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**Recycling Technical Assistance
Project #417
Lewisburg Borough and
East Buffalo Township
Union County**

**Evaluation of Equipment
and Program Options to
Improve Curbside Collection
Efficiencies**

August 2007



Nestor Resources, Inc.

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Introduction

The Recycling Technical Assistance Program, is sponsored in partnership by the Pennsylvania Department of Environmental Protection (DEP) through the Solid Waste Association of North America (SWANA), the Pennsylvania State Association of Township Supervisors (PSATS) and the Department of Community and Economic Development (DCED) Governor's Center for Local Government Services. Qualifying municipalities wishing to enhance their recycling, composting, and waste reduction programs are provided with professional support to assist them achieve their goals and objectives.

Union County, on behalf of the municipalities of Lewisburg and East Buffalo Township, requested technical assistance to examine a variety of curbside collection vehicles available on the market today. The purpose of the project was to determine the equipment most suitable for the geography, logistics and budgets of the municipal recycling programs.

As the consultant selected to manage the project, Nestor Resources, Inc. is pleased to submit to Union County, Lewisburg and East Buffalo Township our findings and recommendations. This report includes background data, resources and references, as well as explanations and justifications for the consultant's suggestions.

Background

The Municipal Waste Planning, Recycling and Waste Reduction Act of 1988, Act 101, mandate both the Union County municipalities of Lewisburg Borough and East Buffalo Township to provide curbside collection of recyclables and leaf waste. They are the only mandated communities in Union County.

Service offerings in Lewisburg and East Buffalo have many similarities. Residents have the opportunity to recycle via a monthly curbside collection. Materials designated for curbside collection are limited; however, residents have weekly access to a drop-off site located within each municipality. Both are very labor intensive operations. Program differences occur in personnel responsible for collection, equipment used and types of material collected at the curb. Variations in seasonal leaf and brush collection also exist.

Currently, the communities are in general compliance with Act 101 requirements. Nevertheless, the Pennsylvania Department of Environmental Protection, during a recent compliance audit, suggested that Lewisburg explore improvements to curbside collection equipment and methodology in order to increase recovery of

recyclables. Realizing that East Buffalo's program faced similar issues, Union County sought technical assistance on behalf of both municipalities.

Project Scope of Work

Task #1: Nestor Resources, Inc made casual field observations in the municipalities and then met with the Supervisor of East Buffalo Township, the Borough Manager of Lewisburg, representatives of the public works crew and the Union County Recycling Coordinator to discuss the current collection practices and expectations for future improvements. In addition, the consultant entered into discussions with Lycoming County Resource Management Services in order to establish an understanding of limitations and constraints; and an overall projection of feasible collection methodologies and equipment that would be compatible with the processing facility.

Task #2: Nestor Resources, Inc. made contact with manufacturers and distributors of recycling collection equipment to research and review specifications and appropriate applications for each body and chassis available on the market today.

Task #3: Utilizing information gathered in meetings and/or discussions with the municipal representatives, field observations and industry knowledge, the consultant developed a matrix that illustrates the features and benefits of the various equipment options. The matrix compares the functionality of equipment to the needs of the municipalities.

Task #4: Nestor Resources, Inc prepared and submitted to the Pennsylvania Department of Environmental Protection (PADEP) for review and comment, a draft project report, which summarized the consultant's findings and recommendations. Based on the PADEP's input, the consultant finalized the report. Both the municipalities and the Department were provided with the report in electronic format. In addition, a hard copy of the document was provided to the municipalities.

Summary of Recommendations

The primary purpose of the project was to narrow the available choices of collection vehicles to those with features most representative of the needs of East Buffalo Township and the Borough of Lewisburg. Additionally, the project was to provide comparative costs for vehicle purchase in 2008, the soonest period in which grant funds could be awarded. A review of the municipalities' programs in relationship to the mandates of Act 101 and current performance was also included.

Nestor Resources, Inc. conducted research of the curbside collection vehicles currently available in the marketplace. Officials were provided with examples of models possessing some or all of the features desired by Lewisburg and East Buffalo. The consultant offered commentary on the positive and negative aspects of each model featured. Minor improvements to attain full compliance were noted by Nestor Resources, Inc.

Following is a summary of the consultant's suggestions.

- A key factor in the design of a successful recycling program is the integration of the method of collection with the method of processing most appropriate for local conditions. Although, there are vehicles that could provide greater collection efficiencies, East Buffalo and Lewisburg must limit their selection to multi-compartmentalized vehicles that can handle source separated material acceptable to LCRMS.
- Manual collection crews encounter common risks for injury. Many occupational hazards can be avoided through proper vehicle design. The municipalities should consider vehicles with one or more of the following options: a low entry cab, blue bin hooks, a loading trough, or a fold out ladder.
- The county's agreement provides for transport of the materials from the drop-off locations to the Lycoming County Resource Management Services (LCRMS) at no cost to the municipalities or the county. This presents a significant savings in labor and fuel to the municipalities. Lewisburg and East Buffalo should factor these savings against equipment providing route efficiencies or ergonomic benefits, but which ultimately require directly hauling material to Lycoming County.
- The Kann Side Dump Hi-Jacker and the Stellar Hook Lift with a Customized Detachable Body are the two vehicles that attained the greatest number of selection criteria in the matrix. Both have some ergonomic flaws, which could be reduced somewhat with a few design options.
- This Stellar Hook Lift offers flexibility of use in other applications, a low cost back-up option as a second lift can be mounted on an existing chassis, compatibility with LCRMS hook lift equipment and ability to off-load locally. It is also the low cost alternative. Officials should ask for demonstrations of various hook lifts and bodies. A low entry chassis would be a value added feature if available. The municipalities should explore and compare this model as a potential purchase.
- The Kann Side Dump Hi-Jacker dumps directly into roll-off containers. It has the capability of off-loading locally or hauling directly to LCRMS. It offers a fold down ladder to minimize lifting injuries. Although shown with a

conventional cab, a low entry chassis would be a value added feature if available. The municipalities should explore and compare this model as a potential purchase.

- Purchase of a vehicle designed specifically for recycling could provide the municipalities with the ability to collect a wider variety of materials at the curb. Officials should opt for the maximum compartments affordable on the selected model. Additionally, a plastics compaction unit would be a value added component.
- Both municipalities provide the lowest frequency of service mandated by Act 101 for curbside collection of recyclables. While once per month collection meets the letter of the law, it is the least desirable frequency option for curbside collection. The Nationwide Diversion Rate Study conducted for the Solid Waste Association of North America by SERA, Inc. shows that by simply increasing to every other week from monthly collection, communities experience a dramatic, yet cost effective, increase in resident participation and the recovery of material. Lewisburg and East Buffalo should consider this change in frequency.
- At some point, the growth of the recycling routes in East Buffalo will necessitate either, more time diverted from other public works activities, or employing a dedicated crew. In Lewisburg, the addition of recycling to the current refuse crew's service offerings may also require an increase in personnel. The two municipalities may want to consider a joint effort in that respect, rather than duplicating efforts. It is possible that one crew dedicated to recycling collection could easily service both municipalities at a reduced cost.
- Curbside collection of leaves occurs during the fall in Lewisburg and East Buffalo. Branches, twigs, and brush are gathered at central drop-off sites. In Lewisburg, this drop-off service is offered virtually year round. In East Buffalo, the drop-off site is open one day in the fall and spring. Seasonal curbside service of "leaf waste" should be expanded in both communities. In order to comply with Act 101, each should begin to offer at least one collection in the spring.
- The municipalities should investigate how they can pool resources to handle the growing volume of yard waste. The increase is expected due to the growing number of residential planned developments and the greater frequency of collections resulting from with Act 101 leaf waste guidelines. Neither municipality operates a compost site; however, Briar Patch Farm currently handles the material from Lewisburg. East Buffalo should investigate the potential of transporting its material to the same location. A drop-off and consolidation point that is equal distance between the municipalities would facilitate a joint operation, which could reduce the costs of equipment, labor and potentially transport time.

Overview of the Programs

Although the borough of Lewisburg and East Buffalo Township are relatively close in proximity, the municipalities have yet to initiate any joint municipal ventures in recycling or waste management. Each community operates autonomously. The programs have some similarities, mainly in their drop-off programs. However, the manner in which recycling and leaf waste is collected differs. A brief description of each component municipal program is provided in the following sections.

Solid Waste

Waste collection within Lewisburg is controlled and operated by the Borough. Private haulers are not permitted to operate residential or commercial collection routes. These services are provided by three men from the Borough Public Works crew. Roll-off service for construction demolition and other bulk material is provided by the private sector

Residential and commercial participation is mandatory and a fee schedule is established by ordinance. Collection routes operate 6 days per week. Two days are dedicated to commercial collection. Approximately 300 homes are serviced on each route. The crew uses a rear loading compaction vehicle for both curbside and containerized collection. Waste is transported 30 miles to the Lycoming County Landfill.

East Buffalo Township has no operational role in waste collection, nor does the municipality contract with a single hauler to provide those services. Residents and commercial businesses enter into agreements with the hauler of their choice through private subscription.

Recycling

In Lewisburg on the first Saturday of each month, volunteers from the Boy Scouts of America collect at the curb, newsprint, glass containers (separated by color) and aluminum cans. Collection equipment includes a flat bed trailer with 55-gallon drums and gaylord boxes into which the material is sorted. Material is off-loaded at the municipality's drop-off site at Wolfe Field. Here additional materials are collected, including: bi-metal containers, HDPE and PET plastics, office paper, and cardboard. On the first Tuesday of each month, personnel from East Buffalo Township's Public Works crew utilize tipper boxes placed atop a flat bed trailer to collect aluminum cans and glass containers separated by color. East Buffalo's material is also off-loaded at the municipality's drop-off site, located next to the Township's building on Fairground Road. Additional materials collected at the

drop-off site include office paper, newsprint, cardboard, bi-metal containers and HDPE and PET plastics.

For the most part, materials collected by these operations are marketed cooperatively through a joint agreement between Union County and the Lycoming County Resource Management Services (LCRMS). In both municipalities, aluminum is marketed directly. East Buffalo reported revenue from aluminum sales at nearly \$6,000 for 2006.

Union County's agreement provides for transport of the materials by LCRMS from the drop-off locations to the Lycoming Materials Recovery Facility (MRF). This service is offered at no cost to the municipalities or the county. The MRF, along with the Lycoming County Landfill, is approximately 10 miles south of Williamsport, and roughly 30 miles north of Lewisburg and East Buffalo. It is estimated that turnaround time to and from the facility, including switch-out of containers, tipping of material commodities, and windshield time is approximately 1.5 to 2 hours. This presents a significant savings in labor and fuel to the municipalities.

Leaf Waste Management

East Buffalo Township vacuums leaves at the curb beginning in mid to late-October and continuing through until the week of Thanksgiving. Christmas trees



are collected at the curb for approximately two weeks in January. On the third Saturday in April and October, residents may bring branches, limbs and twigs, each less than 10" in diameter, to the Township Maintenance Yard where municipal personnel chip material and redistribute it to the community. The Township currently transports leaves, chipped material, including

Christmas Trees, to a local farm for composting. There is some concern from Township officials that the current site may not be adequate to handle the volume of leaf waste generated as dormant fields transform into landscaped lots in the municipality.

Lewisburg vacuums leaves from September through November following the daily street sweeping route schedule. Throughout the year on Wednesdays and Saturdays, residents may bring trees, branches, shrubbery and other by-products to the Borough's "brush pile". Grass is not accepted. The City of Lewisburg uses the Briar Patch Organic Farm for processing of leaf waste. Nearly 500 cubic yards of leaves, brush and material from landscape trimmings and weeding are sent to

Table 1-1 Tons of Recyclables Collected Annually

Annual Curbside and Drop-off Performance Reported in Tons												
	Glass Clear	Glass Brown	Glass Green	Aluminum	Bi-Metal	Plastic #1	Plastic #2	ONP	Office Paper	Magazines	OCC	TOTAL
Lewisburg	25	10	19	.10	10	7	6	77	23	54	64	295.1
East Buffalo	28	15	20	4	.64	9	9	82	7	0	27	201.64

the site approximately twice per year. Personnel from Bucknell University transport the Borough's material to the farm. Briar Patch also serves as a free drop-off point for residents during times when the Borough offers no collection.

Act 101 Compliance

The Borough and Township generally comply with the provisions of Act 101. However, a few opportunities for improvement do exist. Modifications to the leaf waste collection procedures will ensure that the municipalities are in full compliance. Purchase of a vehicle specifically designed for recycling makes it possible to add more materials to those collected at the curb.

Both municipalities provide the lowest frequency of service mandated by Act 101 for curbside collection of recyclables. While once per month collection meets the letter of the law, it is the least desirable option for curbside collection. Residents do have the opportunity to bring materials to a drop-off center between collections; however, the convenience and the reduced need for storage capacity are preferable to most participants.

Weekly collection results in optimal participation and recovery. However, the Nationwide Diversion Rate Study conducted for the Solid Waste Association of North America by SERA, Inc. shows that by simply increasing to every other week from monthly collection, communities experience a dramatic increase in resident participation and the recovery of material. This lesser frequency will remain more cost effective for the municipalities and result in just a slight decrease in recycling tonnage than weekly collection.

Leaf waste is defined by the Act, as leaves, garden residues, shrubbery and tree trimmings, and similar material, but not including grass clippings. Act 101 requires that it must be collected at the curb once per month in mandated municipalities. Alternatively, curbside collection must occur twice per year, provided that a permanent drop-off location is made available to residents. It should be noted that in the interim between curbside collections, leaf waste must still be separated and may not be collected or disposed as municipal waste.

Windrow Composting on a Farm



TECHNICAL ASSISTANCE PROGRAM

Appendix A includes Pennsylvania's Act 101 Leaf Waste Collection Requirements.

Curbside collection of leaves occurs during the fall in Lewisburg and East Buffalo. Branches, twigs, and brush are gathered at central drop-off sites, virtually year round in Lewisburg and

LEWISBURG AND EAST BUFFALO VEHICLE SELECTION

twice per year in East Buffalo. Seasonal curbside service of “leaf waste” should be expanded in both communities. In order to comply with Act 101, each municipality should offer at least one additional collection in the spring.

The municipalities should investigate how they can pool resources to handle the growing volume of yard waste. The increase is expected due to the growing number of residential planned developments and the greater frequency of collections resulting from with Act 101 leaf waste guidelines. Neither municipality operates a compost site; however, Briar Patch Farm currently handles the material from Lewisburg. East Buffalo should investigate the potential of transporting its material to the same location. A drop-off and consolidation point that is equal distance between the municipalities would facilitate the possibility of a joint operation, which could reduce the costs of equipment, labor and potentially transport time.

General Characteristics of the Municipalities

The greatest population density in the county centers in Lewisburg. Approximately, 1940 housing units in the Borough create an average density of 1,974 housing units per square mile. For the most part, well-kept and restored architecture grace the town. The downtown historic district, preserved as a commercial center, retains much of the original design and grid layout seen throughout the town. The result is network of narrow alleys and roadways with on street parking.



Bucknell University is located in Lewisburg. Staff, students and alumni, who reside in the Borough, influence opinion on public policy and subsequently the development of programs. Town/Gown relations are friendly and opportunities to collaborate on services and projects exist.



East Buffalo Township boasts the second largest population in Union County and perhaps the wealthiest. East Buffalo expects to continue on a growth trend, in the foreseeable future. Based on similar development in other areas, the influx of more affluent residents brings with it expectations for greater and more efficient public services.

While still considered a relatively rural area, emerging development in the proximity of Lewisburg and near Linntown, indicates a trend toward sprawling

suburban subdivisions. Within these plans, builders situate structures and lots to maximize development on the available land. However, due to the current distance between subdivisions the overall average housing density in the Township of 121 housing units per square mile is significantly lower than in Lewisburg.

Striving for Operational Efficiencies

Lewisburg and East Buffalo have opportunities for improvement in the collection programs currently implemented for residential recycling. Each recovers less material at the curb than could be expected with better equipment and, a greater selection of acceptable items, and a more frequent schedule. Material is double and often triple handled before it ever reaches the MRF. The curbside systems are labor intensive, accept few materials, and operate at the minimum frequency allowable. Drop-off sites supplement these services; however, actual operating hours at these facilities offer limited access for the majority of residents.

Seasonal fluctuations of students living in off campus housing have impact on waste generation, collection and the need for ongoing recycling education. Material contamination produced by uninformed or careless recyclers makes curb sorting more difficult and reduces the volume of material acceptable for recovery. Peaks in volume can disrupt the balance of routes. Both municipalities share these issues, although Lewisburg likely has a larger student population.

The narrow roadways in the Borough create a challenge for collection vehicles to maneuver. The open spaces in the Township provide voids in the collection routes. In both instances, the prevailing conditions contribute to the time and labor required, even if some of it is volunteer. Distance to processing facilities and/or markets limits options and increases the cost of direct transport. Consolidation and handling likewise contribute to expense.

That the Borough controls the waste collection franchise speaks to the importance municipal officials place on ensuring that service meets the expectations of its residents. Over 20 years ago, Lewisburg instituted the practice to deal primarily with uncollected garbage resulting from vacated housing units and to prevent illegal dumping. Officials are currently considering provision of curbside recycling collection. The intent is to increase program participation and material recovery. Since curb sorting can require more effort at each unit, it is likely that to service homes for recycling will exceed the route hours than garbage collection. This transition requires more efficient collection equipment to make best use of available work force and control costs.

East Buffalo uses public works personnel to collect recyclables at the curb. On collection day, those workers are unavailable for other routine public works responsibilities. The expansion of planned residential developments in the

Township continues to increase the amount of hours necessary to complete the collection routes. Consequently, East Buffalo has interest in collection equipment that increases route capacity and productivity.

At some point, the growth of the routes in East Buffalo will necessitate either, more time diverted from other public works activities, or employing a dedicated crew. In Lewisburg, the addition of recycling to the current refuse crew's service offerings may also require an increase in personnel. The two municipalities may want to consider a joint effort in that respect, rather than duplicating efforts. It is possible that on crew dedicated to recycling collection could easily service both municipalities at a reduced cost.

Criteria for Vehicle Selection

A key factor in the design of a successful recycling program is the integration of the method of collection with the method of processing most appropriate for local conditions. Collection and processing decisions must be made in conjunction with each other, because typically, the capabilities of the processor dictate how material is collected. There is often a trade-off between whether the cost and complexity falls on the backs of the collection or the processing operation.

In areas where processors require material to be source separated upon delivery, the cost most certainly falls more heavily on those who are responsible for collection. Recycling vehicle design has a significant effect on collection productivity. Therefore, it is essential that any given vehicle is not only compatible with the processing system, but also that its features reduce the time and labor otherwise required to collect and deliver materials for processing.



Vehicles equipped with hooks secure the recycling bin during curb sorting to reduce back and wrist injuries.

As the number and types of communities that offer curbside recycling increased, vehicle manufacturers were challenged to produce a wider selection of models to meet specific conditions and needs. Improved compaction capabilities with less impact on the marketability of materials; split bodies that allow collection of waste and recyclables in one pass; bodies with greater capacity to extend the reach of each route; and ergonomic designs to decrease injury, are some of the popular features available.

Local needs

Although, there are vehicles that could provide greater collection efficiencies, East Buffalo and Lewisburg must limit their selection to those that can handle material

acceptable to LCRMS. Representatives from both municipalities described a number of other operational criteria for consideration. These include:

- Manual curb sort with residents using one bin for all material
- 4-6 compartments available for material designated for curbside collection
- Hooks to support recycle bins during curb sort
- Maneuverability in narrow roadways
- Load capacity to maximize routes on rural roadways
- Ease of maintenance
- Affordability of a back-up vehicle for down time
- Potential expanded uses for vehicle
- Ergonomics
- Overall cost of operation

Ergonomic Considerations

In addition to specific local conditions, of importance to the municipalities is the ergonomics of the collection process. Manual collection crews encounter common risks for injury. While some of the injuries are caused by the worker's personal habits or methods, many are a direct result of the equipment used. Many occupational hazards can be avoided through proper vehicle design.



Manual collection crews repeatedly bend and lift from ground level to sort materials directly into the body of the truck. Material is deposited at heights that at times may be overhead. A simple solution on some vehicles is a fold out step that raises the worker and decreases the height for the lift. A more advanced approach is seen on hydraulic side-loading trucks specifically designed to overcome this problem. To reduce the height of the lift, materials are sorted into a segmented trough on the side of the vehicle. When the trough is full, it is hydraulically raised to the top of the truck where each material is dumped into its own divided compartment

Low entry cabs minimize stress on knees and legs caused by repetitive exit and reentry

Direct Haul versus Transfer

Under an agreement with Union County, LCRMS hauls roll-off boxes filled with recyclables from the East Buffalo and Lewisburg at no cost to the municipalities. The containers hold material deposited at the drop-off sites and from the curbside collections. This is a significant savings in both time and expense for each

community. In the evaluation process, these savings must factor against equipment providing route efficiencies or ergonomic benefits for curbside collection, but which ultimately require directly hauling material to Lycoming County. The municipalities must consider if the method of off-loading material for future transport to LCRMS; the space required for storage or tipping; and the compatibility with LCRMS transport equipment, present sufficient advantages over less handling and greater travel.

Features that will lend themselves to route efficiencies include abilities to load from both sides of the vehicle; compaction units; low entry cabs, and a greater number of compartments. Compartments that off-load into roll-offs; and detachable bodies compatible with LCRMS equipment favor the transfer method. Some vehicles may have a combination of both features.

The matrix on the following pages shows vehicles in the market representative of those, which could meet the overall needs of the municipalities. It contains illustrations, projected cost to purchase in 2008 based on the specific chassis and body shown and to what degree each model meets the selection criteria.


Conclusions



Research conducted by Nestor Resources, Inc. for this project demonstrates that many viable options for recycling collection vehicles exist in today's market. Specifically, models are available that meet some or all of the selection criteria established by the Borough of Lewisburg and East Buffalo Township. The two most influencing factors in the final decision are the cost savings realized during the collection process versus those that are available through the avoidance of a direct haul to Lycoming County. Other features of importance that ensure safety and prevent injury are available on models that will serve either purpose. Purchase estimates projected by the consultant will assist officials in weighing the value of each feature against the cost of transportation.


The Kann Side Dump Hi-Jacker and the Stellar Hook Lift with a Customized Detachable Body are the two vehicles that attained the greatest number of selection criteria in the matrix. Both have some ergonomic flaws, which could be reduced somewhat with a few design options.


Nestor Resources is confident that background information provided in the report, along with the visual selection matrix, will simplify the procurement process for the municipalities. The findings will also help Lewisburg and East Buffalo justify their final selection in future grant requests and a demonstration of full compliance with Act 101.



Options for Residential Recycling Collection Vehicles

Truck Type	Method of Operation	Make and Model	Estimated Cost 2008	Features	Comments	Selection Criteria Attained
Body Mounted on Chassis	Multi position roll-up style doors	Kann Side Dump Hi-Jacker on International Chassis 	135,000	Loading Height of 20 in. Above Frame Up to six body partitions are available Plastic/Cardboard Compactor Loading Doors Have 5 Opening Positions Blue Box Hooks Fold-Out Loading Steps Capable of Dumping Into a 30 Yd. Roll-Off Container Without Exact Alignment Side and rear dump combinations available	As compartments fill, lifting and reaching overhead to load is required. Could require slight changes to existing drop-off center to accommodate the off-load roll-offs Cab requires climbing steps in and out repeatedly Hydraulics can fail as vehicle ages compromising off loading capability.	Manual Curb Sort 4-6 vehicle compartments available Maneuverability in narrow roadways Load capacity to maximize routes Ability to off load locally Ergonomic design Maintains capability for LCRMS to haul

Truck Type	Method of Operation	Make and Model	Estimated Cost 2008	Features	Comments	Selection Criteria Attained
Body Mounted on Chassis	Multi position roll-up style doors	Kann Rear Dump Versa Hauler on International Chassis  	128,000	Loading Height is 24" Above Frame Height Up to seven body partitions are available Plastics Compactor Loading Doors With 5 Loading Positions Blue Box Hooks Underbody Foldout Loading Steps Allows collection on both sides of the street	As compartments fill, lifting and reaching overhead to load is required. Must drive 2.5 hours roundtrip to Lycoming County to unload. Reduces available collection hours per day. Could require more employees or more collection days Cab requires climbing steps in and out repeatedly	Manual Curb Sort 4-6 vehicle compartments available Maneuverability in narrow roadways Load capacity to maximize routes

Truck Type	Method of Operation	Make and Model	Estimated Cost 2008	Features	Comments	Selection Criteria Attained
Body Mounted on Chassis	Loading Trough	Labrie Top Select on International Low Profile Chassis 	185,000	Trough Loading Height is at Frame Height reducing back and lifting injuries Dual bucket system allows collection on both sides of the street Low entry cab conversion for optimum one-man operation productivity Up to seven body partitions are available Plastic/ Cardboard Compactor	Must drive 2.5 hours roundtrip to Lycoming County to unload. Reduces available collection hours per day. Could require more employees or more collection days Optional one side trough has a shorter frame for maneuverability in narrow roadways As vehicle ages hydraulics can lose power resulting in failure of trough to reach sufficient dumping height. Could result in injuries. Trough must have overhead clearance on route	Manual Curb Sort 4-6 vehicle compartments available Maneuverability in narrow roadways Efficiency on rural roadways Load capacity to maximize routes Ergonomics of collection

Truck Type	Method of Operation	Make and Model	Estimated Cost 2008	Features	Comments	Selection Criteria Attained
Fully integrated cab, chassis and body	Multi position roll-up style doors	Lodal ECO 35-R 	155,000	Plastics Compactor Up to 6 body partitions are available using split compartments Body allows collection on both sides of the street Underbody Foldout Loading Steps Low entry cab for optimum one-man operation productivity	Limited dealerships could make maintenance issues more difficult to resolve Useful life of chassis and body may not be the same	Manual Curb Sort 4-6 vehicle compartments available Maneuverability in narrow roadways Efficiency on rural roadways Load capacity to maximize routes Ergonomics of collection

Truck Type	Method of Operation	Make and Model	Estimated Cost 2008	Features	Comments	Selection Criteria Attained
<p>Hook lift for use with detachable customized body</p>	<p>Multi position roll-up style doors</p>	<p>Toyota/ Hino Chassis with Stellar Hook Lift</p>  <p>Detachabile body fabricated by American Roll-off</p> 	<p>\$77,000</p> <p>Custom Steel Bodies \$5000 - 7000 each</p> <p>Should purchase a minimum of 3-4 bodies for switch and transport</p>	<p>Driver does not have to leave cab to service</p> <p>Can load/unload in tighter areas</p> <p>Lifting capacity of up to 30,000 pounds</p> <p>Chassis can be used for multiple purposes with other detachable bodies i.e leaf vac bodies, chippers, salt spreaders, special bulk collections</p> <p>Bodies can be custom designed for local needs.</p> <p>Underbody fold out steps available on chassis or body.</p>	<p>Lifting heights could be higher than typical curbside vehicles</p> <p>Lycoming County has Stellar Hook Lifts making the equipment compatible allowing Lycoming to continue handling the cost of transportation.</p> <p>Hook lifts can be mounted on existing chassis to ensure a back-up vehicle</p> <p>Could require slight changes to drop-off center to accommodate the detachable bodies</p>	<p>Manual Curb Sort</p> <p>4-6 vehicle compartments available</p> <p>Maneuverability in narrow roadways</p> <p>Efficiency on rural roadways</p> <p>Ability to off load locally</p> <p>Cost to transport to Lycoming County</p> <p>Compatibility with Lycoming's equipment</p> <p>Ease of maintenance</p> <p>Back-up vehicle for down time</p> <p>Expanded uses for vehicle</p>



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Appendices



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Appendix A

Pennsylvania's Act 101 Leaf Waste Collection Requirements

Act 101, Section 1501(c)(1)(ii) and (iii), requires persons in mandated municipalities to separate leaf waste from other municipal waste generated at residential, commercial, municipal and institutional establishments. "Leaf waste" is defined in the Act and its regulations as "Leaves, garden residues, shrubbery and tree trimmings, and similar material, but not including grass clippings." Source separated leaf waste, as with other recyclable material, is to be collected at least once per month as set forth in Act 101 Section 1501(c)(2) and (3) and processed at Pa. DEP-approved composting facilities.

Act 101 mandated municipalities with programs that collect leaves only in the fall are not in compliance with the Act. Mandated municipalities desiring to establish leaf waste collection programs in compliance with Act 101 must, as a minimum:

1. Require by ordinance that leaf waste consisting of leaves, garden residues, shrubbery and tree trimmings, and other similar material are targeted for collection from residences and commercial, municipal and institutional establishments; and
2. Establish a scheduled day, at least once per month, when leaf waste is collected from residences; or
3. Establish a scheduled day, not less than twice per year and preferably in the spring and fall, when leaf waste is collected from residences, and facilitate a drop-off location or other collection alternative approved by Pa. DEP that allows persons in the municipality to deposit leaf waste for the purposes of composting or mulching at least once per month.

The leaf waste drop-off location may be located in a neighboring municipality or at a private sector establishment provided that an agreement is in place to utilize that location and the municipality keeps residents and commercial, municipal and institutional establishments informed of the option at least once every six months.

4. Ensure that commercial, institutional and municipal establishments generating leaf waste have collection service.
5. Municipalities are encouraged to manage source separated Christmas trees as leaf waste for processing at Pa. DEP-approved composting facilities.



Nestor Resources, Inc.