations. All compost produced has been sold. The Biosolids Cocomposting Facility utilizes an aerated, agitated bin technology to compost the biosolids. Prior to composting, biosolids delivered from wastewater treatment plants are mixed with clean wood in order to attain the prescribed moisture content, density, and carbon to nitrogen ratio necessary for the production of compost by the system. All receiving, mixing, agitation, and curing operations are enclosed. Odors generated within the composting building are ducted to an odor control system that employs scrubbers and a biofilter to prevent objectionable odors from leaving the site.

The Cocomposting facility accepts clean unprocessed wood waste for \$25.00 per ton and wood pallets for \$10.00 per ton. Clean chipped wood is accepted for no charge.

Clarkstown Concrete Crushing Facility

The Concrete Crushing Facility began operations in 1997. It accepts and stockpiles incoming loads of uncontaminated broken concrete and asphalt, produces finished, screened recycled concrete aggregate and recycled asphalt product from the materials delivered, stores product prior to shipment to markets, and loads vehicles for shipment of product to markets. The recycled concrete aggregate is generally used as a substitute for gravel in road sub-base, structural fill, and walkways. The recycled asphalt is generally used for patching roads. The Concrete Crushing Facility is located in the Town of Clarkstown, adjacent to the Clarkstown Yard Waste Composting Facility. The Concrete Crushing Facility site encompasses approximately 2.8 acres.

The Concrete Crushing Facility site includes two parcels. The main parcel is the location of the stockpiles of delivered Acceptable Materials and the crusher. The second parcel is the location of the screen and product stockpiles, which are loaded into trucks for shipment to markets. All vehicles delivering concrete and asphalt will be weighed at the scale upon arrival and after unloading in order to determine the net weight of materials delivered.

NYSDEC has issued a Facility Registration, dated June 9, 2009, for the operation of the Concrete Crushing Facility that limits acceptance of concrete and asphalt to no more than 17,000 tons per year. The annual tonnage of concrete and asphalt received at the Facility has ranged from a low of 38,709 to a high of 67,283 tons during the 2003 to 2006 period, according to annual reports filed by the Town of Clarkstown with NYSDEC. In 2012, 30,000 tons of materials were received at the facility. The Facility Registration also covers the Authority's wood mulching operation for processing of 20,000 tons per year, as well as the Authority's recyclables transfer area for processing up to 12,500 tons per year. The Authority has requested an increase in the capacity of the Concrete Crushing Facility up to 100,000 tons per year under the umbrella permit application described earlier.

Recyclables Pre-Processing Facility

The Authority's improvements to the Hillburn Transfer Station, which increased the efficiency of its waste transfer operations, also included the subdivision of the Hillburn Transfer Station structure to allow for the installation of the Recyclables Pre-Processing Facility processing system. The Recyclables Pre-Processing Facility has the capacity to pre-process certain residential recyclables, dry commercial wastes, mixed bulky wastes, and construction and demolition wastes for recycling.

Revenues:

The Authority's ratepayers are assessed annual charges as follows:

- Capital Charge – assessed on all properties on ad valorem basis.
- Unit Charges
 - Green Waste Unit Charge - \$25.75

- Household Hazardous Waste Unit Charge - \$6.25
 - Transfer Station Facility Unit Charge - \$12.30
 - Materials Recovery Facility Unit Charge - \$11.80
 - Cocomposting Facility Unit Charge - \$14.45
 - Total Unit Charges - \$70.55
- Garbage, Bulky Items and Recyclables Collection and Disposal Charge

In addition to the fees collected, the Authority has implemented an innovative revenue sharing system with several of the operators of its designated facilities where the Authority and the private operator share the profits made from after-market sales of processed materials. For example, at the Authority's Concrete and Asphalt Crushing Facility, the Authority pays the private operator a per-ton fee for the accepting and processing of the materials. Then, the private operator markets the crushed concrete, asphalt, and metals and the Authority and the operator split those revenues 60/40 in the Authority's favor.

In conclusion, The Rockland County Solid Waste Management Authority is a wonderful example of the types of innovative solid waste management systems that significantly reduce landfilling and other environmental impacts, while also providing a sustainable financial model at a reasonable rate for its users.