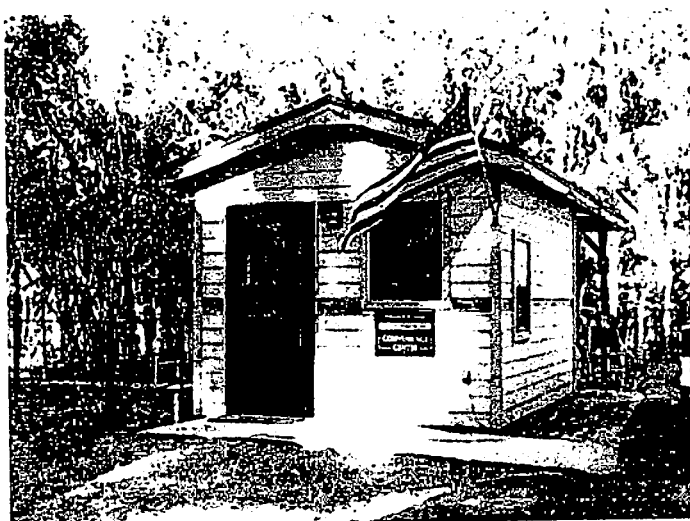


Final Report

Evaluation of Solid Waste Management Alternatives

Beaufort County, South Carolina



February 2005



R. W. BECK

EVALUATION OF SOLID WASTE MANAGEMENT ALTERNATIVES Beaufort County, South Carolina

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EXECUTIVE SUMMARY

Purpose of Study

In 2004, Beaufort County, South Carolina retained R.W. Beck, Inc. to review its current arrangements for county-wide solid waste disposal and recycling, solid waste collection in Solid Waste Districts 6 and 7, and to evaluate alternatives that could be implemented for disposal, collection and recycling in the future. To provide guidance to the evaluation process, the Beaufort County Solid Waste and Recycling Board and staff identified the criteria that were the most important to the County in their solid waste management system. The results of this process, which are described in more detail in the following sections, suggest that for disposal, collection, and recycling, low long-term operating costs are the top priority, even if this requires capital investment in the near term.

The County undertook this study with an eye toward the future, to prepare for the continuing growth that the County is expected to experience. The net present value of 20 year costs and the average cost per ton over 20 years was projected for several alternatives. The U.S. Census Bureau projects that the County's population will continue growing at nearly 4 percent each year, faster than any other County in the State. Of equal impact to solid waste management in the County, an estimated 2.2 million people visit Beaufort County each year. The solid waste generated by these new residents and visitors must be accommodated.

Summary of Results and Recommendations

The analysis contained in this report indicates that Beaufort County can likely reduce its future disposal costs, can cost effectively offer curbside collection of residential waste and recyclables in specific Solid Waste Districts, and can continue to reduce the costs associated with its recycling program. The recommendations in this report include capital investments to be made either by the County or by a private contractor. However, based on the guidance provided by the Solid Waste and Recycling Board and staff, the County ~~was~~ would consider investing to invest in facilities, equipment, and vehicles in order to reduce long-term operating costs and increase its control over the future of solid waste management in Beaufort County.

Disposal

The amount of municipal solid waste (MSW) disposed of by Beaufort County residents and businesses in fiscal year 2004 (FY04) was just over 132,000 and is expected to increase to nearly 268,000 tons per year by FY2024. As the waste to be disposed increases, so will the cost of managing it.

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Currently, MSW from Beaufort County is disposed of at the Hickory Hill landfill, owned and operated by Waste Management, Inc., under a contract that expires in June 2010. The tipping fee charged to the County is currently \$43.08, higher than most local governments in the state pay for disposal.

Research conducted for this study suggests that there is significant capacity in landfills throughout the region to handle Beaufort County's waste. However, these landfills are far enough away from Beaufort County to warrant the use of a transfer station if waste was to be disposed at these sites. It is estimated that depending on the size of a transfer station, it would cost between \$4.38 and \$6.25 per ton to operate a transfer station. In addition, costs to haul waste in trailers from the transfer station to a more distant landfill are projected to range from \$11.40 to over \$30 per ton.

In reality, the actual price paid for transfer/haul/disposal alternatives would depend on factors other than costs, for example, competition among disposal facilities. Thus, it is recommended that the County issue a Request for Proposals for disposal capacity, to include transfer and hauling. The request could allow companies to propose on several options, including providing rates for disposal capacity only and rates for transferring and hauling waste as well as disposal capacity. It is recommended that this Request for Proposals (RFP) be issued in 2007, well before the current disposal contract expires. This will allow time for the County or a contractor to develop and permit any necessary infrastructure, such as a transfer station, to implement the most cost effective option.

Collection

The County requested that R.W. Beck, Inc. analyze the costs associated with implementing curbside collection for solid waste and recyclables in Solid Waste Districts 6 and 7. These costs were projected over a 20 year planning horizon. The average cost to collect solid waste and recyclables weekly in these two Districts (implemented simultaneously) is projected to be just under \$10 per household per month, or an average of \$2.2 million per year, including the cost of vehicles and containers. If the three drop off centers in these Districts were scaled back to accept only yard waste and bulky materials, an estimated \$300,000 per year would be saved in container rental and hauling costs. Offering curbside collection in these two Districts would require that the County develop a mechanism that allows it to bill residents of different Districts based on the level of service received. Residents in an area receiving curbside collection from the County are receiving a higher level of service than those that still use drop off centers to dispose of their waste and they should pay more for this service.

Although the only way to know what a contractor might charge to provide this service is to issue a bid solicitation, there is no reason to assume that the actual costs to provide this service will differ dramatically whether the County operates the system or if they hire a contractor to provide this service. Thus, the County should decide whether to purchase the equipment and hire the staff to operate the collection system or hire a contractor to do so based on factors other than cost. Most importantly, the County should determine whether it wants to get into the collection business for the

long term. The decision should take into account that as the County grows, County-provided curbside collection, either through County or a contractor, may need to be expanded to cover others areas with increasing density.

Recycling

Processing fees are currently the most costly part of the County's recycling program. R.W. Beck's analysis suggests that the County could reduce these costs by nearly \$86,000 per year, over a 20 year time horizon, by developing a recycling facility that accepts two streams of recyclables, mixed paper and commingled containers. A two-stream facility would also allow for less costly collection approaches at the curb and fewer containers at the drop off centers.

The processing option with the lowest projected long term net costs (after revenues are applied) is a facility that allows for the sorting and baling of mixed paper and the transfer of commingled containers to another processing facility that has the ability to sort these materials. Our research indicates that there are markets for the sorted, baled paper as well as one or more facilities that would accept commingled containers. However, it is recommended that the County secure market agreements for sorted and baled paper as well as commingled containers before developing a facility. A recycling facility can be owned and operated by the County or a private contractor. County operation provides more control but also more risk. If a transfer station is part of the County's ultimate disposal system, it would be cost-effective to co-locate a recycling facility with a transfer station. However, the County may want to move ahead with a recycling facility before 2010 when the County implements a new disposal alternative.

Next Steps

Table ES-1 indicates the steps to be taken and a draft schedule to implement the recommended options contained in this report. The schedule will need to be adjusted over time as the approach the County chooses to take is refined.

EXECUTIVE SUMMARY

Table ES-1
Implementation Steps for Recommended Options

Actions for Solid Waste Collection and Disposal and Recycling Program Operations		
		2005
Determine whether the County or a contractor will operate the collection system.		Spring 2005
For recycling program operations, solicit proposals from markets and processors to accept source separated materials, mixed paper, and commingled materials and confirm best approach for processing/transporting ⁽¹⁾		Spring 2005
If contractor collects, define role of County and role of contractor (e.g., billing, customer service, purchase and distribution of containers)		Summer 2005
The County will inform residents and private haulers operating in the area about the upcoming changes in the collection system		Summer 2005
If County collects, perform routing analysis to finalize equipment and staffing needs		Summer 2005
For recycling program operations, identify site for MRF (work with military bases to determine their interest in combining material)		Summer 2005
For recycling program operations, negotiate agreement for processors to accept commingled containers		Summer 2005
For recycling program operations, design MRF to sort and bale paper and to transfer recyclables (assuming agreement is in place to accept commingled containers)		Summer 2005
If contractor collects, issue RFP for services to be provided by contractor		Fall 2005
If contractor collects, negotiate contract with collector		Fall 2005
If County collects, issue bid solicitation for vehicles and containers		Fall 2005
If the County collects, County will order vehicles and containers		Fall 2005
For recycling program operations, enter into short term agreements for baled paper		Fall 2005
For recycling program operations, complete construction of facility		Fall 2005
		2006
Determine whether surrounding communities are interested in participating in a solicitation for solid waste disposal		Through 2006
Purchase equipment and containers, if County is to provide		Spring 2006
Educate residents about changes in collection system and impact on fees		Spring 2006

EXECUTIVE SUMMARY

Table ES-1
Implementation Steps for Recommended Options

Actions for Solid Waste Collection and Disposal and Recycling Program Operations		
Hire and train staff		Spring (June) 2006
Distribute public education material about recycling		Spring (June) 2006
Adjust mileage to recover costs of collection system from users		Spring (June) 2006
Distribute containers		Spring (June 2006)
Begin curbside collection program		Summer (July 1) 2006
For recycling program operations, divert curbside recyclables from Districts 6 and 7 to MRF		Summer (July) 2006
For recycling program operations, adjust mileage to reflect the new costs of the recycling system		Summer (July) 2006
Downgrade drop off centers to collection yard waste and bulky materials only		Fall 2006
Prepare RFP, carefully laying out options, for solid waste disposal		Winter 2006
If contractor collects, determine impact of curbside collection fees		Winter 2006
If County collects, determine impact of curbside collection on fees		Winter 2006
For recycling program operations, begin to divert recyclables from drop off centers, curbside, and commercial programs to MRF		Winter 2006
For recycling program operations, promote the availability of the MRF to other generators of recyclables		Winter 2006
For recycling program operations, redesign drop off centers to accept two streams of recyclables		Winter 2006
		2007
Issue RFP for disposal capacity		Spring 2007
Evaluate responses to RFP for disposal capacity, including a full cost analysis of County ownership and/or operation of necessary transfer operation, if any		Summer 2007
Negotiate contract for disposal		Fall 2007

EXECUTIVE SUMMARY

**Table ES-1
Implementation Steps for Recommended Options**

Actions for Solid Waste Collection and Disposal and Recycling Program Operations		
		2008
If County is to develop transfer capacity for solid waste disposal, procure land		Fall 2008
Educate public about new disposal rates		Winter 2008
		2009
If County is to develop transfer capacity for solid waste disposal, design facility and acquire permit.		Spring 2009
If County is to develop transfer capacity for solid waste disposal, begin construction		Fall 2009
		2010
If County is to develop transfer capacity for solid waste disposal, complete construction		Spring 2010
If private firm develops transfer capacity, begin directing waste to transfer station		Summer (July 1) 2010
If County is to develop transfer capacity for solid waste disposal, begin operation		Summer (July 1) 2010
If County is to develop transfer capacity for solid waste disposal, implement new rates that reflect the new disposal option		Summer (July 1) 2010
For recycling program operations, continue to educate and inform the public about opportunities to recycle		Ongoing

¹ This schedule indicates the dates for implementing an alternative option for processing exclusively. If the County decides to move ahead with a transfer station, a recycling facility could be co-located with the transfer station which would push the schedule for implementation back.



Section 1

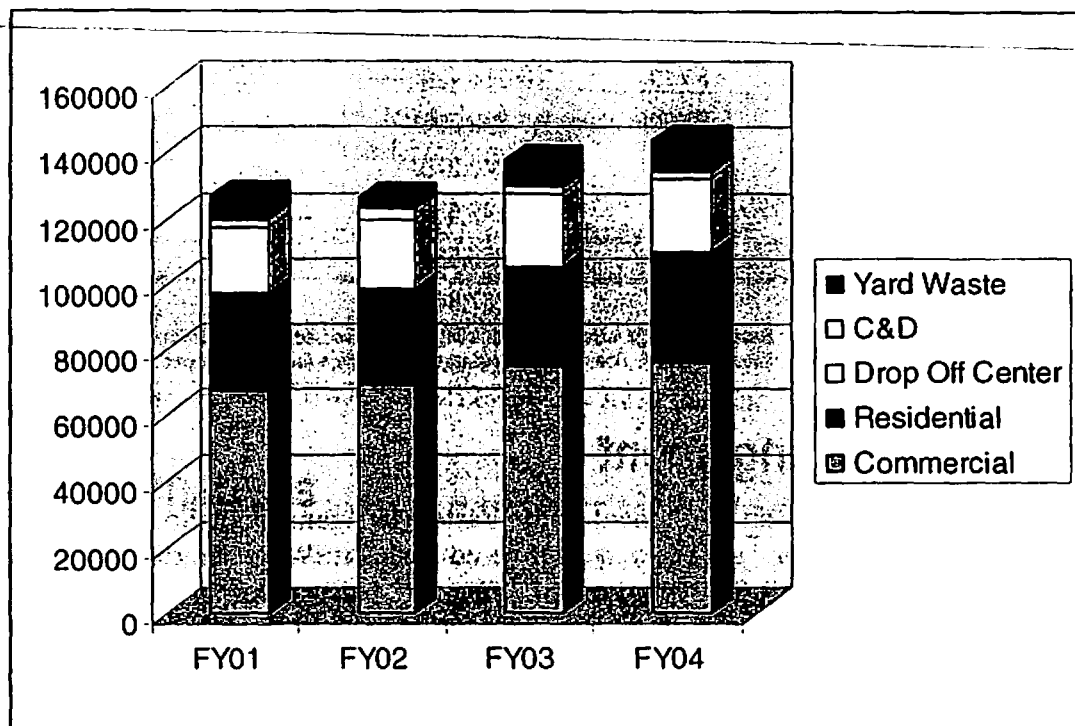
DISPOSAL ALTERNATIVES

Section 1 DISPOSAL ALTERNATIVES

1.1 Amount of Waste

Nearly 144,000 tons of solid waste was disposed of from Beaufort County in Fiscal Year 2004, as shown in Figure 1-1. Just over 132,000 tons of the total amount of waste disposed in Fiscal Year 2004 was municipal solid waste (MSW) disposed of at the Hickory Hill landfill in Jasper County, just across the western border of Beaufort County. The remainder of the waste was yard waste or construction and demolition debris disposed of at either Barnwell Resources Landfill in Beaufort County or Oakwood Landfill in Jasper County. Over half of the total waste disposed of was commercial waste, due in large part to contributions from the tourism and hospitality industry that dominate a good portion of the County.

Figure 1-1
Tons Disposed



On average, the total amount of waste disposed has increased 4 percent per year over the past six years. If the total amount of waste continues to increase by 4 percent each year, then Beaufort County will generate 267,841 tons of MSW for disposal in Fiscal Year 2024, as shown in Table 1-1.

Table 1-1
Projections of MSW to be Disposed

Year	Tons
FY05	136,786
FY06	141,710
FY07	146,812
FY08	152,097
FY09	157,573
FY10	163,245
FY11	169,122
FY12	175,210
FY13	181,518
FY14	188,053
FY15	194,822
FY16	201,836
FY17	209,102
FY18	216,630
FY19	224,429
FY20	232,508
FY21	240,878
FY22	249,550
FY23	258,534
FY24	267,841

Based on average increase in the amount of waste disposed at Hickory Hill landfill from FY98 through FY2004. Does not include construction and demolition debris or yard waste.

1.2 Current Arrangement

The County currently has an agreement with Waste Management of South Carolina, Inc. (WMI) to deliver (or “cause to be delivered”) all MSW generated within the County to the Hickory Hill Sanitary Landfill (Hickory Hill) in Jasper County. This excludes separated yard waste and construction and demolition debris. The 20-year contract expires June 30, 2010, with two ten-year optional terms. This contract was “amended and restated” in January 2004.

Hickory Hill is the only landfill located within 30 miles of the most densely populated areas in Beaufort County. The northern part of Beaufort County has good access to the site via Route 170. The Bluffton/Hilton Head area also has access via Route 278; however, haulers from Hilton Head Island can experience delays on Route 278 during the day because of traffic onto and off of Hilton Head Island. Growth projected for this area of the County is expected to make traffic congestion more severe over the planning period.

As of August 2004, the County was paying \$43.08 per ton for waste disposed at the Landfill.¹ Table 1-2 suggests that this amount is high compared to what other local governments in the region are reportedly paying.² The County pays the tipping fee for all residential waste collected in the County, whether it is collected at County drop off centers or in curbside programs operated by private haulers or municipalities. In the past, the County also paid the tipping fee for all commercial waste generated in the County. However, haulers of commercial waste are now paying a portion of the tipping fee for the waste they collect and deliver to Hickory Hill. By July 1, 2006, the County will no longer be paying any disposal costs for commercial waste.

The County spent nearly \$4,000,000 in FY2004 to pay for the disposal of waste generated in the County. The revenue to cover these costs, as well as the County's other solid waste management costs, comes from a solid waste mileage collected on the property tax bill. The mileage is adjusted annually depending on the County's solid waste management budget.

Table 1-2
Tipping Fees in Surrounding Communities

Local Government	Facility Used	Cost per Ton for MSW
Beaufort County	Hickory Hill Landfill	\$43.08
Screven County, Georgia	Hickory Hill Landfill	\$19.98
Bamberg County	Tri-County (regional waste authority) transfer station	\$40
Barnwell County	Transfer station owned /operated by Three Rivers Solid Waste Authority	\$30.15
Berkeley County	Berkeley County Landfill	\$19
Colleton County	Oakridge Landfill	\$36.50
Horry County	Horry County Landfill	\$29

¹ Based on telephone conversations in November and December 2004 and January 2005.

1.3 Alternatives

The current disposal agreement between Beaufort County and Waste Management of South Carolina, Inc. d/b/a Hickory Hill Sanitary Landfill and Recycling Center, dated January 30, 2004, obligates the County to continue delivering (or causing to be delivered) at least 117,203 tons of solid waste to Hickory Hill landfill annually (increasing by two percent through June 2007) through June 30, 2010. There are no provisions for dissolving the agreement prior to this date.

Since the tipping fee under the current agreement is high compared to what other communities in the region are paying, the County should consider alternatives for

¹ This "tipping fee" increases annually according to an escalator based on the U.S. Department of Labor's "All Items Index" (90%) and "Gasoline Index" (10%).

² Conversations with local government representatives

Section 1

disposal to be ready for implementation on July 1, 2010 when the current term of the contract expires. Since some alternatives, such as developing a new landfill or transfer station, may require several years to implement, the County is considering disposal alternatives now so that it will be prepared to implement them on July 1, 2010. The following alternatives were considered:

- The potential to develop a landfill in Beaufort County based on the availability of land as identified in South Carolina's "Demonstration of Need";
- The use of alternative disposal facilities; and
- Opportunities for regional collaboration.

On December 16, 2004, the Beaufort County Solid Waste and Recycling Board and staff met to establish and score criteria for future disposal alternatives. The results, shown in Table 1-3, indicate that long term costs and maintaining County control are the County's top priorities. These priorities guided the evaluation of alternatives.

**Table 1-3
Evaluation Criteria for Disposal Alternatives**

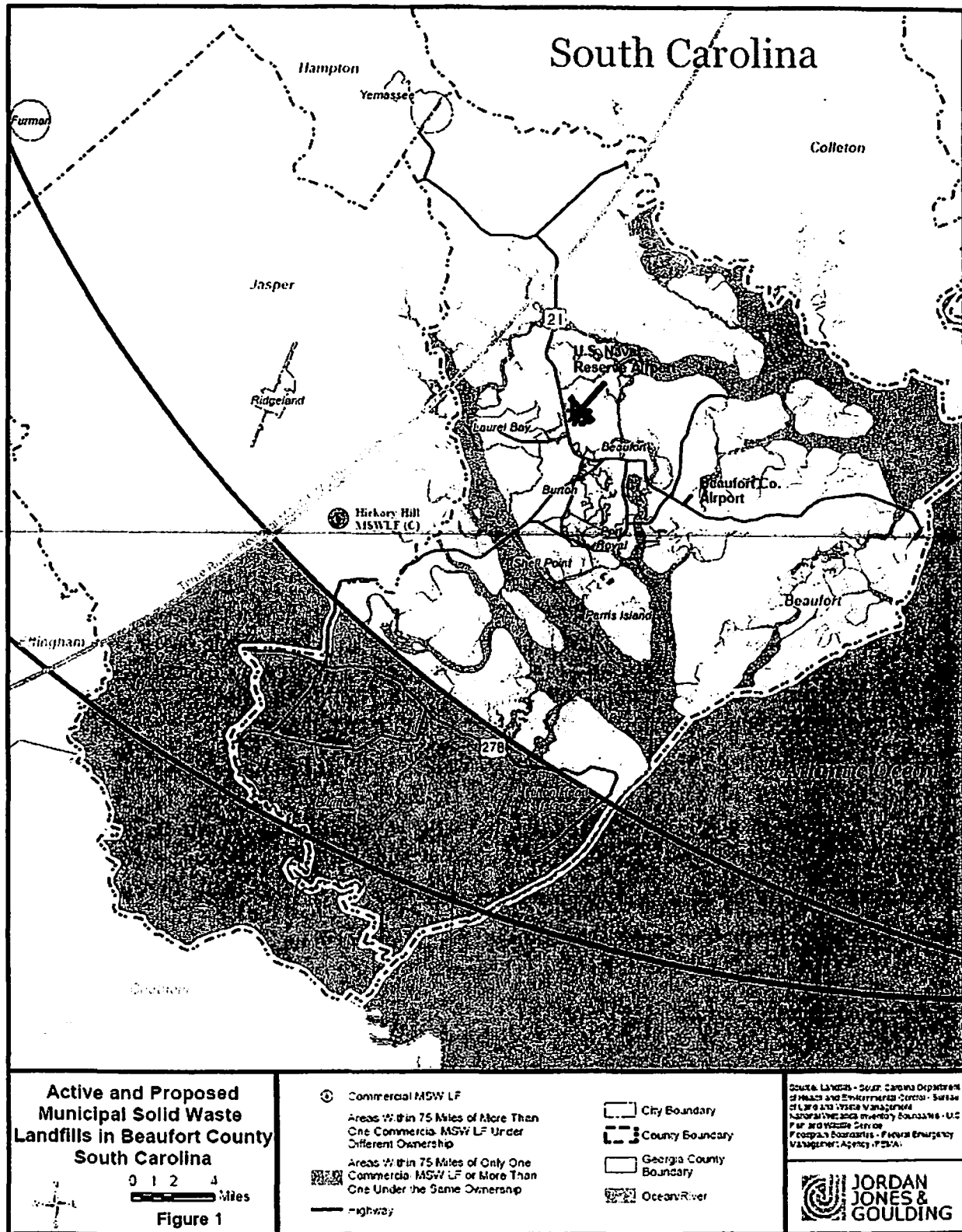
Criteria	Score ¹
The alternative selected should have the lowest possible average cost per ton over 20 years.	4.75
The alternative selected should allow Beaufort County maximum control over its destiny.	4.50
The alternative selected should address the cost of commercial and residential disposal.	3.86
The alternative selected should have the lowest capital investment requirement.	3.13
The alternative selected should not include the development of a new landfill in the County.	2.88
The alternative selected should not include the development of a new transfer station in the County.	2.50
The alternative selected should not include the development of a new landfill at all.	2.29

¹ A score of 1 is the least important and a score of 5 is the most important.

1.3.1 Develop In-County Landfill

R.W. Beck, Inc. was tasked with identifying potential areas of the County where a new landfill could be developed based on the State of South Carolina's Demonstration of Need requirement. This requirement limits construction of a new solid waste disposal facility in areas where there are at least two (2) commercial disposal facilities under separate ownership in the State of South Carolina within a 75 mile radius. Figure 1-2, based on maps obtained from the South Carolina Department of Health and Environmental Control (DHEC), illustrates that the only portion of the County that meets this limitation (i.e., that is not within a 75 mile radius of two commercial disposal facilities under separate ownership within South Carolina) is located south of Hwy 278. This area represents approximately one-fourth of the County.

Figure 1-2
Land Limited by S.C. Demonstration of Need Requirement



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Section 1

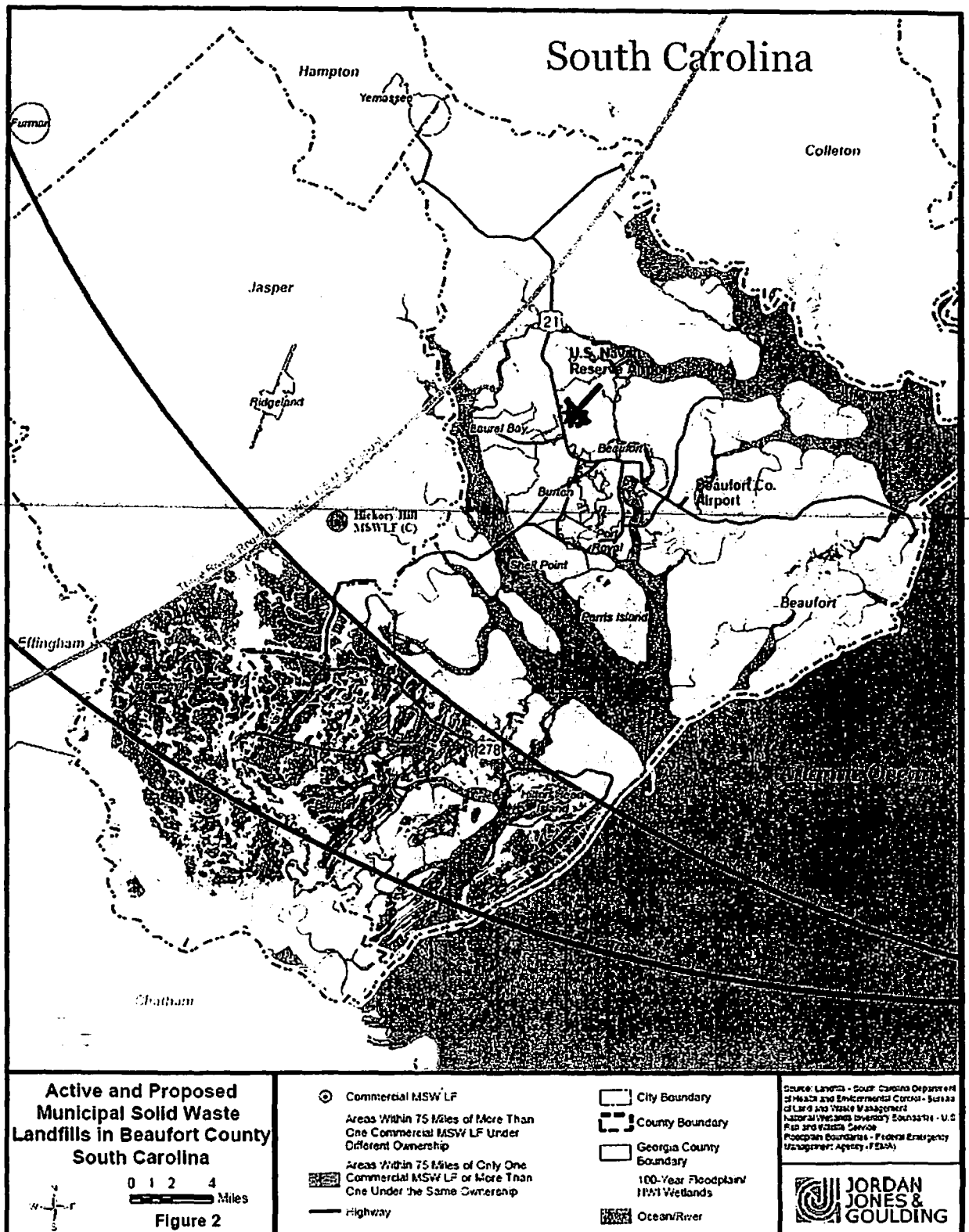
Other landfill location restrictions are specified in regulation 67-107.258.10. These restrictions include, but are not limited to, development within 100 year flood plains and wetlands. Floodplain boundaries were obtained from the Federal Emergency Management Agency maps and preliminary wetland boundaries were obtained from the U.S. Fish and Wildlife Service's National Wetlands Inventory Maps. Applying these restrictions to a map of the County further reduces the areas where a landfill could be located as illustrated by Figure 1-3. The acceptable areas indicated will likely be reduced even further by landfill development restrictions around airports. Parts of the County that are within a six mile radius around the Savannah/ Hilton Head International Airport, Beaufort County Airport, U.S. Naval Reserve Airport, and the Hilton Head Airport property would also need to be excluded. Evaluations of additional landfill siting limitations are beyond the scope of this report.

1.3.2 Use of Alternative Disposal Facilities

The analysis of alternative facilities where Beaufort County could dispose of its waste starting in July 2010, when its current contract with Hickory Hill expires, was conducted using the following approach:

- A review of disposal facilities in South Carolina and Georgia was conducted.
- ~~Certain facilities were eliminated from consideration based on distance, travel time, and access from major highways. Generally, sites within about 170 miles and less than 3 hours drive time were kept on the list of facilities to be considered further. One exception was the Charing Landfill in Taylor County, Georgia which was kept for consideration because it is able to accept waste by rail, offering the potential for more distant hauls economically. Other Waste Management owned facilities were not considered under the assumption that the company would have no incentive to offer a better deal at a more distant landfill.~~
- All landfills that met these criteria were contacted by telephone to determine their interest in accepting waste from Beaufort County. Table 1-4 indicates the facilities contacted and their interest in accepting waste from Beaufort County. Those that stated that they would not accept waste from Beaufort County usually cited local ordinances, host agreements, or other requirements that precluded the acceptance of waste from outside the County or, in the case of Georgia facilities, the State. The location and distance of the remaining facilities (from the City of Beaufort and from the Hilton Head Island Bridge) are shown in Table 1-4. Their location is shown on Figure 1-4.

Figure 1-3
Land Limited by S.C. Demonstration of Need Requirement,
Floodplain and Wetland Boundaries



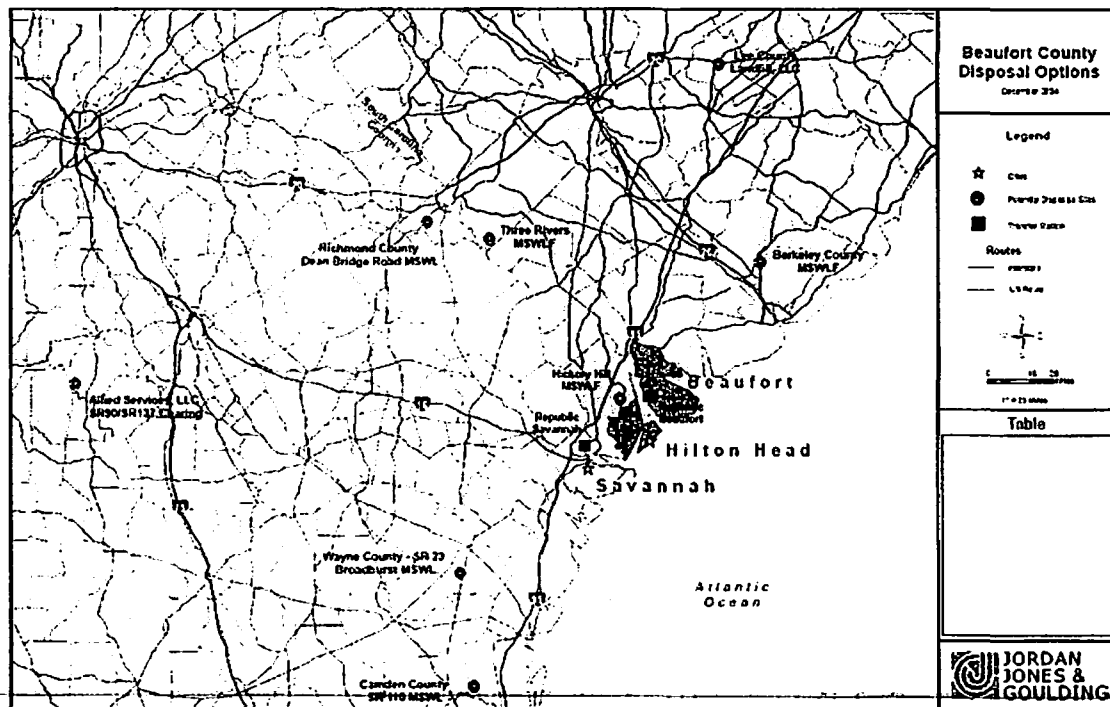
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Section 1

Table 1-4
Disposal Facility Interest in Accepting Waste from Beaufort County

Site	Location	Owner/Operator	Interest ¹	Rd. Miles to City of Beaufort	Cost per Ton ²
Lee County Landfill	Lee Co., SC	Allied Waste	Yes	144	20
Broadhurst Landfill (operates 1 transfer station)	Wayne Co., GA	Republic Waste	Yes	143	16-26
Three Rivers Landfill (operates 4 transfer stations)	Aiken, SC	Three Rivers SWMA	Yes	95	28.77
Camden County Landfill	Camden Co., GA	Camden County	Yes	169	27
Charing Landfill	Taylor Co., GA	Allied Waste	Yes	249	15.15
Deans Bridge Road Landfill	Richmond Co., GA	Richmond County	Yes	137	28-32
Berkeley County Landfill	Berkeley Co., GA	Berkeley County	Yes	89	50
Toombs County	Toombs Co, GA	Toombs County	Does not accept out-of State waste		
Dean Forest Road Landfill	Savannah, GA	City of Savannah	Does not accept out-of State waste		
Candler County Landfill	Candler Co., GA	Candler County	Does not accept out-of State waste		
Georgetown County Landfill	Georgetown Co., SC	Georgetown County	Does not accept out-of County waste		
Savannah Waste-to-Energy Plant	Savannah, GA	Montenay Power	Current contract with City does not allow acceptance of additional waste		
¹ From telephone conversations November 2004 through January 2005. ² From telephone conversations or quoted gate rates.					

Figure 1-4
Alternative Disposal Facilities



The remaining facilities were researched further to determine the remaining life of the site, facility capacity, the average daily tonnage accepted, the anticipated length of a contract required for a generator like Beaufort County, and the approximate tipping fee. It is important to recognize that given the nature of these discussions, the contractual issues are for comparison only and do not reflect the actual terms likely to be negotiated. In fact, several facility operators were not willing to provide specifics about contract terms, such as tipping fees, without further discussions directly with the County. In these cases, we have listed the published gate rate. The results are shown in Table 1-6.

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**Table 1-5
Disposal Facility Alternatives**

Facility Name	Ownership	Remaining Facility Life (years)	Avg. Daily Tonnage	Length of Contract (Years)	Approximate Tipping Fee (\$/ton)	Comments
Camden Co Landfill	Camden (GA) County Solid Waste Authority	19	450	5 yr./5 yr. renewal	out of state 27	1000 acres to expand(negotiable on rate)
Richmond Co Deans Bridge	Richmond Co., GA	2	750	discount based	28-32	Negotiable on rate
Charing Landfill	Allied Waste	23	5,000	3 to 5	15.15	Rail Access
Broadhurst Landfill	Republic Waste	16	2,200	min 5	16-26 - neg.	Existing transfer station located in Savannah. Rail access possible 8/2005
Berkeley Co Landfill	Berkeley Co Water & Sanitation Authority	21.6	500	negotiable	50	
Lee County Landfill	Allied Waste	23.4	4,000	5 w/renewal	20	Rail Access
Three Rivers Landfill	Three Rivers Solid Waste Authority	106.9	900	put or pay	28.77	Closet Three Rivers owned transfer station is 75 miles
Hickory Hill Landfill	Waste Management	26.6	700	-	-	See Existing contract

South Carolina DHEC Landfill Capacity Data:

http://www.scdhec.gov/lwm/html/Annual%20Report%2003/Chapter_10/Chapt%2010%20Table%2010.5%20MSW%20LF%20Disposal%20and%20Capacity.pdf

Georgia Department of Natural Resources Landfill Capacity Data: http://www.ganet.org/dnr/environ/regcomm_files/lpb/swcapacity03.xls

Transfer Stations

Given that the next nearest landfill that could take waste from Beaufort County is nearly 90 (road) miles from Beaufort County, the County would need to use a transfer station to access landfills other than Hickory Hill in a cost effective manner. The primary reason for using a transfer station is to reduce the cost of transporting waste to disposal facilities. Consolidating smaller loads from collection vehicles into larger transfer vehicles enables collection crews to spend less time traveling to and from distant disposal sites and more time collecting waste. It is unlikely that collectors would be willing to bear the cost of hauling waste directly from collection routes to a distant disposal facility. Although cost-effectiveness will vary, transfer stations generally become economically viable when hauling distance to the disposal facility is greater than 15 to 20 miles.³ This would be the case with any of the disposal alternatives other than Hickory Hill.

A transfer station can be developed, owned, and or operated by the operator of the disposal facility used, another private entity, or the County. Republic Waste currently owns a site within Beaufort County that used to operate as an open air transfer station. Republic has expressed interest in retrofitting that site to operate as a transfer station for Beaufort County waste. Alternatively, Beaufort County can develop its own site and then either operate the facility or hire a contractor to do so. Table 1-7 shows ownership and operation options for a transfer station in Beaufort County.

Table 1-6
Potential County and Contractor Responsibilities for Transfer Station

	Own Transfer Station	Operate Transfer Station/Haul Waste	Disposal
Arrangement 1	Contractor	Contractor	Contractor
Arrangement 2	County	Contractor	Contractor
Arrangement 3	County	County	Contractor

R.W. Beck, Inc. has calculated projected costs for three sizes of transfer stations for Beaufort County. One scenario is to have one transfer station sized to handle the County's entire waste stream, assumed to be 800 tons per day toward the end of the 20 year planning period. A second scenario is to have two separate transfer stations, one for the northern part of the County with a capacity of 300 tons per day and a second transfer station in the southern half of the County with a capacity of 500 tons per day. This scenario was included because the population of the County is divided into two distinct areas of the County; north Beaufort County located north and east of Broad River and Port Royal Sound and south Beaufort County located south and west of Broad River and Port Royal Sound.

For the purpose of analyzing the cost of a transfer station in the County we have assumed that a transfer station would be constructed on a five acre site, with land costs

³ Waste Transfer Stations: A Manual for Decision-Making. USEPA, April 2001

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of \$10,000 per acre. The assumed technology is a top load operation employing a tractor and a 100 cubic yard transfer trailer to move a 20 ton payload. Table 1-7 provides planning level costs for three sizes of transfer stations.

Table 1-7
Cost Projections for Transfer Station

Facility Capacity	300 TPD	500 TPD	800 TPD
Predevelopment Costs(05\$) ¹	\$450,000	\$525,000	\$600,000
Building (05\$) ²	\$2,035,000	\$2,200,000	\$2,640,000
Equipment Costs ³	\$681,375	\$1,026,375	\$1,250,625
Annual Operating Costs (05\$) ⁴	\$585,000	\$877,500	\$1,092,000
Average Cost Per Ton (05\$)	\$6.25	\$5.63	\$4.38

1) One time costs for engineering, legal and administrative services, and permitting.

2) Building costs amortized over 20 years.

3) Equipment to operate facility only (no cost for transportation equipment) replaced every 7 years.

4) Labor, fuel, utilities, supplies.

In addition to the costs of operating a transfer station, the County would incur the hauling costs involved with hauler transfer trailer loads from the transfer station to distant landfills. At an estimated cost per ton per mile of 12 cents, haul costs for these alternatives would range from \$11.40 to over \$30 per ton. The combined cost of transfer, haul, and disposal would have to be considered when choosing a disposal option. However, other benefits of a transfer station must be considered in the evaluation of options. Depending on where the transfer station is located, the collector hauling waste from generators to a tipping location may realize savings resulting from shorter haul distances. Although the costs to transfer, haul, and dispose of waste at alternative landfills can be projected, the actual price that the County would be charged is unknown until the County actually negotiates a price for these services.

Rail Haul

Intermodal transfer is a technology that has the potential to change the flow of waste materials from traditional waste sheds. Solid waste from the Northeast has traveled to South Carolina, Virginia, and other states that have low cost landfills. The Lee County Landfill, owned by Allied, is one South Carolina landfill with rail access. Lee County is permitted to receive up to 5,000 tons per day and receives large quantities of solid waste via rail. Another Allied facility, the 137 Charing Landfill located in Taylor County, GA, indicates that rail access is available.

There are two basic approaches to rail haul, one using conventional (high-sided gondolas) and another using intermodal transfer. With conventional equipment, waste is loaded directly into a railcar at a transfer station. At a landfill with a rail siding, waste in high-sided gondolas is unloaded using a rotary dumper, a device that turns a car so that waste can be emptied from the top of the car. At a landfill, waste is loaded into trucks and taken to the working area for disposal.

For transfer stations and/or landfills that are not directly rail served, the intermodal approach offers a means for waste to be transported by rail. Intermodal systems offer

more flexibility primarily for a rail haul program to shift to another rail served landfill. Flexibility is the primary reason that 16 of the 19 operating rail haul programs in the U.S. use intermodal equipment. Waste received at a transfer station is loaded into a container, either using a large bucket loader or a pre-load compactor. Waste is dumped into a 62 cubic yard container (20 ton payload) and tamped down for compaction. The containers can hold a much higher payload, but would exceed the legal limit on highways (gross vehicle weight: 80,000 pounds). In an intermodal system the containers are designed for transfer between truck trailer and rail car. Loaded containers are trucked from the transfer station building to a rail siding that may be located on the transfer station property or at another nearby site. The container is lifted off the trailer and placed on a rail car. At the receiving end the containers are taken from the railcar and trucked to the landfill working face by flatbed vehicles capable of handling a 20 ton payload.

Existing waste generation figures in Beaufort County do not currently justify the investment in rail or intermodal transfer. Other local governments have found that the only way to ensure reliable rail service is to purchase their own rail cars, a significant investment that is more feasible with larger amounts of waste. However, if a company responding to a Request for Proposals proposes to develop a rail transfer station for a competitive price, then the County should consider this proposal.

Haul-All Transtor-System

The County has asked R.W. Beck, Inc. to evaluate a proposal from an equipment manufacturer for a system that is designed to avoid the need for constructing a transfer station building. The Haul-All Transtor System is an outdoor modular storage and transfer system that is composed of one or more 53 cubic-yard storage containers that can receive waste directly from a collection vehicle or from the public at a drop off center. The storage containers swing and empty into a transfer trailer without the need for a loader.

One shortcoming of using this system at drop off centers is that the collection sites must be serviced as soon as the collection containers fill as there is no tip floor to accommodate excess waste. This system also requires waste collected directly from businesses and residents to be handled twice: once to empty collection vehicles into the Transtor containers and a second



time for the Transtor containers to be emptied into the transfer trailer. The Transtor System avoids the cost of constructing a transfer station and scalehouse and the cost of transfer station operations. Because no cost data were available to compare the cost of the Transtor

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System to the transfer station options described above, a cost comparison could not be performed.

1.3.3 Regional Collaboration

It may be possible for Beaufort County to reduce the cost per ton for transfer, haul, and/or disposal by collaborating with nearby counties on disposal alternatives. Often, existing disposal facilities will offer better per ton rates for higher tonnages. Similarly, as shown in Table 1-10¹, the cost per ton to operate a County transfer station is lower for larger facilities so increasing the amount of waste handled at a transfer station by pooling waste from more than one County may lower costs.

Other counties in the State of South Carolina have formed solid waste management authorities to jointly manage their waste. The motivation to overcome the challenge of political and jurisdictional boundaries and work together on developing disposal alternatives typically comes when multiple counties face similar challenges, either a lack of disposal alternatives or high tipping fees. Given that all of the counties surrounding Beaufort County currently have long-term disposal alternatives available and given that all of the counties except Charleston County generate significantly less waste than Beaufort County, there is no clear incentive for neighboring counties to join together to address disposal needs (see Table 1-10).⁷ However, like Beaufort County, surrounding counties may be interested in reducing the cost of disposal by considering alternatives. Therefore, it is recommended that prior to issuing a Request for Proposals for transfer and/or disposal capacity or developing a County transfer or disposal facility that the County contact surrounding communities to determine their interest in participating in a disposal solution with Beaufort County.

Table 1-8
Amount of Waste and Current Disposal Arrangements in Surrounding Counties

County	Waste Disposed ¹	Current Disposal Facilities Used	Remaining Life (years) ²
Jasper	17,693	Hickory Hill	26
Hampton	16,591	Hickory Hill	26
Colleton	15,939	Oakridge	18
Charleston	381,609	Foster Wheeler Waste to Energy Facility	Indef.

¹ SCDHEC Annual Report FY03, Table 10.2, MSW Landfill Disposal Data by Facility and County or State of Origin in Tons

² SCDHEC Annual Report FY03, Table 10.2, MSW Landfill Disposal Data by Facility and County or State of Origin in Tons

1.4 Recommendations

Our research suggests that given the limited land available in Beaufort County for development of a new landfill and the abundance of capacity in landfills in the region, sending waste to an existing landfill is the best option to handle Beaufort County's waste. To ensure that Beaufort County has a disposal option in place for July 2010 that minimizes long-term disposal costs, R.W. Beck, Inc. recommends that the County issue a Request for Proposals for disposal capacity in 2007, allowing sufficient time

for a contractor or the County to develop the infrastructure that may be necessary to transfer waste to a more distant landfill. A contract term of at least five years is recommended to offer a private company time to recover the investment in any infrastructure needed.

The request does not need to specify whether the proposed capacity needs to be in an existing or new landfill or in a transfer station. The County could specify several options in its RFP including a rate for disposal capacity only and a rate for transfer and disposal capacity. If the cost of transfer, haul, and disposal are separated out in a proposal, the County can compare the cost of a private transfer station to the projected costs for a County facility updated from Table 1-8.¹ Because one of the County's main criteria for a future disposal system is to maintain control, the County may want to consider owning, and possibly operating the transfer station itself, even if the costs are slightly higher. Whether a transfer station is publicly or privately operated, the County is likely to incur costs approximating those projected in Table 1-8, either through direct costs of developing and operating the facility or through the fees it pays a Contractor to operate the facility. Another possible arrangement is for the County to lease land it currently owns or purchases for this purpose, to a contractor for a transfer station. This may make it easier for a contractor to site and develop a transfer station and reduce costs accordingly.

Table 1-~~11~~⁹ contains an implementation schedule for disposal options. Note that the dates are approximate as circumstances may change that require the County to accelerate or reduce the schedule.

**Table 1-9
Implementation Schedule for Disposal Options**

Action		Date
Determine whether surrounding communities are interested in participating in a solicitation		Through 2006
Prepare RFP, carefully laying out options		Winter 2006
Issue RFP for disposal capacity		Spring 2007
Evaluate responses to RFP, including a full cost analysis of County ownership and/or operation of necessary transfer operation, if any		Summer 2007
Negotiate contract		Fall 2007
Educate public about new disposal rates		Winter 2008
If County is to develop transfer capacity	If private firm develops transfer capacity	
Procure land		Fall 2008
Design facility and acquire permit		Spring 2009
Begin construction		Fall 2009
Complete construction		Spring 2010
Begin operation	Begin directing waste to transfer station	July 1, 2010
Implement new rates that reflect the new disposal option		July 1, 2010

Section 2

COLLECTION ALTERNATIVES

Section 2

COLLECTION ALTERNATIVES

2.1 Current Arrangements

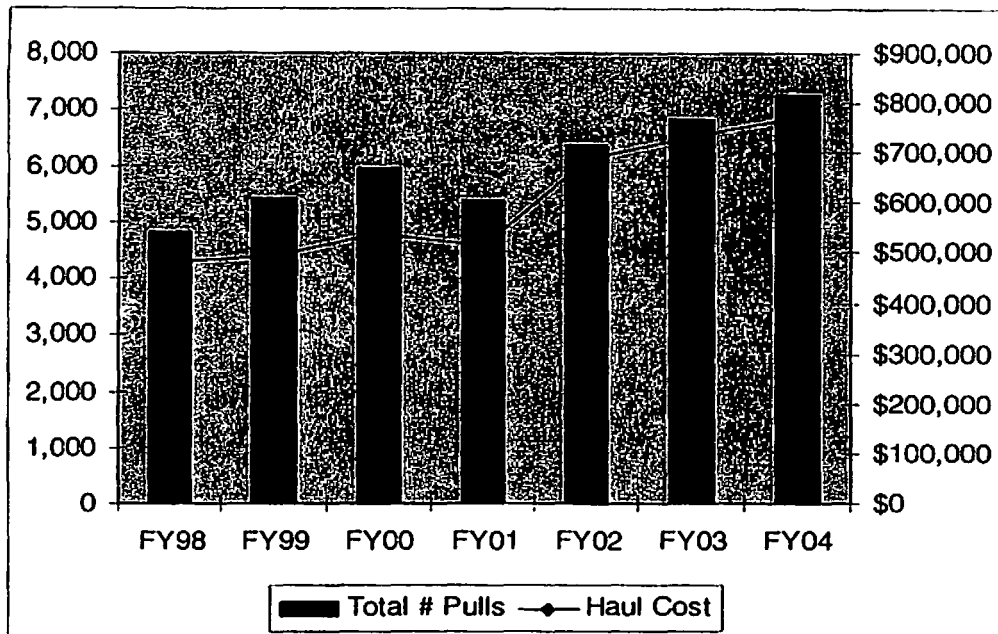
Beaufort County currently operates 12 staffed drop off centers and one unstaffed drop off center to collect residential garbage, bulky materials, small amounts of yard debris, and recyclables. In 2004, the County collected over 22,000 tons of solid waste and nearly 5,000 tons of yard waste at the drop off centers. The County rents the drop off center containers from two contractors (Waste Management and Republic) and pays them each time a full container is hauled to the landfill. The County paid over \$770,000 in FY2004 to rent containers and have this waste hauled to disposal facilities.

Five of the drop off centers - Hilton Head, Gate, Shanklin, Bluffton, and Lady's Island - account for 80 percent of the drop off center traffic. Each of these sites receives more than 10,000 visits per month even in the slowest months. In July 2004, the drop off centers in St. Helena and Hilton Head were upgraded and enlarged (see photo at right), resulting in a dramatic increase in the use in those locations. As the number of people using the drop off centers increases, some sites suffer from overuse. Several of the sites are too small or configured in a way that prohibits the collection of all materials. At some of the sites, waste reportedly overflows the containers at times, especially on Sunday when the drop off centers are open but the landfill is closed.



An increase in the amount of visits over the years requires that the containers be hauled more frequently to the landfill. Figure 2-1 shows the increase in the number of times containers are pulled from the drop off centers and the resulting impact on costs to the County.

**Figure 2-1
Number of Pulls and Impact on Costs**



In addition to the County drop off centers, the City of Beaufort, and the towns of Port Royal and Bluffton offer collection of solid waste to their residents. The City of Beaufort provides curbside or rear door collection of refuse twice weekly to 4,500 single-family residents, small multi-family residents, and a limited number of small businesses. The City also collects recyclables and yard waste weekly and bulky items on request. The City of Beaufort charges residents \$10 per month for curbside collection and \$20 per month for backdoor service. The City offers dumpster collection to commercial customers two to five times per week, depending on needs.

Port Royal provides curbside solid waste collection services to households twice weekly and yard waste and bulky item collection services weekly. The City of Beaufort collects recyclables curbside from residents in Port Royal under an interlocal agreement between the two municipalities. The Town of Bluffton has a contract with Waste Management of South Carolina, Inc. to provide curbside collection of solid waste and recyclables weekly to its 1,168 households.

Private companies independently offer residential and commercial collection services to generators elsewhere in the County, especially in the more populated areas. For example, in Hilton Head, many residents have private haulers collect their waste, either under individual agreements or through a neighborhood association. However, many residents of the densely populated areas of the County, including Hilton Head, use the County's drop off centers to dispose of their waste. In fact, it is estimated that one half of the waste delivered to the drop off centers comes from residents of Hilton Head.

2.2 Curbside Collection in Districts 6 and 7

In its solid waste management planning process, completed in 2000, Beaufort County determined that the density of single-family households and the amount of solid waste generated in Solid Waste Districts 6 and 7 warrant the consideration of providing curbside collection services to households in these Districts. In a meeting on December 16, 2004, the Solid Waste and Recycling Board and staff scored the importance of evaluation criteria for collection. Table 2-1 indicates the results. Instituting a collection system with the lowest possible average cost per ton and one that allows the County control over its destiny were top priorities. Thus, these criteria were considered in the course of this evaluation.

Table 2-1
Evaluation Criteria for Collection Alternatives

Criteria	Score ¹
The alternative selected should have the lowest possible average cost per ton over 20 years.	4.63
The alternative selected should allow Beaufort County maximum control over its destiny.	4.63
The alternative selected should be readily expandable to other areas in the County.	3.71
The alternative selected should have the lowest capital investment requirement.	3.38
The alternative selected should mimic the curbside systems already in place in the County.	1.75

¹ A score of 1 is the least important and a score of 5 is the most important.

2.2.1 Curbside Collection Cost Estimates

At its December 2004 meeting, the Solid Waste and Recycling Board and staff defined a collection system in Districts 6 and 7 as follows:

- Municipal solid waste and recyclables should be collected at the curb on a weekly basis. Yard waste and bulky collection will continue at drop off centers.
- The technology used (manual, semi-automated, automated) should be selected based on its ability to meet the evaluation criteria. However, it is not necessary that the technology be consistent with that used in surrounding collection programs. In addition, there are not known constraints (e.g., low hanging wires, on-street parking, etc.) that would limit the use of fully automated collection vehicles.

R.W. Beck, Inc. was able to take these guidelines and apply its proprietary collection model to analyze the costs associated with a collection system for Districts 6 and 7. Table 2-2 summarizes the system parameters used as assumptions in the model.

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Table 2-2
District 6 and 7 Collection System Parameters

	District 6	District 7
Households	7,876	4,481
Tons Generated		
Refuse	6,717	4,861
Recyclables	1,679	1,215
Travel time		
▪ To Disposal facility	25 min	40 min
▪ To Recyclables processing facility	30 min	30 min

There are numerous types of collection technology and crew configurations operating in the Southeast. Based on feedback from the County, we have drawn from the collection industry's best practices to model a highly efficient, relatively low cost collection system, defined in Table 2-3. This system uses fully automated side-loading vehicles with a one-person crew for refuse and a two-stream sort for recyclables (a collection approach consistent with recycling options in Section 3). Although this type of system has higher capital costs than some other options, ~~primarily due to the cost associated with purchasing automated side-loading vehicles~~ and new containers, operating costs tend to be lower than other collection options. This system is consistent with the criteria established by the Solid Waste and Recycling Board and staff.

Table 2-3
Collection System Definition

	Refuse	Recycling ¹
Crew size	1 person	1 person
Service frequency	Weekly	Weekly
Weekly work schedule	Five 8-hour days (M-F)	Five 8-hours days (M-F)
Daily work schedule	60 minutes allotted for lunch and breaks	60 minutes allotted for lunch and breaks
Vehicle Type	Automated Side-load ("one-armed bandit")	Manual Dual Compartment
Containers provided	90-gallon carts	Two 20-gallon bins

¹ Assumes a two-stream collection system, one bin and vehicle compartment for paper and another bin and vehicle compartment for mixed containers.

Based on the assumptions and system parameters above, R. W. Beck calculated the system needs to provide the specified curbside collection services (Table 2-4). Given the relatively small size of these Districts, it is more efficient and less costly to manage the two districts as a single service area. Stated another way, by combining the two districts the County will be able to offer the most cost effective service and minimize under-utilization of collection vehicles.

Table 2-4
District 6 and 7 Routes, Staffing and Fleet Needs

	Refuse	Recycling	Total
Routes per Day	4	4	8
Collection Crew	5	5	10
Route Supervisors	0.5	0.5	1
Automated Trucks	5	0	5
Recycling Trucks	0	5	5
Pick-ups	0.5	0.5	1

Based on these estimates, the average route size for both refuse and recycling is 617 households. This is well within expected ranges for 8-hour workdays, and assuming standard pre- and post-trip inspection practices and lunch/break schedules. We note that it may be possible to reduce the number of routes per day for each service from four to three, and that doing so would reduce the staffing and fleet needs. However, for planning purposes, we have retained a more conservative estimate of on-route productivity. Table 2-5 summarizes the expected capital costs associated with this collection system.

Table 2-5
Capital Cost Estimates

Item	Unit Cost	Number	Total Capital Cost
Automated Refuse Truck ¹	\$180,000	5	\$900,000
Recycling Truck ¹	\$125,000	5	\$625,000
Pick-up Truck	\$22,500	1	\$22,500
90-gallon cart	\$40	14,293	\$571,723
20 gallon bin	\$6	14,293	\$85,758
Total			\$2,204,982

¹ One spare truck assumed.

For purposes of projecting 20-year capital costs, we have assumed that vehicle replacement would begin in year 3 and would level out over time (i.e., new vehicle purchases would begin to spread out so that one or two new vehicles are purchased each year). Further, based on a customer base growth rate of 3.85 percent (consistent with recent population projections for the County), it is projected that new routes would need to be added every five to six years. We have incorporated these assumptions in our 20-year model.

Table 2-6 summarizes the operating costs associated with the system, totaling \$867,512.

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**Table 2-6
2005 Operating Cost Estimates**

Item	Unit Cost	Number	Total Cost ¹
Labor			
Refuse Crews	\$13.00/hr	5	\$182,520
Recycling Crews	\$10.50/hr	5	\$147,420
Route Supervision	\$15.00/hr	1	\$45,279
O&M Cost per Route			
Refuse	\$25,000	4	\$100,000
Cart maintenance/replacement	\$1	14,293	\$14,293
Recycling	\$18,000	4	\$72,000
Route Supervision	\$6,000	1	\$6,000
Subtotal			\$567,512
Mgmt/Admin/Overhead ²			\$300,000
Grand Total			\$867,512

¹ Assumes 40-hour work week, 52 weeks per year, and 35% benefits rate.

² Includes management (1 staff), customer service (1 staff), and an administrative assistant, as well as office overhead and other internally allocated services such as utility billing expenses, legal, human resources, etc.

Table 2-7 indicates the estimated average cost per year, per residential customer, and per ton for curbside refuse and recycling service in Districts 6 and 7. It should be noted that these are the average annual costs over 20 years, at 3 percent inflation, including the cost of purchasing vehicles and containers. The actual costs in a particular year will vary. For example, in the first year, an estimated \$3.1 million will be spent, including \$2.2 million to purchase eleven new vehicles and containers for each resident. Annual costs are also high at the end of the 20 year period when inflation has the biggest impact.

**Table 2-7
Curbside Collection Cost Summary**

	Amount
Average Annual Cost Over 20 Years ¹	\$2,210,057
Average Annual Cost per Household Over 20 Years ¹	\$116.03
Average Monthly Cost per Household Over 20 Years	\$9.67
Average Cost per Ton Over 20 Years	\$104.17

¹ Factoring in capital costs on a 7 year equipment replacement schedule, inflation, and 4 percent interest rate.

² Assumes 3.85 percent growth in number of households.

As shown, the total collection costs for providing curbside refuse and recycling service in Districts 6 and 7 is estimated to be \$9.67 per household per month, comparable to other rates charged in the County. The Town of Bluffton charges its residents \$9 per month for weekly collection of solid waste and recyclables while the City of Beaufort charges \$10 per month. If Beaufort County implemented collection in one of the two Districts only, the per household cost projection would increase.

The County could reduce operations at the drop off centers located in Districts 6 and 7 if it implements curbside collection of residential waste and recyclables. The savings from eliminating the containers for solid waste and recyclables at the Gate, Shanklin, and Lady's Island drop off centers is estimated at \$300,000 per year. This includes container rental and hauling but does not take into account any savings from reducing the hours of operation or staff at these sites.

2.2.2 Public vs. Private Collection

The County has two options for initiating curbside collection: implement public collection or procure private collection via contract.⁴ The cost estimates above are representative of either public or private collection, assuming that the County has the operational wherewithal to manage the system efficiently. In our experience, a well-run public collection operation is comparable in direct resources and costs to a privately-operated system. Although the actual costs may vary slightly between the two, they will be roughly comparable. Notable differences between public and private collection include:

- Benefits levels are typically higher in the public sector, especially for employees who stay employed for more than five years. Private sector operations typically have higher turnover and lower benefits.
- Private sector providers have more flexible wage structures, and can offer better wage-based incentives for collection performance. This typically allows private sector haulers to achieve higher productivity compared to the public sector (although not better overall cost-effectiveness).
- Private sector haulers typically require a certain profit over and above their direct costs. Conversely, public sector providers must only cover their direct costs.
- Private sector haulers must, out of necessity, focus appropriate resources on maintaining their fleet. Because of the unique fleet maintenance needs associated with solid waste collection (heavy hydraulics, dirty vehicles, high vehicle availability requirement), many public sector fleet maintenance shops have trouble maintaining solid waste fleets. The County should critically evaluate the ability of their fleet maintenance operation to handle this type of fleet before implementing a public collection system.

⁴ As part of the evaluation of alternatives, the City of Beaufort was contacted to determine their interest in expanding their collection operations to collect solid waste and or recyclables from residents in Districts 6 and 7. The City was not interested in performing this service at this time.

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- Public sector service providers are generally known for providing higher customer service compared to private haulers. For example, public sector haulers are more likely to go back to a household that had not set out when the truck first passed by, whereas private haulers are more inclined to provide strictly the level of service defined in their contract. Although a well-written contract will minimize these differences in service levels, it is fair to expect a lower level of flexibility from a private sector hauler.

It is important to recognize that whether or not the County contracts for collection or uses its own forces, a County collection system in Districts 6 and 7 will displace some haulers that are already operating in the area under individual agreements with residents.

2.3 Recommendations

Based on the considerations above, the County should first decide whether it wants to get involved in the solid waste collection business. Our experience suggests that the costs of collection are not inherently different between the public and private sector, so other considerations such as the role of the County Public Works Department, should dictate whether the County begins its own collection system or hires a private contractor to do so. One consideration in making this decision is that, as the population of the County grows, more Districts, or parts of Districts, may be better served by curbside collection than drop off centers. Thus, the system that is implemented may need to be expanded to other areas within the 20 year planning period.

Table 2-8 indicates the steps that should be taken to implement curbside collection in Districts 6 and 7.

COLLECTION ALTERNATIVES

**Table 2-8
Implementation Schedule for Collection Option**

Action		Date
Determine whether the County or a contractor will operate the collection system		Spring 2005
Inform residents and private haulers operating in the area about the upcoming changes		Summer 2005
If County collects	If contractor collects	
Perform routing analysis to finalize equipment and staffing needs	Define role of County and role of contractor (e.g., billing, customer service, purchase and distribution of containers)	Summer 2005
Issue bid solicitation for vehicles and containers	Issue RFP for services to be provided by contractor	Fall 2005
Order vehicles and containers	Negotiate contract with collector	Fall 2005
Determine impact of curbside collection on fees	Determine impact of curbside collection on fees	Winter 2006
Purchase equipment and containers, if County is to provide		Spring 2006
Educate residents about changes in collection system and impact on fees		Spring 2006
Hire and train staff		June 2006
Distribute containers		June 2006
Distribute public education material about recycling		June 2006
Adjust mileage to recover costs of collection system from users		July 1, 2006
Begin curbside collection program		July 1, 2006
Downgrade drop off centers to collection yard waste and bulky materials only		Fall 2006

Section 3

RECYCLING ALTERNATIVES

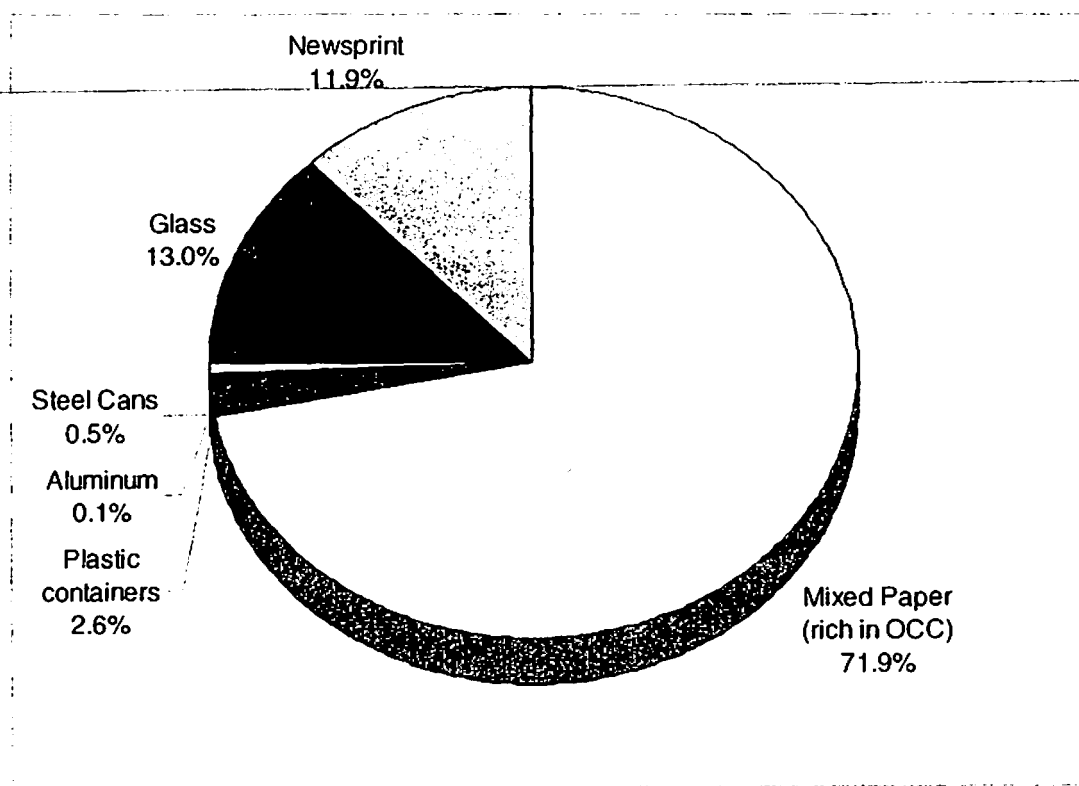
Section 3

RECYCLING ALTERNATIVES

3.1 Current Arrangements

Beaufort County currently collects recyclables at seven of its twelve drop off centers. Due to space and site layout issues, different materials are accepted at each center. In addition the City of Beaufort, the towns of Port Royal and Bluffton provide curbside collection of recyclables as described in the previous section. Some businesses also have recycling programs, primarily collection of corrugated containers (OCC). In FY2004, approximately 2,100 tons of recyclable materials were collected at the drop off centers and 2,500 tons were collected by municipalities or private haulers. Figure 3-1 shows that the majority of this material was mixed paper (rich in OCC).

Figure 3-1
Breakdown of Material Recycled

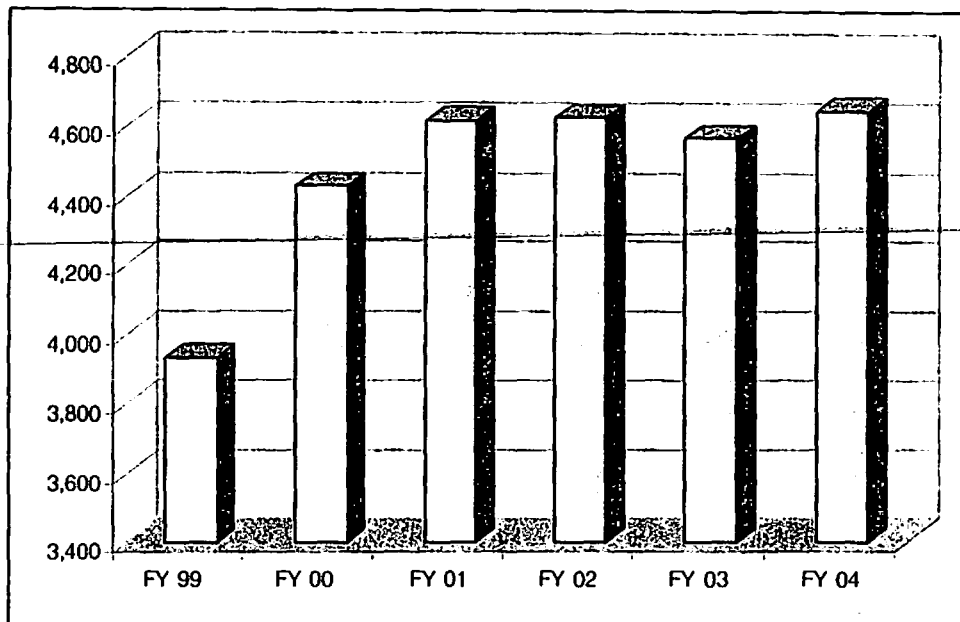


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The tons recycled through these programs leveled off from Fiscal Year 2001 through Fiscal Year 2004, as shown in Figure 3-2. However, in July 2004, the County opened upgraded drop off centers in Hilton Head (shown in photo at right) and St. Helena's. The increased use of these drop off centers are likely to result in increased tonnages for recycling in the future.



Figure 3-2
Tons Recycled



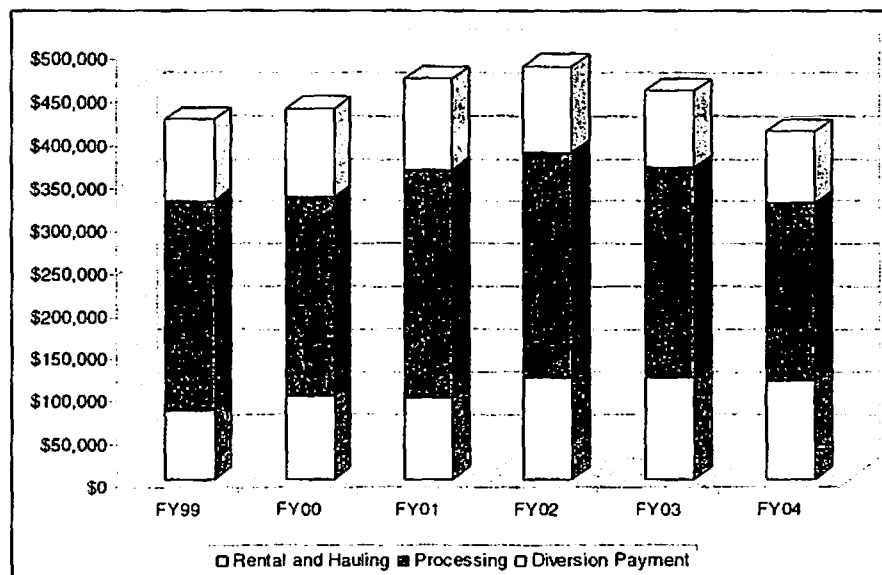
Most of the material recycled in the County was delivered source separated to the Hickory Hills Materials Recovery Facility (MRF) in Jasper County under a contract between Waste Management of South Carolina, Inc. and the County. The current term of the contract goes through June 30, 2005, with three 1-year extensions. However, the County or Contractor can terminate the agreement with 60 day advanced notice. The MRF accepts glass, aluminum and tin/steel cans, PET and HDPE plastic containers, newspapers, mixed paper, magazines, paperboard, OCC, and office paper. As of September 2003, Beaufort County started diverting newspaper collected at the drop off centers away from the Hickory Hill MRF. Instead, another company, SP Recycling, provides containers, at no rental charge, for collecting newspapers at the drop off centers. Once the containers are full, SP hauls these containers to their facility at no charge. SP currently pays the County \$15 per ton for newspapers collected at the drop off centers.

Waste Management, Inc. provides containers, at a rental charge, for the recyclables, except newspaper, at each of the County's drop off centers and hauls containers to the MRF when full. In FY2004, the County paid \$114,527 for container rental and hauling of recyclables. In addition, the County pays \$62 per ton to Waste Management, Inc. for processing recyclables collected at the drop off centers as well as recyclables collected through other programs in the County that are delivered to the Hickory Hill MRF. The County renegotiated part of the contract with Waste Management, Inc. so that starting in February 2004, the County began to receive 50 percent of the revenue from the sale of materials from the MRF. The County typically receives between \$7,000 and \$10,000 per month from revenues from the sale of recyclables. The net processing cost paid by the County in FY2004 (after revenues for February through June were applied) was \$208,994.

In addition to the fees paid to Waste Management, the County historically paid private and public haulers a "diversion credit", or fee per ton recycled, to encourage recycling. In FY2004, these costs totaled \$84,100. As of July 1, 2004, the County stopped paying diversion credits to all haulers except the City of Beaufort. The County still pays the City of Beaufort a \$35 per ton diversion credit, but only for material sent to markets other than the Hickory Hill MRF (tonnage for which the County does not have to pay the processing fee).

Figure 3-3 shows the breakdown of costs associated with the recycling program. Altogether, the annual costs of the County's recycling program totaled over \$400,000 in FY2004. Costs decreased in 2004 because 1) newspapers from the drop off centers were diverted to SP Recycling, instead of the Hickory Hill MRF, resulting in net revenues rather than hauling and processing costs; 2) processing costs for material processed at the Hickory Hill MRF were offset by revenue sharing starting in February 2004; and 3) the diversion credit was only paid to the City of Beaufort for materials sent to markets other than the Hickory Hill MRF.

Figure 3-3
Recycling Program Costs



3.2 Alternatives

As with disposal and collection, the Beaufort County Solid Waste and Recycling Board and staff scored evaluation criteria for recycling alternatives to indicate what was most important to the County (Table 3-1.). The top priority was to reduce long-term costs. Since the most significant cost associated with recycling is the cost of processing, this analysis focuses on alternatives to using the Hickory Hill MRF for processing recyclables collected at the drop off centers, from businesses, and in current and future curbside programs.

Table 3-1
Evaluation Criteria for Recycling Alternatives

Criteria	Score ¹
The alternative selected should have the lowest possible average cost per ton over 20 years.	4.75
The alternative selected should result in moving towards State's waste reduction goals.	4.50
The alternative selected should allow Beaufort County maximum control over its destiny.	4.00
The alternative selected should have the lowest capital investment requirement.	3.13
The alternative selected should not include the development of a new MRF in the County.	2.14

¹ A score of 1 is the least important and a score of 5 is the most important.

The current contract with Waste Management does not require that the County deliver a certain amount or specific material types to the MRF. Therefore, if the net cost of an alternative processing arrangement is less than the net cost of using the Hickory Hill MRF, then the County should consider diverting some or all of its recovered material to alternative processors. This analysis of costs must consider:

- The amount of material collected;
- The cost to rent or purchase containers;
- The cost to rent or purchase processing equipment (such as a baler) if needed;
- The cost to operate processing equipment, if needed;
- The cost to haul materials to market; and
- Revenue that the County is likely to receive.

The second highest scored priority was for the County to move toward the State's reduction goals. It is the goal of the State of South Carolina to reduce, on a statewide per capita basis, the amount of municipal solid waste being generated to 3.5 pounds per day and to recycle, on a statewide basis, at least 35 percent (by weight), of the municipal solid waste stream generated in this state no later than June 30, 2005.

3.2.1 Other Markets

Alternative processors and end use markets were identified, in part, by contacting local governments in the area to ask them about their recycling programs and markets as well as by drawing from state market directories and other sources. Although we contacted operators of several existing processing facilities, including those at the Air Station, Paperstock/Sonoco (Savannah, Georgia), Charleston County, Horry County, and FCR, Inc. (with facilities in Greenville and Charlotte), only Paperstock/Sonoco and Charleston County expressed a willingness to consider accepting all of the materials collected from Beaufort County. On the other hand, several processors and end use markets expressed an interest in accepting select materials from Beaufort County, especially paper. Although many of the markets we contacted were not prepared to discuss specific financial arrangements, they were able to offer a general description of a proposed arrangement. Table 3-2 summarizes the results of the survey of potential processors and end users in the area.

The John L. Jencks Recycling Center in Charleston County is a county owned and operated facility, accepting commingled containers and mixed paper. They have a contract to accept recyclables from Berkeley and Dorchester Counties and have expressed an interest in accepting material from Beaufort County. Charleston County reports that it would charge Beaufort County \$12 per ton for any material delivered and keeps all the revenue from the sale of materials.

Paperstock/Sonoco, located in Savannah, Georgia, expressed an interest in accepting loose or baled PET and HDPE plastic, aluminum, steel, and all grades of paper including magazines and telephone books. They will accept glass although they prefer not to. Paperstock/Sonoco could provide some collection containers, though probably not enough to collect all materials at all drop off centers and would haul full containers to their facility.

Other processors expressed an interest in accepting paper only from the County. SP Recycling, which currently takes the newspapers from the County's drop off centers, expressed an interest in taking loose magazines and mixed paper and baled OCC. SP could provide a limited number of front load containers for placement at drop off centers.

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Table 3-2
Results of Survey of Processors and End Users

Entity	Market Type	Distance In Miles	Location	Materials Accepted	Specifications	Financial Arrangement
Hickory Hill MRF	Processor	15	Jasper County, SC	OCC, newspaper (ONP), mixed paper, magazines, telephone books, glass, PET and HDPE plastic, aluminum mixed with steel/tin	Source separated	\$62 per ton processing fee; County receives 50% of revenue from materials
SP Recycling	End User	46	Garden City, GA	OCC, ONP, mixed paper, magazines	Magazines and mixed paper loose, OCC baled	Currently pays \$15 per ton for news. Willing to provide a proposal for other paper.
Caraustar Industries	End User	29	Hardeeville, SC	OCC, ONP, mixed paper, magazines, telephone books	Loose or baled. 12 bale minimum.	Based on market price. Offer baler in exchange for material w/36 month agreement.
Paperstock (Sonoco)	End User	25	Savannah, GA	OCC, ONP, mixed paper, magazines, telephone books, PET and HDPE plastic, aluminum, steel/tin, (possibly glass)	Loose or baled; can possibly provide some containers to County at no charge.	To be negotiated
Air Station/Parris Island (Military Bases)	Processor	0	Beaufort County, SC	OCC, ONP, mixed paper, magazines, glass, PET and HDPE, aluminum, steel/tin	Can not accept any material from off base.	
Horry County Solid Waste Authority	Processor	201	Conway, SC	OCC, ONP, mixed paper, magazines, telephone books, glass, PET and HDPE plastic, aluminum, steel/tin	Not able to accept materials from outside of the County	

RECYCLING ALTERNATIVES

Table 3-2
Results of Survey of Processors and End Users

Entity	Market Type	Distance In Miles	Location	Materials Accepted	Specifications	Financial Arrangement
FCR, Inc.	Processor	232	Charlotte, NC Greenville, SC	OCC, ONP, mixed paper, magazines, glass, PET and HDPE, aluminum, steel/tin		Willing to provide a proposal
Charleston County (John L. Jencks Recycling Center)	Processor	75	Charleston, SC	Aluminum and steel cans, plastic (#1, #2), glass (brown, green and clear), residential mixed paper (office, brown bags, magazines, mixed paper, newspapers and inserts), motor oil bottles.	Accepts loose materials from outside of the County in two streams, through a contract agreement.	Tipping fee (likely based on type of materials delivered) negotiated in contract terms. Current fee charged to other communities is \$12 per ton.

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Caraustar Industries, located in Hardeeville, South Carolina, expressed an interest in accepting OCC, newspapers, and mixed office paper either loose or baled at its facility. Loose materials would have to be delivered by the County, however Caraustar would pick up baled paper (12 bale minimum per pickup). If the County is willing to commit to a 36 month service agreement, Caraustar would provide and install a horizontal baler, valued at approximately \$15,000. The County could pay off the cost of the baler by providing the baled material to Caraustar without receiving revenue until the baler is paid off. Caraustar estimates this will take approximately 6-12 months. After this, the County will receive revenue for the sale of the materials to Caraustar. The County would need to provide collection containers and, if it delivers materials loose, a vehicle to haul the materials.

3.2.2 Transfer and Processing Options

Hauling the County's recyclables to Savannah, Georgia or Charleston, South Carolina instead of to the Hickory Hill MRF directly from the curbside collection routes or from the drop off centers would add to the cost of collection. Transferring the recyclables into larger hauling vehicles to ship long distances, before or after processing, would be more cost effective. Net processing, transfer, and hauling costs would need to be low enough that they would not eliminate the savings that would result from lower processing costs.

Beaufort County also has the option of performing its own processing by constructing and equipping a materials recovery facility or by contracting with a private firm to develop such a facility in the County. Such a facility could be configured in several ways, including a less expensive facility that would perform limited sorting to a full-scale materials recovery facility that is capable of processing two-stream commingled recyclables. Four options were considered for a County-owned processing facility, assuming that 6,324 tons of material per year (increasing by 3.6 percent annually) would come from the drop off centers, local businesses, current city curbside collection programs, and additional curbside routes added in Districts 6 and 7. The four options are:

1. Process and market curbside-sorted recyclables;
2. Bale mixed paper and transfer commingled containers (two stream collection);
3. Sort/bale mixed paper and transfer commingled containers (two stream collection);
or
4. Process two stream recyclables at a full scale Material Recovery Facility (MRF).

These options are described below.

Process and Market Curbside Sorted Recyclables

The first option of processing curbside-sorted recyclables would require the County to construct, or have privately constructed, some type of simple processing facility. Recyclables collected from the drop off centers, businesses, and residents at curbside would be delivered to the facility and sorted into the following categories: mixed

paper, mixed steel and aluminum cans, mixed #1 (PET) and #2 (HDPE) plastic bottles, clear glass containers, brown glass containers, and green glass containers. This approach would require that recyclables be sorted at the drop off centers and at the curb into the separate categories, a more expensive collection approach. The facility would have a single sorting belt that discharges directly to a horizontal baler. The sort line would be used primarily for picking contaminants prior to baling; however, it would allow for rudimentary sorting, such as the separation of OCC from a mixed paper stream, prior to baling.

Bale Mixed Paper/Transfer Commingled Containers

The second option of baling mixed paper and transferring commingled containers to another processing facility would allow for two stream collection of recyclables and processing (baling only) of the County's drop off mixed paper. This option would reduce the operating cost of labor because only minimal sorted of paper would take place. Containers could be commingled at both curbside and drop off collection. This option would require the ability to load a transfer trailer for transfer of containers to a MRF capable of processing commingled containers (e.g. to Charleston County).

Sort and Bale Mixed Paper/Transfer Commingled Containers

The third option of sorting mixed paper and transferring commingled containers would allow for two stream collection of curbside recyclables while allowing for sorting and baling of curbside-collected and drop off mixed paper. Equipment and processing labor at this MRF would be similar to that for the first (curbside sort processing) option; however, commingled containers would be transferred as in the second option. Like the second option, this third option would require the ability to load a transfer trailer for transfer of containers to a MRF capable of processing commingled containers.

Full Scale Two-Stream MRF

The fourth option is to construct and operate a full-scale MRF that is capable of processing two streams of recyclables, a mixed paper stream and a commingled containers stream. This option would have the greatest capital cost but would enable the County to access end users for most materials rather than transfer recyclables to another processing facility. Thus, the County would not be dependent on another entity's ability to accept and process the County's recyclables.

3.2.3 Evaluation of Costs

The options described above were evaluated to determine which approach would have the lowest overall costs for Beaufort County. Table 3-3 shows that the capital costs for a facility to process curbside sorted recyclables are projected to be approximately \$1.1 million. A total of \$1.2 million is projected for a facility to sort and bale paper and transfer commingled containers. A full scale MRF that would allow for processing of two streams of recyclables to prepare them for marketing directly to end users is estimated at \$3.3 million. If any of these facilities were co-located with a

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transfer station, it is projected that capital costs could be reduced by an estimated 15 percent.

Table 3-3 also shows the operating costs and anticipated revenues associated with each option. The operating costs are lower in the first and fourth option, in which commingled containers are transferred rather than processed. However, the revenues associated with these options are lower as well since the material produced has less value.

When the costs in Table 3-3 are considered for the entire 20 year planning period, as shown in Table 3-4, all options are less costly than the current arrangement. It is important to note that these costs are the average annual cost over a 20 year period. In actuality, the costs for each option are high in the first year, when the facility is developed, and in the tenth year, when equipment is replaced, and at the end of the 20 year period, when inflation has had its greatest impact.

This analysis does not take into account any changes in collection costs associated with getting recyclables from the collection point to a processing/transfer station. However, given that recyclables are currently delivered to a MRF in Jasper County, it is likely that transport costs from the curbside routes and many of the drop-off centers would be reduced. In addition, collection of two streams of recyclables, rather than source separated materials, at the drop off centers, is likely to reduce the number of containers and space needed at the site and allow for the addition of other materials at sites that currently only collect a few materials.

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Table 3-3
Projected Costs of Recycling Options

Processing Option	Capital Costs(05\$)		Annual Operating Costs and Revenues		
	Building Cost ¹	Equipment Cost ²	Facility Operation	Other Costs	Revenues ³
Existing Practice — Deliver Recyclables to Hickory Hill MRF	\$0	\$0		\$160,090 ⁴	\$7,680 ⁵
Process and Market Curbside-Sorted Recyclables	\$850,000	\$250,000	\$450,000	\$80,000 ⁶	\$435,000
Sort and Bale Paper and Transfer Commingled Containers	\$950,000	\$250,000	\$270,000	\$105,000 ⁷	\$325,000 ⁸
Bale Mixed Paper and Transfer Commingled Containers	\$950,000	\$250,000	\$220,000	\$105,000 ⁷	\$235,000 ⁸
Full Scale MRF Processing of Two Stream Recyclables	\$1,800,000	\$1,500,000	\$540,000		\$510,000

1. No costs for land are included. Twenty year projected life.

2. Ten year projected life.

3. Based on handling approximately 6,300 tons of recyclables per year. Revenues from the sale of processed materials are based on market prices in effect at the beginning of 2005 - \$90 per ton for OCC, \$110 per ton of office paper, and \$70 per ton for newspaper.

4. Assumes 4,574 tons of mixed paper to Hickory Hill MRF at \$35 per ton (\$62 per ton fee minus \$27 per ton revenue).

5. Assumes \$15 per ton for 512 tons of newspaper sent to SP.

6. Includes the cost of an additional truck and labor required to sort recyclables at the curb.

7. Includes the cost to transfer 1,750 tons of commingled containers 75 miles.

8. Projected paper revenue minus an assumed tip fee of \$12 per ton to tip commingled containers at John L. Jencks Recycling Center in Charleston.

Table 3-4
Projected Costs Annual and Per Ton Costs of Recycling Options¹

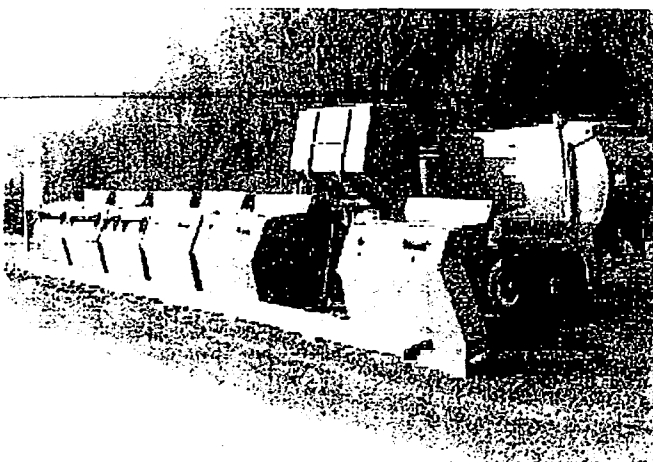
Options	Average Annual Cost Over 20 Years ²	Average Cost Per Ton Over 20 Years
Existing Practice	\$374,359	\$41.44
1. Process and Market Curbside-Sorted Recyclables	\$248,242.	\$27.48
2. Sort and Bale Paper and Transfer Commingled Containers	\$177,401	\$19.64
3. Bale Mixed Paper and Transfer Commingled Containers	\$248,945	\$27.56
4. Full Scale MRF Processing of Two Stream Recyclables	\$345,859	\$38.28

¹ See assumption in Table 3-3.

² Assumes 4% interest rate and 3% inflation. Incorporates annual amortization of building cost and equipment replacement every 10 years.

3.2.4 Haul-All Drop off Recycling System

The County has asked for a preliminary review of a proposal for recycling equipment to replace the current system of roll-off containers that are hauled to the processor when full. The Haul-All Drop off Recycling System is a modular system that is designed to collect recyclables at unattended drop off centers. The containers are designed to minimize contamination with deposit chutes that limit the types of material deposited. A dedicated vehicle (shown at right) is used to collect one material at a time from each drop off center. The empty containers are left on site.



This approach would eliminate the cost of renting the current containers for recyclables at the drop off centers as well as the cost to haul materials from the centers to market, currently the Hickory Hill MRF. However, in the absence of a specific cost proposal, it is not possible to compare those savings to the net cost of purchasing or leasing the Haul-All containers and vehicles and retrofitting the drop off sites to accommodate this system. Because of the capital investment required, the Haul-All system is likely to be more cost-effective when there a sufficient number of drop off centers to fully utilize the specialized collection vehicles. As the County moves toward collecting more recyclables at the curb, rather than at the drop off centers, the number of drop off centers to be served by this type of technology is likely to decrease rather than increase.

The equipment manufacturer suggests that by using a combination of the Haul-All Drop off Recycling System and the Haul-All Transtor System (described in Section 2), the recyclables from the drop off centers could be delivered directly to end users. While that potential may exist for some recyclables, most end use markets are not equipped to receive and store loose recyclables (except, of course, glass markets and some newspaper markets). Furthermore, most end use markets require that material they receive has at least been minimally processed to remove contaminants. A more practical potential use of a combination of Haul-All Drop off and Transtor Systems would be the ability to collect and transfer two-stream recyclables to a remote MRF.

3.3 Recommendations

Based on this cost analysis, it is recommended that the County consider developing a facility to handle two streams of recyclables from residential curbside programs, drop off centers, and commercial collection programs. This facility would have the capability to sort and bale mixed loads of paper and be designed to allow for the transfer of commingled containers to an existing Materials Recovery Facility that has the capacity to sort and market these materials. It is recommended that this facility include a horizontal baler that has the capability to handle not only paper, but other materials the County collects for recycling. This would offer the County the flexibility to bale other materials in the future if it desires. Prior to finalizing a design for such a facility, the County should get a clear understanding of the specifications of the markets available to take materials from the facility. The facility should be designed not only to meet the requirements of the markets that provide the most net revenue but also to allow for flexibility to send materials to multiple markets.

A County owned and operated MRF achieves the objective of providing the County maximum control over its "destiny." But this also means that the County assumes the full risk associated with fluctuations in markets prices and other factors that that would impact the costs associated with handling recyclables. The County may want to consider private ownership or public ownership and private operation of a MRF to handle the County's recyclables. The costs included in Table 3-5 could be used as a "benchmark" for the costs that should be anticipated if a private company operated a MRF and charged the County for the cost of processing.

If the County chooses to move ahead with operating or procuring one or more transfer stations for solid waste in the County, a transfer and/or processing facility for recyclables could be incorporated into this facility. A joint solid waste transfer/recycling processing facility would reduce the net cost per ton of both facilities. It may also increase the potential for material recovery. In some locations where a MRF is co-located with a transfer station, loads delivered to the transfer station that contain a high proportion of recyclables (typically commercial loads containing OCC) are diverted to the MRF tipping floor for processing.

Although the timing may not be ideal (the County could pursue a MRF in the near future while a transfer station may not begin operation until 2010), the County should consider co-locating these facilities. If the County relies on a private contractor to develop an in-County transfer station, it may want to include a requirement to

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construct and operate a MRF to bale and market paper and transfer commingled containers in the Request for Proposals.

An implementation schedule for the recommended recycling options is included in Table 3-5.

**Table 3-5
Implementation Schedule for Recycling Option**

Action	Date ¹
Solicit proposals from markets and processors to accept source separated materials, mixed paper, and commingled materials and confirm best approach for processing/transporting	Spring 2005
Identify site for MRF (work with military bases to determine their interest in combining material)	Summer 2005
Negotiate agreement for processors to accept commingled containers	Summer 2005
Design MRF to sort and bale paper and to transfer recyclables (assuming agreement is in place to accept commingled containers)	Summer 2005
Enter into short term agreements for baled paper	Fall 2005
Complete construction of facility	Fall 2005
Begin to divert recyclables from drop off centers, curbside, and commercial programs to MRF	Winter 2006
Promote the availability of the MRF to other generators of recyclables	Winter 2006
Redesign drop off centers to accept two streams of recyclables	Winter 2006
Divert curbside recyclables from Districts 6 and 7 to MRF	July 2006
Adjust mileage to reflect the new costs of the recycling system	July 2006
Continue to educate and inform the public about opportunities to recycle	Ongoing

¹ This schedule indicates the dates for implementing an alternative option for processing exclusively. If the County decides to move ahead with a transfer station, a recycling facility could be co-located with the transfer station which would push the schedule for implementation back.

0.5 1/2

