COST PROJECTIONS FOR TRANSFER, HAUL, AND DISPOSAL OF MUNICIPAL SOLID WASTE

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Prepared for Beaufort County Council

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Cost Projections for Transfer, Haul, and Disposal of Municipal Solid Waste

PREPARED FOR BEAUFORT COUNTY COUNCIL

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EXECUTIVE SUMMARY

Beaufort County, South Carolina continually evaluates its options for managing municipal solid waste (MSW) over the next 20 years, including disposal options. The County has contracted for the disposal of residential MSW at the Hickory Hill landfill, owned and operated by Waste Management, Inc., for decades. The current contract terms expires on June 30, 2015. The County tipping fee of $43.31 (in FY2015) is higher than the state average tipping fee which DHEC reported as $39 per ton in 2013 and reportedly up to twice as much as that paid by other local governments using Hickory Hill.

The South Carolina Department of Health and Environmental Control (DHEC) projects that the Hickory Hill landfill will reach its permitted capacity sometime between 2020 and 2025. Although other landfills have expressed an interest in accepting MSW from Beaufort County, Hickory Hill is the only landfill close enough to haul MSW directly from collection routes to the landfill. Any other landfill would require the use of a transfer station for cost-effective access.

Both because the Hickory Hill landfill is not projected to last through the 20 year planning period and because the tipping fees charged to Beaufort County are relatively high, the revised Beaufort County Solid Waste Management Plan, approved by the Beaufort County Council on June 24, 2013, states that *"Beaufort County plans to site, permit and construct a transfer station of suitable capacity to handle waste streams for the next 20 years."* This report presents the most recent evaluation of the cost associated with four options to develop transfer stations and to haul and dispose of MSW from the County at another landfill. The options include: 1) development of one transfer station for residential municipal solid waste (MSW) only, 2) development of two transfer stations for residential MSW only, 3) development of one transfer station for all MSW, and 4) development of two transfer stations for all MSW.

Table ES-1 shows that based on the assumptions detailed in the report, the options that are designed to manage all of the MSW (Options 3 and 4) cost more in total but less per ton than the others. The options with one transfer station (Options 1 and 3) cost less annually and less per ton than those with two transfer stations.

Table ES-1 Annual and Per Ton Costs for Each Option, 2025 and 2035

Option	MSW Managed	# Transfer Stations	2025		2035	
			Annual	Per Ton	Annual	Per Ton
Option 1	Residential Only	1	$5,976,436	$100.53	$8,581,212	$127.77
Option 2	Residential Only	2	$6,655,780	$111.96	$9,373,011	$139.56
Option 3	All MSW	1	$14,980,305	$95.42	$21,347,523	$120.37
Option 4	All MSW	2	$15,367,756	$97.89	$21,765,110	$122.72

If the County does not pursue a transfer station, either by developing one or more facilities itself or by soliciting a proposal for a private company to do so, it is likely that a private company will develop a transfer station independently when Hickory Hill reaches capacity, if not before. Although impossible to predict what a private transfer station may charge, based on historic fees charged at the Hickory Hill landfill, in the absence of competition, it is likely to be more than the per ton estimates shown in Table ES-1. Based on the reduced tipping fee in Waste Management's 2013 proposal (whereby fees would be reduced by a dollar per ton for the first five years if the County enters into a long-term contract) and adding in the transfer and haul costs calculated for residential MSW only if the county developed the transfer stations (thus, no profit has been added to these costs), the projected cost for transfer, haul, and disposal in the absence of a county transfer station is $117.54 per ton in 2025 and $138.62 per ton in 2035.

All of the cost estimates presented in this report are for transfer, haul, and disposal of MSW only. The County will still need facilities to manage other materials in MSW, either because this is required by law, because citizens demand recycling and recovery programs, or to reduce the cost of hauling MSW to distant landfills.

In conclusion, it is likely that long-term MSW management costs will be lower if more than one management option is available. Given that only one landfill is located within a direct-haul distance and given that according to DHEC, the capacity of that landfill will not last for a 20-year planning period, either additional landfill capacity nearby or a transfer station will be required to serve the County. This is acknowledged in the County's current Solid Waste management Plan.

At the same time, the County needs to ensure that convenient and reasonably priced alternatives for diverting materials from the landfill, including recycling and composting, are available. The County could incorporate these functions into any future facilities it developed. A transfer station, with or without recovery and recycling can be developed by the County with specific services (design, construction, operation, hauling, etc.) solicited from the private sector. Given the time required to site, permit, design, construct, and begin operation of a transfer station, the County should determine the number of transfer stations to be developed, the diversion and recovery activities at that facility, the tonnage to be managed, potential sites, and the role of private partners and then move ahead to pursue that strategy in a way that protects the environment, reduces the MSW disposed, and controls long-term costs to Beaufort County citizens.

INTRODUCTION

As part of the 20-year solid waste planning process required by the State, Beaufort County, South Carolina (the County) is considering its options for disposing of municipal solid waste (MSW). Currently, the County pays a private contractor for the disposal of MSW collected from residents at the County's convenience centers and at the curb by private and municipal haulers. This residential MSW is disposed at the Hickory Hill Landfill in Jasper County, just over the Beaufort County line. The landfill is owned and operated by Waste Management, Inc. Table 1 indicates that per ton tipping fee paid by Beaufort County to Waste Management over the past 15 years. The tipping fee paid for disposal at Hickory Hill is reportedly higher than the fee paid by others using the same landfill and higher than the average in the State, which was $39 per ton in FY2013. In 2012, Waste Management offered to reduce the tipping fee by $1 per year for five years if Beaufort County extended its disposal contract through 2025.

Table 1 Historic Tip Fee Paid by Beaufort County to Hickory Hill Landfill

Fiscal Year	Per Ton Fee
2000	38.93
2001	40.38
2002	40.43
2003	41.84
2004	43.08
2005	45.62
2006	48.38
2007	49.80
2008	37.75[1]
2009	39.34
2010	39.34
2011	40.32
2012	41.31
2013	42.04
2014	42.42
2015	43.31
1The Contractor reduced fee as County explored other options.	

Capacity at the Hickory Hill Landfill is not projected to last through the 20-year planning period. As of June 30, 2013, the landfill had 7.4 years of remaining life at permitted disposal rates and 12.4 years of remaining life at the 2013 disposal rate[1]. Based on these estimates, Hickory Hill will reach its permitted capacity between 2020 and 2025.

Both because the Beaufort County has historically paid a relatively high tipping fee at the Hickory Hill landfill and because the State projects that capacity at the landfill falls short of the 20-year planning period, the County periodically considers its options for alternative disposal facilities. When past research

[1] South Carolina Solid Waste Management Annual Report for Fiscal Year 2013 (Table 9.6 Remaining Capacity & Disposal in Tons), South Carolina Department of Health and Environmental Control, 2014.

was conducted on disposal options for Beaufort County, several disposal facilities expressed an interest in accepting Beaufort County's MSW. Table 2 shows the landfills that expressed interest in accepting MSW from Beaufort County in 2010[2], the last time this analysis was performed, the distance of each of these landfills from Beaufort County (at the time, the intersection of Laurel Bay and Shanklin Road was used as a starting point to estimate distance), and the quoted or projected tipping fee. The nearest landfill expressing an interest in accepting MSW from Beaufort County was the Berkley County landfill which is over 90 miles away, with a tipping fee of $50 per ton. The Three Rivers Solid Waste Authority landfill, just over 100 miles away, also expressed an interest in accepting the MSW from Beaufort County and quoted a lower tip fee of $31.70 at that time.[3] A transfer station will be needed for the County to cost-effectively access any of these landfills. A transfer station would also offer the County flexibility to dispose of MSW at multiple landfills. This potential competition has proven to keep disposal costs lower in other locations.

Table 2 Landfills Expressing Interest in Accepting MSW from Beaufort County (in 2010)

Facility Name	County, State	Owner	Distance[1]	Projected Tip Fee
Berkeley County MSWLF	Berkeley Co, SC	Berkeley County Waste & Sanitation Authority	92	$50
Three Rivers MSWLF	Aiken, SC	Three Rivers Solid Waste Management Authority	101	$31.70
Broad Hurst MSWL	Wayne Co, GA	Republic Services	118	N/A
Deans Bridge Rd. MSWL	Richmond Co, GA	Augusta-Richmond County, GA	134	$24
Lee County Landfill	Lee Co, SC	Republic Services	139	Mid to upper $20s
Camden County SR110 MSWL	Camden Co, GA	Camden County	149	$27.44
Wolf Creek Landfill	Twiggs Co, GA	Advanced Disposal Services	195	N/A
Taylor County Landfill	Taylor Co, GA	Veolia Environmental Services	284	$18-$20

1 Determined from Shanklin Road and Laurel Bay.
2 According to scale house operator, this is the tip fee for large volume customer.

This report considers the cost of the county developing and operating a transfer station(s) and hauling MSW to one of these landfills starting in 2025 when Hickory Hill is projected to reach capacity. The County may or may not choose to wait until Hickory Hill reaches capacity before considering the development and/or use of a transfer station. However, it is likely that moving ahead with development of a transfer station, which will to take several years to site, permit, design, and build, would provide Beaufort County more flexibility when negotiating a contract for disposal of its MSW.

[2] The projected tip fees and the landfills' interest in accepting Beaufort County's waste would have to be confirmed before Beaufort County proceeds further in exploring options that entail disposing at them.

[3] Three Rivers was contacted to update its 2010 quote, but was unwilling to provide more definitive quotes without more assurance that the County was prepared to negotiate an agreement.

WASTE PROJECTIONS

The cost associated with the development of a transfer station, as well as the cost to haul and dispose of MSW, depends on the amount to be managed. For this analysis, two variations of tonnages of MSW to be handled through transfer stations are considered. In the first, only residential MSW is included, that is, the MSW for which the County currently covers the cost of disposal. In the second variation, all the MSW projected to be generated for disposal, whether residential or commercial or institutional, is included.

Table 3 shows the projected amount of residential and total MSW projected annually from FY 2015 through 2035. The projections assume that the estimated amount of MSW currently disposed *per capita* will remain the same throughout the planning period. Thus, the total amount to be disposed increases with projected population increases. In 2013, the County paid for disposal of approximately 50,000 tons of residential MSW. This is equivalent to 1.61 pounds per person day or 158 tons per day of residential MSW. When the projected population is multiplied by 1.61 pounds per person per day, the total amount of residential MSW to be managed is projected to be 163 tons per day in 2015 and 213 tons per day in 2035. When all MSW is considered, an estimated total of 432 tons per day in 2025 and 561 tons per day in 2035 is projected based on an assumed average of 4.25 pounds per person per day generated for disposal. These projections are the basis for sizing the transfer stations and estimating hauling and disposal costs in the options analyzed in subsequent sections.

Table 3 Projected MSW, 2015 – 2035

Year	Population[1]	Residential Only		All MSW	
		Tons Per Year	Tons Per Day[2]	Tons Per Year	Tons Per Day[2]
2015	175,900	51,665	163	136,432	432
2016	178,519	52,435	166	138,464	438
2017	181,177	53,215	168	140,525	445
2018	183,874	54,008	171	142,617	451
2019	186,611	54,812	173	144,740	458
2020	189,500	55,660	176	146,981	465
2021	191,995	56,393	178	148,916	471
2022	194,523	57,135	181	150,877	477
2023	197,084	57,888	183	152,863	484
2024	199,679	58,650	186	154,876	490
2025	202,400	59,449	188	156,987	497
2026	204,900	60,183	190	158,926	503
2027	207,432	60,927	193	160,889	509
2028	209,994	61,680	195	162,877	515
2029	212,588	62,442	198	164,889	522
2030	215,300	63,238	200	166,992	528
2031	218,207	64,092	203	169,247	536
2032	220,835	64,864	205	171,285	542
2033	223,450	65,632	208	173,313	548
2034	226,056	66,397	210	175,335	555
2035	228,656	67,161	213	177,351	561

1) Based on population projections extrapolated from http://www.sccommunityprofiles.org/census/proj_c2010.php
2) Assumes 316 operating days/year

OPTIONS CONSIDERED

This report presents cost projections for four transfer, haul, and disposal options. These options, selected in collaboration with County staff, are described below.

1. Beaufort County develops one transfer station to manage residential MSW only (the portion of the waste for which it currently pays for disposal).

2. Beaufort County develops two transfer stations to manage residential MSW only (one in the northern half of the County and one in the southern half of the County).

3. Beaufort County develops one transfer station to manage all of the MSW generated in the County.

4. Beaufort County develops two transfer stations to manage all of the municipal solid waste generated in the County.

Option 1

In this option, the County develops, or arranges for the development, of one transfer station to handle residential MSW only (based on the projected tonnage indicated in Table 3). This facility is assumed to be a single-bay, fully enclosed, top load transfer station designed to handle 215 tons per day. Table 4 shows that in 2014 dollars, the estimated capital cost for such a facility is $4,115,000. Table 5 shows the estimated annual operating cost is $474,000 for a facility of this size.

Table 4 Estimated Capital Cost for One Transfer Station, Residential MSW Only

Line Item	Estimated Cost (2014$)[1]
Site Acquisition	$160,000[2]
Site Work	$828,000
Transfer Building and Maneuvering Area	$1,237,000
Scale House and Scales	$317,000[3]
Subtotal - Construction Cost	**$2,541,000**
Design and Engineering (20%)	$508,000
Permitting (2%)	$51,000
Construction Inspection (4%)	$102,000
Construction Contingency (20%)	$508,000
Surveying and Soils Report	$30,000
Total Construction Cost	**$3,740,000**
Mobile Equipment	$375,000[4]
Total Capital Cost	**$4,115,000**

1 All costs rounded to the nearest $1,000
2 Eight acres at $20,000 per acre
3 Two scales assumed
4 One front-end loader assumed

Table 5 Estimated Annual Operating Cost for One Transfer Station, Residential MSW Only

Line Item	Estimated Cost (2014$)[1]
Labor	$247,000[2]
Building And Site Maintenance	$25,000[3]
Equipment Operating And Maintenance Costs	$15,000[4]
Utilities - Building And Site	$13,000
Rolling Stock Fuel Costs	$37,000
Insurance	$75,000
Subtotal Operation & Maintenance	**$412,000**
Contingency (10%)	$41,000
Accounting, Supplies, Misc. (5%)	$21,000
Total Annual Operation & Maintenance Cost	**$474,000**

1 All costs rounded to the nearest $1,000
2 Four full time equivalents and inflated by an 85% efficiency factor to account for personal leave, training, sick/injury, etc. plus 40% benefits
3 One percent of capital excluding mobile equipment
4 Assumes loader operates continuously during station hours and is replaced in years 6, 11, and 16 with 20% resale value.

Table 6 shows the projected cost to haul residential MSW from the transfer station to the landfill in 2025 and in 2035. In all options, the landfill is assumed to be located 100 miles one-way from the transfer station. The projected hauling cost, in 2025 when 59,449 tons per year is anticipated, is $1.95 million per year. In 2035, at the end of the planning period, hauling costs are projected to total $2.3 million for the 67,161 tons projected

Table 6 Estimated Hauling Cost for Residential MSW Only[1]

Line Item	Estimated Cost for 2025 Tonnage (2014$)[2]	Estimated Cost for 2035 Tonnage (2014$)[2]
Labor	$604,000	$714,000
Fuel and Oil	$496,000	$601,000
Tires	$84,000	$101,000
Maintenance and Repairs	$189,000	$218,000
Equipment	$193,000[3]	$223,000[4]
Insurance, License, Taxes	$180,000	$210,000
Subtotal Hauling	**$1,746,000**	**$2,067,000**
Contingency (10% on all costs except equipment)	$155,000	$184,000
Accounting, Supplies, Misc. (3% on all costs except equipment)	$47,000	$55,000
Total Hauling	**$1,948,000**	**$2,306,000**

1 Assuming a 100-mile haul distance from the transfer station to the landfill one-way.
2 All costs rounded to nearest 000s.
3 Annual cost based on $2,080,000 equipment purchase price and 65% depreciated value over 7 years (=$2,080,000*.65/7)
4 Annual cost based on $2,400,000 equipment purchase price and 65% depreciated value over 7 years (=$2,400,000*.65/7)

Table 7 shows that the projected annual disposal fees at the current estimated tipping fee of $32 per ton (in 2014 dollars) is $1.9 million in 2025 tonnage and $2.15 million in 2035.

Table 7 Estimated Disposal Cost for Residential MSW Only

	2025	2035
Tons	59,449	67,161
Annual Cost	$1,902,000[1, 2]	$2,149,000[1, 2]
1 Rounded to nearest 000s. 2 Assumed to be $32 per ton in 2014$		

Table 8 shows the resulting total projected cost to transfer, haul, and dispose of residential MSW in Option 1 in 2025 and 2035. The annual cost in 2025 (in 2025 dollars assuming a 2.5 percent annual inflation rate) is $5,976,436 which is equal to $100.53 per ton. In 2035, the projected cost is $8,581,212 per year or $127.77 per ton. Hauling and disposal costs are the most significant costs, approximately three times more than the cost of transfer station debt service and operations and maintenance combined. Thus, any steps taken to decrease hauling and disposal costs, such as using a landfill closer than the assumed 100 mile distance or negotiating a reduced tipping fee, would have a significant impact on the total cost of transfer, haul, and disposal of MSW.

Table 8 Annual and Per Ton Costs of One Transfer Station, Residential MSW Only, 2025 and 2035

	2025 (59,449 tons assumed)		2035 (67,161 tons assumed)	
	Annual	Per Ton	Annual	Per Ton
Transfer Station Operation	$621,928	$10.46	$796,120	$11.85
Debt Service[1]	$302,789	$5.09	$302,789	$4.51
Hauling[2]	$2,556,132	$43.00	$3,872,879	$57.67
Disposal[3]	$2,495,587	$41.98	$3,609,424	$53.74
TOTAL	**$5,976,436**	**$100.53**	**$8,581,212**	**$127.77**
1 Assuming 20-year payment schedule and 4 percent interest 2 Assuming a 100-mile haul distance to the landfill one-way 3 Assuming a tipping fee of $32 per ton in 2014$ inflated by 2.5% per year				

Option 2

In this option, the County develops, or arranges for the development, of two transfer stations with the combined capacity to process the same amount of MSW as in Option 1. Two transfer stations would reduce the distance (and thus the costs) to transport MSW from collection routes to the transfer station(s). It is assumed that one transfer station is developed in the northern part of the County to handle 40 percent of the total residential MSW and one transfer station is developed in the southern part of the County to handle 60 percent of the total residential MSW. The facility in the north has a design capacity of 85 tons per day while the one in the south has a design capacity of 130 tons per day. Both of these facilities are assumed to be a single-bay, fully enclosed, top load transfer stations.

Table 9 shows that the estimated capital cost for two separate facilities is nearly $8 million, almost twice as much as the capital cost for a single facility to handle the same tonnage. Operating costs (Table 10) are estimated to be $780,000 per year. There are minimal savings from reducing the size of facility from a capacity of 215 to 130 or 85 tons per day. Even a 215 ton facility is relatively small and thus requires the minimal amount of land and equipment and staff to operate. Thus, each of the smaller facilities require nearly the same level of investment as the 215 ton per day facility.

Table 9 Estimated Capital Cost for Two Transfer Stations, Residential MSW Only

Line Item	Estimated Cost (2014$)[1]
Site Acquisition	$320,000[2]
Site Work	$1,431,000
Transfer Building and Maneuvering Area	$2,466,000
Scale House and Scales	$633,000[3]
Subtotal Construction	**$4,850,000**
Design and Engineering (20%)	$970,000
Permitting (2%)	$97,000
Construction Inspection (4%)	$194,000
Construction Contingency (20%)	$970,000
Surveying and Soils Report	$60,000
Construction	**$7,141,000**
Mobile Equipment	$750,000[4]
Total Capital Cost	**$7,891,000**

1 All costs rounded to the nearest $1,000
2 Sixteen acres (8 acres for each facility) at $20,000 per acre
3 Two scales at each facility assumed
4 Two front-end loaders assumed, one at each transfer station

Table 10 Estimated Annual Operating Cost for Two Transfer Stations, Residential MSW Only

Line Item	Estimated Cost (2014$)[1]
Labor	$404,000[2]
Building And Site Maintenance	$49,000[3]
Equipment Operating And Maintenance Costs	$29,000[4]
Utilities - Building And Site	$23,000
Rolling Stock Fuel Costs	$75,000
Insurance	$98,000
Subtotal Operation & Maintenance	**$678,000**
Contingency (10%)	$68,000
Accounting, Supplies, Misc. (5%)	$34,000
Total Annual Operation & Maintenance Cost	**$780,000**

1 All costs rounded to the nearest $1,000
2 Three full time equivalents plus a shared transfer station Supervisor and inflated by an 85% efficiency factor to account for personal leave, training, sick/injury, etc. plus 40% benefits
3 One percent of capital excluding mobile equipment
4 Assumes loader operates continuously at each transfer station during station hours and is replaced in years 6, 11, and 16 with 20% resale value

The hauling and disposal cost for transferring 215 tons per day is no different whether it is hauled from one or two facilities assuming the same distance from each transfer station to the landfill and are those indicated in Table 6 and 7.

Table 11 shows the total estimated cost for transfer, haul, and disposal in Option 2 in 2025 and 2035. The annual cost in 2025 (in 2025 dollars assuming a 2.5 percent annual inflation rate) is $6,655,780 which is equal to $111.96 per ton. In 2035, the projected cost is $9,373,011 per year or $139.56 per ton (in 2035 dollars). The cost to develop and operate two smaller transfer stations is much higher than the cost

to develop and operate one 215 ton per day facility. As a result, the total projected cost of Option 2 is about 10 percent higher than Option 1, primarily because of the increase in debt service (due to higher capital costs) and transfer station operations and maintenance costs. The advantage of two transfer stations, rather than one, is that the average distance to a transfer station from a collection route is likely to be lower if one transfer station is sited in the north and one in the south.

Table 11 Annual and Per Ton Costs for Two Transfer Stations, Residential MSW Only, 2025 and 2035

	2025 (59,449 tons assumed)		2035 (67,161 tons assumed)	
	Annual	**Per Ton**	**Annual**	**Per Ton**
Transfer Station Operation	$1,023,427	$17.22	$1,310,074	$19.51
Debt Service[1]	$580,634	$9.77	$580,634	$8.65
Hauling	$2,556,132	$43.00	$3,872,879	$57.67
Disposal	$2,495,587	$41.98	$3,609,424	$53.74
TOTAL	**$6,655,780**	**$111.96**	**$9,373,011**	**$139.56**

1 Assuming 20-year payment schedule and 4 percent interest
2 Assuming a 100-mile haul distance to the landfill one-way

Option 3

Option 3 assumes one transfer station accepts all the MSW projected to be generated in the County including the residential MSW that the County currently includes in its disposal agreement (and was included in Options 1 and 2) plus all the commercial and institutional MSW that is collected by private haulers. The County would need to work with municipalities and haulers to develop an approach for bringing all MSW to one facility.

Given the projections shown in Table 3, a single transfer station to handle all MSW would require an estimated capacity of 500 tons per day. As in Options 1 and 2, this facility is assumed to be a single-bay, fully enclosed, top load transfer station. Table 12 shows that in 2014 dollars, the projected capital cost for such a facility is $5,495,000. Table 13 shows the projected annual operating cost is $784,000 for a single facility of this size.

Table 12 Estimated Capital Cost for One Transfer Station, All MSW

Line Item	Estimated Cost (2014$)[1]
Site Acquisition	$290,000[2]
Site Work	$1,231,000
Transfer Building and Maneuvering Area	$1,595,000
Scale House and Scales	$317,000
Subtotal Construction	**$3,432,000**
Design and Engineering (20%)	$686,000
Permitting (2%)	$69,000
Construction Inspection (4%)	$137,000
Construction Contingency (20%)	$686,000
Surveying and Soils Report	$30,000
Construction	**$5,040,000**
Mobile Equipment	$455,000[3]
Total Capital Cost	**$5,495,000**

1 All costs rounded to the nearest $1,000
2 14.5 acres at $20,000 per acre
3 One front-end loader and one-tractor assumed

Table 13 Estimated Annual Operating Cost for One Transfer Station, All MSW

Line Item	Estimated Cost (2014$)[1]
Labor	$432,000[2]
Building And Site Maintenance	$34,000[3]
Equipment Operating And Maintenance Costs	$36,000[4]
Utilities - Building And Site	$13,000
Rolling Stock Fuel Costs	$69,000
Insurance	$99,000
Subtotal Operation & Maintenance	**$682,000**
Contingency (10%)	$68,000
Accounting, Supplies, Misc. (5%)	$34,000
Total Annual Operation & Maintenance Cost	**$784,000**

1 All costs rounded to the nearest $1,000
2 Five positions, each at 58 hours per week and inflated by an 85% efficiency factor to account for personal leave, training, sick/injury, etc. plus 40% benefits
3 One percent of capital excluding mobile equipment
4 Assumes loader operates continuously during station hours and is replaced in years 6, 11, and 16 with 20% resale value; crane is operated 40% of station operating hours and is replaced in years 6, 11, and 16 with 15% resale value; and tractor is operated 50% of station operating hours and replaced in years 6, 11, 16 with 25% resale value.

Table 14 shows that the projected hauling cost for the anticipated 156,987 tons of MSW projected in 2025 is approximately $5.3 million per year (in 2014 dollars) and $6.0 million in 2035 for 177,351 tons. Table 15 shows that the projected disposal fees at the current estimated rate of $32 per ton (in 2014 dollars) is approximately $5.0 million per year for the 2025 tonnage and $5.7 million for the 2035 tonnage.

Table 14 Estimated Hauling Cost for All MSW, 2025 and 2035

Line Item	Estimated Cost for 2025 Tonnage (2014$)[1,2]	Estimated Cost for 2035 Tonnage (2014$)[1,2]
Labor	$1,648,000	$1,867,000
Fuel and Oil	$1,352,000	$1,532,000
Tires	$236,000	$258,000
Maintenance and Repairs	$508,000	$581,000
Equipment	$520,000[3]	$594,000[4]
Insurance, License, Taxes	$487,000	$555,000
Subtotal Hauling	**$4,751,000**	**$5,387,000**
Contingency (10% on all costs except equipment)	$423,000	$479,000
Accounting, Supplies, Misc. (3% on all costs except equipment)	$127,000	$144,000
Total Hauling	**$5,301,000**	**$6,010,000**

1 All costs rounded to nearest 000s
2 Assuming a 100-mile haul distance from the transfer station to the landfill one-way.
3 Annual cost based on $5,600,000 equipment purchase price and 65% depreciated value over 7 years (=$5,600,000*.65/7)
4 Annual cost based on $6,400,000 equipment purchase price and 65% depreciated value over 7 years (=$6,400,000*.65/7)

Table 15 Estimated Disposal Cost for All MSW

	2025	2035
Tons	156,987	177,351
Annual Cost	$5,024,000[1, 2]	$5,675,000[1, 2]

1 Rounded to nearest 000s
2 Assumed to be $32 per ton in 2014$

Table 16 shows the projected annual cost of this option in 2025 (in 2025 dollars assuming a 2.5 percent annual inflation rate) is nearly $15 million and over $21 million in 2035 (in 2035 dollars). Although the total annual cost is higher than in the options in which only residential MSW is considered, the cost per ton is lower at $95.41 per ton in 2025 and $120.37 in 2035.

Table 16 Annual and Per Ton Costs of One Transfer Station, All MSW, 2025 and 2035

	2025 (156,987 tons assumed)		2035 (177,351 tons assumed)	
	Annual	**Per Ton**	**Annual**	**Per Ton**
Transfer Station Operation	$1,028,677	$6.55	$1,316,794	$7.42
Debt Service[1]	$404,332	$2.58	$404,332	$2.28
Hauling[2]	$6,955,372	$44.31	$10,094,769	$56.92
Disposal	$6,591,924	$41.99	$9,531,628	$53.74
TOTAL	**$14,980,305**	**$95.42**	**$21,347,523**	**$120.37**

1 Assuming 20-year payment schedule and 4 percent interest
2 Assuming a 100-mile haul distance to the landfill one-way

Option 4

The County develops, or arranges for the development, of two transfer stations, one in the northern half of the County and one in the southern half of the County, to handle all MSW generated in the County. The capacity of the facility in the northern part of the County (assumed to handle 40 percent of the total MSW) is 200 tons per day. The capacity of the facility in the southern part of the County (assumed to handle 60 percent of the total MSW) is 300 tons per day. Table 17 shows that in 2014 dollars, the estimated capital cost for two facilities of this size is $9,298,000. Table 18 shows the combined estimated annual operating cost is $866,000 for these two facilities.

Table 17 Estimated Capital Cost for Two Transfer Stations, All MSW

Line Item	Estimated Cost (2014$)[1]
Site Acquisition	$450,000[2]
Site Work	$1,872,000
Transfer Building and Maneuvering Area	$2,804,000
Scale House and Scales	$633,000
Subtotal Construction	**$5,759,000**
Design and Engineering (20%)	$1,152,000
Permitting (2%)	$115,000
Construction Inspection (4%)	$230,000
Construction Contingency (20%)	$1,152,000
Surveying and Soils Report	$60,000
Construction	**$8,468,000**
Mobile Equipment	$830,000[3]
Total Capital Cost	**$9,298,000**

1 All costs rounded to the nearest 000s
2 Eight acres for the 200 TPD facility and 14.5 acres for the 300 TPD facility at $20,000 per acre
3 One front-end loader at each station and a yard tractor at the 300 TPD facility only

Table 18 Estimated Annual Operating Cost for Two Transfer Station, All MSW

Line Item	Estimated Cost (2014$)[1]
Labor	$456,000[2]
Building And Site Maintenance	$58,000[3]
Equipment Operating And Maintenance Costs	$25,000[4]
Utilities - Building And Site	$23,000
Rolling Stock Fuel Costs	$85,000
Insurance	$106,000
Subtotal Operation & Maintenance	**$753,000**
Contingency (10%)	$75,000
Accounting, Supplies, Misc. (5%)	$38,000
Total Annual Operation & Maintenance Cost	**$866,000**

1 All costs rounded to the nearest $1,000
2 One scale attendant, one loader operator, and one spotter/laborer at each facility and shared transfer station supervisor and equipment operator between the two facilities, 40 hours per week, 52 weeks per year. Hours are inflated by an 85% efficiency factor to account for personal leave, training, sick/injury and other non-productive time.
3 One percent of capital excluding mobile equipment
4 Assumes loader operates continuously during station hours and is replaced in years 6, 11, and 16 with 20% resale value; crane is operated 40% of station operating hours and is replaced in years 6, 11, and 16 with 15% resale value; and tractor is operated 50% of station operating hours and replaced in years 6, 11, 16 with 25% resale value.

The hauling and disposal cost for transferring 500 tons per day from two facilities is assumed to be the same as the cost to haul and dispose of 500 tons per day from one facility (as shown in Option 3). Table 19 shows the projected cost for transfer, haul, and disposal of MSW in Option 4 is nearly $15.4 million in 2025 and nearly $21.8 million in 2035. The resulting cost per ton is $97.89 in 2025 and $1202.72 in 2035.

Table 19 Annual and Per Ton Costs of Two Transfer Stations, All MSW, 2025 and 2035

	2025 (156,987 tons assumed)		2035 (177,351 tons assumed)	
	Annual	**Per Ton**	**Annual**	**Per Ton**
Transfer Station Operation	$1,136,267	$7.24	$1,454,520	$8.20
Debt Service[1]	$684,193	$4.36	$684,193	$3.86
Hauling[2]	$6,955,372	$44.31	$10,094,769	$56.92
Disposal	$6,591,924	$41.99	$9,531,628	$53.74
TOTAL	**$15,367,756**	**$97.89**	**$21,765,110**	**$122.72**

1 Assuming 20-year payment schedule and 4 percent interest
2 Assuming a 100-mile haul distance to the landfill one-way

Comparison of Options

Table 20 compares the projected total and per ton cost of Options 1 through 4 for transfer, haul, and disposal. Although the total cost of a system to manage all MSW is more than for a system to manage residential MSW only, the cost per ton is lower since economies of scale can be realized with more tons. Options 3 and 4 assume that non-residential generators in the County use the same facilities as residential generators. Although the full cost of the operations in these Options is shown, the commercial and institutional sector would likely cover a portion of these costs and so the total cost to the county for

residential MSW may be lower. Since businesses and institutions in the County will need to dispose of MSW in some way, the County may want to consider negotiating an arrangement with private generators and haulers when sizing and developing a transfer station to reduce everyone's long-term costs. Table 20 also shows that the cost for two facilities is higher than for a single transfer station, whether all MSW or just residential MSW is being handled. However, two transfer stations, one in the north and one in the south, could reduce the distance, and thus the cost, of hauling MSW from collection routes to the transfer station. The savings in hauling from the collection route to the transfer station and the costs of developing and operating two transfer stations instead of one would need to be weighed by the County when deciding whether to construct one or two transfer stations should it proceed.

Table 20 Annual and Per Ton Costs for Each Option, 2025 and 2035

Option	Portion of MSW Managed	# Transfer Stations	2025		2035	
			Annual	Per Ton	Annual	Per Ton
Option 1	Residential Only	1	$5,976,436	$100.53	$8,581,212	$127.77
Option 2	Residential Only	2	$6,655,780	$111.96	$9,373,011	$139.56
Option 3	All MSW	1	$14,980,305	$95.42	$21,347,523	$120.37
Option 4	All MSW	2	$15,367,756	$97.89	$21,765,110	$122.72

No County Transfer Station

There is no way to predict the fee charged to the County to manage MSW in the future, especially beyond the life of Hickory Hill, if the County chooses not to develop, or arrange for the development of a transfer station. For the purposes of this analysis, we have projected the costs based on an assumption that the current disposal contractor would develop a transfer station when its existing landfill closes and the County would contract with this facility for transfer, haul, and disposal of residential MSW. The estimated transfer, haul, and disposal costs have been projected using the following assumptions.

- The County extends its current contract for disposal at the Hickory Hill landfill based on the rates proposed by Waste Management in 2013. Based on this proposal, it is assumed that the tip fee decreases by $1 per ton in each of the first five years and then increases annually with the CPI (assumed to be 2.5 percent per year) until 2025 when Hickory Hill reaches capacity.

- Starting in 2025, the disposal cost at a distant landfill continues to increase by 2.5 percent per year (as was assumed in Options 1 through 4).

- The transfer costs in each year 2025 through 2035 are the same as the transfer O&M plus debt service costs in Options 1 and 2.

- The hauling costs in each year 2025 through 2035 are the same as the transfer O&M plus debt service costs in Options 1 and 2.

Although the same transfer and haul costs is assumed for private operation as for a County transfer station, the actual fee charged by a private company is likely to be very different. On one hand, if a private transfer station operator solicits MSW from other sources, the cost per ton could be lower as

capital and fixed operating costs would be spread over more tonnage (as shown in the difference in per ton costs in Options 1 and 2 versus Options 3 and 4). On the other hand, a private operator would likely add a profit margin to the operating cost that is not included in this analysis. In the absence of competition from multiple transfer stations or landfills, actual fees charged could be significantly higher than those based solely on projected costs, as evidenced by the fees charged by the Hickory Hill landfill to Beaufort County over the past two decades.

Table 21 shows that based on these assumptions, the projected costs for a private transfer and haul operation is projected to be $117.54 in 2025 and $138.62 in 2035. These projections are higher than a privately operated system solely because disposal costs are projected to be higher. Disposal fees are projected to be higher because even at the reduced rate proposed by Waste Management for a long-term contract with Beaufort County, the current landfill tip fee on which projections are based are higher than those quoted by several other landfills. The actual costs in the future will depend on the transfer, haul, and disposal costs offered by private landfill operators and, if transfer and haul is privately operated, by the transfer and haul costs proposed. Experience suggests that these costs tend to be lower when competitive proposals are solicited and multiple alternatives are available.

Table 21 Projected Per Ton Costs with No County Transfer Station, 2015 - 2035

Year	Transfer[1]	Haul[1]	Disposal[2]	TOTAL
2015	$0	$0	$43.31(current)	$43.31(current)
2016	$0	$0	$42.31	$42.31
2017	$0	$0	$41.31	$41.31
2018	$0	$0	$40.31	$40.31
2019	$0	$0	$39.31	$39.31
2020	$0	$0	$40.29	$40.29
2021	$0	$0	$41.30	$41.30
2022	$0	$0	$42.33	$42.33
2023	$0	$0	$43.39	$43.39
2024	$0	$0	$44.48	$44.48
2025[3]	$15.53	$56.42	$45.59	$117.54
2026	$15.60	$57.12	$46.73	$119.45
2027	$15.67	$57.83	$47.90	$121.40
2028	$15.74	$58.56	$49.09	$123.39
2029	$15.82	$59.29	$50.32	$125.43
2030	$15.89	$60.00	$51.58	$127.47
2031	$15.95	$60.69	$52.87	$129.51
2032	$16.04	$61.46	$54.19	$131.69
2033	$16.13	$62.26	$55.54	$133.94
2034	$16.23	$63.08	$56.93	$136.25
2035	$16.34	$63.92	$58.36	$138.62

1 Transfer and haul costs are based on those calculated for similar size facility in Options 1 and 2.
2 Based on assumptions taken from 2013 proposal from Waste Management, Inc. to Beaufort County assuming $1 increase for first five years with 2.5 increase (assumed CPI) each year thereafter.
3 Assuming transfer and hauling begins in 2025 after Hickory Hill is assumed to reach capacity.

RECYCLING AND RECOVERY OPERATIONS

All projected costs included in this report only include the cost for a transfer station to accept MSW and transfer it to larger trailers for hauling to a disposal facility. Over the years, the County has considered a more comprehensive recovery and transfer station that would enable the County to reduce the amount of MSW requiring transfer and disposal and to handle materials like electronics and household hazardous waste more efficiently. In a work session with the County on June 8, 2010, representatives identified the following functions for a recovery and transfer station in addition to those planned for the facility described in the options in this report:

- Convenience center for residents, including compactors for MSW and grade separated drop-off for bulky items;
- A baling facility for corrugated cardboard and other fiber to send to recycling markets;
- A household hazardous waste (HHW) collection and storage facility;
- A vactor decant facility;
- An administration building; and
- Space for future expansion.

At that time, R. W. Beck, Inc., the consultant preparing the analysis, identified the criteria that should be considered when developing a facility to serve all of these functions, in addition to transfer station operations, and prepared a conceptual layout. The estimated land parcel recommended for a full-function recovery and transfer station was 30 acres.

If the County moves ahead with developing, or arranging for the development of one or more transfer station facilities, it may want to consider incorporating some or all of these functions into the site(s). If the County chooses to rely solely on the private sector to manage MSW in the future, the County will need a strategy to manage materials that cannot be disposed and may want to increase diversion of other materials to reduce the cost for transferring and hauling this material to distant landfills