August 7, 2006

Mr. Justin Miller
Recycling Coordinator
Cumberland County Solid Waste Authority
1 Courthouse Square
Carlisle, PA 17013

Subject**:** **SWANA Technical Assistance Project**

Dear Justin:

This letter report summarizes R. W. Beck's evaluation of a shared yard waste compost system for Cumberland County and five of its municipalities. The objective of the evaluation was to investigate the feasibility of implementing a regional composting program for yard waste that could economically serve the needs of residents in Carlisle Borough, North Middleton Township, South Middleton Township, Dickinson Township and Middlesex Township. This approach is appealing to the County because they envision that a regional yard waste facility could eventually serve as the primary yard waste processing site for the entire County, although municipalities would still have the option of developing their own sites and using the County's yard waste processing equipment on loan.

This evaluation was performed as part of the Recycling Technical Assistance program sponsored by the Pennsylvania Department of Environmental Protection (DEP) and the Solid Waste Association of North America (SWANA).

The report is divided into the following sections:

- Executive Summary
- Background on Cumberland County's current recycling and organics management infrastructure;
- Identification and discussion of permitting implications for compost facilities in Pennsylvania;
- Presentation of planning-level design and cost estimates;
- Identification of possible facility ownership, management, operations and funding strategies;
- Estimation of annual operating and capital costs; and
- Recommendations.

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Executive Summary

Cumberland County comprises 33 municipalities, including 12 Act-101 mandated recycling communities. Cumberland County's solid waste management system is overseen by the Solid Waste Authority of Cumberland County (SWACC), a fully chartered Authority under the Pennsylvania Municipal Authorities Act.

Approximately half of Cumberland County municipalities provide some level of yard waste processing for their residents, although the degree of complexity and level of service offered is diverse. The SWACC administers a yard waste equipment loan program that provides all municipalities an opportunity to utilize a range of equipment at a reasonable cost. The mandated municipalities of Carlisle Borough, North Middleton Township and South Middleton Township, along with the non-mandated municipalities of Middlesex Township and Dickinson Township, agreed to participate with the SWACC in a technical evaluation of a shared yard waste processing facility, to serve their residents as well as potentially other under-served communities in Cumberland County.

This evaluation considered the amount of yard waste available in these communities for processing and developed planning-level site design and cost estimates based on these volumes. Options for site and facility ownership and management, along with the possibility of co-locating the yard waste site with a recycling drop-off site, were presented. The permitting implications of a shared site and DEP's Yard Waste Compost Guidelines were reviewed. A cost estimate, including possible DEP grant funding, was developed. Based on an evaluation of these factors, the following recommendations were provided to the County:

- Plan for a regional yard waste facility that could initially manage the yard waste processing needs of the five participants in this study, and would also have the capacity to grow and accept additional materials from the initial communities and/or from other communities over time.
- Identify municipal partners willing to participate by helping to develop the site (including cost sharing), contributing yard waste materials, and assisting with site management.
- Develop an equipment usage plan for the facility.
- Identify preferred funding and cost-sharing strategies.
- Develop an operations plan, to include responsibility for staffing and associated tasks on-site.
- Consider establishing a fair price for compost and mulch products produced at the regional site in order to help defray operating costs.

Current Recycling and Yard Waste Infrastructure in Cumberland County

General Information

Cumberland County is located in the Cumberland Valley, stretching for 42 miles from the Borough of Shippensburg on the west to the banks of the Susquehanna River on the east. Three major highways converge in Cumberland County -- the Pennsylvania Turnpike (I-76), I-83, and I-81. Cumberland County is located in close proximity to Harrisburg, Hershey, Gettysburg and Lancaster, and two hours from Philadelphia, Washington and Baltimore.

According to the 2000 U.S. Census, the county's 11 boroughs and 22 townships are home to 213,674 people, making Cumberland County the 16th most populous county in Pennsylvania. The County's economy is based on service provision -- in 2001, 38 percent of all businesses in the County qualified as service industries. The County's unemployment rate consistently falls below 4 percent.

Cumberland County Recycling System

General Background

Cumberland County's solid waste management system is overseen by the Solid Waste Authority of Cumberland County (SWACC). SWACC is a fully chartered Authority under the Pennsylvania Municipal Authorities Act. As such, it may own land and develop solid waste facilities; currently, however, it functions mostly in an advisory capacity to the Cumberland County Commissioners. The Authority consists of seven voting board members, three staff members, a consulting engineer, and a solicitor. Additionally, in accordance with Act 101, a Solid Waste Advisory Committee is appointed by the County Commissioners to offer input and guidance in the development and maintenance of the County Waste Management Plan, as required. The members of this committee include representatives from citizen organizations, municipalities, industry, and private solid waste businesses operating in the County,

The mission of the SWACC is to:

- Provide for the long-term disposal capacity for Cumberland County's municipal waste in an environmentally sound and cost-effective manner;
- Reduce waste generation;
- Increase recycling; and
- Provide County residents with proper disposal options for certain items that are generally considered inappropriate for municipal solid waste disposal facilities.

SWACC conducts an aggressive educational program with activities and materials targeting residents of all ages. The Cumberland County Recycling Coordinator works on behalf of the SWACC to conduct presentations at local schools and universities, and coordinates and sponsors visits from professional groups (i.e. Illusion Maker and Kaleidoscope Kids). SWACC publishes and distributes the quarterly environmental newsletter, *Trash Talk!,* targeting fourth and fifth grade students with waste reduction and recycling information. *Trash Talk!* is accompanied by a Teacher's Guide that highlights the educational concepts and skills presented in each issue.

SWACC also maintains working relationships with all of the municipalities in the County and offers them a broad array of assistance. The Act 101-mandated municipalities consult SWACC on a regular basis for information and advice relating to their recycling programs. SWACC also makes a conscientious effort to keep the municipalities informed of the resources available to them, including Act 101 recycling grants, technical assistance grants, organizations such as Professional Recyclers of Pennsylvania (PROP), and the recycling programs offered through SWACC. SWACC also offers assistance with the development of recycling and burning ordinances and with the completion of grant applications.

The programs and initiatives of the Solid Waste Authority are funded by a County Administrative Fee of $2.50 on every ton of Cumberland County generated municipal waste. This fee is collected by disposal facilities that accept Cumberland County waste. Since the average Cumberland County resident generates approximately one ton of waste per year, the programs and initiatives of the Solid Waste Authority of Cumberland County cost each County resident approximately $2.50 per year.

Approximately 83 percent of Cumberland County residents, representing 18 of 33 municipalities, have access to curbside recycling through contracted municipal collection. With the exception of one municipality, all of these communities are located either in the central or eastern portion of the County. Twelve of these municipalities are Act 101-mandated recycling communities. Of these 12 mandated municipalities, three are potentially interested in a regional yard waste processing facility – Carlisle Borough, North Middleton Township, and South Middleton Township. Mandated municipalities are required to also provide for the collection from residents of "leaf waste." As defined by Act 101, Chapter 271 of the Pennsylvania Municipal Code, leaf waste is defined as "leaves, garden residues, shrubbery and tree trimmings, and similar materials, but not including grass clippings."

Seventeen percent of Cumberland County's population resides in the 15 rural municipalities in the western portion of the County, without access to municipally provided curbside collection of recyclables and refuse. Two of these communities, Dickinson Township and Middlesex Township, are potentially interested in a regional yard waste composting facility. Trash and recycling collection in these rural areas are by subscription service arranged directly by households. SWACC sponsors two drop-off centers where residents can deliver the following recyclable materials:

- Aluminum cans,
- Steel cans,
- Clear, green, and brown glass,
- #1 and #2 plastics bottles,
- Corrugated cardboard,
- Newspapers,
- Magazines, and
- Office paper.

One drop-off site is located at the Hopewell Township Building (available the first Saturday of each month) and one is located at the Newville Fairgrounds (available the third Saturday of each month). These drop-offs are staffed by volunteers. Together, these two sites are only open a total of 8 hours per month.

Trash/Recycling Cost Structure

Of the 12 mandated municipalities, six allow unlimited weekly trash and recycling set-outs and bundle the costs in one quarterly fee. Three others allow residents to choose either unlimited weekly set-outs paid per quarter, or a pay-as-you-throw (PAYT) system where residents can either buy bags or tags for set out (usually requires a minimum purchase per year) and unlimited recycling. Two municipalities offer their residents a choice of either a 90 gallon toter cart for weekly set out for a flat quarterly fee, or a PAYT system (requires a minimum purchase per year). The remaining mandated municipality provides a PAYT option only.

Six municipalities have voluntarily contracted for municipal wide trash and recycling services. Of these six, three allow unlimited weekly trash and recycling set-outs and bundle the costs in one quarterly fee. Two municipalities offer their residents a choice of either a 90 gallon toter cart for weekly set out for a flat quarterly fee, or a PAYT system (requires a minimum purchase per year). The remaining municipality charges a flat quarterly fee, but limits trash setouts to 3 bags or 75 pounds per week.

The trash and recycling cost structure for the five municipalities included in this compost feasibility study are summarized in Table 1.

Table 1
Trash and Recycling Cost Structure for Core Municipalities

Municipality	Mandated?	Cost/Qtr	Cost/Yr	Bulky Waste Included?	Cost per Bag or Tag	Min. Bags or Tags	Minimum Cost/Yr of Bags
Carlisle Borough	Yes	N/A .	N/A	Bulky waste drop-offs at municipal location semi-annually, appliances curbside semi-annually	$3.00 Per Bag. For up to 3-unit complexes. Unlimited recycling.	N/A	N/A
N. Middleton Twp.*	Yes	$40.05[1]	$160.20	Includes one bulky item per week	$3.00 Per Tag	18	$54.00
S. Middleton Twp.*	Yes	$42.39	$169.56	Collected at Spring and Fall clean-ups	$2.60 Per Tag	18	$46.80
Middlesex Twp.*	No	$39.48	$157.92		$2.58 per Tag	18	$45.90
Dickinson Twp.	No	3 Options: 1. $61.56 for 90-gallon cart, unlimited recyclables weekly. 2. $55.56 for 3 bags max, unlimited recyclables weekly. 3. $36 for 1 bag max, unlimited recyclables weekly.	$246.24 $222.24 $144	Options1 and 2: 1 bulk item weekly, Option 3: Available for additional fee	N/A	N/A	N/A

* N. Middleton, S. Middleton, and Middlesex Twp residents must choose between the quarterly unlimited option and the Tag option.

[1] Through 9/30/06

The trash and recycling costs described in Table 1 do not include yard waste collection. Quarterly flat-fee rates range from $39.48 to $61.56 ($160.20 to $246.24 per year). Per-bag disposal fees range from $2.58 to $3.00. If a resident is able to dispose of just 18 bags of trash per year, they can pay just $45.90 to $54.00 per year, in the PAYT communities. This is a savings of $106.20 to $190.24 per year over unlimited collection.

Future Plans

The County was awarded a 902 Recycling Development and Implementation Grant from Pennsylvania DEP in 2004, in the amount of $500,000 to construct a permanent recycling drop-off center. This Center would supplement the recycling programs offered by both the mandated and non-mandated communities and possibly serve small businesses. The County envisions locating this site in the central portion of the County. The County owns approximately 8 acres on Army Heritage Drive in Middlesex Township. This site is large enough for a recycling drop-off center; however, it would not satisfy the County's desire to co-locate a composting facility with the recycling drop-off center. Therefore, a composting facility would need to be located either on another piece of land owned by the County, or on land owned by one of the municipalities. The County also owns a parcel of approximately eighty acres on the east side of Army Heritage Drive opposite the 8 acre site that might be suitable for both a recycling center and a yard waste site.

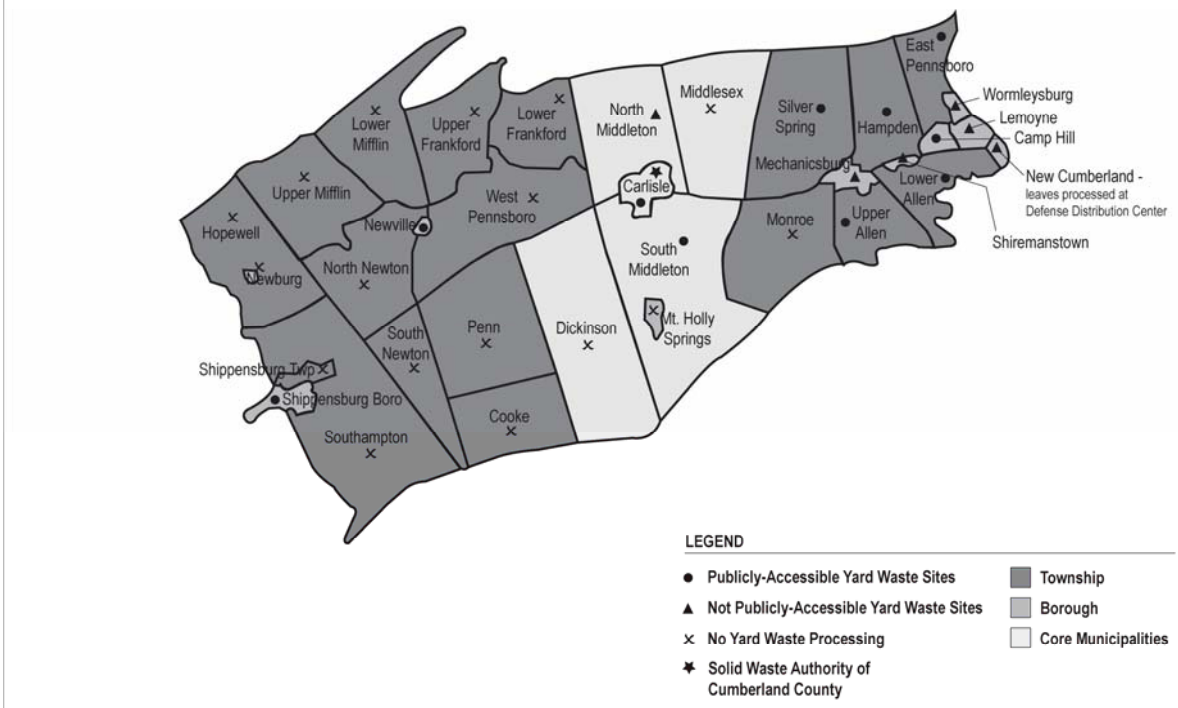
Cumberland County Yard Waste Management System

Background

Sixteen Cumberland County municipalities provide some level of collection and processing for yard waste, 10 of which have processing sites accessible to the public. The eastern portion of the County has a well-established infrastructure for yard waste processing consisting of either operating or planned yard waste facilities. Figure 1 shows a map of Cumberland County with the locations of the yard waste sites identified.

Figure 1

CUMBERLAND COUNTY, PA YARD WASTE FACILITIES



Most municipalities in Cumberland County have developed programs to collect and process yard waste; however, these operations are diverse in terms of their degree of complexity, manner of operation, and level of service offered. All municipal yard waste programs offer public access for material drop-off except for Lemoyne Borough, Mechanicsburg Borough, New Cumberland Borough, North Middleton Township, Shiremanstown Borough, and Wormleysburg Borough.

Lemoyne Borough processes leaves collected residentially and brush from municipal maintenance programs but does not make it available to the public. Camp Hill Borough handles the leaf waste from Shiremanstown Borough, but not brushy waste. Mechanicsburg Borough currently collects leaves and takes them to a local farmer. A new site in Mechanicsburg will serve that Borough and Silver Spring Township. New Cumberland Borough collects leaves and delivers them to the New Cumberland Defense Distribution Center which processes them along with their own leaf waste and uses some of the material on-site, offering the rest at no charge to municipalities that want it. Wormleysburg Borough collects leaves and piles them at a site for

passive decomposition. North Middleton Township collects leaves and chips brush on-route, piling both on a municipal site for passive decomposition. Carlisle Borough's site happens to be located in North Middleton Township. Currently Middlesex Township and Dickinson Township have no yard waste processing services available to their residents.

The Cumberland County Yard Waste Equipment Program

The SWACC established a program to loan yard waste processing equipment to municipalities in 1994, through DEP recycling grant funds. The County saw this as a way to help municipalities process yard waste cost-effectively. The County first purchased a tub grinder and two windrow turners in 1994 to assist the five municipalities participating in the loan program. As more municipalities expressed interest an additional grinder, a screener, and a top dresser were purchased and added to the program. The County also provides operator training, equipment maintenance and replacement parts, scheduling, and transportation. Currently there are 10 municipalities participating in the program.

An annual fee is charged to the participating municipalities for unlimited use of the equipment to help defray expenses. The equipment and corresponding fees are presented in Table 2.

Table 2
Cumberland County Yard Waste Processing Equipment

Equipment	Manufacturer/Model	Purpose	Annual Fee
Horizontal Brush Grinder	Vermeer HD 525	Grind brush and tree trimmings into wood chips and mulch	$1,650 (Includes both grinders)
Tub Grinder	Olathe867 TG 10-foot	Grind brush and tree trimmings into wood chips and mulch	
Windrow Turners (2)	SCAT 482B, each with 20-ton trailer	Turn leaf windrows to facilitate composting. Pull behind tractor, hook up to PTO.	$350
Trommel Screen	Retech 620 Prospector	Screen mature compost for beneficial use.	$450
Top Dresser	Millcreek 75 TD	Spread compost. Pull behind tractor, hook up to PTO	$100

Regional Yard Waste Processing Facility

Background

The objective of this study was to investigate the feasibility of implementing a regional composting program for yard waste that could economically serve the needs of residents in the following communities:

- Carlisle Borough,
- North Middleton Township,
- South Middleton Township,
- Dickinson Township, and
- Middlesex Township.

The County envisions that a regional yard waste facility could eventually serve as the primary yard waste processing site for the entire County, although municipalities would still have the option to operate their own sites and use the County's yard waste processing equipment on loan, for a fee. While Dickinson Township and Middlesex Township provide no yard waste services to their residents currently, the other programs are described below.

Carlisle Borough – Carlisle Borough's municipal crews collect bagged leaves in November and December, and Christmas trees in January, at the curb. The material is delivered to the Borough's processing site and is processed using the County yard waste processing equipment and ancillary municipal equipment (dump trucks and loaders). Residents are also allowed to deliver leaves and brush to the collection site. The site is staffed during operating hours to reduce improper dumping of materials. The hours are Tuesday and Thursday, 7:30 AM to 3:30 PM; Wednesday, 3:00 PM to 8:00 PM; and Saturday, 8:00 AM till noon. The number of residents/households served and the tonnage of material processed are unknown. There is no charge to residents for yard waste collection and processing. The leaf mulch, compost and wood chips produced are given to residents or used for municipal projects. The municipal yard waste site occupies 10 acres. Water and electricity are available at the site, although the distribution system for both is limited. The site is unable to expand due to encroachment by residential development. Municipal officials indicate that while it meets their current needs, it is unsuitable for a regional facility. In the new trash/recycling contract just awarded, York Waste Disposal will begin collecting brush at the curb and deliver it to the Borough's yard waste site.

South Middleton Township – For no additional fee to residents, South Middleton Township municipal crews collect yard waste at the curb, and residents are allowed to drop off bagged leaves, Christmas trees, and brush/limbs at the Township's yard waste processing site. Township officials report that all of their 5,081 households receive curbside yard waste collection, and approximately half of these households (2500) use the drop-off center. The

facility is permitted by DEP (General Permit, Yard Waste Leaf/Brush Composting Facility, APS #473228) and operating at about 80 percent capacity, processing 600 tons per year of leaves and 750 tons per year of brush and limbs. Two acres are currently being used of a 17-acre site. The Township utilizes County equipment, supplemented with its own packer truck and front-end loader, to manage the material. The leaf mulch, compost and wood chips produced are given to residents and used for municipal projects.

North Middleton Township – Municipal crews from North Middleton Township collect brush and limbs in March, April, May and September, Christmas trees in January, and bagged leaves in November and December. The brush and limbs are volume-reduced on route using a wood chipper towed behind a truck. There is no charge to residents for this service. The chipped material and leaves are taken to a Township-owned site for storage. The site is not open for public drop-off. Township officials indicate that all leaf mulch and wood chips produced are used in municipal projects.

The yard waste programs are summarized in Table 3.

Table 3
Summary of Municipal Yard Waste Programs
Serving Five Core Communities

Municipality	Leaf Collection	Limb Collection	Christmas Trees Collected?	Drop-Off Site Available	Free Mulch to Residents?
Carlisle Borough	✓	✘	✓	✓	✓
South Middleton Township*	✓	✓	✘	✓	✓
North Middleton Township	✓	✓	✓	✘	✘
Dickinson Township	✘	✘	✘	✘	✘
Middlesex Township	✘	✘	✘	✘	✘

Yard waste collection services, where available, are provided on a seasonal basis by municipal crews for no additional fee to residents.

* South Middleton Township accepts Christmas trees at its composting site, but does not collect them from residences.

Estimate of Available Yard Waste

In order to design a regional yard waste processing site of appropriate size and capacity, the anticipated quantity of leaves and wood waste generated by the participating municipalities is needed. Table 4 presents estimates of the materials potentially available from these sources in

the targeted municipalities. The estimates were provided by the Cumberland County Solid Waste Authority from its 2004 Act 101 Summary Report.

Table 4
Estimated Cumberland County Yard Waste Annual Generation

Jurisdiction	Population	Materials Available					
		Leaves		Wood		Total	
		Tons	Cubic Yards[1]	Tons	Cubic Yards	Tons	Cubic Yards
Carlisle Borough	17,970	180	1,029	600	4,800	780	5,829
S. Middleton Twp.	12,939	600	3,429	750	6,000	1350	9,429
N. Middleton Twp.	10,197	89	509	266 [2]	1,064	355	1,573
Middlesex Twp.	6,669	277	1,583	317	2,536	594	3,939
Dickinson Twp.	4,702	195	1,114	224	1,792	319	2,906
TOTAL: PARTICIPATING MUNICIPALITIES	52,477	1,341	7,664	2,157	16,192	3,398	23,856
Other Potential Participants [3]	15,525	743	4,246	980	7,840	1,723	12,086
POTENTIAL GRAND TOTAL	68,002	2,084	11,910	3,137	24,032	5,121	35,942

[1] Conversion Factors: 350 lbs/cy. for leaves; 250 lbs./cy for loose brush; 500 lbs/cy for chipped brush

[2] Chipped on route.

[3] Includes Monroe Twp, Mt. Holly Springs Borough, Penn Twp, and West Pennsboro Twp.

Approximately 1,341 tons per year of leaf waste and 2,157 tons per year of wood waste are generated by the five participating municipalities. While North Middleton Township's wood waste is chipped on route, the remainder is picked up loose. To plan for the capacity of a yard waste processing site, these tonnages must be converted to volume in cubic yards. The density figures used are 350 lbs/cubic yard for leaves, 250 lbs/cubic yard for loose brush, and 500 lbs/cubic yard for chipped brush. The total material for the five core municipalities therefore totals approximately 23,856 cubic yards per year of yard waste, including 7,664 cubic yards of leaves and 16,192 cubic yards of brushy wood waste. It is assumed that the leaves will be composted in windrows, and the woody brush chipped and stockpiled for mulch.

Cumberland County officials have indicated that additional jurisdictions might be willing to participate in a joint yard waste composting facility in the future. These additional municipalities – Monroe Township, Mount Holly Springs Borough, Penn Township and West

Pennsboro Township – could potentially contribute additional materials in the amounts of 4,246 cubic yards of leaves and 7,840 cubic yards of wood waste annually. Including this volume, Cumberland County's yard waste generation could total 11,910 cubic yards of leaves and 24,032 cubic yards of wood waste.

Whether or not these additional municipalities choose to participate in the yard waste facility, it is wise for Cumberland County to plan for growth in yard waste collection programs and design the site accordingly. If the current per-capita yard waste generation rate of 51 pounds per person (calculated from Table 4) were to increase to 100 pounds per capita, it would be consistent with other yard waste generation studies conducted in Pennsylvania. For urban and suburban communities, generation rates range from 100 to 250 lbs per capita.[1] If Cumberland County assumes growth into the 100 lbs/capita range, an additional 14,993 cubic yards of yard waste would be generated, which, using current leaves/wood waste ratios, would account for roughly 5,000 cubic yards of leaves and 10,000 cubic yards of wood waste.

To account for program growth, whether it occurs due to additional municipalities signing on or to existing program growth, it is recommended that Cumberland County plan to manage a total of 12,664 cubic yards of leaves and 34,032 cubic yards of wood waste within five years.

Facility Sizing

The Pennsylvania Department of Environmental Protection has issued guidelines for yard waste composting facilities operating under 25 Pennsylvania Code Section 271.103(h) Permit by Rule.[2] These Guidelines limit the amount of yard waste, including leaves that can be processed or stockpiled at any site to 3,000 cubic yards per acre.

For Cumberland County's initial estimated volume of 23,856 cubic yards of material, eight acres would be required. For the maximum volume, factoring in future growth, of 46,696 cubic yards of yard waste, approximately 16 acres would be needed. Since composting leaves decrease in volume by one-third to one-half over a period of about 60 days, and since the County would presumably be grinding the wood waste soon after delivery to the site and thus reducing its volume, the land area required for actual storage and processing of material could be reduced. On the other hand, square footage on-site also needs to be budgeted for drop-off, delivery, and pick-up zones; truck maneuvering; access aisles; equipment storage; storm water management, and possibly utilities. Since this growth would not occur all at once, it is possible that the County could develop a suitable site in phases and not incur all costs immediately.

[1] Borough of Mechanicsburg – SWANA Recycling Technical Assistance, April 2004. Gannett-Fleming, Inc.
[2] "Guidelines for Yard Waste Composting Facilities", Document Number 254-5403-100, September 1, 1997.

Yard Waste Processing Site Design Considerations

Permitting Issues

Four types of permits that apply to municipal or county organics composting facilities are provided by the Pennsylvania Department of Environmental Protection (DEP). The type of permit depends primarily on the size of the compost operation site. The four types of permits are summarized below.

- Agricultural land application of leaf waste on areas less then five acres in size:
  - May operate under "Permit by Rule," as authorized by Pennsylvania Municipal Solid Waste Regulations (Title 25, Chapters 271, 281 and 285).
  - DEP Publication # 254-5403-100, "Guidelines for Yard Waste Composting Facilities," addresses specific siting and operational criteria that must be met.
- Yard waste compost operations less than five acres in size:
  - May operate under "Permit by Rule," as authorized by Pennsylvania Municipal Solid Waste Regulations (Title 25, Chapters 271, 281 and 285).
  - DEP Publication # 254-5403-100, "Guidelines for Yard Waste Composting Facilities," addresses specific siting and operational criteria that must be met.
- Compost operations more than five, but less than 15 acres:
  - May operate under existing Pennsylvania "General Permit" WMGM-017 for beneficial use of a waste material, as long as the operations comply with the provisions of this permit.
  - Allows addition of food wastes and other nitrogenous feedstocks.
  - DEP issues a "Determination of Applicability" once the applicant demonstrates compliance with the permit terms.
- Compost operations over 15 acres:
  - Must apply for an individual permit.
  - The permitting process is rigorous and involves bonding, insurance requirements, and public hearings. It can be costly to the municipality. The timeframe for an individual permit is nine months.

A site of approximately 16 acres, suitable for processing the maximum amount of yard waste forecasted under growth scenarios, would require the County to obtain an individual permit for their processing facility. However, due to the complexity of applying for an individual permit and the uncertainties in the forecast, it is recommended instead that the County acquire a 15-acre site and plan to develop its capacity as a yard waste processing facility in phases, as

demand requires. A site of this size would fall under the Commonwealth's "General Permit" WMGM-017, provided that during the application process the site chosen and proposed activities were found to be consistent with the existing General Permit and approved by the DEP.

Site Characteristics and Guidelines

The DEP's "Guidelines for Yard Waste Compost Facilities" outlines a set of criteria to be used in identifying and evaluating a site. This document should be reviewed carefully as part of the site selection process to understand in detail the DEP requirements. The list below summarizes the criteria contained in the Guidelines:

- Site:
  - Remote from Residential Areas (300-foot buffer recommended); and
  - Close proximity to yard waste, to reduce transportation costs and impacts.
- Land:
  - Sufficient size (1 acre per 3,000 cubic yards of yard waste);
  - Level to moderately sloping land;
  - Good drainage and no high water table;
  - Not within 100 feet of a perennial stream or within 300 feet of a water source; and
  - Outside of floodplain.
- Sensitive Areas:
  - No wetlands;
  - No historic sites;
  - No rare/endangered species;
  - No restricted lands;
  - No public well heads;
  - No sensitive "receptors" nearby (schools, churches); and
  - No sinkholes within 100 feet.
- Access:
  - Easy access for vehicles, equipment, and the public; and
  - Control of access to unauthorized persons.

- Utilities:
  - Water and power supplies available; and
  - Stormwater control measures implemented.

An evaluation of any potential site should be undertaken using the complete Guidelines document prior to any lease or purchase negotiations.

Site Location

Currently Cumberland County owns a site of approximately 8 acres in the County's central portion. While the County was hopeful that this site could co-locate both a recycling center and a regional yard waste facility, the land requirements for the regional yard waste facility exceed the amount available on this site. To develop the regional yard waste facility, the County is interested in possible co-ownership and co-management of another site with one if its municipalities. Municipalities were therefore queried regarding whether they had a site, or a potential site, that could be developed into a yard waste processing facility. Table 5 presents a summary of these responses.

Table 5
Potential Regional Yard Waste Sites

Jurisdiction	Site Description							
	Usable Area	Surface Comp.	Water	Power	Ownership	Current Use	Possible for Regional Facility?	Comments
Cumberland County	8.5 acres	Aggregate	No	No	County	Undeveloped, potential drop-off recycling center	No	Only large enough for recycling drop-off
Carlisle Borough	10 acres	Unknown	Yes	Yes	Borough of Carlisle	Drop-off YW Facility	No	Relative small size, proximity to residential development, access to water and power is limited.
S. Middleton Twp.	17 acres	Asphalt / Aggregate	Yes	Yes, 30-amp	S. Middleton Twp.	YW Facility, Permitted	Yes	Proximity to residential development, competing Township uses, access roads inadequate.
Middlesex Twp.	6 acres	Grass	No	No	Middlesex Twp.	Parkland open space	Yes	Too small
N. Middleton Twp.	None	N/A	N/A	N/A	N/A	N/A	N/A	
Dickinson Twp.	None at this time	N/A	N/A	N/A	N/A	N/A	N/A	Potential at later date

Note: n.a. = information not available. N/A = not applicable

Of the three existing municipal yard waste processing sites among the five municipalities, South Middleton Township's is the only permitted site. The Middlesex Township site, at six acres, is too small for a regional site. Carlisle Borough, whose 10-acre site could accommodate at least the current needs of a regional site, reports that the site is too close to residential development to be suitable for a yard waste site. Therefore, South Middleton Township currently owns and operates the only yard waste site in the County that is large enough to potentially be suitable for a regional yard waste site. Of the 17 acres, only two are currently used for yard waste processing, according to municipal officials. The site also has the advantage of holding a General Yard Waste facility permit. However, due to issues with surrounding development and other possible Township uses for this land, Township officials indicate that it is not suitable for expansion into a regional yard waste site.

While these three municipalities have indicated interest in pursuing a regional yard waste processing site, the County must also consider the possibility that one or more of them may not be willing to give up their own facilities if a regional site becomes a reality. This is especially true for any municipalities that received 902 Recycling Development and Implementation Grant funding to establish their sites. Pennsylvania rules require that a yard waste site developed with 902 recycling grant funds must remain dedicated to that purpose, or the grant funds be reimbursed back to the DEP. If a municipality were to transfer their yard waste operations to another site which was more suitable than the original, as opposed to closing the site, the DEP would need to be contacted with the specifics of the situation to determine if an exception could be made to this rule.

The other two municipalities without their own facilities that have expressed interest in the feasibility of a regional yard waste site are North Middleton Township and Dickinson Township. Dickinson Township does not currently provide yard waste collection to its residents, although Cumberland County's 2005 Act 101 report shows yard waste originating in the Township (see Table 4). These municipalities may be more willing to partner with the County to develop a regional site located in their jurisdiction. They would gain a service not currently available to their residents, and not have to face the possibility of reimbursing DEP for 902 recycling grants already received.

In addition to these five jurisdictions, the County indicates that West Pennsboro Township, Penn Township, Monroe Township and Mt. Holly Springs may be interested in participating in a regional yard waste facility if one were built. These jurisdictions were not surveyed to determine whether they own sites that may be suitable for this purpose.

Considering access and geographic location, it seems that Dickinson Township would be a logical site for a regional yard waste facility, especially if it could be sited in the northern end of the township. Such a location would be close to both West Pennsboro Township and Penn Township, possibly providing an incentive to them to participate. Additionally, Carlisle Borough may also be willing to transfer their yard waste processing activities to another tract of

land and free up their existing site for another beneficial use. South Middleton Township might also participate, keeping its own site but also utilizing the regional site if it were convenient. Mt. Holly Springs would also be nearby geographically. Monroe Township would be the furthest from a site in north Dickinson Township. However, they could choose to participate with South Middleton Township, especially if a new, nearby regional County yard waste site gave South Middleton Township the ability to direct seasonal yard waste overflow there and not exceed the capacity of its own site. The southeastern portion of West Pennsboro Township or the northeastern portion of Penn Township may also be areas to consider for a regional site, in terms of geographic location offering other municipalities easy access.

With these considerations in mind, Cumberland County has four options for identifying a suitable site for a regional yard waste processing facility:

1. Locate land currently under County ownership that is of sufficient size and has the desirable characteristics for yard waste processing. The County may choose to pursue co-ownership of this parcel with the municipality in which it is located, in return for consideration in usage of the site, or the County's processing equipment, by this municipality. The County should first consider using a portion of its currently owned 80-acre Army Heritage Drive parcel. Another geographically desirable location might be found in Dickinson Township.
2. Locate land currently owned by one of the core municipalities that is of sufficient size, and has the desirable characteristics for yard waste processing. Again, arrangements could be pursued for joint ownership, development, and/or management of the site. This option may include converting an existing municipal site into the regional yard waste site, but that conversion may not be feasible.
3. Survey the municipalities of West Pennsboro Township, Penn Township, Monroe Township and Mt. Holly Springs to determine whether they own land currently under-utilized that could meet the criteria for development of a regional yard waste site.
4. Locate land available for purchase on the open market that is suitable for a regional yard waste facility, preferably in the western or central regions of the County. Again, co-ownership with the municipality in which the land is located would be an option. However, the market price of land in some municipalities may be prohibitive.

Co-Location of Yard Waste Site with Recycling Drop-off Center

Cumberland County had initially thought to co-locate the regional yard waste processing center on the 8 acres of land dedicated to the development of a recycling drop-off center.

An inquiry to the State DEP revealed 16 compost site locations that also include recycling drop-offs on the same site. Further analysis of the data revealed that at seven of these facilities the compost operation and recycling operation were located close enough to be considered "co-located". Of these seven facilities, one was a working farm and thus the compost operation did not include public access. Two facilities were five acres or less in size. At one of these, the

drop-off recycling consisted of cardboard only. At the other, the drop-off center was open to the public only 20 hours per week, and for safety reasons, no yard waste processing occurred on-site while the public drop-off was open. Three other facilities did not respond to requests for more information about their operations.

R.W. Beck conducted a site visit of the Derry Township recycling and composting facility, located in Hershey, Pennsylvania. This complex includes a leaf composting operation, brush chipping and mulch production, and a drive-through recycling center for certain recyclable materials. The entire facility occupies 15 acres, of which eight to 10 are dedicated to leaf composting windrows. The facility handles approximately 7,600 cubic yards of leaves and 10,800 cubic yards of wood waste per year, serving a population of approximately 21,000.

Derry Township establishes its leaf composting windrows on an unpaved grass surface and reports no problems with this. They use a PTO-operated windrow turner and tractor to turn the piles. Approximately 30 to 40 cubic yards of mulch are kept on site for residents to pick up. The Township does not charge residents to drop-off yard waste or for mulch or compost, but instead charges a fee to collect the yard waste at the household. This is done on an on-call basis. Contractors may drop off yard waste materials for a fee of $10. Township staff report that the mulch and compost are in high demand by the public.

Derry Township's drive-through recycling center is intended as a supplement to the curbside recycling program. Magazines are the only common material. Other materials recycled at the center include furniture, electronics, batteries, motor oil, and polystyrene foam products. The recycling center and yard waste drop-off are only open to the public on Friday afternoons and Saturdays.

While the Derry Township example was interesting, it was not directly relevant to Cumberland County's needs. The site was large, but it also housed the Township's Public Works Department, including vehicle maintenance and school bus parking. The compost windrows were spread out around the grounds. Other differences from Cumberland County's vision for their site are that Cumberland County does not plan on having an enclosed, drive-through recycling center, and the County hopes to provide more hours for public access to its recycling drop-off center.

In summary, co-locating a recycling drop-off center and a yard waste processing center is a good idea and it has been done in Pennsylvania, although none of the existing examples are a perfect model for Cumberland County. It would certainly offer the convenience of "one-stop shopping" to the public. However, Cumberland County's eight acres is not enough land to allow for both a regional yard waste processing center and a recycling drop-off center in the long term.

Facility Ownership

A discussion of facility ownership must include both the ownership of the actual land and the ownership of the facility itself, including equipment. The identification of options for ownership and management of a Cumberland County regional yard waste processing facility then needs to consider the existing status of each jurisdiction in terms of access to yard waste processing services and its geographic location in the County. A third important factor is the willingness of local elected officials and solid waste managers in these jurisdictions to cooperate with each other and the County in developing a new site and service, and their willingness to consider potential costs associated with this. Evaluation of this third factor is beyond the scope of this study.

Ownership of Site

As mentioned above, there are three options for ownership of the actual site where the processing center would be established: County-owned land, municipally-owned land, or a joint ownership arrangement. Similar options exist for ownership of the facility itself, acknowledging that the County currently owns most, but not all, of the equipment needed for a yard waste processing facility.

If Cumberland County does locate a suitable parcel of land under its ownership, the simplest option would be for Cumberland County to assume full ownership of the site and facility as the Solid Waste Authority of Cumberland County. This would not preclude arrangements with individual municipalities, including the municipality in which the site was located, for site management, access, and fees. Ownership by the SWACC would ensure that representatives of certain municipalities could participate in the establishment and governance of the yard waste facility by virtue of their positions on the Authority's Board.

Ownership by the SWACC may be a less practical option if the County identifies a suitable site that is currently under municipal ownership. It would be less costly to the County to allow the site to remain the property of the municipality, and to enter into a lease agreement for the land. Alternatively, an arrangement could be made to provide consideration to the municipality in return for use of the land. This consideration could include special financial incentives related to site usage for the host municipality.

Joint ownership of a parcel of land is possible, but may not provide tangible benefits to the County considering the administrative costs of negotiating and establishing such an arrangement. One way to establish joint ownership would be through the existing Solid Waste Authority of Cumberland County. The improvements made to the parcel to establish a yard waste site, including paving, fencing and constructing buildings, would accrue to the parcel and thus be also jointly owned. While joint ownership arrangements can be complicated, the fact that Cumberland County already has a Solid Waste Authority in place could provide the structure for the establishment of a municipal/County owned site.

Therefore, it is recommended that either the SWACC or one municipality own the land on which the site is established.

Ownership of Facility

If the regional yard waste processing facility is located on the site of an existing municipal yard waste processing facility, with site improvements made to expand its capacity and efficiency, the eventual regional facility ownership must consider the original ownership, the ownership of any equipment brought on site, and the contribution of site improvements such as paving and fencing.

The most cost-effective option for the County, even though it may be time consuming, would be to utilize the resources of each participating or potentially participating municipality to help develop the site in return for partial ownership of the facility. This partial ownership could be granted via consideration to the municipality for use of the site. Depending on the relative contribution of the municipalities, usage fees could be adjusted. Contributions may include:

- Using municipal public works crews for site grading, paving, fencing and utility establishment;
- Using municipal equipment to supplement the County's equipment (front-end loader, dump trucks, skid steer loaders, lawnmowers, etc.);
- Using municipal employees for daily site management and material processing;
- Using other municipal resources for public education, site marketing and promotion, and product marketing and promotion.

It is also possible for the County Solid Waste Authority to own both the facility and the site, and still provide consideration to municipalities for the services outlined above. A careful analysis of the legal issues of ownership should reveal whether these arrangements should be considered, or whether they should apply to site management only.

Processing Equipment

Since the County owns several pieces of yard waste processing equipment, those costs do not have to be factored in to site development (see Table 2). Other equipment owned by the municipalities may also be useful at the regional processing site. Carlisle Borough owns a front-end loader and dump trucks. South Middleton Township owns a front-end loader and North Middleton Township owns a Case wheel loader and several dump trucks. These municipalities may be willing to allow their equipment to be used at a regional yard waste facility, pending review of liability and other issues. Table 6 summarizes the equipment owned by the core municipalities.

Table 6
Municipal Equipment Potentially Available for Regional Yard Waste Site

Municipality	Description of Equipment	Percent of time currently used for yard waste activities	Age of Equipment
South Middleton Twp.	Packer Truck – International	100	Model Year 1988
	Front-End Loader	50	Model Year 2000
Borough of Carlisle	Dump Trucks	10	5 – 10 years
	Front End Loaders	10	5 – 15 years
Middlesex Twp.	None		
Dickinson Twp.	None		
N. Middleton Twp.	Wood Chipper	165 hours per year *	Model Year 1989
	1-Ton Dump Truck	247 hours per year	Model Year 1997
	Medium Duty Dump Truck, single axle	170 hours per year	Model Year 1985
	Heavy Duty Dump Truck, tandem axle	63 hours per year	Model Year 2002
	Pick-up Truck	127 hours per year	Model Year 1989
	Case Wheel Loader	31 hours per year	Model Year 1999

Note: N. Middleton Twp did not provide percent estimates.

Since the County lacks a front-end loader, necessary equipment for a compost operation, it may wish to provide compensation, perhaps in the form of a "trade" allowing one of the municipalities use of one of the other pieces of equipment at no charge or a reduced fee, in return for periodic use of the loader. A heavy-duty front end loader with a 3 to 4 cubic yard bucket would cost $90,000 - $110,000. If such an arrangement were considered, the age, hours, and condition of the loader should be carefully evaluated, since the composting environment can be corrosive and lead to premature wear on equipment.

The sharing and transporting of equipment from site to site becomes more time-consuming and complex as more municipalities and more pieces of equipment are included, especially if fee adjustments or other consideration are utilized. In the case of a front-end loader, one advantage of a purchase or lease is that it would also be available for other County uses when not used for yard waste processing.

The County may wish to consider installing its tub grinder permanently at the regional yard waste processing site, and removing it from the loan program. County officials indicate that

municipalities overwhelmingly prefer the horizontal grinder to the tub grinder. As long as the tub grinder remained operational and safe, this arrangement would reduce the complications of transporting and scheduling this equipment and allow the County to always be able to process wood mulch. This would eliminate any back-ups of loose brush on the site. The County may also wish to consider leaving one of the two compost turners on the regional site permanently, for the same reasons.

Conceptual Operational Description

To guide the County in evaluating potential sites, a conceptual operational description is presented here.

Leaf Composting

In windrow composting, leaves are laid down in elongated piles, kept moist by watering, if necessary, and agitated and aerated by turning with either a loader or a windrow turner. Windrow composting is a proven, low-tech method currently in use by many Pennsylvania municipalities including several in Cumberland County.

Generally new windrows are constructed to spec with a front-end loader using a one cubic-yard scoop. As each width is laid down, the layers are watered as needed (generally 15 to 25 gallons per scoop). Watering each layer allows the moisture to be absorbed, as opposed to waiting until the pile is constructed before watering it, which results in run-off. Newly completed windrows are left for seven days, and then turned. The piles should be turned so that the material at the outer edges of the old pile is placed in the center of the new pile. Another 10 to 14 days after the first turning, windrows are ready to be turned again. At this point, decomposition has reduced the size of the windrows by about 1/3 of their original volume, so that two piles may be combined into one. Turning and mixing is important to allow uniform moisture distribution and to aerate and agitate the material. Water should be added if the pile has dried out. After the first two turnings, the piles should be monitored and turned on a schedule that promotes active composting. The DEP Guidelines direct that windrow piles must be turned at least once every three months.

Tasks associated with windrow composting systems include building the windrows, turning them as needed, and keeping track of the age of windrows and the progress of the composting process. The length of windrows will vary with material quantity, but the width and height should be constructed to specific dimensions to optimize the composting process. Pile widths of 12 to 14 feet are recommended, with heights of six to eight feet. The dimensions of Cumberland County's windrow turners suggest that a height of six feet and a width of 18 feet are optimal in this case. With these dimensions, one linear foot of windrow contains approximately two cubic yards of leaves.

The initial quantity of leaves to be composted at a Cumberland County site, as illustrated in Table 4, would be 7,664 cubic yards, the current amount collected by the five participating municipalities.

The 7,664 cubic yards of leaves would require 3,832 total feet of windrow length. Experienced windrow composters construct their windrows in pairs, so that as they decompose they can be combined into one windrow of suitable size to allow the composting process to continue. Windrows that become too small may be unable to retain the optimal temperature or moisture levels. Due to volume reduction and gradual delivery of leaves, two-thirds of this original volume will be arranged in active windrows at any given time.

Using this information for design purposes, the area needed for active windrow composting can be calculated:

- Twelve windrows – comprising six pairs – would be constructed, each approximately 213 feet long;
- Aisles between windrows in a pair would measure two feet;
- Aisles between the pairs to allow equipment access would measure 14 feet; and
- Thirty feet would be reserved at either end for equipment access.

The area needed for windrow placement is 2.24 acres.

Once the windrow composting process is finished the volume reduction essentially stops, and the compost is then put in a curing pile to cool and be stockpiled for pick-up by users. The volume of leaves in the curing pile would be the remaining 2,555 cubic yards, volume reduced by one-third, yielding 1,703 cubic yards. If the curing piles were stacked twice as high as the windrows, 12 feet tall, and turner access were no longer needed, the area for these piles would be approximately one-fifth of an acre if arranged in 18-foot wide windrows with 10 feet between them.

Although theoretically leaves may be stored and composted on a dirt or grass surface, and DEP has no prohibition against this, it is not an ideal surface. During dry conditions, the site may become very dusty, and during times of rain and snow, the surface may become rutted, muddy, and frozen. This makes efficient material processing difficult and is detrimental to the equipment. Therefore, it is advisable to have a hard surfaced area, either concrete or asphalt, for the 2.5-acre composting zone. Areas for equipment storage, stormwater and run-off management, and other support operations would require approximately one more acre which could be gravel or aggregate surface. In summary, leaf composting would require three and one-half acres, as follows:

- 2.5 hard-surface acre for windrows and curing piles; plus
- 1 gravel or aggregate-surface area for support operations.

Wood Waste Mulching

The wood waste delivered to the site would be ground, but not composted, and stockpiled for use as mulch by the County, municipalities, residents, and potential other "customers". Initially, the County would require enough acreage to manage the 16,192 cubic yards of wood waste generated by the project participants only. Due to some of the material being delivered already chipped, and accounting for ongoing chipping activity on-site, it is assumed that, at any given time, half of the material to be stockpiled would be loose, and half would be volume-reduced to a density of 500 lbs/cubic yard by chipping. This original loose 16,192 cubic yards would therefore require approximately one acre for storage prior to processing.

After processing, the finished wood chips and mulch will be in taller, more compact piles than leaf windrows, and would require about 1/3 less room, or about 2/3 of an acre for stockpiling. An additional acre would be needed for the grinding operation, material handling, and access. In summary, the total area for managing the wood waste in the initial stages of this project would be approximately three and two-thirds acres, as follows:

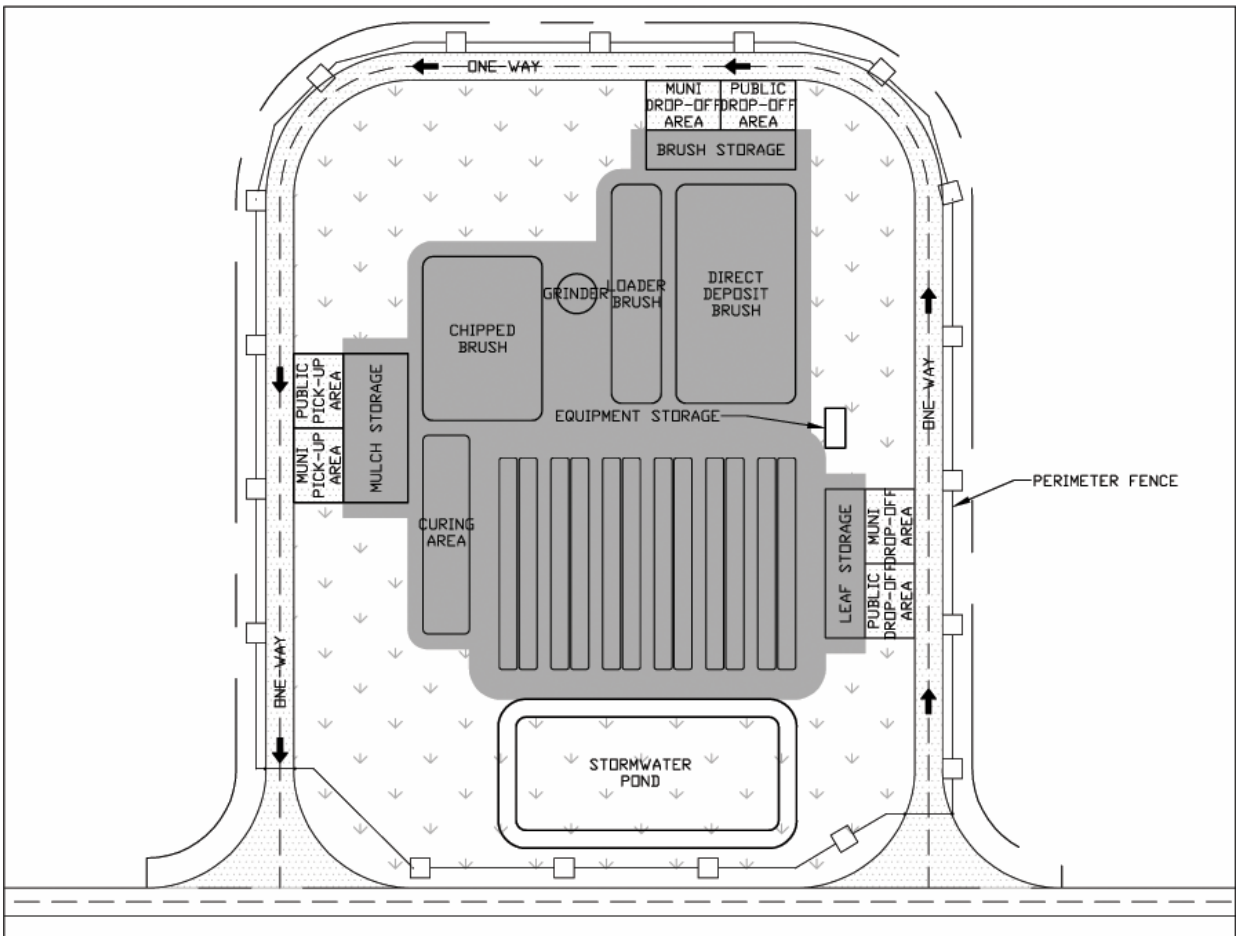
- 1 hard-surface acre for storage of incoming loose and chipped material;
- 2/3 hard-surface area for storage of finished wood chips and mulch;
- 1 hard-surface acre for chipping, material handling, and access; and
- 1 gravel or aggregate-surfaced acre for support operations.

The regional yard waste processing operation would therefore use approximately 7 acres initially. A little over five acres would need to be hard-surfaced with concrete, asphalt, or an alternative material. If the County chose to secure a larger, 15-acre site, it would serve the County longer term assuming demand for yard waste processing services would grow.

Conceptual Site Design and Description

A sketch of a potential site plan, based on the expected volume, site guidelines, and acreage discussed, is attached as Figure 2.

Figure 2
Regional Yard Waste Center
Proposed Site Layout



The site within the dashed lines is comprised of 14.71 acres. This includes 5.24 acres of asphalt pavement, 2.21 acres of gravel for the access road and drop-off/pick-up areas, and the remainder is grass-covered, including 20-foot buffers between the road and the land perimeter. It is anticipated that 20-foot buffers will be adequate, but this depends on the location of the site relative to development.

Municipal trucks, private contractors' vehicles, and the general public's vehicles would enter the one-way access road and proceed directly to the leaf drop-off area. Then they would proceed to the brushy waste drop-off area. The last station would be for picking up both leaf compost and wood chip mulch. The composting, grinding and material handling activities would all occur in the center of the site to eliminate traffic issues and access by unauthorized persons into the processing area. It may be a minor inconvenience for users to stop at two

stations to unload materials, but it will also spread the traffic over two stations, potentially reduce the time spent at any one station, and prevent leaves from getting mixed with brushy waste.

Cost Estimates and Cost Sharing Options

Site Development

Converting an existing yard waste processing site to a regional site would be the least expensive in terms of site development costs; however, this option is probably not feasible under current conditions. Assuming that an unimproved site is chosen, the County Solid Waste Authority should apply for a Section 902 Recycling Development and Implementation Grant to cover the site development costs. If a grant were not obtained, these costs would then be borne by either the County alone, or the County and one or more municipal partners. The development costs, like the operating costs, would be shared based on either the population or the yard waste generation of partnering municipalities. If, however, a partnering municipality had the ability to undertake site development using its own resources, or otherwise at a below-market cost, it would be advantageous to the County and any other partners to provide some consideration to this partner in return for savings in development costs. Table 7 presents a summary of potential site development costs, with and without the expense of a front-end loader, and factors in the possible contribution of a DEP recycling grant.

Table 7
Cost Estimates for Site Development

Item	Total Cost	DEP Recycling Grant 90%	Cost to Project Participants 10%
Front-End Loader with 4-cu yd bucket *	$110,000	$99,000	$11,000
Grading and aggregate surface for 2.21 acres	$96,267	$86,641	$9,627
Asphalt Hard Surface for 5.24 Acres	$913,018	$821,716	$91,302
Utility Building for Equipment Storage, 75 ft long by 25 ft wide	$75,000	$67,500	$7,500
Electricity	$5,000	$4,500	$500
Facility Sign	$1,000	$900	$100
Gate House	$2,500	$2,250	$250
Fencing 15 acres	$6,500	$5,850	$650

Item	Total Cost	DEP Recycling Grant 90%	Cost to Project Participants 10%
Additional Site Improvements	$5,000	$4,500	$500
TOTAL with Loader	$1,214,285	$1,092,857	$121,429
TOTAL w/o Loader	$1,104,285	$993,857	$110,429

* Purchase of front-end loader may not be necessary if it can be borrowed from a municipality.

Notes: Grading and aggregate based on estimate of $1.00 per square foot. Asphalt costs from National Construction Cost Estimator, 2005, at $4.00 per sq ft for 4" of HMA over 12" gravel base course including grading and sub grade preparation. Equipment storage building estimated at $40 per sq. ft. Fence calculated at $2 per linear foot. Other costs based on actual reported costs from other Pennsylvania composting facilities.

Operations

Facility labor and other operational costs would also be shared among the County and its municipal partner(s). Operational and management tasks include, but are not necessarily limited to, the following:

- Gatekeeping and site logistics;
- Receiving and stockpiling raw materials from both the general public and participating municipalities;
- Building, turning and monitoring leaf compost windrows;
- Chipping and piling brush;
- Supervising the distribution and loading of finished compost and mulch into private vehicles and large trucks from municipalities and, potentially, landscape contractors;
- Maintaining equipment;
- Ordering and managing fuel and other supplies;
- Record-keeping.

Many different options are possible for sharing the labor and resources necessary for site management among the County and its municipal partners. For example, responsibility for site-specific tasks, such as gate keeping and record-keeping, could be done by the municipality that hosted the site, while tasks related to processing could be managed by the County. The management arrangement determined by the jurisdictions should be recorded in written form to prevent misunderstandings. This record can be in the form of a memorandum of understanding, or, more formally, in an inter-municipal agreement. This type of document is enforceable as a contract between jurisdictions.

Labor

Operating cost estimates are based on the following parameters:

- The facility is assumed to be open to the public six days per week, Monday through Saturday, for six hours, April through October, or 1,080 hours per year. These would also be the hours during which partner municipalities would deliver their materials[3];
- The facility is expected to be staffed during all operating hours by an attendant earning $5.50 per hour (minimum wage in PA is currently $5.15 per hour);
- The equipment operator is expected to be a County employee, earning $16.00 per hour, with benefits assumed to cost 1/3 of his annual salary;
- The number of processing and material handling hours per week will vary depending upon the generation of leaves and brush. Some tasks will be conducted only in the fall and early winter, while others will not be performed in the winter months. The average hours per week over the course of a year are presented in Table 8. It is important to note that some weeks more than the average hours will be spent and some weeks less. These tasks could complement winter-specific tasks, such as snow and ice removal. These tasks are assumed to be performed by an employee earning $16.00 per hour.

Table 8
Estimated Annual Labor Cost for Windrow Composting Systems

Tasks(1)	Average Hours per Week	Hours per Year	Estimated Labor Cost per Year
1. Gate keeping and general oversight (2)	36	1080	$35,179
2. Stockpile raw material (3)	10	180	
3. Build windrows (3)	15	270	
4. Turn windrows (4)	6	210	
5. Monitor windrows	2	104	
6. Grind brush (4)	8	275	
7. Stockpile finished material (4)	5	175	
8. Misc. material handling and maintenance tasks	5	260	

1 Task 1 costs based on hourly rate of $5.50 per hour/, Tasks 2 – 7 based on County worker's hourly rate of $16.00, plus benefits.
2 April through October; Task 1 costs based on hourly rate of $6.50 per hour.
3 Fall and early winter months only (18 weeks)
4.Not in winter months of January, February, March and April (17 weeks)

[3] The actual months and hours of operation would be negotiated among the County and its partner municipalities. These dates and times are for purposes of illustration. It may be desirable for the site to have some public access hours during the winter months.

Total Annual Operating Costs

Total annual costs are summarized in Tables 9 and 10. Table 10 presents two options, one assuming that recycling grants exist for site development, and the other assuming they do not. It should be noted that these costs assume that the processing equipment currently being utilized will remain in usable condition.

Fuel costs assume that the average fuel consumption for the various pieces of equipment is 10 gallons per hour, and that fuel costs $3.50 per gallon. The total yearly equipment operating hours are 1,110.

Table 9
Estimated Annual Operating Expenses
for Regional Yard Waste Facility

Expense	Cost
Gatekeeper	$5,940
Processor	$29,239
Subtotal Labor	$35,179
Fuel	$38,850
Maintenance	$5,000
Utilities	$1,200
Total Operating Costs	$80,229

Table 10
Estimated Annual Costs of Regional Yard Waste Facility,
Including Capital Costs

Assumptions	Annual Operating Costs	Annual Capital Costs	Total Annual Costs
Ten Year Amortization – No Grants, including Front end Loader	$80,229	$121,429	$201,658
Ten Year Amortization – No Grants, no Front end Loader	$80,229	$110,429	$190,658
Ten Year Amortization – 90% of Site Improvement Paid for with Grant, including Front end Loader	$80229	$12,143	$92,372
Ten Year Amortization – 90% of Site Improvement Paid for with Grant, no Front end Loader	$80,229	$11,043	$91,272

Cost Sharing Options

The capital costs of establishing a regional yard waste facility are high, but it is possible that the SWACC could utilize DEP 902 recycling grant funding for the majority of the capital expense. The County is fortunate that it already owns compost processing equipment, and can most likely borrow what it does not have from its municipalities.

However, the annual operating costs are also significant for a facility that could handle the volume of yard waste the County expects to generate and process. These costs should be equitably divided between the County and the municipalities that would be served by the facility.

A number of options exist for equitable cost-sharing with the municipalities that choose to participate. Two of the most equitable are:

1) The municipalities pay a share of operating costs based on the number of visits from their community, including both the public and municipal trucks;

2) The municipalities pay a share of operating costs based on the number of households (or single-family households) in their jurisdiction;

Assigning a share of operating costs to all participating municipalities in the County, based on the number of single-family households in the jurisdiction seems the most equitable, because:

- Having municipalities contribute based on the number of visits from their jurisdiction imposes a disincentive to encourage promotion of the facility, and thus a disincentive to reduce waste disposed;
- Assigning costs based on number of visits requires a system to keep track of individual visits and credit them to the proper municipality, which may increase costs;
- Calculating the contribution based on single-family households recognizes that multi-family households are normally serviced by private landscapers;
- Such a system does not overburden smaller municipalities.
- Such a system provides an incentive for municipalities to encourage their residents to use the facility rather than disposing of or burning their yard waste

Municipalities that participate in the capital funding for the facility would be partners and would be given consideration in the terms of their operating cost-sharing arrangement. This might take the form of a reduced share of operating costs.

In addition to the Cumberland County jurisdictions that are actively interested in pursuing a regional yard waste facility, other potential participants have been identified. It may be in the County's interest to offer favorable terms to those who are willing to enter into partnerships up-front and participate in site development. Later entrants may be required to pay an extra fee up-front that could count towards the site development costs already borne by the County, its

original partners and the DEP. Alternatively, in the interest of equity, the County could allow later entrants to "piggy-back" on the same contract terms.

Individual residents who used the yard waste facility to drop-off their yard waste materials, and to potentially also pick up finished mulch and compost, may also be assigned a share of the costs. There are a number of options for this as well, including a gate "tipping fee", a pre-paid system, and a fair price for the final products.

Private landscape contractors may be expected to use the facility also. Currently very little is known about the amount of yard waste managed by private landscape contractors, and where and how it is processed. The cost of their usage of the site capacity must also be factored in to any cost-sharing formula, in a way that encourages them to use the site but not overwhelm its capacity.

Tracking Yard Waste Volume

A regional yard waste site, as envisioned, would by definition serve multiple jurisdictions, residents of those jurisdictions, and potentially private contractors. A system would be needed to record the amount of material brought in from each jurisdiction, in order to track tonnage for Pennsylvania Act 101 annual municipal and county reporting. The purchase of a scale and associated data collection system is costly and impractical, so some method of gathering data on yard waste volume, then converting it to tonnage, is needed.

One option would be to use a card-key system that would track the volume data and allow restricted access to the site. These cards would be issued to municipalities for each truck expected to visit the site. The card would be swiped and the visit recorded. The cubic yard capacity of the truck would be recorded on the card, and each visit would assume a full truck.

Residents and landscape contractors would purchase similar card keys at County and municipal offices or designated agencies. The cards could be configured to allow a certain number of visits for a certain fee paid, similar to telephone minutes cards. To track the volume delivered by private residential vehicles, a standard cubic yardage would be assumed and applied to every private residential visit. The municipality of residence would be recorded on the card.

The costs and complexity of installing a card-key or similar system should be explored. It is possible that a simpler record-keeping system, such as checking drivers' licenses or vehicle registrations, may be adequate.

Conclusions and Recommendations

A regional yard waste processing facility would allow Cumberland County to expand its role in assisting its municipalities with waste reduction and recycling services. It could serve the needs of the five municipalities that participated in this study by providing a centralized location for municipal yard waste delivery, processing and product pick-up. The two municipalities that

currently have no services for their residents would benefit most (provided the site were geographically convenient), the two municipalities with active sites that are constrained by potential development or conflict with other land uses would benefit as well, by potentially sharing the costs of site development and thus reducing their impact. The one municipality that has its own permitted yard waste site may not initially benefit, but longer term may be able to better manage its material flow and share its site in a larger regional system. Another benefit of a regional yard waste site would be to potentially expand yard waste management services to a greater number of municipalities in Cumberland County, possibly strengthening the relationships between the County and municipalities that currently provide no yard waste services. If centrally located and easily accessible, the site could expand to include additional municipalities beyond the five that participated in this study.

Based on the analysis in this report, R.W. Beck makes the following recommendations to Cumberland County:

1. ***Plan for a regional yard waste facility that could initially manage the yard waste processing needs of the five initial participants in this study, and would also have the capacity to grow and accept additional materials from within those communities and/or from other communities over time***. . Ownership of the site and facility by the Solid Waste Authority of Cumberland County is desirable; however, municipal site ownership would likely be a practical alternative if a municipal yard waste site is converted to regional use, or if a municipally-owned site conforming to DEP guidelines is identified. The County should recognize that growth can arise from expansion of existing municipal collection programs; increases in participation in these programs, and additional municipalities establishing collection programs. The County should also recognize that the initial five interested municipalities may not be the initial participants in the regional site, and possibly may not participate at all, depending to a large degree on the relationship they see between their existing yard waste sites and a regional site. Some additional municipalities, on the other hand, may not fully recognize the advantages of participating in a regional site until it is built and operating successfully.
2. ***Identify municipal partners willing to participate by helping to develop the site (including cost sharing), contributing yard waste materials, and assisting with site management.*** A site of up to 15 acres should be identified, ideally a site under either County or municipal ownership, based on geographic location and conformance with site criteria identified in the DEP Compost Guidelines. Actual development costs for such a site, based on the potential costs and site layout presented in this report, should be solicited. An equitable cost-sharing arrangement for both development and operating costs of the site should be agreed upon. The partners should consider three scenarios: 90 percent DEP recycling grant funding, some lesser percentage of grant funding under which they will still participate, and no grant funding forthcoming (if they still wish to participate under those terms). An agreement with these partners should be drafted, either informally or on a contractual basis, outlining the goals and the parameters of this relationship. This regional partnership should then apply for

a DEP Act 101, Section 902 Recycling Development and Implementation Grant for site development.

3. ***Develop an equipment usage plan for the facility.*** The County Solid Waste Authority's existing yard waste equipment should be factored into this plan based on how much time it must be dedicated to the regional site and how much time is then available for the municipalities under the current yard waste processing agreement. The current agreement may have to be changed to accommodate the new demands of a regional site. It should be taken into account that equipment demands are seasonal in nature. The County should consider permanently dedicating their tub grinder to the regional yard waste site. A detailed inventory of municipally-owned equipment (including information pertaining to the condition and age of equipment) should be performed, to identify which pieces may be suitable for usage at the regional yard waste site. The County should be prepared to consider a reduced fee or some other consideration to a municipality that has a front-end loader appropriate for use at the regional site, to save the County the considerable purchase or lease cost for such equipment.
4. ***Identify preferred funding and cost-sharing strategies.*** The SWACC should prepare a Section 902 Recycling Development and Implementation grant application for the initial development costs. Ongoing operational cost-sharing strategies could be based on a tiered system of fees for municipalities that originally signed on as partners in site development and/or provided some funding or other resources for capital expenditures; other municipalities that are not original partners but agree to participate later and provide some resources for the development and/or operations of the site; private citizens residing in participating municipalities, and private landscape companies doing business in the County.
5. ***Develop an operations plan, to include responsibility for staffing and associated tasks on-site.*** The SWACC attorney could help investigate the legal issues of liability and risk management. As part of this plan, the jurisdictions should identify how the volume of material will be tracked for each jurisdiction, as necessary to calculate recycling rates. Site security should also be addressed.
6. ***Consider establishing a fair price for compost and mulch products produced at the regional site in order to help defray operating costs***. The price structure should allow the products to compete with privately available mulch and compost, considering the quality of the products, proven consumer demand, and the availability of competing goods.

We hope these findings are useful to you, and we appreciate the opportunity to work with Cumberland County on this project. Please contact me at (508) 935-1807 should you have any questions.

Very truly yours,

R.W. BECK, INC.

Sandi Childs
Consultant

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