

**SWANA RECYCLING
TECHNICAL ASSISTANCE STUDY**

FINAL REPORT

**FEASIBILITY OF IMPLEMENTING
A SINGLE STREAM RECYCLING PROGRAM**

Prepared for:

**CHELTENHAM TOWNSHIP,
MONTGOMERY COUNTY, PENNSYLVANIA**



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SWANA TECHNICAL ASSISTANCE STUDY
CHELTENHAM TOWNSHIP
EXECUTIVE SUMMARY
IMPROVING CURBSIDE COLLECTION METHODS AND EDUCATION FOR
THE CURBSIDE RECYCLING PROGRAM

The Township of Cheltenham’s (Township) Public Works Department provides waste and recycling services to its residents. The current recyclables collection format is commingled or “dual-stream,” where container recyclables including glass, plastic, steel/bi-metal and aluminum cans and bottles are collected separated from mixed paper. In 2008, the Township diverted 2,700 tons of recyclables from the waste stream. GF evaluated the feasibility of implementing a single-stream recycling program, where all container recyclables (e.g. bottles and cans) are mixed with paper items for collection in a single curbside container. This Executive Summary provides a concise description of our conclusions and recommendations. Refer to the full Report and Conclusion and Recommendations sections for details.

Although the “status quo” dual-stream recycling program is a success and operates effectively, its potential to maximize recovery of Township-generated recyclables is limited by the collection format, the collection equipment and the curbside containers. Some key areas where the dual-stream program falters include:

- The side-loading recycling trucks do not maximize collection efficiency, particularly when compared with a single-stream recyclables packer truck that can collect 40 percent more recyclables (by weight) per load. The side-loading recyclers cannot handle larger pieces of cardboard, resulting in disposal of cardboard that could be recycled.
- The 14-gallon curbside recycling bins do not have sufficient capacity for recyclables generated by the average home. Small recycling containers are inconvenient for many residents and discourage recycling. Handling of multiple small containers at the curbside slows collection crews.
- The dual-stream program does not recover plastics #3 to #7 (which would be recovered single-stream) and does not effectively recover cardboard.
- Paid workers compensation claims associated with the curbside trash and collection program exceeded \$375,000 in 2008.
- The Township does not currently collect recyclables and trash from residential four-unit establishments.

Based on our comparative analysis of the dual-stream recycling program and the single-stream alternative, GF identified the following benefits of single-stream recycling:

- Economic
 - Improves recyclables collection efficiency, resulting in unquantified significant operational cost reductions from:
 - increased collection capacity and efficiency of single-stream collection equipment and methods;

- additional material collected per stop;
- reduced workman’s compensation claims (if semi-automated lifting technology is used).
- Additional recyclables recovery will slightly increase total commodity revenue while lowering costs by reducing the total cost paid in disposal tip fees, saving the Township \$30,000 to \$50,000 annually.

Cheltenham Township		
Net Financial Impact of Single-stream Recycling		
	Additional Diversion Scenario	
	20%	30%
Increased Recycling Tonnage	540	810
Disposal Cost Savings @ \$63/ton	\$ 34,020	\$ 51,030
Recycling Revenue Increase/(Decrease) ⁽¹⁾	<u>\$ (1,682)</u>	<u>\$ 1,620</u>
Net Savings	\$ 32,338	\$ 52,650
Percent Savings (over status quo)	5.4%	8.8%

⁽¹⁾ Net effect of increasing tonnage and decreasing revenue per ton.
 Note: Table does not include operating savings.

▪ Social

- Health, safety and welfare preserved through a more efficient recovery program.
- Environmental stewardship for the community.
- Continuing and improving an accepted and important community program.

▪ Environmental

- Recovering 30 percent more recyclables (by weight) in a mature single-stream curbside recycling program (not including yard wastes) will:
 - Reduce greenhouse gas emissions by an additional 505 metric tons of carbon equivalents (MTCE);
 - save an additional 59,395 gallons of gasoline;
 - save enough additional energy to power 72 homes for one year.

Ultimately, the benefit of the improved waste system efficiency can be shared with residents through the continued delivery of affordable waste management services in an environmentally, economically, and socially responsible manner. As summarized, GF recommends Cheltenham Township Transition to a single-stream recycling program to optimize the overall waste management and recycling system performance as follows:

- Initially, implement a single-stream recycling program without the RecycleBank incentive program to avoid potential additional costs associated with specialized equipment and containers and added RecycleBank fees.
- Procure the proposed 25-cubic yard Leach recyclables packer truck included in the Act 101, Section 902 Recycling Grant and add semi-automated collection capabilities to waste packers and new recyclables packers for use on routes where semi-automated collection is feasible. Procure a second Leach 25-cubic yard recyclables packer as soon as feasible. Custom paint the Leach recycler(s) to distinguish these recycling vehicles from trash trucks.
- Re-evaluate the Township’s 32-gallon recycling container choice, considering a 64-gallon or larger cart as recommended by GF and by many recycling professionals.
- Roll-out a comprehensive educational campaign in conjunction with the single-stream program, emphasizing that the quality and types of material placed in the bin is important.
- Establish a 3-year goal for improving the total curbside recyclables tons diverted above current diversion, which could be set at: year 1 (10 percent), year 2 (20 percent), year 3 (30 percent).
- Providing trash and recyclables collection to four (4) unit residential structures to increase the number of residents that benefit from affordable trash and recycling and to increase recycling and avoided disposal costs. Update ordinances accordingly.

SWANA TECHNICAL ASSISTANCE STUDY
CHELTENHAM TOWNSHIP
FINAL REPORT
IMPROVING CURBSIDE COLLECTION METHODS
AND EDUCATION FOR
THE CURBSIDE RECYCLING PROGRAM

1.0 INTRODUCTION

The Township of Cheltenham (Township) provides waste and recyclable collection using its Public Works Department. The Township is interested in evaluating the feasibility of changing the current commingled or “dual-stream” recyclables collection program to a single-stream collection program. Through the partnership with the Solid Waste Authority of North America (SWANA), the Pennsylvania State Association of Township Supervisors, and the Pennsylvania Department of Environmental Protection (PADEP), the Township was awarded \$7,500 in technical assistance to be provided by Gannett Fleming, Inc. (GF).

1.1 Scope of Work

GF worked with the Township to confirm the following tasks for this recycling technical assistance project.

- Task #1** Gather and review background information provided by the Township related to existing recycling activities, including costs and revenues. This task will include a review of relevant contracts with processors or other entities.
- Task #2** Evaluate and document the existing commingled/dual-stream collection program and conduct a comparative analysis of an alternative single-stream recycling system. GF will develop recommendations regarding the feasibility of implementing single-stream recycling in the Township. This task will include one (1) meeting/site visit.
- Task #3** Prepare and provide the Township with a summary report of findings and recommendations. This task includes a review of the Report by the PADEP and response to PADEP comments. An electronic file of the final report will be submitted to PADEP. Both an electronic and hardcopy version of the final report will be provided to the Township.

2.0 BACKGROUND

Cheltenham Township is a large suburban municipality located in Montgomery County, Pennsylvania. According to the 2000 US Census Bureau, the Township population is 36,875, occupying a total of 14,346 residential households. The Township is 9.01 square miles and is networked by approximately 130 miles of Township, State and County roadways. The Township’s waste management and recycling program has been in place over 30 years. Waste collection is a comprehensive program operated by Township municipal crews who embrace recycling. Although the waste management and recycling program is strong, the Township is interested in evaluating single-stream recycling as an opportunity to improve the overall

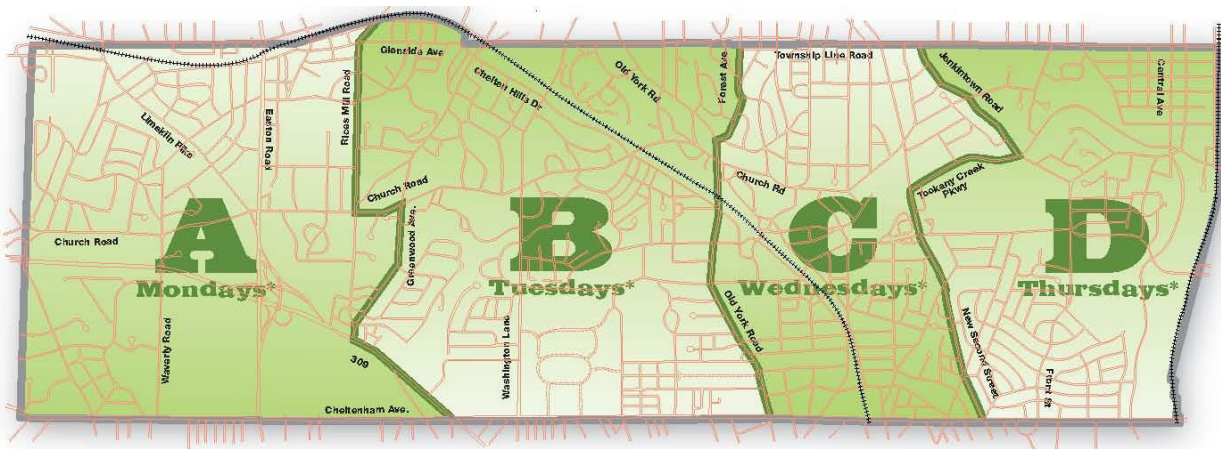
collection program by implementing a single-stream collection program. **Single-stream** refers to a recyclables collection system in which all paper fibers and recyclable containers are mixed together in a single container and collected by one truck (typically a waste packer). Local processors, including Blue Mountain Recycling/FCR are designed to accept single-stream commodities. Under the proposed system, the Township would initially procure 32-gallon recycling containers for all households and procure a Leach, 25-cubic- yard recyclables packer. These items are included in a pending Act 101, Section 902 Recycling Grant.

3.0 EXISTING WASTE AND RECYCLABLES COLLECTION SERVICES

The following sections describe the residential waste collection service and commingled or dual-stream (paper and containers) recycling program currently operated by the Township’s Public Works Department.

3.1 Waste Collection

The Public Works Department provides waste collection services to residential single-family units, duplexes and tri-plexes once-per-week. The collection areas are broken into zones as shown in the service map below.



Residents set out refuse in trash cans, carts and bags once per week with the maximum curbside set-out limits as follows:

- Six (6), 20-gallon containers (maximum 60 lbs. each)
- Ten (10), polyethylene bags (maximum 30 lbs. each).

After collection, waste is delivered to nearby Covanta Abington Transfer Solutions. The \$63 tipping fee is paid at the transfer station and the final disposal occurs at the Covanta Plymouth Renewable Energy facility. The residential fee for trash and recycling, billed to 9,491 homes, is \$233.00 per year. It is noted that larger carts (e.g. 96 gallon) have created a safety problem due to crews lifting overweight containers that exceed the Township limit of 60 lbs. Residents are asked to put trash into bags before placing the bags in curbside trash receptacles.

3.2 Recyclables Collection

In conjunction with providing residential trash services, Township municipal crews also collect recyclables once-per-week on the same day as trash from single-family units, and residential duplexes and tri-plexes. The majority of recyclables are collected using side-loading recyclers (GS Products body and Peterbilt chassis). Container recyclables are placed “commingled” or mixed in 14-gallon rectangular bins and paper items are kept separate from bottles and cans. The side-loading recycler is a split compartment so these two material streams remain separated in the truck. Sometimes recyclables are collected in single-stream format using a 20-cubic yard waste packer.



Township recyclables include the following:

Commingled Containers

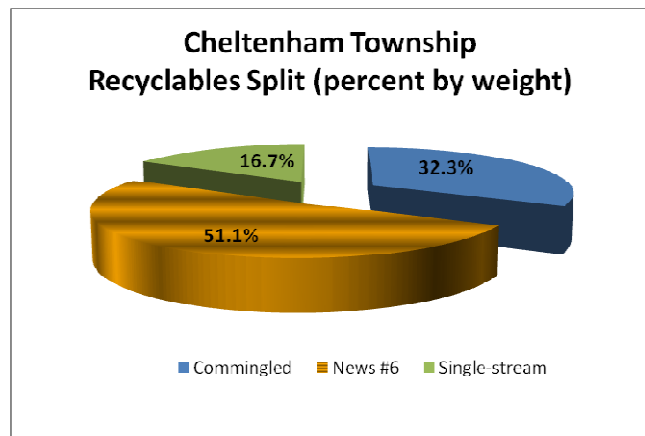
- Plastic bottles (#1 & #2)
- Glass bottles and jars
- Steel/bimetallic cans
- Aluminum cans

Fiber/Paper

- Newspaper
- Magazines
- Junkmail
- Paperback books
- Telephone books

Note: Paper items are tied in bundles or placed in paper bags and cardboard must be broken down to fit in the 14-gallon container.

The **Recyclables Breakout** pie chart is based on 2008 data and reflects the distribution of different recycling streams collected in the Township.



- **Commingled** - mixed bottles and cans.
- **News #6** - mixed paper including junk mail, magazines, newspaper, broken down cardboard, colored paper, etc.
- **Single-stream** - mixed paper and commingled bottles and cans collected together in one container and typically collected using a waste packer truck.

News #6 (mixed paper) represents over half of the material collected (by weight).

After collection, recyclables are consolidated into transfer trailers at the Abington Transfer Station (for recyclables only), which is located just outside the Township in Upper Dublin Township (see following photo). The recyclables transfer station is a maximum of 14 minutes travel from the opposite end of Cheltenham. Once filled, trailers that are owned by Blue

Mountain Recycling/FCR are then pulled and delivered to Blue Mountain Recycling located off the Schuylkill Expressway in Philadelphia.



Cheltenham Township is under a 3-year pricing contract through The Montgomery County Recycling Consortium and Blue Mountain Recycling/FCR. The consortium involves six (6) area municipalities. The commodity pricing paid to the Township from Blue Mountain Recycling/FCR is as follows:

- **\$15.03/ton** - Commingled containers
- **\$16.47/ton** - News #6 (includes junk mail, news, mixed paper, cardboard)
 - Price as of July 1, 2009. News #6 price is subject to Quarterly adjustment based on Official Board Market (OBM) price index.
- **\$12.23/ton** - Single-stream

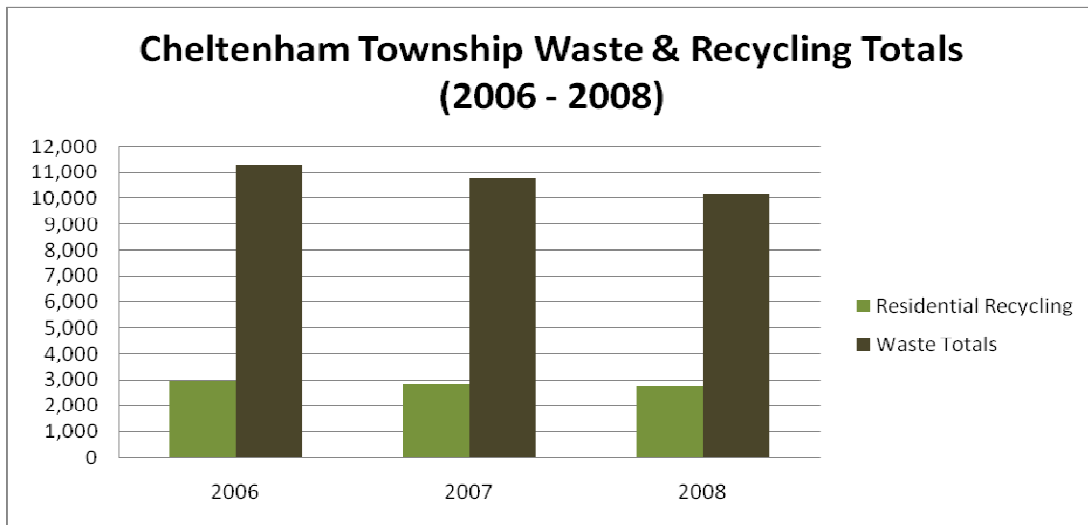
The Township also recovers cardboard at drop-off sites located at the Township compost facility and at the Township Public Works Service Center. When commodity market pricing for cardboard is good, cardboard from drop-off points are taken to Casella Waste Systems, Inc. in Montgomery County approximately 15 miles away. When cardboard pricing is low, cardboard is mixed with other recyclables and taken to the Abington Transfer Station to reduce transportation costs.



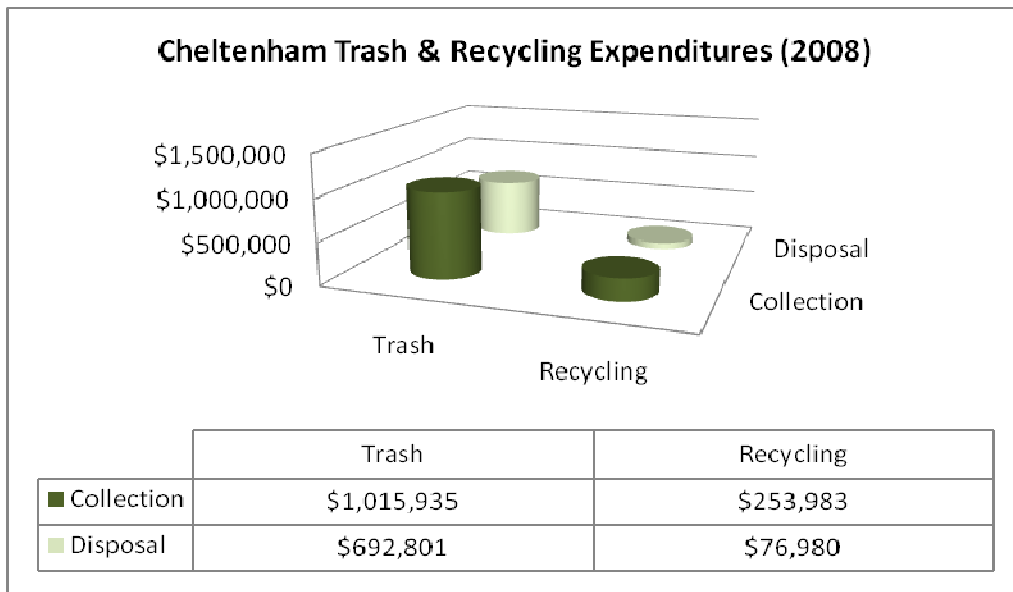
3.3 Residential Refuse and Recycling Summary

As shown in the following **Waste & Recycling Totals** graph, the Township collects between 10,000 to 11,000 tons of municipal waste annually and recycles 2,700 to 3,000 tons of mixed paper and commingled bottles and cans annually from a total of 9,491 residential establishments. There is a slight downward trend for total waste and recyclables tonnages that can be attributed

to economic stress, slow consumer spending and reduced waste generation and disposal. The reported diversion for 2008 is equivalent to a 21 percent curbside recycling rate, excluding leaf waste recycling.



Cheltenham Trash & Recycling Expenditures are summarized below for year 2008. Trash collection and disposal costs (tip fees for incineration) make up the majority of the waste management system costs and exceed 1 million dollars annually. Recyclables collection and disposal is about 1/6th the total waste system cost. Recycling “disposal” represents tip fees paid to process recyclables during depressed market conditions. The Township offsets program costs through revenues from trash bills, special collections, recyclables sales, recycling grants, and sale of refuse and leaf waste bags. The cost of leaf waste collection is managed separately via taxes.



3.4 Preliminary Evaluation of the Existing Collection System

The following is a bulleted list of key findings from GF’s preliminary analysis of the Township’s existing curbside waste and recyclables collection program:

- Overall, the Public Works Department operates a fairly efficient waste and recycling program as reflected in the total quantities of recyclables diverted, and as evidenced by the affordable residential fee for comprehensive waste and recycling services (\$233.00 annually).
- Public Works crews service between 800 and 1,100 household per recyclables collection route, which is comparable to waste industry routes and demonstrates efficient utilization of collection crews and equipment.
- The waste and recycling educational program is comprehensive and particularly effective because of the hands-on nature of the Public Works staff, including use of curbside feedback (e.g. notes explaining proper recycling methods/requirements).
- Based on the Township’s observations, 87 percent of residents participate in curbside recycling, which is a favorable recycling participation rate.
- 14-gallon recycling containers are currently utilized for curbside collection. For many households, the capacity of 14-gallon containers does not store the volume of recyclables generated from a household between weekly collections. Consequently, the limited capacity of these containers discourages recycling participation because residents overflow the containers, they must use several containers or excess recyclables may become trash.
- Although cardboard is accepted in the residential curbside collection program, its recovery is not maximized in the current commingled collection format:
 - Existing side-loading collection vehicles do not effectively handle cardboard unless it is broken down to a size that fits in the 14-gallon recycling bin.
 - Requiring residents to break down cardboard to such a small size is inconvenient and discourages residents from participating.
 - According to Public Works staff, 1-2 tons of additional residential cardboard is recovered per collection route when a trash packer is utilized and all cardboard set outs are recovered.
- The Township program allows a maximum refuse set out of six (6), 20-gallon containers (maximum 60 lbs. each) or ten (10), polyethylene bags (maximum 30 lbs. each). The allowance for such a high volume of curbside trash disposal may discourage recycling participation because so much disposal capacity is available that waste disposal is extremely convenient.
- Based on the list of recyclable materials currently collected, there will be an increase in the types of materials collected under a single-stream program. Plastics #3 to #7 (e.g. pill bottles, plastic flower pots, etc.) will be added to the list of materials. Because these additional materials are typically lightweight and do not make up a sizeable portion of the waste stream, adding plastics #3 to #7 is not expected to noticeably increase tonnages. However, allowing residents to throw all plastics into a single container simplifies

education and improves convenience, which can translate into additional tonnages for the program as a whole.

- Waste and recyclables collection is an ongoing focus of safety concerns due to manual lifting of heavy containers, sharp objects in trash, and injuries from being struck by collection or other vehicles. In 2008, workman’s compensation claims that were paid and associated with curbside waste and recyclables collection exceeded \$375,000.
- The Township has several areas where narrow roadways and alleys limit the type of equipment that may be effectively and safely utilized for collection.
- The current commingled/dual-stream recycling program is operating near its peak performance provided the “status quo” collection methods, equipment and curbside containers remain unchanged. However, there is a clear opportunity to divert a significant quantity of additional recyclables from the waste stream if a single-stream collection alternative is implemented and includes new collection equipment (25-cubic yard packer trucks) and larger capacity curbside recycling containers (refer to Section 4.0, Single-Stream Analysis).

4.0 SINGLE-STREAM COMPARATIVE ANALYSIS

GF conducted a preliminary analysis comparing the existing or “**status quo**” dual-stream/commingled recyclables collection program with a **single-stream** recyclables collection program under consideration by the Township. The 2,700 tons of recyclables used as the status quo program in this analysis is not entirely limited to materials collected curbside; it includes an unquantified, but modest amount of material collected from cardboard drop-off points and other recyclables recovered in containers located in Township Parks and business districts. Yard waste recycling was not evaluated.

The Township’s proposed single-stream program will include new 32-gallon curbside recycling bins and a 25-cubic yard waste packer that will be used for curbside collections of single-stream recyclables. GF conducted a comparative analysis to answer the question, “will implementing a single-stream collection program increase the tonnage of recyclables recovered?” Answer: Yes. Determining precisely “how much” this increase is nearly impossible due to a host of variables, ranging from existing participation levels to the capacity and type of containers utilized under an alternate single-stream program, materials collected, waste stream characteristics, economic conditions, etc. However, GF applied existing data and case study information to develop reasonable projections for the single-stream alternative. In the following subsections, GF compares current waste and recyclables tonnages and associated program costs (i.e. disposal tip fees & recyclables revenues) with projected waste and recyclables tonnages and costs under an alternate single-stream recycling program.

4.1 Baseline Additional Recovery from Single-Stream Implementation

GF reviewed information from the following sources to develop a conservative estimate for potential waste diversion (that exceeds current or status quo recycling efforts) under the single-stream alternative:

- **Penn Waste, Inc.** – Penn Waste, Inc. is a private sector waste and recycling company that collects and processes commingled/dual-stream and single-stream recyclables and focuses on residential sector recycling. Based on Penn Waste’s service experience, residential customers that were dual-stream and transitioned to single-stream realized a 20 to 30 percent increase in recycling. Households averaging 7 to 8 lbs. per week with dual-stream collection average around 10 lbs. per week under single-stream.
- **City of Madison Automated Collection and Single-stream Program Status Report** (November, 2008) –This Report and the City’s website (www.cityofmadison.com/streets) indicate that the transition to automated collection and single-stream recycling was key to overall waste collection and recyclables program improvements and cost reductions. Through the transition to single-stream collection (using automated collection), Madison realized a 29 percent increase in recycling and is saving over 1 million dollars annually.
- **City of Philadelphia** - The City changed from a dual-stream collection program to a single-stream collection program. Under the former and current recycling program, the City uses 20-gallon recycling containers and allows residents to use their own containers up to 32 gallons. The City experienced a 25 to 30 percent increase in recyclable tonnages by changing to single-stream recycling.

Based on these benchmark case studies and consideration of the Township’s existing waste management and recycling structure, GF concluded that a **20-30 percent increase** in total tons diverted from the curbside program can be expected by transitioning to single-stream recycling program.

4.2 Single-Stream – 20 to 30 Percent Waste Diversion Impact

GF used 20 percent and 30 percent increases (by weight) above status quo recycling as the baseline to estimate the total annual tons of recovered recyclables under an alternative single-stream program. This comparative analysis reveals program impacts in the following areas:

- Increase in the total tons of recyclable materials collected annually
- Impact to recyclables revenues/income
- Reduction in waste tons and associated “avoided costs”
- Equipment efficiency impact

For comparative analysis, GF used the total annual tons (rounded) for waste (10,150 tons) and recyclables (2,700 tons) multiplied by current rates for disposal tip fees and rates for recyclable commodities to calculate costs. As shown below, the Township currently spends nearly \$640,000 annually on waste tipping fees.

Cheltenham Township - Disposal/Processing Tip Fees		
Curbside Waste Disposed/Processed (2008 Tons)	Disposal/ processing Per Ton Tip Fee (Covanta Abington Transfer Solutions)	Extended Disposal/ Processing Costs
10,150	\$63.00	\$639,450.00

To compare the value of recyclable commodities under a single-stream program with the status quo program, GF created a baseline for the status quo program by multiplying the tons for each commodity stream collected by its corresponding revenue per ton (as paid to Blue Mountain Recycling/FCR). Under the status quo program, 2,700 tons of recyclables (generated in 2008) would generate a total of \$41,306.97.

Cheltenham Township Recycling Revenue Baseline (Year-end 2009 Commodity Pricing)				
	Commingled	News #6/ Mixed Paper	Single-stream	Total
Recycling Split (% weight)	32.3%	51.1%	16.7%	100.0%
Tons (based off 2,700)	871.3	1,378.9	449.8	2,700.0
Recycling Revenue per ton ⁽¹⁾	\$15.03	\$16.47	\$12.23	
Recycling Revenue Extended	\$13,095.66	\$22,709.69	\$5,501.63	\$41,306.97

⁽¹⁾ Rates are from Blue Mountain Recycling/FCR as negotiated through December 2009.

The **Single-Stream Recycling Projections** table reveals that 20 percent and 30 percent increased recovery will result in an increase of 540 tons or 810 tons, respectively, increasing the total waste tons recycled to over 3,000 tons annually. If the Township achieves only a 20 percent additional recovery under the single-stream program, the total annual revenue/income recovered through sale of recyclables is slightly less than the status quo program (due to the lower market value of single-stream recyclables). If the Township recovers 30 percent more recyclable material and receives current single-stream rates, the Township will generate slightly more recyclables income annually than the status quo program. Consequently, the avoided costs and operational savings are the key financial benefits of the single-stream system (see following subsections).

Cheltenham Township - Single-Stream Recycling Projections (20 and 30% Increased Diversion)		
Current Tons (annual total)	20% Increased Diversion (total tons)	30% Increased Diversion (total tons)
2,700	3,240.0	3,510.0
Projected Single-stream Revenue (\$/ton)		
\$12.23	\$39,625.20	\$42,927.30

4.2.1 Avoided Disposal Costs

Avoided Disposal Costs are costs that can be avoided when recycling, or reuse replaces material disposal and subsequent costs for waste collection, transportation and gate rate tip fees at the disposal facility. The **Avoided Processing/Disposal Costs** table demonstrates the trend of

increased “savings” or “avoided costs” with increased diversion to recycling. Since waste generation from the residential sector is relatively constant, the 2008 waste tons (10,150) and current tipping fee (\$63 per ton) are used to calculate avoided costs for both the 20 percent and 30 percent scenarios under the single-stream alternative. Diverting an additional 20 percent (540 tons) results in \$34,020 of avoided costs and 30 percent additional diversion results in \$51,030 annual savings through reduced tipping fees.

Cheltenham Township - Avoided Processing/Disposal Costs (Tip Fees)					
	Curbside Waste Disposed/ Processed (Tons) ⁽¹⁾	Recycling (tons)	Disposal/Processing Tip Fee (Covanta Abington Transfer Solutions)	Extended Disposal/ Processing Costs	Single-stream Disposal/ Processing Annual "Savings"
Status Quo	10,150	2,700	\$63.00	\$639,450.00	
Single-stream (20% additional Diversion)	9,610	3,240	\$63.00	\$605,430.00	\$34,020.00
Single-stream (30% additional Diversion)	9,340	3,510	\$63.00	\$588,420.00	\$51,030.00

⁽¹⁾ 10,150 tons disposed (2008) used as baseline disposal/processing quantity for estimating disposal reduction through recycling.

4.2.2 Net –Impact – Recycling Income and Avoided Costs

GF presents the summary of the net financial impact for 20 percent and 30 percent additional diversion scenarios in the table below. The table does not include collection costs, which will also realize savings. As shown, through recycling income and avoided costs the Township can achieve between 5 percent and 9 percent savings over the existing program, or about \$30,000 to \$50,000 annually.

Cheltenham Township Net Financial Impact of Single-stream Recycling		
	Additional Diversion Scenario	
	20%	30%
Increased Recycling Tonnage	540	810
Disposal Cost Savings @ \$63/ton	\$ 34,020	\$ 51,030
Recycling Revenue Increase/(Decrease) ⁽¹⁾	\$ (1,682)	\$ 1,620
Net Savings	\$ 32,338	\$ 52,650
Percent Savings (over status quo)	5.4%	8.8%

⁽¹⁾ Net effect of increasing tonnage and decreasing revenue per ton.

Note: Table does not include operating savings.

4.2.3 Single-Stream Collection Efficiency

Transitioning to a single-stream recycling program will significantly improve overall recyclables collection efficiency, thus reducing annual operating costs. These efficiencies will be realized in two primary ways:

- Increased quantity (weight) of material collected per stop as a function of:
 - Additional capacity of curbside collection containers (32-gallon proposed)
 - Acceptance of new recyclable materials (plastics #3 to #7)
 - Acceptance of larger-sized cardboard
 - Increased residential participation due to improved convenience
- Added vehicle capacity and reduced unload time:
 - The proposed 25-cubic yard recyclables packer will collect approximately 10 tons per load of single-stream recyclables. The current side-loading recyclers collect 5-6 tons. The collection capacity of the single-stream recycling truck nearly doubles collection capacity, therefore optimizing collection efficiency, particularly through a dramatic reduction in the total number of trips required to dump materials at the transfer station.

Note: Although GF has not completed an economic analysis of operational cost savings, the improved operating efficiency achieved under a single-stream program can yield the largest portion of the economic benefit. There will be a significant reduction in labor and associated operational costs (e.g. fuel) for single-stream recyclables collection. Workman’s compensation claims will also be reduced with implementation of semi-automated collection arms that reduce the amount of lifting by work crews.

4.3 Consideration of RecycleBank within the Proposed Single-Stream Program

“RecycleBank” is a recycling incentive program that awards residents points for their recyclables which can be cashed in for coupons at participating stores. Under this program residents receive curbside recycling totes fitted with RFID chips or other technology that allow the hauler to weigh and record the amount of recyclables. Rewards can be based on weights per household or based on the average weight recovered from the community. Residents access their points and coupons on-line.

GF has worked on other municipal recycling projects to evaluate RecycleBank or to include RecycleBank services within municipal waste collection bid specifications. RecycleBank has a track record of increasing recycling efforts. The structure and costs for RecycleBank are highly variable depending on the community structure and desired program. The costs for RecycleBank are highly variable depending on the community and many other factors and can include the following components:

- Cost for retrofitting curbside containers with technology that transmits information (e.g. house ID, weight, etc.) to the collection vehicle.
 - Retrofitting of existing containers can be done, but retrofitting new containers at the manufacture at time of purchase is less expensive.
- Cost for retrofitting collection equipment with weighing technology and technology to log recycling data.
- Cost for RecycleBank service: cost is highly variable and may be offset by savings, which usually is tied to “avoided costs” of disposal. This cost is usually recovered as a fee incorporated into the trash bill.

The fee structure is usually a flat fee or a percentage that is based on the additional savings the municipality realizes through the avoided disposal costs from the recyclables diverted under the RecycleBank program. It is GF's position that the Township will achieve a significant increase in recycling under the proposed single-stream program without RecycleBank. The Township will begin to approach or reach peak diversion rates under a single-stream program. Consequently, GF would not expect a substantial increase in the total recyclables recovered by RecycleBank when compared with a single-stream program. The RecycleBank program will however, add at least some costs, which typically will increase the trash and recycling bill paid by residents. GF recommends the Township first implement standard single-stream recycling and evaluate its costs and recovery rates. If the Township and its residents continue to desire RecycleBank, then re-evaluate the RecycleBank program feasibility with the assistance of a RecycleBank Representative.

5.0 INCREASING RECYCLING PARTICIPATION THROUGH SINGLE-STREAM IMPLEMENTATION

In the analysis in Section 4.0, GF projected addition material recovery and compared some of the economics associated with the proposed single-stream program. Below, GF highlights aspects of single-stream program implementation that can enhance recovery rates by improving residential participation. "Participation" means both the percentage of households that set out recyclables and also how much material is recycled properly from each home.

- **Educational Campaign** – Prior to, and during the introduction of the proposed single-stream program the Township should increase program awareness through a comprehensive educational campaign. The campaign should include an explanation of how this new and convenient program increases participation in recycling and will help manage costs, keeping residential trash bills affordable.
- **Convenience**: Single-stream recycling is more convenient for residents because all designated recyclables go in one larger recycling container. The capacity of the current 14-gallon recyclables containers is inadequate for many homes. As containers overfill or if multiple containers are required, residential participation is negatively impacted.
- **Curbside Program Feedback** – The Public Works Staff should continue the curbside feedback program (e.g. notices left on curbside containers noting proper recycling methods) that assures residents understand program requirements. New components of the program should be clarified (e.g. encourage acceptance of larger cardboard and note acceptance of additional types of plastics).

6.0 SUSTAINABILITY

Pennsylvania's Act 175 of 2002 requires municipalities to ensure that their recycling programs are financially self-sufficient. The Pennsylvania Department of Environmental Protection (PADEP) requires communities to implement financially sustainable programs and to report these efforts through annual reporting and grant requests. For this Report, we consider "sustainability" to include the pursuit of economic prosperity, environmental quality and social equity, commonly referred to as the 'triple bottom line'. In this review, we characterize the

sustainability of the status quo recycling program and then compare existing sustainability efforts with the proposed single-stream recycling program using the **Northeast Recycling Council's (NERC) Environmental Benefits Calculator**.

Based on GF's review of Cheltenham's existing waste management system, it is clear the Township strives to maximize program sustainability. In fact, this municipally-operated waste management program has included recycling since the 1970's. Some economic, social and environmental benefits of the existing waste and recycling program include:

Economic Benefits

As provided by the Township, the revenues/income noted in the bulleted list below offset operations and maintenance costs including disposal and recycling tip fees, labor and benefits, capital equipment costs and other costs associated with the waste management system:

- Trash and Recycling Fee (estimated) - \$233.00 x's 9,491 homes = **\$2,211,000.00**
- Refuse Special Collections: **\$30,378.00**
- Recycling Income: **\$152,857.00**
- Sale of Refuse Bags: **\$186.00**
- Sale of Leaf Waste Bags: **\$22,417.00**
- Supplemental Grant Revenues - **varies**

Note: Leaf waste management costs are offset through taxes.

The economic sustainability of the program is based on sound principles including diversified revenue streams, material ownership and contractual commodity pricing arrangements, data management, operational efficiency, cost avoidance and ongoing program evaluation. The waste management program employs about 15 people in any given year and supports regional waste and recycling markets, while providing comprehensive and affordable waste and recycling services to nearly 10,000 households and 40,000 residents.

Social Benefits

Recycling programs play an important role in the social environment of Cheltenham Township. A growing program since the 1970's, recycling has become a culture and a norm for this large suburban community. Public Works crews work directly with residents and strive to make recycling a convenient, safe, affordable and socially desired activity. These ongoing efforts offer several social benefits:

- Meets residential needs for desired recycling services with reasonable cost;
- Maintains health, safety and welfare through reduction of improper waste disposal;
- Equitable pricing for waste and recycling leaves money in the pockets of residents to support spending on local goods and services;

- Promotion of positive environmental ethics and stewardship in the community;
- Education of residents of all ages about the importance of integrated waste management.

Environmental Benefits

Integration of recycling operations with other solid waste practices is an important factor in a sustainable, environmentally responsible program. It takes more energy to extract and process raw materials than it does to reuse or recycle materials. Increased recycling saves energy, saves fossil fuels, decreases greenhouse gases, and conserves landfill space and/or eliminates incineration. Cheltenham is ideally located within five miles of transfer facilities for both waste and recyclables, which significantly reduces environmental harms associated with material transportation (e.g. fossil fuel consumption and emissions). Efficiencies are created by optimizing economy of scale, highlighted by the consortium arrangement for recyclables consolidation, transfer and marketing. Consolidation and transfer further reduce truck traffic, fuel consumption and emissions, while at the same time mitigating environmental impacts by sustaining recycling to minimize waste disposal and raw material extraction. 2,700 tons of bottles and cans and paper were recovered from the waste stream and recycled in 2008.

GF measured environmental benefits using the **Northeast Recycling Council's (NERC) Environmental Benefits Calculator**. Because reported data was not broken out by commodity, GF input the 2,700 tons of curbside recyclables from 2008 as “mixed recyclables”. Waste data from 2008 (10,150 tons) was used for the disposal input. As estimated using the Calculator for 2008 recycling efforts, Cheltenham Township realizes the following environmental benefits:

Status Quo Recycling Program Environmental Benefits

- Curbside recycling (not including yard wastes) reduces greenhouse gas emissions by 1,684 metric tons of carbon equivalents (MTCE).
- Curbside recycling saves a total of 24,597 Million BTUs of energy. This is equivalent to 197,983 gallons of gasoline. This represents the amount of energy required to power 240 homes for one year.

Under the proposed single-stream recycling program, GF believes a 30 percent increase in recycling tons is achievable after 2 to 3 years of implementation, which is equivalent to 3,510 tons (annually). Waste data from 2008 (10,150 tons) was used for the disposal input.

Based on projected single-stream recycling efforts (30 percent above status quo) environmental benefits for Cheltenham Township would include:

Proposed Single-Stream Recycling Program Benefits

- Curbside recycling (not including yard wastes) would reduce greenhouse gas emissions by 2,189 metric tons of carbon equivalents (MTCE) greenhouse gas emissions of 1,172 MTCE.

- A total of 31,976 Million BTUs of energy would be saved. This is equivalent to 257,378 gallons of gasoline and represents the amount of energy that would be required to power 312 homes for one year.

Other Environmental Benefits include:

- Compliance with local, state and federal regulations regarding recycling and waste management;
- Waste reduction efforts including educational programs raising environmental awareness;
- Avoidance of collection, hauling and disposal activities that create environmental detriments;
- The Township’s recycling program goes beyond curbside recycling and includes special collections that assure environmentally responsible disposal or recycling of a variety of materials including appliances, bulky items, yard wastes, etc.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Cheltenham Township and Township residents are serious about recycling. The existing “commingled” or dual-stream program separates container recyclables and paper recycling streams and diverted 2,700 tons of recyclables from the waste stream in 2008. Although the “status quo” recycling program is a success and operates effectively, its potential to maximize recovery of Township-generated recyclables is limited by the collection format, the equipment and the containers. Some key areas where the status quo program falters include:

- The side-loading recyclers do not maximize collection efficiency, magnified because the single-stream recyclables transfer stations and processors are located nearby. The inability of the side-loading recyclers to accept larger pieces of cardboard leads to disposal of this valued recyclable commodity. The side-loading recyclers collect 5 to 6 tons of recyclables, while a 25-cubic yard single-stream packer can collect 10 tons per load.
- Undersized 14-gallon recycling bins do not have sufficient capacity for recyclables generated by the average home. Small recycling containers are inconvenient and proven to discourage recycling. Many residents must use multiple containers which is inconvenient, but also slows the time per stop during collection.
- The status quo program does not accept all the materials accepted by Blue Mountain Recycling/FCR (i.e. plastics #3 to #7) and does not effectively recover cardboard.
- Worker safety is stressed, however, worker injuries associated with the curbside trash and collection program are excessive (paid workman’s compensation claims in 2008 exceeded \$375,000).
- The Township collects recyclables and trash from residential single units, duplexes and triplexes, but not from four-unit establishments. The Township is missing an opportunity to manage waste and recover recyclables from four-unit houses.

Based on our comparative analysis of the status quo recycling program and the single-stream alternative, GF concludes that the benefits of single-stream recycling for Cheltenham Township far outweigh any negatives. Some of the benefits include:

- Economic
 - Improves recyclables collection efficiency and associated operational cost reductions.
 - Additional recyclables sold to markets plus reduced waste disposal tip fees.
 - Continued affordable waste and recycling services for residents.
- Social
 - Health, safety and welfare.
 - Environmental stewardship for the community.
 - Continuing and improving an already accepted and important community program.
- Environmental
 - Compared to benefits of the existing recycling program, recovering 30 percent more recyclables (by weight) in a single-stream curbside recycling program (not including yard wastes) would:
 - Reduce greenhouse gas emissions by an additional 505 metric tons of carbon equivalents (MTCE);
 - save an additional 59,395 gallons of gasoline;
 - save enough additional energy to power 72 homes for one year.

Single-stream market values are lower per ton than for news #6 (mixed paper) and commingled containers, and therefore, it is not expected (at current rates) that the Township will generate much additional income from sale of recyclables. However, the avoided costs and operational savings are significant and the key financial benefits of the single-stream system. Total system costs are expected to be reduced because of:

- Increased collection and routing efficiency realized through the proposed 25-cubic-yard recyclable packer that will dramatically reduce the total number of trips to the recyclables transfer station each year and overall operational costs,
- Improved collection efficiency realized through more recyclable material (weight) per collection stop,
- Reduction in waste disposal and associated tip fees, saving \$30,000 to \$50,000 annually,
- An increase in total income from recyclables recovered and marketed can be achieved when 30 percent additional diversion is achieved (at current commodity rates), and
- Improved safety and reduced workman's compensation claims:
 - Reduced back injuries from semi-automated lifting of containers.

- Semi-automated loading will slow down workers a little, giving them time to focus on what they are doing, with less rush.
- Fewer containers will be picked up at the curbside, minimizing distractions, the number of times workers must walk back and forth to curbside, and reducing lifting.

Ultimately, the benefit of the improved waste system efficiency can be shared with residents through the continued delivery of affordable waste management services in an environmentally, economically, and socially responsible manner. When implemented properly, the proposed single-stream collection program will increase recycling and improve operating efficiency. GF believes that a 30 percent increase in recyclables (by weight) will be achievable in 2 to 3 years after single-stream implementation. Implementing these changes will require that the Public Works Department make adjustments in the methods, schedules, and equipment utilized for residential waste and recyclables collection. The new collection system will also require small adjustments by residents, but the improved convenience will minimize negative public feedback and facilitate participation.

7.1 Recommendations

Based on our waste and recycling program analysis, GF recommends Cheltenham Township transition to a single-stream recycling program to optimize the overall waste management and recycling system performance. Specifically, GF recommends the Township:

- Implement a single-stream recycling program without the RecycleBank incentive program to avoid potential additional costs associated with, specialized equipment and containers and RecycleBank fees so that these costs are not passed to residents. In the future, after the single-stream recycling program is in place and performance is documented, the Township can re-evaluate the RecycleBank program with the assistance of a RecycleBank representative.
- Procure the proposed 25-cubic yard Leach recyclables packer truck included in the Act 101, Section 902 Recycling Grant.
- Add semi-automated collection capabilities to waste packers and new recyclables packers for use on routes where semi-automated collection is feasible. This is a measure to improve worker safety and reduce workman's compensation claims. Re-evaluate the worker's safety policy and practices for curbside laborers and drivers with consideration of an incentive program based on injury-free work days.
- Provided the pending Act 101, Section 902 Recycling Grant is awarded for equipment and containers, it is recommended the Township re-evaluate its 32-gallon recycling container choice. Due to the design of the single-stream program to handle all recyclable materials in one container, including larger cardboard, GF believes 32-gallon containers are smaller than optimal and will still limit the efficiency of the program to some degree. If one container size will be offered to residents, GF recommends a 64-gallon cart, which would be suitable for semi-automated loading. The Township should follow up with PADEP, who can reallocate funds to a different, larger container even after the Grant has been awarded.

- Roll-out a comprehensive educational campaign in conjunction with the single-stream program. Recyclables quality must be stressed under the campaign so that single-stream recycling is not confused with “anything goes”, which can lead to lowered market value.
- Procure a second Leach 25-cubic yard recyclables packer as soon as feasible.
- Custom paint the Leach recycler(s) to very clearly reflect that they are a recycling (not trash) vehicle. This can be part of the educational campaign.
- Establish a baseline for the status quo program (as partially done in this Report), and use this as a baseline for ongoing measurement of the success for the single-stream program.
- Establish a 3-year goal for improving the total curbside recyclables tons diverted above current diversion, which could be set at: year 1 (10 percent), year 2 (20 percent), year 3 (30 percent). Note: 2,700 tons used in this analysis is not entirely curbside recyclables. Consequently, achieving 20 and 30 percent increases in curbside tonnage may result in slightly less total tons recovered than shown in our scenarios.
- Continue to competitively market recyclables to assure the highest commodity return value.
- Consider providing trash and recyclables collection to four (4) unit residential structures to increase the number of residents that benefit from affordable trash and recycling and to increase recycling and avoided costs. This should include necessary revisions to any relevant ordinances.

