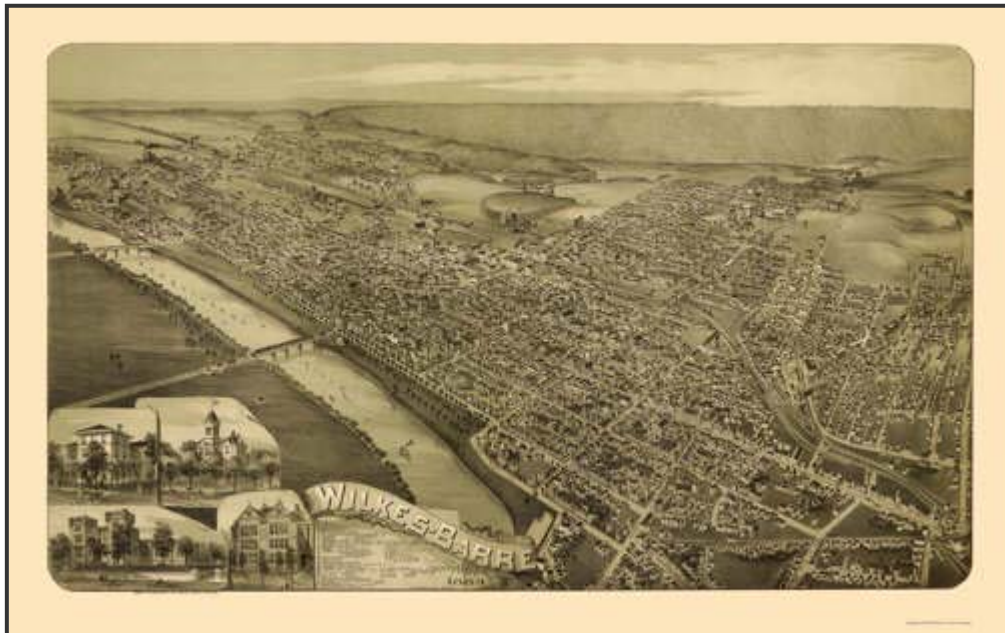


**SWANA RECYCLING
TECHNICAL ASSISTANCE STUDY**

RECYCLABLES COLLECTION EQUIPMENT EVALUATION

Prepared for:

**CITY OF WILKES-BARRE,
LUZERNE COUNTY, PENNSYLVANIA**



Prepared by

GANNETT FLEMING, INC.



HARRISBURG, PENNSYLVANIA

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**SWANA RECYCLING
TECHNICAL ASSISTANCE STUDY**

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FIGURES

Map: City of Wilkes-Barre Recycling Service Area Map

RECYCLABLES COLLECTION EQUIPMENT EVALUATION

1.0 INTRODUCTION

Through the partnership with the Solid Waste Association of North America (SWANA), the Pennsylvania State Association of Township Supervisors (PSATS), and the Pennsylvania Department of Environmental Protection (PADEP), the City of Wilkes-Barre was awarded \$6,000 in technical assistance to be performed by Gannett Fleming, Inc.

1.1 Scope of Work

Gannett Fleming (GF) has been requested by the City of Wilkes-Barre to complete the following three tasks to evaluate the feasibility of purchasing eight dump trucks for the collection of recyclable materials:

- Task #1** Gannett Fleming staff will work with the City of Wilkes-Barre to gather pertinent background information. This will include information about existing and proposed recycling and waste collection equipment and operations. Specific City needs and/or problems associated with the existing and/or proposed equipment and operations will be reviewed as they are identified.
- Task #2** One GF staff person will conduct a site visit and record observations of the existing recycling collection equipment, methods, routes, etc.
- Task #3** GF will provide the City of Wilkes-Barre with a brief summary report that will include findings and recommendations for the feasibility of using the proposed recycling collection vehicles.

GF has agreed to meet a two-week project schedule commencing with GF's receipt of required information from the City necessary to complete this study. GF requested the data (e.g. equipment specs, program details, etc.) needed for this study in a letter that was provided to the City on January 28, 2003.

2.0 BACKGROUND OF PROJECT

On July 31, 2002 the City of Wilkes-Barre requested an amendment of its Act 101, Section 902 Grant Agreement #ME 350591. The original Grant Agreement contained approved costs for recycling equipment that totaled \$314,823.00. The original Grant agreement was for the purchase of two (2) side-loading recycling collection vehicles and four (4) foam filled loader tires. The amendment request is for the purchase of eight (8) GMC Sierra 3500 regular cab truck chassis in place of the two side-loading recycling trucks requested in the original grant agreement. According to the City's request, the eight trucks requested in the amendment would be used exclusively for recyclables collection in the City and would be modified to include a lift and 2.3 cubic yard steel tipper dump body.

Originally, the Pennsylvania Department of Environmental Protection (PADEP) did not approve the amendment to the original grant because PADEP wanted confirmation that the eight (8) trucks would be used solely for Act 101 recyclables. PADEP requested verification that

utilizing the requested eight trucks is an efficient and effective method for the City to conduct curbside recyclables collection.

The City of Wilkes-Barre received an extension of Grant Agreement #ME 350591, extending it until May 14, 2003. In order to utilize the grant funds, the City must take delivery of any trucks that are purchased by May 14, 2003. Truck manufacturers typically can take up to 120 days to deliver ordered trucks. As a result, the City requires a decision on its grant amendment request to be made in approximately two weeks.

The City is requesting technical assistance to determine whether or not utilizing the eight trucks identified in the amendment is the most efficient and effective method for the City to conduct curbside collection of recyclables. At the completion of the assignment, the City and PADEP will be provided recommendations for use in making decisions regarding this matter.

3.0 EXISTING RECYCLING SYSTEM

3.1 Pay As You Throw

The City of Wilkes-Barre is home to approximately 44,000 residents and is the largest municipality in Luzerne County, Pennsylvania. The City of Wilkes-Barre's Department of Public Works (DPW) collects recyclables at the curbside using the "Pay Per Bag" or Pay as You Throw (PAYT) system. In 1994, when the city began using PAYT, they became the largest city in the Commonwealth of Pennsylvania to collect trash and recyclables using this type of collection system. Currently, residents pay \$1.25 for blue PAYT trash bags that are available at local grocery stores and convenience centers. This system encourages diversion of recyclables out of the garbage containers and into the recycling containers through the economic incentive of minimizing the cost of purchased garbage bags. Since the implementation of PAYT, the City has been able to dramatically increase the amount of material that is diverted from the landfill. As a result of this program and the increased recycling efforts, the City has reduced its annual solid waste disposal costs to the landfill from \$1.4 million to \$600,000.

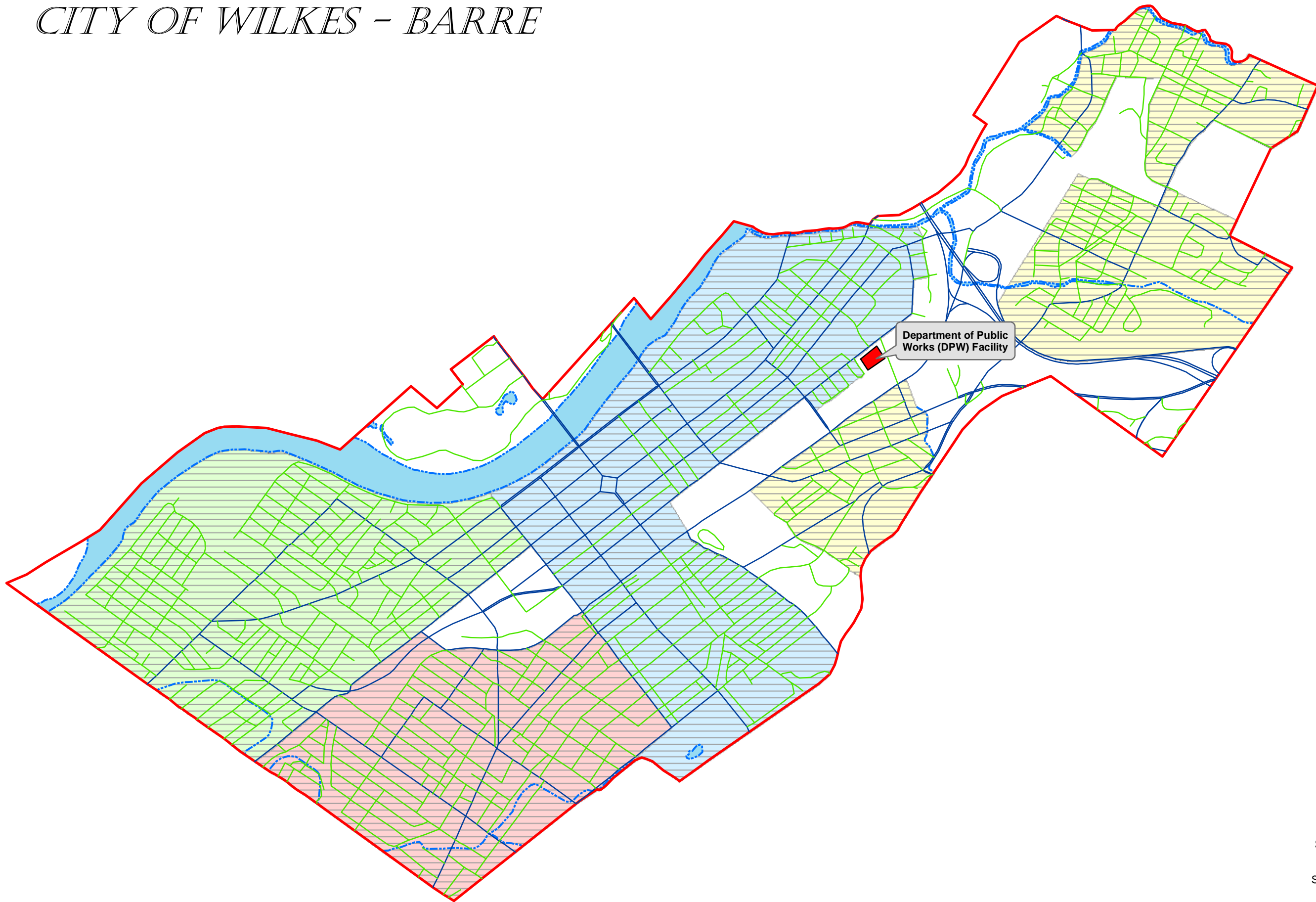
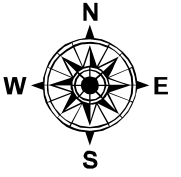
3.2 Commingled Collection

The DPW currently provides citywide bi-weekly curbside recyclables collection for commingled recyclable containers on Mondays or the following day. The City consolidates its curbside collected commingled material at the DPW facility located near the center of the City (see map). The commingled material is dumped into bunkers enclosed by "jersey barriers" at the DPW yard. The following commingled materials are placed in 20-gallon plastic recycling containers and set-out bi-weekly by City residents for curbside collection:

- Aluminum Cans*
- Steel and bi-metal cans
- Glass (clear and colored)
- Plastics (PET and HDPE)

*Some residents remove aluminum cans from their recyclables and take them directly to a local recycler located adjacent to the DPW facility. Residents currently receive 40 cents per pound for aluminum cans.

CITY OF WILKES - BARRE



Legend

- Local Roads
- State Roads
- City Boundary
- Streams / Rivers

Recycling Pick-Up

- Monday**
Commingled (bi-weekly)
Newsprint (bi-weekly)
- Tuesday**
Corrugated - 8 Tues/year
Yard Waste - 35 Tues/year
White Goods - 6 Tues/year
- Wednesday**
Corrugated - 8 Weds/year
Yard Waste - 35 Weds/year
White Goods - 6 Weds/year
- Thursday**
Corrugated - 8 Thurs/year
Yard Waste - 35 Thurs/year
White Goods - 6 Thurs/year
- Friday**
Corrugated - 8 Fri/year
Yard Waste - 35 Fri/year
White Goods - 6 Fri/year

Special Dates:

Car and Light Truck Tires and Batteries	
South of Public Square	North of Public Square
March 19-22	March 26-29
June 4-7	June 18-21
September 24-27	October 1-4



In 1998, the City entered into five-year recycling contract for commingled materials with Todd Heller, Inc. After the commingled material is collected and consolidated at the DPW, the recyclables are loaded into open-top trucks provided by Todd Heller, Inc. who then transports to their facility for processing and marketing. A commingled collection day will generate enough material to load between six and eight open-top trailers.

During 2002, the City collected 1,209.7 tons of commingled containers (see Table 1). Given that collection is provided bi-weekly (assuming 26 collection days per year), the City of Wilkes-Barre collected an average of 47 tons of commingled containers per collection day in 2002. Based on interviews with DPW staff and a windshield survey of 100 households, it is estimated that approximately 75 percent of the City’s households participate in recycling commingled materials.

3.3 Newspaper Collection

In 1998, the City entered into a five-year agreement for post consumer newspapers (ONP) with GSP Recycling Corp. Under this agreement, the City consolidates its curbside collected newspaper at the DPW facility and places it in an area permanently protected from the weather. GSP Recycling supplies open top containers at the DPW yard for receipt of the newspaper.

Newspaper is collected citywide on a bi-weekly schedule on the alternating Mondays (or the following day) following commingled collection. Residents are required to bundle newspaper (does not include magazines, junk mail, etc.) with twine or place it in paper bags for collection.

During 2002, the DPW collected 1,569 tons of newspaper at the curbside (see Table 1). Given that collection is provided bi-weekly (assume 26 collection days per year), it is estimated that the City of Wilkes-Barre collected an average of 60 tons of newsprint per collection day in 2002.

Table 1: 2002 Commingled and Newspaper Totals

Recyclable Material	2002 Tonnage Collected
Commingled*	1,209.7
Newsprint**	1,569.0
TOTAL	2,778.7

* Bi-weekly Collection: Mondays or the following Tuesday

** Bi-weekly Collection on the alternating Mondays or the following Tuesday

3.4 Other Recyclables

The City of Wilkes-Barre offers curbside collection of various recyclable materials that are collected on the same days as municipal waste collection (Tuesday – Friday). The curbside recyclables collection provided from Tuesday – Friday is conducted as follows (refer to map, page 5):

- **Corrugated paper** is collected at the curbside by the City’s Public Works employees at least eight (8) times per calendar year.
- **Leaf waste** is collected at the curbside by the City’s Public Works employees on a weekly basis from mid-April through mid-December each year.
- **Lead acid batteries** are collected at the curbside by the City’s Public Works employees at least three (3) times per calendar year.
- **Scrap metal** is collected at the curbside by the City’s Public Works employees at least eight (8) times per calendar year.
- **Telephone books** are collected at the curbside by the City’s Public Works employees at least three (3) times per calendar year.

Table 2 shows the 2002 weight totals for various recyclables included in the City’s recycling program that are collected Tuesday through Friday (refer to Table 3).

Table 2: 2002 Recyclable Totals: Scrap, Batteries, Phonebooks, Corrugated, Leaf Waste

Material	Recyclable Totals
Scrap Metal	306.8 tons
Lead Acid Batteries	2.0 tons
Telephone Books	19.3 tons
Corrugated Paper	142.5 tons
Leaf Waste*	1,390.0 tons
Total	1860.6 tons

*Leaf Waste was provided as a volume (5,560 cubic yards) and converted to tons using 500 lbs/cubic yard for mixed yard waste. Source: Municipal Yard Waste Compost Reference Manual, PADER, 1991.

3.5 Drop-off Recycling

Aluminum is dropped off at the DPW facility during the month of December. In 2002 the City collected 1.15 tons of aluminum cans during the drop-off collection program.

Household Hazardous Waste is dropped off at one of seven sites located throughout the City once every other year.

4.0 EXISTING RECYCLING FLEET

For the purpose of this study, the commingled recycling fleet that was used during GF’s site visit (February 10, 2003) is identified below. When looking at the volume of material handled, the bi-weekly commingled collection operation places the largest daily recyclables demand on DPW equipment and staff. The fleet described below is representative of the recycling equipment that may be used on a typical Monday to collect commingled recyclables.

<u>Vehicles</u>	<u>Bed/Body Capacity</u>
Four (4) Pickup trucks	~1 cubic yard each
Four (4) Packer Trucks	20 or 25 cubic yards each
Two (2) Dump Trucks	25 cubic yards each
Two (2) Small Trucks with Lifts	~ 4 cubic yards each
Two (2) Tandem Axle Trucks	25 cubic yards each

A front-end loader is also used for commingled collection to load recyclables into the high-sided trucks that cannot be safely or efficiently loaded manually by DPW staff.

As demonstrated by the list of vehicles, the City of Wilkes-Barre uses a variety of equipment. The City uses the above vehicle types for the following reasons:

- Due to the excessive volume of recycled materials collected, the City draws on the DPW equipment that is available to complete the equipment-intensive and labor-intensive task.
- Some of the vehicles were purchased through previous State recycling grants and are designated for recycling.
- Narrow streets and alleys common in Wilkes-Barre require that smaller vehicles be used to achieve the City’s collection needs.
- The City provides recycling for a variety of items. Some equipment that may not be specifically designed for commingled or newspaper collection is required for the collection of bulky items and other miscellaneous recyclables.

The following photographs taken during the February 10, 2003 site visit illustrate some of the equipment used by the City for the commingled recyclables collection operation:





4.1 Recyclables Collection Schedule

As indicated in Table 3, the City’s recycling vehicles are used Mondays for the bi-weekly collection of newspaper and commingled material as well as Tuesday through Friday to collect other recyclables throughout the year. Bi-weekly collection of newspaper and commingled material is scheduled to run 7:00 a.m. to 3:30 p.m. Newspaper collection is usually completed by the 3:30 p.m. scheduled shut-down time. Due to the large volume of material, commingled collection typically runs past the 3:30 p.m. shut-down time on approximately 70 percent of the commingled collection days.

Table 3: Existing Recyclables Collection Schedule: Materials, Service Areas, Vehicles and Staffing

Collection	Monday	Tuesday	Wednesday	Thursday	Friday
Material	Commingled (bi-weekly) Newspaper (bi-weekly)	Corrugated – 8 days/year Yard Waste – 35 days/year White Goods – 6 days/year	Corrugated – 8 days/year Yard Waste – 35 days/year White Goods – 6 days/year	Corrugated – 8 days/year Yard Waste – 35 days/year White Goods – 6 days/year	Corrugated – 8 days/year Yard Waste – 35 days/year White Goods – 6 days/year
Service Area	Citywide	North End Heights Brookside	Mayflower Rolling Mill Hills Iron Triangle Goose Island	South Wilkes- Barre	East End Parsons Miners Mills
# of Collection Vehicles	~ 14	~ 6	~ 6	~ 4	~ 4
Crew Size	~ 26	~ 12	~ 12	~ 8	~ 8
Total Service Days per Year	~ 52 Mondays	~ 48 Tuesdays	~48 Wednesdays	~48 Thursdays	~ 48 Fridays

The City has emphasized that it does not want to alter the current collection schedule because the system works well, because the residents are well educated in the current schedule (resulting in high participation rates), and because participation may decrease if significant schedule changes are made to the program.

Various problems can be associated with operating a curbside program that does not achieve its daily route schedule, and these may include: increased costs for staff that are magnified by overtime rates, increased costs for extended equipment use, reduced route efficiencies (especially when routes continue into rush hour traffic periods), increased difficulty in planning and maintaining a consistent route scheduled.

The following problems are associated with recycling collection activities that run beyond the scheduled shut-down time:

- The equipment and safety of DPW recycling staff is jeopardized by hazards related to increased traffic as the operation continues into rush hour traffic.
- The probability of accidents and injury to City residents becomes more likely.
- City traffic flow is slowed by recycling equipment.
- The efficiency of the collection effort is slowed as DPW staff and equipment work around increased traffic volume.

Operational costs are increased due to staff overtime and collection inefficiencies.

5.0 SITE VISIT

On Monday, February 10, 2003, GF conducted a site visit and recorded observations of the existing recycling collection equipment and collection methods used in the City for commingled material. Several DPW recycling staff were interviewed to gain additional knowledge about the collection equipment and the collection system. Information collected during the site visit is summarized in Table 4.

As indicated in the table, recyclables were weighed at 10 different households. Houses were selected for the weighing of recyclables from different neighborhoods, in order to get a good cross-section of the City. The commingled recyclables were weighed together and then separated and weighed individually. The volume of recyclables collected was also estimated using the City's 20-gallon recycling container as a reference to calculate a bulk density of the recyclables.

A windshield survey was used to estimate the percentage of households participating in commingled collection. Out of the 100 houses counted, 75 houses had one or more commingled containers set out for collection. The high participation rate appeared very consistent throughout the City.

Table 4: Site Visit Data Collection Sheet: Material Weight, Volume, Bulk Density, and Residential Participation

One 20 Gallon Recycling Container = 100% Full

Date: 02/10/2003

Commingled Material ⁽¹⁾	House #1	House #2	House #3	House #4	House #5	House #6	House #7	House #8	House #9	House #10	Average per Household
20 gal. Container - % Full ⁽²⁾	210%	205%	105%	100%	205%	300%	90%	100%	175%	90%	158%
Bulk Density - lbs/cubic yard ⁽³⁾	136.1	164.6	86.6	35.4	113.3	115.2	64.0	163.6	150.1	31.4	106.0
<i>Aluminum</i> ⁽⁴⁾	0.0	5.2	1.2	0.6	1.0	0.9	0.2	0.0	3.2	0.7	1.3
<i>Steel/Bimetallic</i>	8.2	5.2	2.0	0.9	1.0	6.0	3.5	3.1	3.4	0.0	3.3
<i>Glass</i>	12.8	18.0	4.3	0.0	12.6	12.0	0.0	11.0	15.3	0.0	8.6
<i>Plastics</i>	7.3	5.0	1.5	2.0	8.4	15.3	2.0	2.1	4.9	2.1	5.1
TOTAL WEIGHT (lbs)⁽⁵⁾	28.3	33.4	9.0	3.5	23.0	34.2	5.7	16.2	26.8	2.8	18.3

(1) Commingled material is collected bi-weekly on Mondays or the following Tuesday.

(2) The 20 gallon container is equivalent to 100 percent. Percentages over 100 indicate that one or more additional containers were set out by the household.

(3) The bulk density was calculated using 7.48 gal/cubic yard. A constant of 0.099 cubic yards was used for the 20 gallon container.

(4) Some residents remove aluminum from their recyclables to sell to a local recycler.

(5) The Total Weight is the weight of the material only.

HOUSEHOLD PARTICIPATION

	House #1	House #2	House #3	House #4	House #5	House #6	House #7	House #8	House #9	House #10	Totals
Number of Total Households	10	10	10	10	10	10	10	10	10	10	100
Households w/ set-out	7	8	7	8	8	7	8	8	7	7	75
Average Participation Rate											75%

6.0 PROPOSED COLLECTION SYSTEM

In the request for an amendment to the 902 Grant Agreement #ME 350591, the City proposes to purchase eight (8) GMC Sierra 3500 regular cab chassis in place of two (2) Recycle-Pac II side-loading compaction vehicles. In a letter response to PADEP dated September 4, 2002, the City identified the following reasons for why the existing fleet of vehicles does not meet the current collection needs:

- Existing fleet consists mostly of high-sided larger trucks which requires throwing material (e.g. commingled, and newsprint) overhead. This activity is a potential safety hazard for employees.
- The existing trucks are better suited for loading bulky items using front-end loaders.
- Existing trucks were originally purchased with the thought that recyclables would require transport outside of the City.
- With eleven neighborhoods, it is most efficient to have thirteen (13) trucks collecting simultaneously.
- Currently, the City operates five (5) collection vehicles (purchased through previous PADEP grants). This leaves the City eight (8) trucks, or (40%), short of meeting the existing need for recyclables collection.
- The City has qualified/licensed manpower to man the additional trucks daily.
- The existing larger trucks have a difficult time maneuvering the streets/alleys (especially in certain neighborhoods: the Heights and South Wilkes-Barre).

6.1 Collection Equipment Specifications

Proposed GMC Sierra 3500 regular cab chassis with lift and steel tipper body (requested in grant amendment)

Total Length: 246.5 inches

Width: 96.1 inches

Height: 76.2 inches

Body Capacity: Modified to include a 2-3 cubic yard tipper body.

Combined, the total bed capacity of the eight (8) GMC Sierra 3500 regular cab truck chassis will be approximately 24 cubic yards.

Proposed Dempster Recycle Pac II (original grant approval)

Body Length: 314 inches
Body Width: 96 inches
Body Height: 105 inches (above chassis)

Chassis Width: up to 102 inch maximum (legal limit)

Capacity: 40 cubic yards (compacted)

Compaction: ~ 2:1 weight compaction ratio for commingled material

Pounds per Cubic yard: ~ 450 pounds per cubic yard for commingled material as reported by Dempster.

Dempster makes side loading recycling vehicles in sizes ranging from 20 cubic yards to 44 cubic yards. Dempster suggests using a cabover chassis type (e.g. MACK LE, shown here) to shorten the wheelbase and increase maneuverability.



6.2 Proposed Schedule and Use of the Eight Proposed GMC Sierra 3500 Trucks

The City intends to keep the 2003 recyclables collection schedule very similar to the schedule used in 2002. The City of Wilkes-Barre intends to use the eight proposed trucks exclusively for the collection of Act 101 recyclable materials. The following schedule has been developed for the eight proposed trucks:

Mondays (or following Tuesday)

- *Commingled*
- *Newspaper*

For the bi-weekly collection of commingled materials and newspapers on Mondays, the city proposes to use the eight proposed trucks along with the 5 compartmentalized recycling trucks (previously purchased through Act 101 grants). The 13 recyclables collection vehicles would operate simultaneously in the 11 neighborhoods throughout the City and would be supported by other equipment as needed.

Tuesday – Friday

The City has recently developed the following schedule for use of the eight proposed trucks for Tuesday-Friday collection:

- **Corrugated cardboard:**
 - *January 7-31; February 25-28; March 4-7; April 8-11; May 27-30; June 24-27; July 15-18; August 12-15; September 16-19; October 7-10 and 28-31; November 4-7; December 2-5, 16-19, and 30-31.*
- **Yard Waste:**
 - *Weekly Tuesday through Friday beginning April 29 through December 19.*
- **Computers/printers:**
 - *February 25-28.*
- **Magazine/catalogs:**
 - *February 11-14.*
- **Car batteries and tires:**
 - *February 4-7; April 8-11; October 21-24.*
- **Metal/white goods/appliances:**
 - *January 28-31; February 18-21; March 11-14 and 18-21; April 22-25; May 20-23; June 3-6 and 17-20; July 15-18; August 19-22; September 23-26; October 21-24; November 18-21; December 9-12.*
- **Telephone books:**
 - *November 18-21; December 2-5, 9-12, and 16-19.*
- **Christmas trees:**
 - *January 7-31.*

7.0 CONCLUSIONS AND RECOMMENDATIONS**7.1 Overview**

The City of Wilkes-Barre has successfully diverted recyclable materials from the landfill through its recycling efforts and corresponding PAYT program. The educational component of this program has been very successful and it is estimated that nearly 75 percent of the residents participate in the bi-weekly commingled recycling program. As a result of this program and the City's recycling efforts, the annual solid waste disposal costs at the landfill have been reduced from \$1.4 million to \$600,000.

Although the City's recycling program is extremely successful, much of the existing equipment used to collect recyclables is not well suited to handle curbside collection activities. In light of the lack of adequate recycling equipment, the City has made use of available resources and equipment to make the recycling program work. Some trucks, with small bed capacities require multiple (15-20) unloadings daily, resulting in several hours of "non-collection" time. Some large trucks can only be loaded with a front-end loader, and/or are too large to negotiate narrow City streets and alleys. The City has a clear need for new recycling and collection equipment to supplement and/or replace the less efficient recycling equipment (and/or shared DPW equipment) that is currently used for curbside recycling activities.

7.2 Considerations

Based on research, field investigations, site observations, and based on existing experience and knowledge of recycling and collection efficiencies, GF suggests that PADEP and the City of Wilkes-Barre consider the following:

- The PAYT program and education component of the program are very successful, and recycling participation from City residents is very high. This program should be supported and encouraged in the future.
- The majority of the existing recycling equipment is fully utilized for recycling tasks Monday through Friday.
- The volume (not weight) of commingled recyclables (and most recyclables) dictates the need for a large capacity vehicle to efficiently collect commingled materials from the curb.
- The existing equipment used for recycling cannot efficiently complete the recycling services that are provided by the City.
- The City has a general need to reduce curbside collection inefficiencies that are largely a function of inadequate recycling equipment. Some existing collection activities may place recycling staff and local residents at potential risk of vehicle accidents and/or injury.
- The City has a specific need for collection equipment to service narrow streets and alleys common in the City.
- The City has a need for efficient curbside recycling equipment to service the larger streets where a significant portion of the total recycling volume is collected.
- The City will continue to collect a variety of different recyclable materials, including some materials not designated by Act 101, in order to meet the needs of the residents.
- Equipment purchased through Act 101 grant funding should be utilized for the purposes specified by Act 101.
- The equipment recommendations provided below recognize that the available grant amount totals \$314,823.00 for equipment. Using this as the cap for purchasing equipment, GF equipment recommendations are based on what we consider to provide the best overall results for the City within this budget.

7.3 Recommendations

Based on information provided by the City, field investigations, and on-site observations, and based on existing experience and knowledge of equipment, recycling and collection efficiencies, GF recommends that the City of Wilkes-Barre:

- Continue to conduct recyclable collection activities using the existing collection schedule (and as modified by the City) that has proven to be effective in maintaining a high participation rate from City residents.
- Continue to use its existing equipment as needed to conduct recyclables collection for the variety of materials collected by the program. The recommended equipment is meant to replace existing equipment or change existing collection methods, and should be used in a manner consistent with Act 101.
- Purchase four (4) GMC Sierra 3500 regular cab chassis trucks and lift that is identified in the grant amendment request, but revised as follows: the customized 2-3 cubic yard tipper body (as identified in the amendment) should be increased in size to a minimum capacity of 6-8 cubic yards. If the selected truck chassis of the GMC Sierra 3500 cannot be fitted with the larger 6-8 cubic yard capacity dump body, it is suggested that another truck chassis be investigated for purchase. Based on the existing cost experience for the proposed chassis and 2-3 cubic yard body, the recommended chassis (same) and 6-8 cubic yard body is estimated to cost approximately \$40,000 each.

The larger 6-8 cubic yard dump body is recommended for the following reasons:

- The body can accommodate a significantly larger volume of all types of recyclable materials collected in the City and thus will reduce lost travel time and trips to the consolidation site, and therefore increase collection efficiency
 - The larger body type should still be able to navigate narrow city streets and alleys, as do the current ~ 4 cubic yard City collection trucks that have the same chassis type.
 - The identified chassis should still have sufficient weight capacity to carry the various types of recyclable materials collected by the City.
- Purchase one (1) forty-cubic yard Recycle-Pac II two-compartment collection/compaction truck as identified in the original Grant Agreement (#ME 350591).

The Recycle-Pac II is recommended because:

- This collection vehicle accepts newspaper, cardboard, and commingled material that accounts for approximately 60 percent of the annual recycling tonnage as reported by the City (including yard waste).

- The volume (not weight) of commingled recyclables (and most recyclables) dictates the need for a large capacity vehicle to efficiently collect commingled materials from the curb.
- The 2:1 compaction capability will increase the effective capacity of the vehicle to pick up curbside commingled containers, and further improve its efficiency.
- There are routes in the City where this vehicle can be used safely and efficiently to collect commingled materials.
- Dempster has historical data that reportedly demonstrate that the 40-cubic yard Recycle-Pac II can collect approximately six tons of commingled material before it must be dumped. Consequently, this vehicle may therefore be able to handle a sizeable percentage of the commingled, newspaper, and cardboard collected by the City. It is estimated that 47 tons of commingled material is collected on each bi-weekly collection day. (see Section 3.2).

Table 5: Recommended Equipment Cost Summary

# of Vehicles	Vehicle Type	Unit Cost	Extended Equipment Cost
Four (4)	GMC Sierra 3500 regular cab chassis fitted with 6-8 cubic yard body	\$40,000	\$160,000
One (1)	40 Cubic Yard Recycle-Pac II Collection/Compaction Vehicle with MR690S Chassis ⁽¹⁾	\$154,175 ⁽²⁾	\$154,175
Total			\$314,175

(1) Dempster suggests a cabover type to reduce vehicle length and increase maneuverability (see section 6.1)

(2) Cost listed is the cost for the equipment (unit price) as provided in the original grant agreement

- The City of Wilkes-Barre may need to make a request to PADEP for a second extension of Act 101 Grant Agreement #ME 350591 to allow for additional time to purchase and receive delivery of the recycling equipment recommended in this report.

Based on a review of the existing recyclables collection operation, it has been determined that the existing recycling fleet does not efficiently meet the recyclables collection needs of the City of Wilkes-Barre. It should be noted however, that a detailed route or equipment analysis was not conducted as part of this study to determine route efficiencies and equipment efficiencies. Route and equipment efficiency analysis and improvements could significantly impact the performance of any curbside collection system.