CHAPTER THREE

Future Forecast

Responsibility to Provide for Disposal/Processing

In the years immediately prior to and following the enactment of the Municipal Waste Planning, Recycling, and Waste Reduction Act (Act 101 of 1988), market conditions in the waste industry were in a state of transition and uncertainty. A sense of crisis prevailed throughout the environmental and regulatory community. The ever increasing municipal waste stream provoked fears that waste generation would exceed the available disposal outlets. During this period, more stringent federal and state landfill regulations were introduced. The impact of the regulations heightened the concerns for diminishing disposal capacity. Small private and municipal facilities found the costs of permitting, engineering design and construction as well as bonding for post closure care to be prohibitive. Many of these landfills closed. Some sold to larger conglomerates intent on internalizing the disposal of waste, which was collected by their hauling divisions. Others, like York County replaced their former method of land disposal with a waste-to-energy solution.

Act 101 specifies that securing long-term disposal capacity is the top priority for Pennsylvania counties during the development of a municipal solid waste management plan. Act 101 also places mandates for recycling on the municipalities in order to decrease the capacity demand by diverting waste material from disposal. This chapter projects York County's generation and disposal requirements for the next twenty-five years. It considers current and historic trends to determine future needs. The capabilities of the York County Resource Recovery Center were reviewed to determine what portion of the County's processible municipal waste the Center could continue to manage, with or without modifications. Factors, which could influence the availability of landfill capacity for non-processible wastes, and alternative methods of disposal and processing are considered. Finally, evidence is offered to demonstrate that York County has made responsible decisions and has taken proper actions to secure access to sufficient disposal capacity throughout the planning period.

Forecasting Capacity Requirements

A variety of indicators were examined to plan for the disposal capacity needs of York County. To plan for future needs, it is important to review and understand trends in current local reported disposal and recovery activities. Because waste is typically measured on a per capita basis, it is vital to know if growth or decline is anticipated in local population. This section describes the sources of data used to calculate York County's capacity needs. It also illustrates the disposal requirements for the next 25 years.

Reported Disposal Quantities

Data from the 2010 PADEP facility reports, prior to any adjustments that might have been made by PADEP, was used to determine disposal needs. 2010 is used as the baseline year for analysis and comparisons throughout the Plan. The County disposed of 294,506 tons of MSW and 54,744 tons of construction & demolition waste. In addition, 3,863 tons of sewage sludge and 13 tons of ash residue were also landfilled. In total York County disposed 353,126 tons of all types of municipal waste in Pennsylvania facilities. There are no reports of out-of-state disposal activity. Conspicuously absent from the reported municipal solid waste disposal data are the large quantities of ash resulting from the operation of the Resource Recovery Center. Because this material is sent directly to a processor that recovers valuable metals from the ash, it is not considered a "waste" at the point of generation (the Center.) However, once the metals have been removed, the residual ash is sent to a landfill to be beneficially used as an alternative daily cover. It is therefore counted within the tons of residual waste disposed from York County.

Future Waste Generation Rate

The United States Environmental Protection Agency (USEPA) tracks and monitors municipal solid waste generation and disposal in the United States. Trends and changes have been recorded since 1960. The most recent figures indicate that the waste generation rate per capita has leveled with little variation. For York County, the generation rate in 2010 for all types of municipal solid waste, including construction & demolition, sewage sludges, and ash residue was determined to be 1.02 tons per capita per year. A review of historic disposal trends in York County presented in Chapter 2 showed that local results mirror the national trends. Therefore, the projections for York County assume that per capita generation rates will remain constant throughout the duration of the planning period.

Population

The US Census Bureau conducted a national census in 2010. This was the most recent available census data published at the time the Plan was being developed. The Pennsylvania State Data Center at the Pennsylvania State University provides historical and current demographic information on counties and municipalities throughout the Commonwealth of Pennsylvania, much of it gathered from local sources. The York County Planning Commission (YCPC) makes long-term population projections, which it adjusts periodically when more current data becomes available during the projected period. YCPC recently adjusted its long range projections for the County, based on the results of the US Census. The Plan bases its population assumptions on the YCPC projections.

Disposal Capacity Needs

Table 3-1 presents actual and projected disposal capacity requirements for the years 2010 through 2035. The tons generated, recycled and disposed are based on actual reported data for 2010 the baseline year for the Plan. The future figures are based on a constant per capita generation and recovery rate with adjustments due to projected population changes. These projections are for all types of municipal waste generated in York County.

Table 3-1 York County Projected Disposal Capacity Requirements Tons Per Year

	Population	Generated	Recycled	Disposed
Actual 2010	434,972	444,126	91,000	353,126
Projected				
2011	437,917	447,133	91,616	355,517
2012	440,862	450,140	92,232	357,908
2013	443,807	453,147	92,848	360,299
2014	446,752	456,154	93,464	362,689
2015	449,697	459,161	94,081	365,080
2016	452,642	462,168	94,697	367,471
2017	455,587	465,175	95,313	369,862
2018	458,532	468,182	95,929	372,253
2019	461,477	471,189	96,545	374,644
2020	464,424	474,198	97,162	377,036
2021	468,477	478,336	98,010	380,327
2022	472,531	482,475	98,858	383,618
2023	476,584	486,614	99,706	386,908
2024	480,638	490,753	100,554	390,199
2025	484,744	494,945	101,413	393,533
2026	488,744	499,030	102,250	396,780
2027	492,798	503,169	103,098	400,071
2028	496,851	507,307	103,946	403,362
2029	500,905	511,447	104,794	406,653
2030	504,958	515,585	105,642	409,943
2031	508,696	519,402	106,424	412,978
2032	512,434	523,218	107,206	416,012
2033	516,173	527,036	107,988	419,048
2034	519,911	530,853	108,770	422,083
2035	523,649	534,669	109,552	425,117

Table 3-2 Resource Recovery Center Projected Processing Capacity

Year	County Population (a)	York County Tons Per Capita Received (b)	York County Tons Received (c)	Contractual Obligations for Out of County Tons (d)	Total Tons to RRC YCSWA Obligated to Accept (e)	RRC Anticipated Capacity (f)	RRC Actual Processing	RRC Annual Anticipated Capacity Filled by YC Tons in %	Remaining Capacity in Tons	RRC Annual Anticipated Capacity Filled by All YCSWA Obligated Tons in %	Remaining Capacity in Tons
2008	422,880	0.742	313,656	17,522	331,178		432,990	72.4	119,334	76.5	101,812
2009	428,926	0.690	296,072	17,383	313,465		433,802	68.3	137,730	72.3	120,337
2010	434,972	0.684	297,696	16,909	314,605		413,988	71.9	116,292	73.9	99,383
2011	437,917	0.727	318,214	17,717	335,931		435,281	73.1	117,067	77.0	99,350
2012	440,862	0.701	308,855	16,817	325,672		441,344	70.0	132,489	76.4	100,328
2013	443,807	0.704	312,440	17,148	329,588	430,204		72.6	117,764	76.6	100,616
2014	446,752	0.704	314,513	17,148	331,661	430,204		73.1	115,691	77.1	98,543
2015	449,697	0.704	316,587	17,148	333,735	430,204		73.6	113,617	77.6	96,469
2016	452,642	0.704	318,660	17,148	335,808	430,204		74.1	111,544	78.1	94,396
2017	455,587	0.704	320,733	0	320,733	430,204		74.6	109,471	74.6	109,471
2018	458,532	0.704	322,807	0	322,807	430,204		75.0	107,397	75.0	107,397
2019	461,477	0.704	324,880	0	324,880	430,204		75.5	105,324	75.5	105,324
2020	464,424	0.704	326,954	0	326,954	430,204		76.0	103,250	76.0	103,250
2021	468,477	0.704	329,808	0	329,808	430,204		76.7	100,396	76.7	100,396
2022	472,531	0.704	332,662	0	332,662	430,204		77.3	97,542	77.3	97,542
2023	476,584	0.704	335,515	0	335,515	430,204		78.0	94,689	78.0	94,689
2024	480,638	0.704	338,369	0	338,369	430,204		78.7	91,835	78.7	91,835
2025	484,744	0.704	341,260	0	341,260	430,204		79.3	88,944	79.3	88,944
2026	488,744	0.704	344,076	0	344,076	430,204		80.0	86,128	80.0	86,128
2027	492,798	0.704	346,930	0	346,930	430,204		80.6	83,274	80.6	83,274
2028	496,851	0.704	349,783	0	349,783	430,204		81.3	80,421	81.3	80,421
2029	500,905	0.704	352,637	0	352,637	430,204		82.0	77,567	82.0	77,567
2030	504,958	0.704	355,490	0	355,490	430,204		82.6	74,714	82.6	74,714
2031	508,696	0.704	358,122	0	358,122	430,204		83.2	72,082	83.2	72,082
2032	512,434	0.704	360,754	0	360,754	430,204		83.9	69,450	83.9	69,450
2033	516,173	0.704	363,386	0	363,386	430,204		84.5	66,818	84.5	66,818
2034	519,911	0.704	366,017	0	366,017	430,204		85.1	64,187	85.1	64,187
2035	523,649	0.704	368,649	0	368,649	430,204		85.7	61,555	85.7	61,555

(a) 2010 Census for 2010 population. Used YCPC projections for 2011 - 2035

(b) 0.704 tons is the average of '10, '11 & '12 tons per capita to the RRC and includes residual waste

(c) PC scale data used for '08 - '12 (YC tons - unburns)

(d) Waste delivered from Swatara Township, Highspire Borough & McSherrystown Borough. These three municipalities have contracts directly with the Authority.

(e) Column 6 = Column 4 + Column 5

(e) Column 6 = Column 4 + Column 5

(f) 430,204 is the avg. of '10, '11 and '12 processing

Seasonal waste generation: During seasonal fluctations when higher-than-average waste deliveries occur, the RRC may experience periods of "seasonal capacity exceedance".

These seasonal peaks can occur for a period of a week(s) or even months. During these seasonal exceedance periods, additional measures must be taken to manage this waste

Source YCSWA

Flow Control Measures and Capacity Assurances

The decision to finance and construct the York County Resource Recovery Center was made to address the needs for long term management capacity for York County and to reduce the reliance on landfill disposal. An important added value was the ability of the facility to generate electricity, thus reducing the County's reliance on fossil fuels. The project was supported by a commitment from the municipalities to utilize the services of the Center for the disposal/processing of municipal waste generated within their political jurisdictions. To ensure that the facility operates at maximum efficiencies, York County enforces a flow control ordinance monitored by the Authority. The Center both historically and currently manages an average of 97% of the County's municipal waste. It also handles some of the residual waste. The Center serves as a disposal/processing option for surrounding counties as well.

Table 3-2 shows the Center's recent processing activity and commitments. It compares the current tons processed to its operational capabilities. Utilizing the current data and assuming that York County will follow current local and national trends, a constant rate of tons per capita received is assumed to project future needs. The population projections are based on YCPC information.

Composition and Combustion

Table 3-1 and 3-2 show raw tonnages of municipal solid waste that must be managed by the County. What neither table shows are how the components of the waste stream affect the amount of material suitable for processing and in turn energy recovery, both of which are crucial in the operation of the Center. Since significant quantities of municipal solid waste generated in York County are discarded and combusted for energy recovery, it is of interest to note what the changes in waste quantities and composition have had on the energy value.

As discussed in previous chapters, the rate of municipal solid waste generation for the last decade has been influenced by changes in material usage, packaging, and economic conditions, among other factors. With increasing recovery, the quantity of municipal solid waste disposed per capita has also been affected. Paper, which is highly combustible, remains as the largest category of material in municipal solid waste generated. However, due to recycling, the quantity of paper discarded has been declining since about 1990. Recently, plastic and food scraps have surpassed paper as the principal components in discarded municipal solid waste.

Table 3-3 presents a breakdown of the contribution of various components in municipal solid waste to the total net heat content of the material. As the relative proportions have changed since 1960, the net heat content has increased, particularly as the percentage of plastic has increased. However, recently net heat

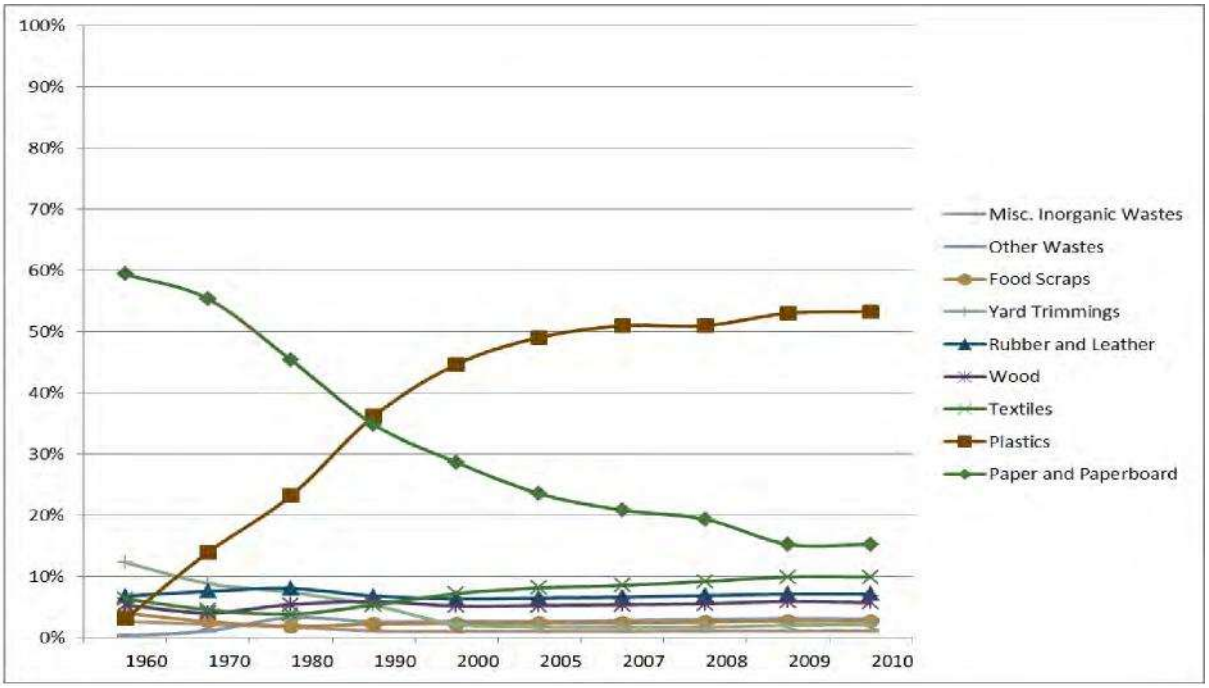
content has remained relatively constant, particularly over the past five years. Other studies have shown a similar growth in gross heat content of MSW up to and tapering off at 2005. Figure 3-1 offers a graphic representation of these changes and Figure 3-2 illustrates the changes in BTU values.

Table 3- 3 Percent of Total BTU Value in Various Component Materials of Discarded MSW in the USA

Materials \ years	1960	1970	1980	1990	2000	2005	2007	2008	2009	2010
Paper/Paperboard	59.36%	55.32%	45.33%	34.79%	28.60%	23.49%	20.78%	19.32%	15.23%	15.25%
Plastics	3.02%	13.91%	23.14%	36.14%	44.63%	49.01%	50.92%	50.95%	52.96%	53.22%
Rubber & Leather	6.79%	7.56%	8.02%	6.78%	6.33%	6.47%	6.60%	6.86%	7.11%	7.11%
Textiles	6.33%	4.53%	3.84%	5.30%	7.19%	8.11%	8.50%	9.15%	9.88%	9.87%
Wood	5.31%	4.04%	5.39%	5.89%	5.13%	5.23%	5.33%	5.53%	5.88%	5.70%
Food Scraps	4.01%	2.60%	1.87%	2.18%	2.29%	2.37%	2.40%	2.52%	2.71%	2.66%
Yard Trimmings	12.28%	8.81%	7.40%	5.26%	2.17%	1.72%	1.65%	1.67%	2.01%	2.09%
Misc. Inorganics	2.63%	2.16%	1.73%	1.07%	1.00%	1.01%	1.02%	1.06%	1.11%	1.10%
Other Wastes	0.26%	1.07%	3.27%	2.58%	2.67%	2.61%	2.80%	2.93%	3.11%	2.99%
Total %	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Net Heating Value BTU per lb.	2211	2610	3036	3748	4407	4600	4678	4640	4600	4623

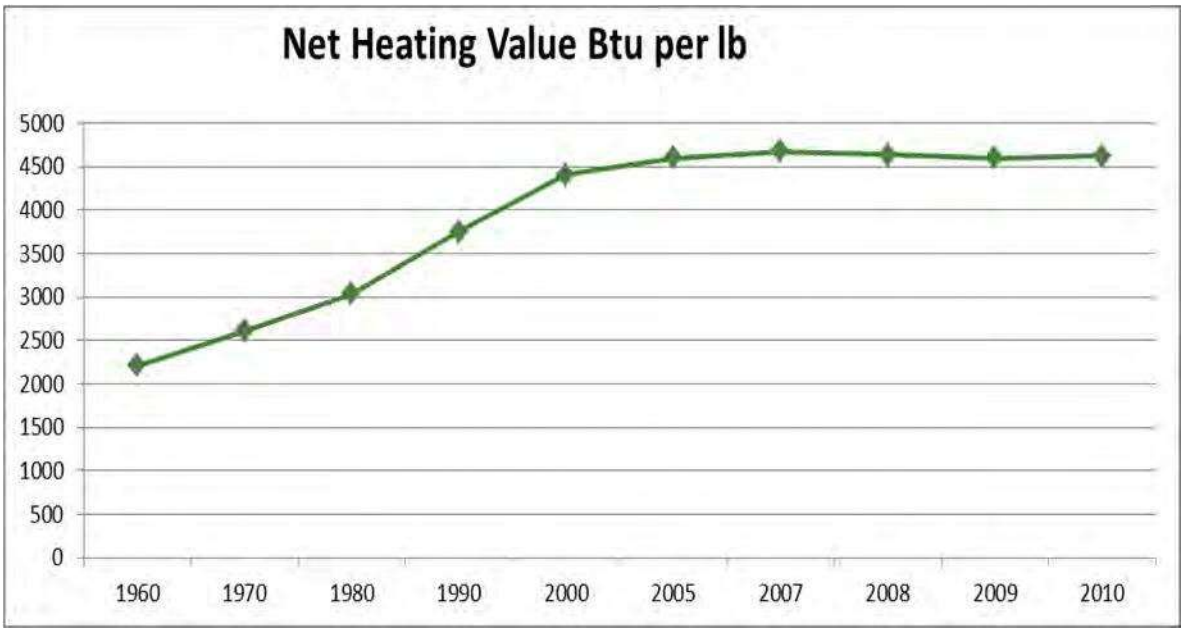
Sources: USEPA . Municipal Solid Waste in The United States: 2010 Facts and Figures and Methodology for Allocating Municipal Solid Waste to Biogenic and Non-biogenic Energy, Energy Information Administration, May 2007 USEPA. Municipal Solid Waste in The United States: 2010 Facts and Figures

Figure 3-1 Materials in MSW Disposed in the USA Contributing to Total BTU Value



Sources: USEPA . Municipal Solid Waste in The United States: 2010 Facts and Figures and Methodology for Allocating Municipal Solid Waste to Biogenic and Non-biogenic Energy, Energy Information Administration, May 2007

Figure 3-2 Changes in the Net Heating Value of Municipal Waste in the USA 1960-2010



Sufficient Local Capacity for Processible Waste

Clearly, the York County Resource Recovery Center has provided sufficient capacity to fulfill the Authority's commitment to manage York County processible waste during the last twenty-five years. Based on the projections, it is safe to assume that if current operating conditions prevail and with the necessary facility upgrades and enhancements, the Center can continue to meet the County's needs for the next twenty-five years as well. Therefore, the York County Resource Recovery Center will remain as the designated facility to manage the County's processible municipal solid waste during this planning period.

As in the past, flow control mechanisms will be necessary to protect this public investment and provide for a consistent volume of material to maximize production. The Center has excess capacity, which will allow it to accept York County residual waste and materials from the surrounding area to control costs.

During the planning period, the continuing evolution of municipal solid waste composition will play an important role. To assure that the Center is operating optimally, the mix of available municipal solid waste materials and their potential for energy recovery must be closely monitored and scrutinized. Periodic

assessments and studies may be necessary to determine if certain wastes currently not delivered to the Center should in fact be delivered or directed there. These could include materials once considered non-processible and/or categories of materials with a certain portion of processible components. Additionally, new technologies and methods of energy recovery could be studied to determine if specific parts of the waste stream, not previously viewed as conducive to combustion could be successfully processed at the Center.

Capacity for Non-processible Waste

A certain portion of the municipal solid waste stream is not suitable for combustion. This non-processible waste must be handled at facilities other than the York County Resource Recovery Center (YCRRC). In addition, there are times when the Center may be unable to handle the volume of waste generated due to catastrophic events, temporary shutdowns, or other circumstances. This waste must by-pass the Center and be disposed elsewhere. Therefore, York County must also provide disposal capacity for these quantities of waste.

Due to the expiration of the Authority's Agreement of Extension and Amendment with Republic Services at the end of 2025 for the use of Modern Landfill, the Authority initiated a Request for Proposals (RFP) in December 2024 for Municipal Solid Waste Disposal and Processing Capacity for the period 2026-2039. In the RFP the Authority sought capacity from disposal facilities for the following four waste streams:

- MSW - primarily both non-processible waste and bypass waste (Note: A high percentage of these tons will continue to be processed at the YCRRC.)
- Ash Residue from the YCRRC
- Construction and Demolition Waste
- Sewage Sludge

Due to the RFP process not resulting in enough capacity assurance for York County generated materials, the Authority contacted numerous facilities who didn't respond to the RFP to gauge their interest in providing disposal capacity for York County generated wastes. These discussions have resulted in additional facilities providing capacity.

In combination, the following facilities provided York County with sufficient disposal capacity for **MSW (primarily both non-processible waste and bypass waste):**

- Commonwealth Environmental Systems Landfill
- J.P. Mascaro Pioneer Crossing Landfill
- Waste Connections Blue Ridge Landfill
- WM Cumberland County Landfill
- WM Fairless Hills Landfill
- WM Mountainview Reclamation Land

In combination, the following facilities provided York County with sufficient disposal capacity for **ash residue from the YCRRC:**

- J.P. Mascaro Pioneer Crossing Landfill
- Waste Connections Blue Ridge Landfill
- WM Cumberland County Landfill
- WM Grand Central Lan
- WM Mountainview Reclamation Landfill

In combination, the following facilities provided York County with sufficient disposal capacity for **construction and demolition waste:**

- Commonwealth Environmental Systems Landfill
- Waste Connections Blue Ridge Landfill
- WM Cumberland County Landfill
- WM Fairless Hills Landfill
- WM Mountainview Reclamation Landfill

In combination, the following facilities provided York County with sufficient disposal capacity for **sewage sludge:**

- Commonwealth Environmental Systems Landfill
- Waste Connections Blue Ridge Landfill
- WM Cumberland County Landfill
- WM Fairless Hills Landfill
- WM Mountainview Reclamation Landfill

All the facilities mentioned in this sub-chapter are included in this York County Plan. Agreements between YCSWA and the facilities are considered implementing documents to the Plan.

Disposal Outlets for Other Types of Municipal Waste

Included in the definition of processible and non-processible wastes used to determine York County's disposal capacity needs are certain other subcategories of the municipal solid waste stream. These include construction & demolition waste and sewage sludge. Because of the manner in which they are managed, other subcategories, such as biosolids and regulated medical waste, were not included in the overall capacity projections, but were demonstrated separately.

None of these subcategory wastes are currently flow controlled to a specific Authority owned or contracted facility. Rather the County's ordinance and the Authority's rules, regulations and standards allow these waste streams to be managed at any in or out-of-state facility permitted to accept them.

The Authority tracks and monitors all of these wastes through its reporting program. Therefore how much and where each type of waste is disposed is known. In addition, the Authority is actively engaged in the oversight of biosolids, through a multi-agency agreement with PADEP and the York County Conservation District. Based on these measures and controls, the Authority has determined that adequate disposal options are available for these sub-sets of municipal solid waste. Consequently, the Authority will not currently pursue additional capacity assurances for any of the waste streams, nor is it expected that the Authority will need to secure disposal/processing capacity for these materials in the future.

Ash Management

An inevitable result of a combustion-oriented waste-to-energy operation is ash residue. Although the combustion process itself does reduce the volume of municipal solid waste, the resulting quantities of ash, if sent to a landfill for disposal, could still impact the airspace available for other waste.

Since the inception of the Resource Recovery Center, the York County Solid Waste and Refuse Authority identified the need to control the costs and effects of ash management. A study was conducted that explored a variety of options that were available or could be made available to manage this material. The study included a request for proposals for handling and processing methods for the ash. High on the list of selection criteria was the ability to recover valuable materials remaining in the residue. The opportunity to utilize the ash for some beneficial use was also an important criterion. The design and implementation of the recommendations of the study supported the Authority's goals and objectives to minimize the impact of ash residue.

Each year approximately 180,000 tons of ash result from the operation of the YCRRC. At the point of generation, the ash is considered a special handling municipal solid waste. The Authority delivers ash residue from the YCRRC to the Ash Recycling and Processing Facility located within the permitted area of the YCRRC for the removal and recovery of reusable materials through a wet separation process. Approximately 18,000 tons of metal are recovered from the ash and recycled annually. In addition, aggregates (stone, brick, concrete, porcelain, ceramics, etc.) and sand (fine aggregates) are removed and beneficially used in construction projects pursuant to Municipal Waste General Permit No. WMGM061SC001B. The remainder of the ash residue, totaling approximately 103,000 tons per year, is sent to an approved landfill for disposal.

Conclusions

Since 1971, YCSWA has accepted the responsibility to manage the municipal solid waste generated within its jurisdiction at a publicly owned disposal/processing facility. The decision for the York County Solid Waste and Refuse Authority to develop the Resource Recovery Center elevated the benefits of local ownership to include the production of energy and to capture the economic benefits of processing out-of-county waste to stabilize the long-term cost of managing York County's waste.

The facility was constructed with the capacity to process York County's municipal solid waste for at least twenty–five years and with the potential for modifications to handle these materials for an extended lifetime. Chapter 6 provides greater details of the operating potential and planned upgrades to the Center. Contingencies were established to handle bypass and non-processible wastes. Current and anticipated conditions confirm the ability of the Center's capacity to fulfill the needs of the County.

Agreements with the following facilities provide York County with sufficient disposal capacity for MSW (primarily both non-processible waste and bypass waste), construction and demolition waste, and sewage sludge expected to be generated in York County through 2039, as well as YCRRC ash residue anticipated for landfill disposal through 2033:

- Commonwealth Environmental Systems Landfill
- J.P. Mascaro Pioneer Crossing Landfill
- Waste Connections Blue Ridge Landfill
- WM Cumberland County Landfill
- WM Fairless Hills Landfill
- WM Grand Central Landfill
- WM Mountainview Reclamation Landfill

From time to time this list may be updated as YCSWA enters contracts with additional disposal facilities to gain or extend disposal capacity and/or to improve system economics on behalf of York County ratepayers.

At least three years prior to the end of 2033, YCSWA will commence measures necessary to confirm adequate ash disposal capacity is available to support ongoing operations of the YCRRC. A status report on YCSWA's efforts to secure necessary ash disposal capacity will be provided to the Department at that time. As capacity is secured at additional facilities YCSWA will send any new contracts to the Department as implementing documents to the Plan.