

THE ECONOMIC IMPACTS OF THE MUNICIPAL WASTE COLLECTION, TRANSPORTATION, AND DISPOSAL INDUSTRY IN PENNSYLVANIA

Report Submitted To:

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1.0 INTRODUCTION

The municipal waste collection, transportation and disposal industry represents a key component of the overall Pennsylvania economy. The municipal waste industry in Pennsylvania generates revenues for processing firms and wages for employees. In addition, the industry also gives rise to economic activity, or output, in other segments of the state and regional economies that provide goods and services to the municipal waste industry and its employees. To the extent that these overall economic impacts accrue to firms and workers located in Pennsylvania, they represent economic benefits that would be absent without the municipal waste industry. One of the objectives of this study is to estimate the overall magnitude of the economic impacts associated with municipal waste collection, transportation, and disposal in Pennsylvania.

In addition to the economic impacts dispersed throughout the state, the municipal waste industry also provides boosts to local municipal and county budgets and provides local communities with important qualitative benefits.

This study is sponsored by the Pennsylvania Waste Industry Association (PWIA), a chapter of the National Solid Waste Management Association, and provides estimates of the overall economic impact of the waste collection, transportation and disposal industry at both the regional and state levels. The report is broken down into the following sections:

- Section 2: Data Sources

- Section 3: Economic Impacts

- Regional Economic Impacts

- Statewide Economic Impacts

- Economic Impacts by Categories of Daily Waste Capacity

- Section 4: The Municipal Waste Industry's Contribution to Local and State Tax Bases

- Section 5: Energy Production

- Section 6: Recycling

- Section 7: Qualitative Impacts

- Section 8: Conclusion

2.0 DATA SOURCES

Primary Data Sources

The first data source is a detailed survey that was distributed to all landfills that are members of the PWIA, a trade association of privately owned waste disposal facilities. The survey was also distributed to member landfills of the Keystone chapter of SWANA (Solid Waste Association of North America), an association of publicly owned landfills. Distributing the survey to member landfills of both associations ensured responses from both privately and publicly owned landfills¹. The survey responses were analyzed and compiled to yield estimates of total direct expenditures, earnings, and jobs, at both the regional and state level. Overall, survey responses represented over 60% of total landfill waste receipts and nearly 61% of total landfills in Pennsylvania in 2006.

Secondary Data Sources

In addition to direct surveying, we also examined data from the US Census Bureau's 2002 Economic Census, which provides general statistics for establishments of firms with payrolls. Statewide data from the 2002 Economic Census are published based on the 2002 NAICS² major sectors.

Data from the Pennsylvania Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) was also used to obtain statewide industry data on municipal waste disposal and collection, recycling, and energy and gas production.

3.0 ECONOMIC IMPACTS

3.1 OUTLINE OF ECONOMIC IMPACT ANALYSIS

Before presenting the specific estimates, we define the various types of economic impacts and describe the methodology used to estimate them. We estimate the potential economic impacts in terms of three measures of economic activity: (1) total sales or output (total economic activity), (2) total employee wages and earnings, and (3) total employment.

Each of these impacts are going to be generated by **direct (initial or ongoing)** spending on annual operations of landfills (ongoing impacts). Operating expenditures will include payroll, professional and technical services fees, legal fees, and other services.

Estimates of total statewide **direct expenditures** were calculated using various data sources, including the survey responses, as well as information obtained from the DEP. In addition, we estimate the breakdown of statewide direct expenditures at the regional level. Each of these "regions" will have different impacts due to the different size of their respective economies.

¹ See Appendix B for a complete copy of the survey.

² North American Industry Classification System

TOTAL ECONOMIC ACTIVITY (ALL EXPENDITURES)

The total regional and statewide **direct** expenditures incurred by the waste disposal industry generate additional economic activity by way of **indirect** and **induced** expenditures. **Indirect** expenditures are those expenditures resulting from all intermediate rounds of goods and services produced by various firms that are stimulated by the direct operating expenditures. For example, a landfill might purchase electronic equipment from a local supplier who would in turn purchase professional services or delivery vehicles, etc., from other businesses. Since some of these items are produced in the region, the landfill's expenditures for electronic equipment will generate additional rounds of expenditures in its respective region and State. **Induced** expenditures are those that are generated through the spending of households' incomes (salaries and wages) earned as part of the direct and indirect expenditures. For example, employees of a landfill will spend their earnings on various items (housing, food, clothing), and since some of these items are produced in the region, these expenditures will generate additional rounds of expenditures in the region. Using an Input-Output model, we then calculate these indirect and induced effects and the spending, earnings and employment generated by the indirect and induced spending.³

Together, the direct, indirect, and induced expenditures sum to the **total** regional and statewide economic activity or output that could be generated by the municipal waste collection, transportation, and disposal industry. The industry's overall operating expenditures and associated indirect and induced expenditures will have ongoing, annual economic impacts.

EARNINGS AND EMPLOYMENT IMPACTS

We also estimate the potential economic impacts of the industry in terms of two additional measures of economic activity: total earnings (wages and salaries), and total employment. These estimates are based on two independent but related direct numbers: first, if data on direct employment and payroll is provided (as is the case with the majority of survey responses), the model will generate estimates of indirect and induced earnings and employment that will be associated with the direct expenditures and employment. Even without direct employment numbers, however, the Input-Output models can be used to generate estimates of earnings and employment based on the total spending in the industries.

REGIONS OF ANALYSIS

In this analysis, we estimate the impacts of the municipal waste industry for the State of Pennsylvania and six regions throughout the State, as specified by the DEP. Table 3.1.1 and Figure 3.1.1 provide details on each of the six regions.

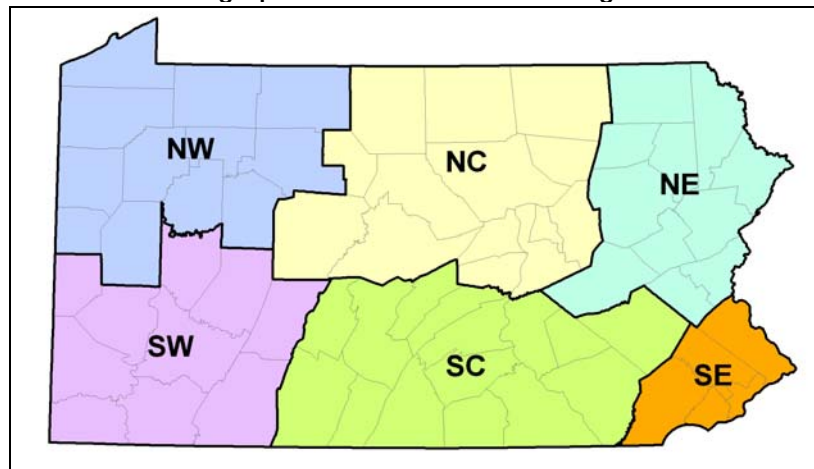
³ We have used U.S. Department of Commerce's Regional Input-Output Modeling System II (RIMS II) models for the State of Pennsylvania and each of the six DEP regions listed in Table 3.1.1. The Input-Output model, which is one of the most commonly used for economic impact analyses, is described in detail in an Appendix to this report.

Table 3.1.1
Member Counties of DEP Regions

DEP Region	Counties
Northcentral (NC)	Bradford, Cameron, Centre, Clearfield, Clinton, Columbia, Lycoming, Montour, Northumberland, Potter, Snyder, Sullivan, Tioga, Union
Northeast (NE)	Carbon, Lackawanna, Lehigh, Luzerne, Monroe, Northampton, Pike, Schuylkill, Susquehanna, Wayne, Wyoming
Northwest (NW)	Butler, Clarion, Crawford, Elk, Erie, Forest, Jefferson, Lawrence, McKean, Mercer, Venango, Warren
Southcentral (SC)	Adams, Bedford, Berks, Blair, Cumberland, Dauphin, Franklin, Fulton, Huntingdon, Juniata, Lancaster, Lebanon, Mifflin, Perry, York
Southeast (SE)	Bucks, Chester, Delaware, Montgomery, Philadelphia
Southwest (SW)	Allegheny, Armstrong, Beaver, Cambria, Fayette, Greene, Indiana, Somerset, Washington, Westmoreland

Source: Pennsylvania Department of Environmental Protection (2007)

Figure 3.1.1
Geographic Boundaries of DEP Regions



Source: Pennsylvania Department of Environmental Protection, Econsult Corporation (2007)

3.2 DIRECT EXPENDITURES

REGIONAL MUNICIPAL WASTE DISPOSAL DIRECT EXPENDITURES

Estimates of total direct expenditures attributable to municipal waste disposal are based mainly on the survey responses. As mentioned above, aggregate survey data suggest that respondents represent over 60% of total landfill waste accepted and over 61%⁴ of total landfills in Pennsylvania in 2006. Table 3.2.1 provides summary totals for the aggregate response data.

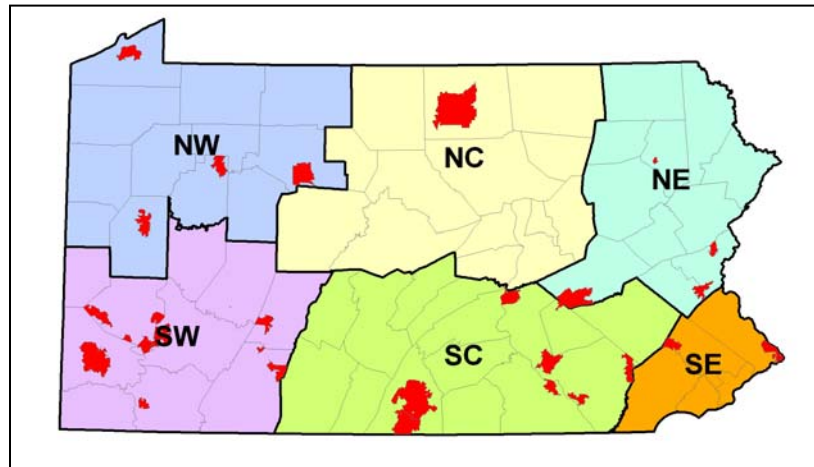
Table 3.2.1
Aggregate Survey Response Results

Description	Total
Survey Responses	30
Total Overall Waste Accepted in 2006 (tons)	13.4 million
Total In-State Waste Accepted in 2006 (tons)	6.5 million
Total Out-of-State Waste Accepted in 2006 (tons)	6.9 million
Total Operating Expenditures (\$ Millions)	\$311.9
Total Payroll (\$ Millions)	\$24.8

Source: Econsult Corporation (2007)

Figure 3.2.1 provides a geographic distribution of the survey responses. Each red polygon represents a 5-digit zip code containing at least one survey response. As can be seen, overall there was a good geographic distribution of respondents⁵.

Figure 3.2.1
5-Digit Zip Codes Containing at Least One Survey Response



Source: Econsult Corporation (2007)

⁴ 30 out of 49 total landfills in Pennsylvania provided survey responses.

⁵ The only exception could be the Northcentral (NC) region, which yielded only one zip code with a survey response. While this may seem problematic, research indicated that there is only one landfill in the Northcentral region.

In order to arrive at an estimate of total regional and statewide direct expenditures attributable to municipal waste disposal, we use the survey data to calculate the average direct operating expenditures per ton of waste accepted in 2006 for each of the six regions. We arrive at estimated average direct operating expenditures per ton ranging from \$14.01 per ton in the Southcentral region to \$41.97 per ton in the Northeast region. We then apply the regional averages to the total tons of regional waste accepted in 2006. (Data on total landfill waste receipts for each disposal facility in the state was obtained from the DEP⁶ and then aggregated to the regional level).

Overall, we estimate that direct operating expenditures at the regional level will range from \$10.1 million in the NC region to \$145.7 million in the NE region. In addition, we estimate that statewide direct expenditures attributable to waste disposal amount to nearly \$482 million.

Table 3.2.2
Landfill Waste Receipts and Estimated Municipal Waste Disposal
Direct Operating Expenditures in 2006
by DEP Region
(Tons of Waste and \$ Millions)

Region	Waste Receipts (tons)	Waste Receipts as % of State Total	Average Estimated Direct Operating Expenditures Per Ton of Waste ⁷	Total Estimated Regional Direct Operating Expenditures (\$ Millions)
NC Region	619,549	3%	\$16.35	\$10.1
NE Region	3,471,738	17%	\$41.97	\$145.7
NW Region	2,489,907	12%	\$18.18	\$45.3
SC Region	5,951,099	28%	\$14.01	\$83.4
SE Region	3,750,356	18%	\$25.84	\$96.9
SW Region	4,705,980	22%	\$21.31	\$100.3
PA State	20,988,628	100%		\$481.7

Source: Pennsylvania Department of Environmental Protection & Econsult Corporation (2007)

MUNICIPAL WASTE COLLECTION AND TRANSPORTATION DIRECT EXPENDITURES

The municipal waste collection and transportation industry encompasses activities of municipal waste pickup at residences and businesses throughout the State. Data on this industry was obtained from the US Census Bureau's 2002 Economic Census. According to the 2002 Economic Census, the "Solid Waste Collection" category (NAICS code 562111) included 368 establishments, over \$1.1 billion in sales, over \$250 million in payroll, and 6,941 employees in the State of

⁶ Commonwealth of Pennsylvania Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Division of Reporting and Fee Collection: Landfill Waste Receipts in Tons of Waste (by disposal facility) For Year 2006.

⁷ Based on an estimated \$23.27 in direct operating expenditures per ton of waste.

Pennsylvania. We then used DEP data on municipal waste at the county-level to compute regional shares of overall municipal waste.

Table 3.2.3
Regional Breakdown of Municipal Waste Collections in 2006
(Tons of Waste)

Region	Municipal Waste Collections in 2006 (tons)	% of State Municipal Waste Collected in 2006
NC Region	498,224	5%
NE Region	1,508,473	15%
NW Region	595,604	6%
SC Region	1,882,537	18%
SE Region	3,935,723	38%
SW Region	1,886,236	18%
PA State	10,306,797	100%

Source: Pennsylvania Department of Environmental Protection

After applying the percentages in Table 3.2.3 to the 2002 Economic Census data for the Solid Waste Collection industry, we arrive at regional estimates of sales, direct operating expenditures, payroll, and employees, as shown in Table 3.2.4.

Table 3.2.4
Estimated Regional Solid Waste Collection Data

Region	Establishments	Sales (\$ Millions)	Estimated Direct Operating Expenditures ⁸ (\$ Millions)	Annual Payroll (\$ Millions)	Paid Employees
NC Region	23	\$54.9	\$41.1	\$15.6	434
NE Region	49	\$166.1	\$124.6	\$33.1	918
NW Region	31	\$65.6	\$49.2	\$21.1	585
SC Region	71	\$207.3	\$155.4	\$48.6	1,348
SE Region	115	\$433.3	\$325.0	\$78.4	2,176
SW Region	79	\$207.7	\$155.8	\$53.4	1,481
PA State	368	\$1,134.7	\$851.1	\$250.1	6,941

Source: U.S. Census Bureau and Econsult Corporation (2007)

Note: Results may not add due to rounding.

⁸ In order to be conservative, we estimate that direct operating expenditures represent 75% of total sales for the Solid Waste Collection industry.

MUNICIPAL WASTE DISPOSAL DIRECT EXPENDITURES – BY DAILY WASTE CAPACITY

In addition to estimating total direct municipal waste disposal operating expenditures at the regional level, we estimate total expenditures categorized by the following daily landfill capacities:

- Less than 1,000 tons
- 1,000 tons to 3,200 tons
- Over 3,200 tons

Landfills with survey responses were grouped according to their respective daily waste capacities and direct operating expenditures were then aggregated. Based on survey responses, total direct operating expenditures for landfills with a daily capacity of less than 1,000 tons amounted to \$11.5 million. Landfills with daily capacities ranging from 1,000 tons to 3,200 tons and those with capacities over 3,200 tons had total direct operating expenditures of \$112.2 million and \$188.2 million, respectively.

Table 3.2.5
Landfill Waste Receipts and Estimated Municipal Waste Disposal
Direct Operating Expenditures in 2006
by Daily Waste Capacity
(\$ Millions)

Daily Waste Capacity (tons)	Total Number of Survey Responses	Total Direct Operating Expenditures of Survey Respondents	Total Estimated Statewide Direct Operating Expenditures (\$ Millions)
Less than 1,000 tons	4	\$11.5	\$17.8
1,000 tons to 3,200 tons	17	\$112.2	\$173.3
Over 3,200 tons	9	\$188.2	\$290.6
Total	30	\$312.0	\$481.7

Source: Econsult Corporation (2007)

In order to reach statewide estimates of total direct operating expenditures by daily capacity, we used ratios of survey respondents' operating expenditures and waste accepted as percentages of the state totals reported in Table 3.2.2 in the previous section.

As shown in Table 3.2.5 above, total estimated statewide direct operating expenditures range from nearly \$18 million for all landfills with a daily waste capacity of less than 1,000 tons to nearly \$291 million for those with a daily capacity of over 3,200 tons.

3.3 ECONOMIC IMPACTS

MUNICIPAL WASTE DISPOSAL – TOTAL ECONOMIC IMPACTS

Statewide Impacts

As shown in Section 3.2 above, total estimated statewide direct municipal waste disposal expenditures amounted to nearly \$482 million, while regional expenditures ranged from \$10.1 million in the Northcentral region to \$145.7 million in the Northeastern region. Based on our estimates of direct operating expenditures, Tables 3.3.1 and 3.3.2 show the estimated overall statewide and regional economic impacts, respectively.

Table 3.3.1
Estimated Statewide Economic Impacts Attributable to Municipal Waste Disposal
(\$ Millions and Total Jobs)

Description	PA State Impact
Direct Expenditures	\$481.7
Indirect & Induced Expenditures	\$594.4
Total Economic Impact	\$1,076.1
Multiplier	2.23
Total Employment	8,194
Total Employee Earnings	\$287.0

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

The estimated direct expenditures of \$481.7 million stimulate over \$594 million in indirect and induced expenditures in the State for a total impact of nearly \$1.1 billion. This \$1.1 billion in total output includes approximately \$287 million in total employee earnings, supporting nearly 8,200 total jobs. The multiplier of 2.23 suggests that for every \$1 in municipal waste disposal expenditures, the State benefits from an additional \$1.23 in indirect and induced expenditures⁹.

⁹ The multiplier of 2.23 is derived from the Regional Input Output Modeling System (RIMS II) from the Bureau of Economic Analysis, U.S. Department of Commerce. RIMS II multipliers capture inter-industry flows and show the industrial distribution of inputs purchased and outputs sold in a given region.

Statewide Impacts by Daily Waste Capacity

Table 3.3.2
Estimated Statewide Economic Impacts Attributable to Municipal Waste Disposal
By Daily Waste Capacity
(\$ Millions and Total Jobs)

Description	Daily Capacity: Less than 1,000 tons	Daily Capacity: 1,000 to 3,200 tons	Daily Capacity: Greater than 3,200 tons	PA State Impact
Direct Expenditures	\$17.8	\$173.3	\$290.6	\$481.7
Indirect & Induced Expenditures	\$22.0	\$213.8	\$358.6	\$594.4
Total Economic Impact	\$39.8	\$387.1	\$649.2	\$1,076.1
Multiplier	2.23	2.23	2.23	2.23
Total Employment	303	2,948	4,943	8,194
Total Employee Earnings	\$10.6	\$103.2	\$173.1	\$287.0

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

Based on the estimated direct expenditures show in Table 3.2.5, we estimate that landfills with a daily capacity of less than 1,000 tons generate a total statewide economic impact of nearly \$40 million, including nearly \$11 million in total employee earnings and 303 total jobs. We estimate that landfills with a daily capacity ranging from 1,000 tons to 3,200 tons generate a total statewide economic impact of over \$387 million, including over \$103 million in total employee earnings, supporting nearly 3,000 total jobs. Finally, landfills with a daily capacity of over 3,200 tons have a total economic impact of over \$649 million, which includes over \$173 million in total employee earnings and over 4,900 total jobs.

Regional Impacts

Table 3.3.3
Estimated Regional Economic Impacts Attributable to Municipal Waste Disposal¹⁰
(\$ Millions and Total Jobs)

Description	NC Regional Impact	NE Regional Impact	NW Regional Impact	SC Regional Impact	SE Regional Impact	SW Regional Impact
Direct Expenditures	\$10.1	\$145.7	\$45.3	\$83.4	\$96.9	\$100.3
Indirect & Induced Expenditures	\$6.2	\$135.8	\$39.5	\$76.4	\$109.7	\$99.7
Total Regional Economic Impact	\$16.3	\$281.5	\$84.8	\$159.8	\$206.6	\$200.0
Multiplier	1.61	1.93	1.87	1.92	2.13	1.99
Total Employment	117	2,146	582	1,207	1,455	1,497
Total Employee Earnings	\$4.2	\$76.5	\$21.1	\$43.4	\$51.5	\$54.1

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

In the Northcentral region, direct expenditures of over \$10 million lead to over \$6 million in indirect and induced expenditures, amounting to a total economic impact of over \$16 million. This total economic impact of over \$16 million includes over \$4 million in total employee earnings, supporting nearly 120 total jobs. The regional multiplier of 1.61 implies that for every \$1 in municipal waste disposal expenditures, the Northcentral region benefits from an additional \$0.61 in indirect and induced expenditures.

In the Southeastern region, direct expenditures of nearly \$97 million lead to nearly \$110 million in indirect and induced expenditures, amounting to a total regional economic impact of nearly \$207. This \$207 million in total economic activity includes nearly \$52 million in total employee earnings, supporting nearly 1,500 total jobs. The regional multiplier of 2.13 implies that for every \$1 in municipal waste disposal expenditures, the Southeastern region benefits from an additional \$1.13 in indirect and induced expenditures.

¹⁰ It is important to note that while the sum of regional direct expenditures sums to the statewide total of direct expenditures, the regional indirect and induced expenditures and resulting total outputs do *not* sum to the state total. This is due to the fact that the six regions each have a specially formulated input-output model that accounts for economic leakages. Since smaller geographic regions will experience more economic leakages, the sum of the economic impacts of the six regions (Table 3.3.2) is smaller in magnitude compared to the PA State impact reported in Table 3.3.1.

MUNICIPAL WASTE COLLECTION & TRANSPORTATION – TOTAL ECONOMIC IMPACT

Section 3.2 above provided a methodology for estimating the regional direct expenditures attributable to municipal waste collection and transportation. Direct expenditures ranged from \$53.2 million in the Northcentral region to \$266.8 million in the Southeast region.

Table 3.3.4
Estimated Statewide Economic Impacts Attributable to
Municipal Waste Collection & Transportation
(\$ Millions and Total Jobs)

Description	PA State Impact
Direct Expenditures	\$851.1
Indirect & Induced Expenditures	\$1,076.6
Total Economic Impact	\$1,927.7
Multiplier	2.27
Total Employment	23,240
Total Employee Earnings	\$616.9

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

The estimated municipal waste collection and transportation direct expenditures of \$851.1 million stimulate nearly \$1.1 billion in indirect and induced expenditures in the State for a total impact of over \$1.9 billion. This \$1.9 billion in total output includes nearly \$617.0 million in total earnings, supporting over 23,200 total jobs. The multiplier of 2.27 suggests that for every \$1 in municipal waste collection and transportation expenditures, the State benefits from an additional \$1.27 in indirect and induced expenditures.

Table 3.3.5
Estimated Regional Economic Impacts Attributable to
Municipal Waste Collection & Transportation
(\$ Millions and Total Jobs)

Description	NC Regional Impact	NE Regional Impact	NW Regional Impact	SC Regional Impact	SE Regional Impact	SW Regional Impact
Direct Expenditures	\$41.1	\$124.6	\$49.2	\$155.4	\$325.0	\$155.4
Indirect & Induced Expenditures	\$26.1	\$114.4	\$33.6	\$145.8	\$387.8	\$158.8
Total Economic Impact	\$67.2	\$239.0	\$82.8	\$301.2	\$712.8	\$314.2
Multiplier	1.64	1.92	1.68	1.94	2.19	2.02
Total Employment	902	3,200	1,111	4,073	7,952	4,059
Total Employee Earnings	\$22.3	\$82.3	\$27.6	\$105.5	\$210.9	\$107.0

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

In the Northcentral region, direct expenditures of \$41.1 million lead to an additional \$26.1 million in indirect and induced expenditures, amounting to \$67.2 million in total output, or total economic activity. This \$67.2 million in total output includes \$22.3 million in total earnings, supporting over 900 total jobs. The regional multiplier of 1.64 implies that for every \$1 in municipal waste collection and transportation expenditures, the Northcentral region benefits from an additional \$0.64 in indirect and induced expenditures.

In the Southeast region, direct expenditures of \$325.0 million lead to an additional \$387.8 million in indirect and induced expenditures, amounting to \$712.8 million in total output, or total economic activity. This \$712.8 million in total output includes \$210.9 million in total earnings, supporting nearly 8,000 total jobs. The regional multiplier of 2.19 implies that for every \$1 in municipal waste collection and transportation expenditures, the Southeast region benefits from an additional \$1.19 in indirect and induced expenditures.

**MUNICIPAL WASTE DISPOSAL AND COLLECTION & TRANSPORTATION –
TOTAL COMBINED ECONOMIC IMPACT**

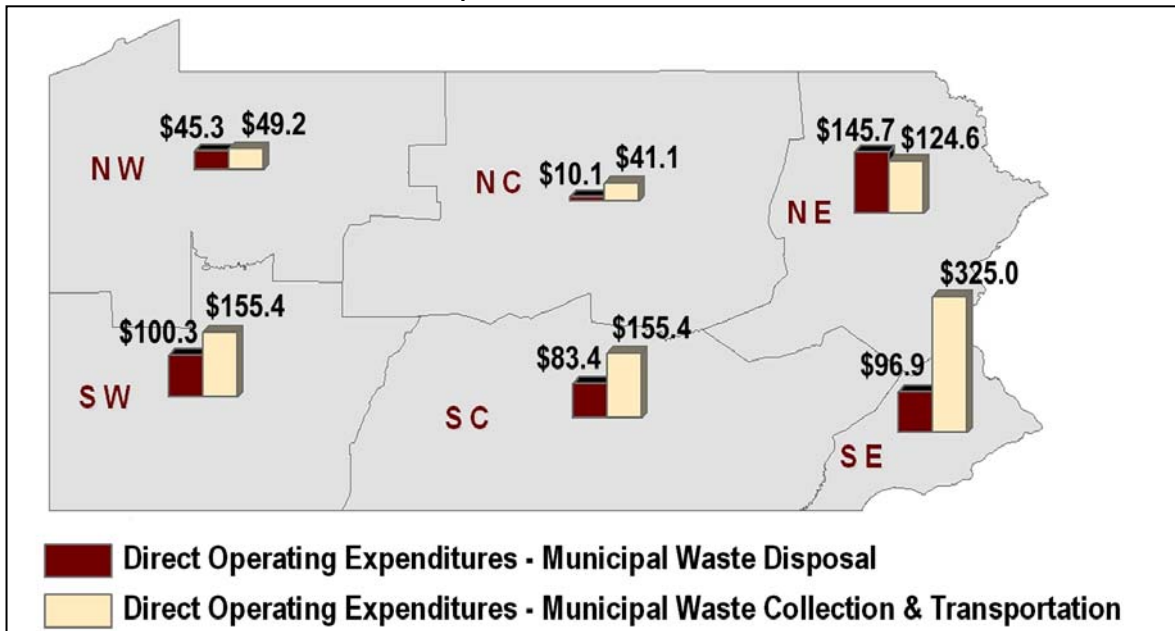
When taken together, total direct expenditures attributable to municipal waste disposal and collection and transportation amount to over \$1.3 billion, as show in Table 3.3.6 below.

Table 3.3.6
Estimated Direct Expenditures Attributable to
Municipal Waste Disposal and Collection & Transportation
(\$ Millions)

Region	Direct Expenditures: Municipal Waste Disposal	Direct Expenditures: Municipal Waste Collection & Transportation	Total Estimated Direct Expenditures
NC Region	\$10.1	\$41.1	\$51.2
NE Region	\$145.7	\$124.6	\$270.3
NW Region	\$45.3	\$49.2	\$94.5
SC Region	\$83.4	\$155.4	\$238.8
SE Region	\$96.9	\$325.0	\$421.9
SW Region	\$100.3	\$155.8	\$256.1
PA State	\$481.7	\$851.1	\$1,332.8

At the regional level, total estimated direct expenditures range from over \$51 million in the Northcentral region to nearly \$422 million in the Southeast region. Tables 3.3.7 and 3.3.8 show the estimated economic impacts attributable to the combined direct expenditures in the state and regions, respectively.

Figure 3.3.1
Distribution of Municipal Waste Disposal and Collection & Transportation Direct Expenditures (\$ Millions)



Source: Econsult Corporation (2007)

Table 3.3.7
Estimated Statewide Economic Impacts Attributable to Municipal Waste Disposal and Collection & Transportation (\$ Millions and Total Jobs)

Description	PA State Impact
Direct Expenditures	\$1,332.8
Indirect & Induced Expenditures	\$1,671.0
Total Output	\$3,003.8
Multiplier	2.25
Total Employment	31,434
Total Employee Earnings	\$903.9

Source: Econsult Corporation (2007)
 Note: Results may not add due to rounding
 Total Output includes Total Earnings
 Total Employment includes part-time and full-time jobs

The estimated municipal waste disposal and collection and transportation direct expenditures of over \$1.3 billion stimulate nearly \$1.7 billion in indirect and induced expenditures in the State for a total economic impact of over \$3.0 billion. This total economic impact of over \$3 billion includes over \$0.9 billion in total earnings, supporting nearly 31,500 total jobs. The state multiplier of 2.25

suggests that for every \$1 in municipal waste disposal and collection and transportation expenditures, the State benefits from an additional \$1.25 in indirect and induced expenditures.

Table 3.3.8
Estimated Regional Economic Impacts Attributable to
Municipal Waste Disposal and Collection & Transportation
(\$ Millions and Total Jobs)

Description	NC Regional Impact	NE Regional Impact	NW Regional Impact	SC Regional Impact	SE Regional Impact	SW Regional Impact
Direct Expenditures	\$51.2	\$270.3	\$94.5	\$238.8	\$421.9	\$255.7
Indirect & Induced Expenditures	\$32.3	\$250.2	\$73.1	\$222.2	\$497.5	\$258.5
Total Output	\$83.5	\$520.5	\$167.6	\$461.0	\$919.4	\$514.2
Multiplier	1.63	1.93	1.77	1.93	2.18	2.01
Total Employment	1,019	5,346	1,693	5,280	9,407	5,556
Total Employee Earnings	\$26.5	\$158.8	\$48.7	\$148.9	\$262.4	\$161.1

Source: Econsult Corporation (2007)

Note: Results may not add due to rounding

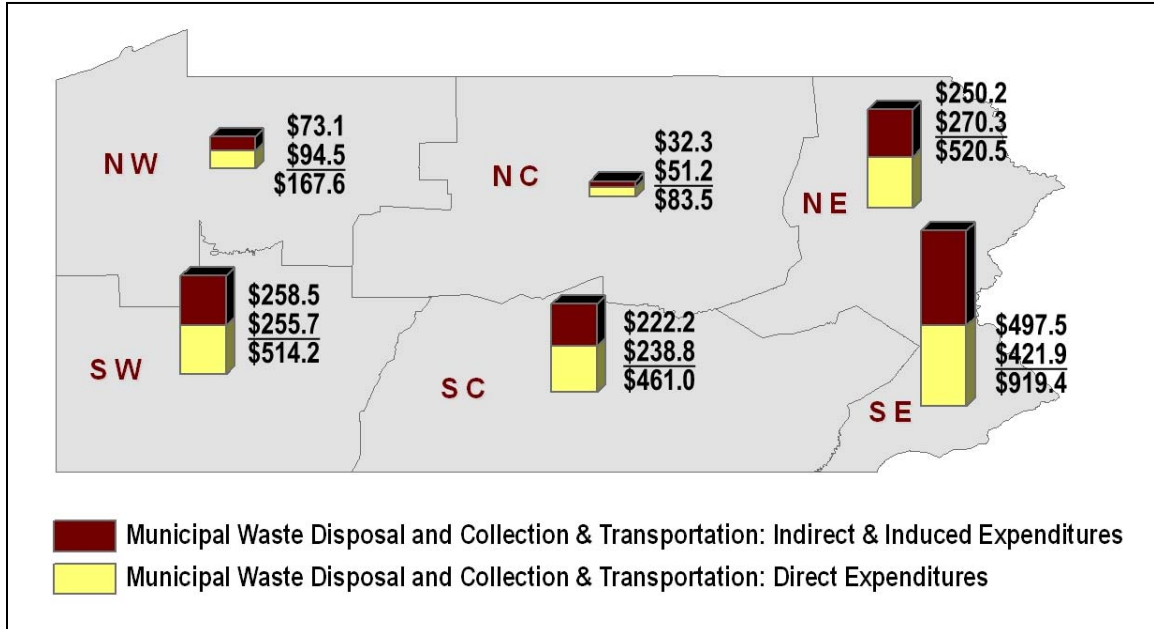
Total Output includes Total Earnings

Total Employment includes part-time and full-time jobs

In the Northcentral region, the combined direct expenditures of over \$51 million lead to over \$32 million in indirect and induced expenditures, amounting to a total economic impact of nearly \$84 million. This total economic impact of nearly \$84 million includes nearly \$27 million in total employee earnings, supporting over 1,000 total jobs. The regional multiplier of 1.63 implies that for every \$1 in municipal waste disposal and collection and transportation expenditures, the Northcentral region benefits from an additional \$0.63 in indirect and induced expenditures.

In the Southeastern region, combined direct expenditures of nearly \$422 million lead to nearly \$498 million in indirect and induced expenditures, amounting to a total economic impact of over \$919 million. This total economic impact of over \$919 million includes over \$262 million in total employee earnings, supporting over 9,400 total jobs. The regional multiplier of 2.18 implies that for every \$1 in municipal waste disposal expenditures, the Southeastern region benefits from an additional \$1.18 in indirect and induced expenditures.

Figure 3.3.2
Distribution of the Estimated Economic Impacts Attributable to Municipal Waste Disposal and Collection & Transportation Direct Expenditures (\$ Millions)



Source: Econsult Corporation (2007)

4.0 THE MUNICIPAL WASTE INDUSTRY'S CONTRIBUTION TO LOCAL AND STATE TAX BASES

In addition to the statewide and regional economic impacts outlined in Section 3.0, the municipal waste collection, transportation, and disposal industry also provides monetary boosts to local municipal and county budgets. In addition, it also generates various tax revenues to state and federal governments.

While most landfills pay at least \$1 per ton in the form of host fees to local municipalities, many facilities pay much more. Based on the survey responses received, the average statewide host fee paid by municipal waste facilities amounted to \$2.33 per ton. These funds can represent major components of host communities' overall municipal budgets and can be put to important use.

All landfills must make the following payments to the state government, as well as any local host fees:

Table 4.1
Fees Paid by Landfills, Per Ton of Waste

Fee	Amount (\$ Per Ton)
State Recycling Fee	\$2.00
State Growing Greener Fees	\$4.25
Total State Fees	\$6.25
Average Host, Municipality, and Other Fees¹¹	\$2.33
Total Fees Per Ton	\$8.58

Source: Pennsylvania Department of Environmental Protection & Econsult Corporation (2007)

¹¹ While host, municipality, and other fees are subject to change, the average of \$2.33 reported in Table 4.1 represents a snapshot as of when surveys were distributed to landfills.

Based on information obtained from the Pennsylvania Department of Environmental Protection, total waste receipts in 2006 amounted to 20,988,628 tons. Applying the total Growing Greener Fees and average host, municipality, and other fees to this amount yields estimates of the total fees paid by landfills, as shown in Table 4.2

Table 4.2
Fees Paid by Landfills, Per Ton of Waste

Fee	Amount (\$ Per Ton)	Total Statewide Receipts (Tons)	Total Fees Paid (\$ Millions)
Total Growing Greener Fees	\$6.25	20,988,628	\$131.2
Total Host, Municipality, and Other Fees	\$2.33	20,988,628	\$48.9
Total Fees	\$8.58	20,988,628	\$180.1

Source: Pennsylvania Department of Environmental Protection & Econsult Corporation (2007)

As shown above, we estimate that total Growing Greener Fees in 2006 amounted to over \$131 million. In addition, based on average host, municipality, and other fees obtained from survey responses, we estimate that these fees amounted to nearly \$49 million statewide in 2006.

5.0 ENERGY PRODUCTION

In addition to being a means of environmentally safe and efficient disposal of solid waste, today's landfills also represent a significant source of green energy. While landfill gas was once considered only a byproduct of waste decomposition, it is now being turned into useful energy. Approximately two dozen landfills in the State of Pennsylvania are currently operating gas-to-energy projects, and many additional landfills will have future capacity for such projects.

Landfills' ability to produce green energy has a significant contribution to the environment, reducing emissions from coal and oil burning power plants. Some of the additional benefits attributable to the waste industry's production of landfill gas as an alternative fuel include the following:

- Offsetting the use of non-renewable resources such as coal, natural gas, and oil.
- Reducing the emission of greenhouse gases.
- Saving money for end-users of energy by replacing fossil fuels with less expensive alternative energy.
- In 2006, landfills in Pennsylvania generated more than 100 megawatts electricity, which is enough to power more than 63,500 homes.
- The electricity generated from landfill gas in Pennsylvania offsets the consumption of an estimated 1.84 million tons of coal on an annual basis.
- The use of landfill gas to make electricity averts the emission of carbon dioxide from fossil fuels into the atmosphere, equivalent to removing the emissions of nearly 100,000 vehicles annually.
- The U.S. Environmental Protection Agency (EPA) has recognized Pennsylvania as one of the top four states in the nation for producing green energy from waste.
- The EPA has twice identified Pennsylvania state government as an energy leader for its commitment to landfill gas-to-energy projects.
- Pennsylvania has invested more than \$3.8 million in landfill gas-to-energy projects through its Energy Harvest Grant Program and Alternative Fuel Incentive Grants Program and through the Pennsylvania Energy Development Authority.
- Pennsylvania has encouraged the use of alternative energy by increasing the state's own purchase of green energy from 5 percent to 10 percent, with a future goal of 20 percent.

6.0 RECYCLING

In addition to asking survey respondents for information on direct operating expenditures and amount of waste accepted in 2006, information was also requested on any on-site recycling activities in which landfills were involved.

An analysis of the survey responses yielded the following activity across various recycling categories:

- 67% of respondents are involved in recycling collection
- 3% of respondents are involved in actual recycling processing
- 10% of respondents are involved in reuse activity

In addition, we also found that survey respondents recycled the following input materials in 2006:

- over 2,000 tons of paper
- over 317 tons of plastics
- over 1,800 tons of glass
- nearly 200 tons of metal
- over 300 tons of tires or rubber
- over 58,000 tons of construction and demolition debris¹²
- over 44,100 tons of organics¹³
- over 11,800 gallons of oil or household hazardous waste

¹² Includes concrete, asphalt, non-yard wood waste, etc. from construction, demolition, and remodeling of roads and structures.

¹³ Includes yard waste, food waste, sludge, land-clearing debris and wood waste including pallets, brush, stumps/tree trunks, sawdust, and mill scrap.

7.0 QUALITATIVE IMPACTS

In addition to being an economic driver in the State of Pennsylvania and providing financial boosts to local municipalities and counties, the municipal waste industry also works directly to support civic activities in their communities.

Based on survey responses, below is a partial list of qualitative benefits that specific municipal waste disposal sites provided to their respective local communities and organizations:

- Provided 50% of the funding to construct a new community library.
- Annually provides 50% of the funding used by the local township to purchase part-time police patrols. Prior to this funding, the local township relied solely on state police response to emergencies.
- Provided funding for a local capital campaign to construct a visitor center.
- Annually provides substantial financial support to volunteer fire companies in nearby communities and offers landfill equipment, materials, and personnel to assist in emergency response. In addition, the landfill also created an emergency bypass road across its property. This bypass was needed when a bridge reconstruction project created a 14-mile detour that would have greatly reduced emergency response time.
- Worked with a local community action committee to provide hundreds of thousands of dollars in benefits to residents of the community. Benefits took the form of CO detectors distributed free of charge to community households and thousands of dollars in heating grants to non-profit organizations and income-eligible households.
- Provided substantial funding for a local energy center and support for local economic development.
- Provided nearly 4,000 environmental education hours to children from the surrounding communities. This award-winning program taught children about resource conservation, recycling, composting, and issues confronting local wildlife.
- Donated money to construct baseball fields for local youth.
- Provided funding for construction of a local environmental education center.
- Donated land to the local school district
- Annual donations over five years for the construction of a proposed local YMCA.
- Gifting of 80 acres of developed wetlands to the Wildlife for Everyone Foundation and in turn to the PA Game Commission, which will eventually become PA Gamelands 93.
- Provided funding for a stream improvement project.
- Provide financial support for a local public-private partnership initiative that is creating and/or improving recreational sites that have a positive effect on the local quality of life.

8.0 CONCLUSION

The municipal waste disposal and collection and transportation industry plays a key role in the overall economy in the State of Pennsylvania. We estimate that the economic impacts of the industry in 2006 can be broken down as follows:

Municipal Waste Disposal Industry:

- total economic impact of nearly **\$1.1 billion**, including:
- nearly **\$0.3 billion** in total employee earnings,
- supporting nearly **8,200** total jobs.

Municipal Waste Collection and Transportation Industry:

- total economic impact of over **\$1.9 billion**, including:
- over **\$0.6 billion** in total employee earnings,
- supporting over **23,000** total jobs.

Combined Impacts: Municipal Waste Disposal & Collection and Transportation Industry:

- total economic impact of **over \$3.0 billion**, including:
- **over \$0.9 billion** in total employee earnings,
- supporting over **31,000** total jobs.

Aside from its overall regional and statewide economic impacts, the municipal waste disposal industry also provides monetary boosts to local municipal and county budgets and generates various tax revenues to state and federal governments. In 2006, total state fees paid by landfills, including state recycling fees and State Growing Greener Fees, amounted to nearly \$131.2 million. In addition, we estimate that total host, municipality, and other fees amounted to nearly \$48.9 million.

In addition to the quantitative impacts listed above, the waste disposal and collection and transportation industry also provides local communities with important qualitative benefits that are not included in the economic impacts. Such qualitative benefits include various funding and donations that provide local communities a number of benefits. Such benefits include a new community library, improved emergency response from police forces and fire companies, support for local economic development programs and initiatives, environmental education for local youth, land for the local school district, and funding for a local visitor center.

Aside from being a means of environmentally safe and efficient disposal of solid waste, today's landfills also represent a significant source of green energy. While landfill gas was once considered only a byproduct of waste decomposition, it is now being turned into useful energy. Approximately two dozen landfills in the State of Pennsylvania are currently operating gas-to-energy projects, and many additional landfills will have future capacity for such projects. In 2006, landfills in Pennsylvania generated more than 100 megawatts electricity, which is enough to power more than 63,500 homes.

APPENDIX A: Model Methodology

A.1 Regional Input-Output Models and Methodology

The economic impact estimates presented in this report were derived from the regional Input-Output (I-O) model developed and maintained by the U. S. Department of Commerce, Bureau of Economic Analysis (BEA). This model, the Regional Input-Output Modeling System (RIMS II), is widely used to estimate the economic impacts of regional projects or programs. The results generated from the RIMS II model are widely recognized as plausible, and defensible, in cases where the input data to the model are accurate and based on reasonable assumptions. This section describes the basic concepts that underlie RIMS II.

An I-O model provides a compact means of summarizing interindustry relationships within regions. The model itself is essentially an accounting framework, expressed as a matrix or array. For each industry in the region, the model shows the distribution of inputs purchased and outputs sold to all other regional industries. The RIMS II model is based on the BEA National I-O model, which shows the input and output structure for nearly 500 industries, and the BEA regional economic accounts, which are used to adjust the information in the national model to reflect a given region's industrial structure and interindustry trading patterns.

The data that drive the I-O model are the planned expenditures associated with the project or program being studied. In the jargon of I-O models, those expenses make up the "direct expenditures," which form one part of the programs' total economic impact on the region. Assuming that the planned project is a new store, the direct expenditures are the sum of all spending needed to construct, equip and operate that facility.

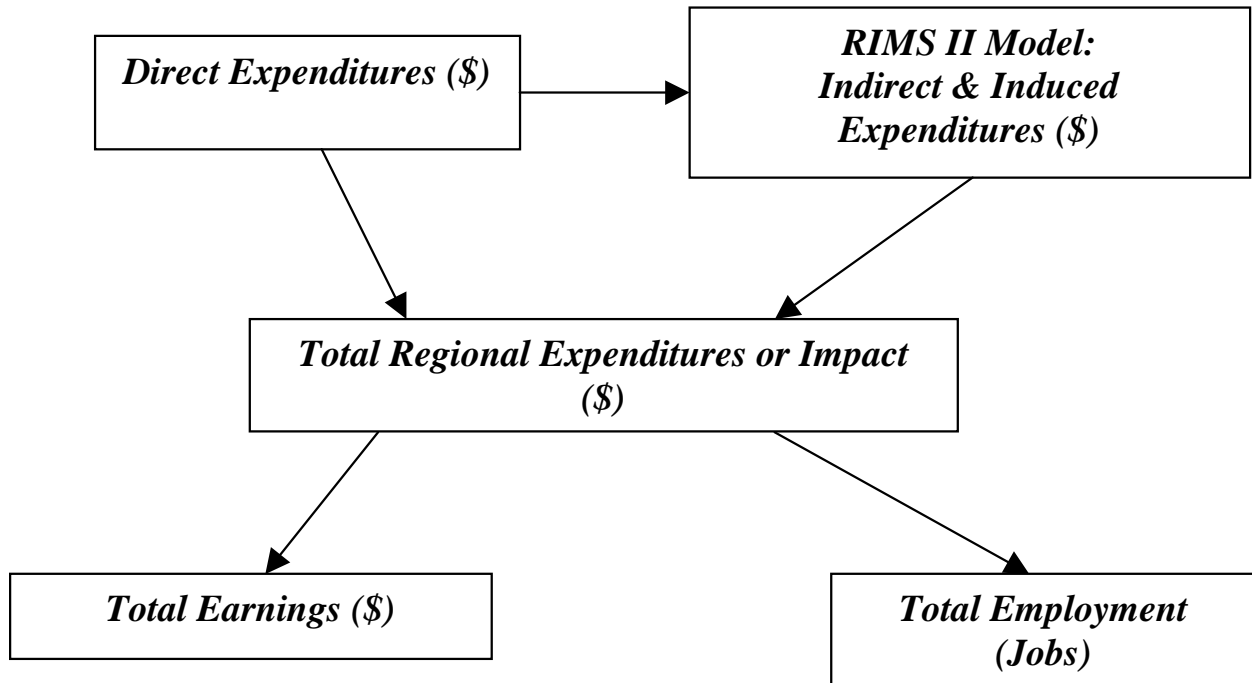
Some of that spending will be to purchase goods and services from other businesses in the region, causing those firms to increase production. In turn, the firms supplying the new store will need to increase purchases from their suppliers to meet their new orders. The sum of all of this interindustry spending is the "indirect expenditures" associated with the new store.

All of the economic activity resulting from the new store, whether direct or indirect, will require workers who must be paid. Some of their earnings will be spent at businesses within the region on various goods and services, creating another round of economic activity like that described above. These expenditures equal the "induced expenditures" associated with the new store.

The sum of the direct, indirect, and induced expenses represent the total economic impact of the new store on the region. In addition to measuring that impact in dollars as output or expenditures, the RIMS II model produces estimates of the proportion of that spending paid to regional households as wages and salaries. Finally, the RIMS II model generates estimates, by industry, of the number of full- and part-time jobs related to the new store. Both the earnings and employment estimates are useful alternative measures of the regional economic impact of the new project.

The following schematic depicts the flow of data, from inputs to outputs, through the model:

Figure A -- Input-Output Model Flow Chart



The overall “success” of the economic impact analysis depends in large part on the initial design of the analysis. For example, if the project involves both construction and operation phases, it is important to separate the total expenditures between the two, and run the RIMS II model for each set of expenditures. The phases occur at different points in time, and have different impacts on the regional economy. Hence, the accuracy of the results depends on recognizing those differences, and treating them appropriately.

APPENDIX B: SURVEY DISTRIBUTED TO LANDFILLS

This enclosed survey is being distributed to all Pennsylvania landfill operators, as well as closed landfills. Survey results will be used to estimate the economic benefits and impacts of the landfill industry in Pennsylvania. All responses will be held strictly confidential, and results will only be reported in aggregate and summarized form. Should you have any questions, please do not hesitate to contact Michael Mariano. Completed surveys can be sent to Michael Mariano:

Mail: Econsult Corporation Phone: (215) 382-1894
 Attn: Michael Mariano Fax: (215) 382-1895
 3600 Market St., 6th Floor
 Philadelphia, PA 19104

BACKGROUND INFORMATION

Name of Landfill: _____

Contact Name: _____

Address of Landfill: Street: _____

City _____

Zip _____

Year landfill commenced operations: _____

Daily capacity of landfill in tons: _____

actual capacity your site is able to accept

Expected life span of landfill (years): _____

Are there currently any future plans to expand this landfill? _____

If yes, by how much? _____

Quantity of municipal waste accepted in 2006 (tons): _____

Quantity of municipal waste accepted from in-state sources in 2006 (tons): _____

Quantity of municipal waste accepted from out-of-state sources in 2006 (tons): _____

Average Number of employees at landfill in 2006: _____

FEES

Tipping fees levied in 2006 (\$/ton):

Description	Amount (\$'s)
<i>Example – Growing Greener Fees</i>	<i>\$5,000</i>

Average host fee paid to local community in 2006 (\$/ton): _____

ANNUAL OPERATING EXPENDITURES

Total operating expenditures in 2006 (\$'s) _____

Please include all sales and general & administrative costs/expenditures in this amount

Amount paid to local vendors for services in 2006 (\$'s): _____

please only include payments made to local vendors located either in the same county as your landfill or in an adjacent county

Amount paid to vendors in Pennsylvania for services in 2006 (\$'s): _____

Total payroll in 2006 (\$'s) _____

Please include all direct labor, operations support, sales, and general & administrative labor costs

Please do NOT include benefits, group insurance, etc.

CAPITAL EXPENDITURES

Approximate average annual capital expenditures over the last five years, 2002-2006 (\$'s)

_____ **Please include ALL capping costs in this amount**

TAXES

Payroll tax paid in 2006 (\$'s): _____

Federal corporate income tax paid in 2006 (\$'s): _____

Federal income tax paid by employees in 2006 (\$'s): _____

State corporate income tax paid in 2006 (\$'s): _____

State income tax paid by employees in 2006 (\$'s): _____

Local corporate income tax paid in 2006 (\$'s): _____

Local income tax paid by employees in 2006 (\$'s): _____

Property tax paid in 2006 (\$'s): _____

Sales tax paid in 2006 (\$'s): _____

MISCELLANEOUS

Quantity of electricity from methane produced in 2006: _____

Gas plant revenue received in 2006 (\$'s): _____

Please describe any goodwill or philanthropic efforts over the past 10 years:

RECYCLING

Is your landfill involved in any of the following recycling activity (please check all that apply)

- _____ Recycling Collection
- _____ Recycling Processing
- _____ Recycling Manufacturing
- _____ Reuse

Roughly how many employees (and/or % of your labor time) at your landfill are allocated to recycling tasks?

Please complete the following table if any input materials listed below are applicable to your landfill.

Input Materials	Unit of Measure	Input Quantity	PROCESS OUTPUTS		
			Residue Disposed	Prepared or Used for Fuel	Recycled Product or Material
<i>Example – Oil</i>	<i>Gallons</i>	<i>1,000,000</i>	<i>5%</i>	<i>75%</i>	<i>20%</i>
Paper					
Plastics					
Glass					
Metals					
Tires or Rubber					
Construction & Demolition Debris ¹					
Organics ²					
Oil or household hazardous waste					
Other					

¹Includes concrete, asphalt, non-yard wood waste, etc. from construction, demolition, and remodeling of roads and structures

²Includes yard waste, food waste, sludge, land-clearing debris and wood waste including pallets, brush, stumps/tree trunks, sawdust, and mill scrap.