



Zero Waste Plan



City of Oberlin, Ohio
December 2013

Prepared by:



CITY OF OBERLIN, OHIO

ZERO WASTE PLAN

December 2013

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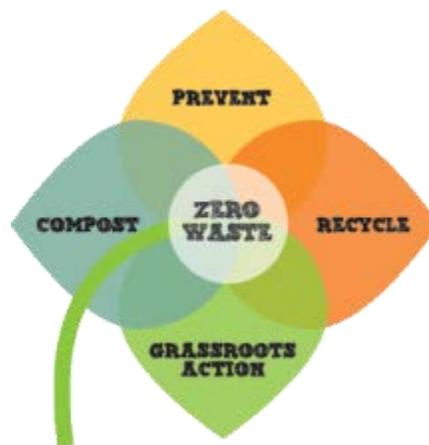
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EXECUTIVE SUMMARY

The term “zero waste” was first used publicly in the United States in the 1970s, and gained more widespread use since the late 1990s as communities such as: San Jose, California; Austin, Texas; and Boulder, Colorado developed comprehensive plans to implement strategies associated with this concept. Even though there are many definitions, it is obvious that each one has a similar objective, goal, theme, and quite possibly even a new way of thinking: improving the earth’s environment by eliminating waste (or trash), using fewer resources to create products, and eliminating discharges to the environment.

The City and Oberlin College have made commitments to become “climate-positive” by reducing greenhouse gas emissions below zero by 2050. The City’s most recent Climate Action Plan, adopted in early 2013, is the roadmap to this goal. It includes both present and future strategies in six broad categories: renewable energy, energy efficiency, transportation, green building, waste management, and education & awareness. Under waste management, the most important strategy is to develop and implement a zero waste plan (ZWP) to provide the framework for reducing greenhouse gas emissions related to waste management activities.

In 2013, the Lorain County Solid Waste Management District (District) identified zero waste planning for political subdivisions as an area of focus. As part of its ongoing efforts to improve environmental stewardship and because evaluation of necessary capital investments in the solid waste program were needed, the City of Oberlin agreed to participate in the development of a ZWP through its Resource Conservation & Recovery Commission (RCRC) and serve as a pilot community for this process. The RCRC collaborates with the City of Oberlin Public Works Department and Refuse and Recycling Division (PWRRD) staff to address issues concerning solid waste management within the City. For the purposes of this ZWP, the RCRC and PWRRD staff has defined zero waste as follows:



“Zero Waste is the City’s goal to minimize the final disposal of waste materials as completely and rapidly as possible. This reduction will be achieved using a combination of environmentally sound strategies with an emphasis on education, on source reduction and reuse, and on recycling and composting.”

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The focus of the ZWP is on the development of programs and policies that can:

- Eliminate or significantly reduce waste generated in the city;
- Develop policies for our city, institutions, commercial and industrial businesses to use fewer resources to create products and/or provide services; and
- Eliminate or significantly reduce discharges to the environment.

It is important to understand that although this is a zero waste plan, it does not provide for the total elimination of waste, but rather steps designed to move the City very close to that objective. The Zero Waste Plan (ZWP) establishes a goal of **90%** waste reduction (or waste diversion) by 2050 or sooner. Waste minimization through incineration shall not count towards ZWP goals. Future energy recovery methodologies must be examined to ensure that they are environmentally and economically sustainable and in compliance with ZWP goals.

One of the first tasks for the RCRC and PWRRD staff involved developing a strategic plan for ZWP implementation. The strategic plan provides an overall mission and roadmap for the RCRC, and is discussed in detail in Section 1. Understanding the current waste disposal and recycling practices within the City and Oberlin College was also one of the initial tasks of this project, and was important in helping to determine the programs and policies which could move the City towards the 90 percent diversion goal as quickly as possible.

The City currently operates a number of successful solid waste management programs, including refuse and recyclables collection for all of its residents as well as Oberlin College and businesses within the City. Yard waste collection and management is also provided to Oberlin residents. The current diversion rate from landfill disposal is 29 percent.

Oberlin College – A Vital Partner

Oberlin College has been a very important partner in the development of the ZWP, and will be instrumental in implementation of this plan. The College has a strong environmental focus; programs and policies designed to reduce waste, increase recycling or conserve resources are coordinated through the Office of Environmental Sustainability. Recyclables are collected throughout the campus, and food waste is recovered at a number of cafeterias and delivered to a composting facility. In 2003, the College won the State of Ohio Department of Administrative Services “STS Recycler of the Year Award” for the amount of carpet it recycled. Oberlin College has a comprehensive policy on environmentally preferable purchasing, and was one of the nation’s first institutions of higher education to accept the goal of climate neutrality, to be achieved by 2025.

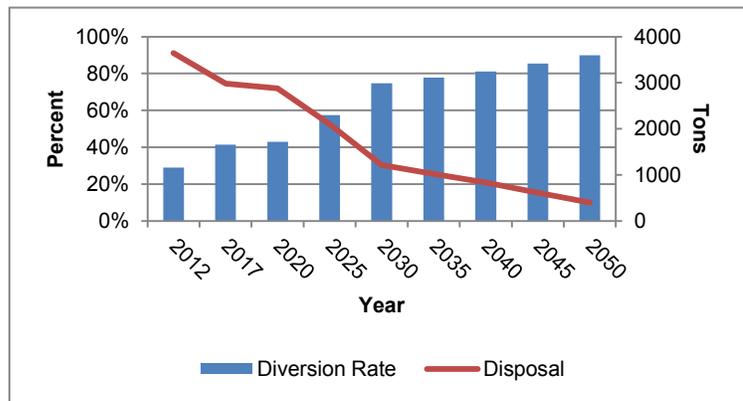
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The programs and policies developed for the ZWP follow the waste management hierarchy shown in the figure to the right. Programs designed to promote source reduction (or eliminating the generation of waste) and reuse has the highest priority, followed by recycling and composting.



Plan Options – Cost Neutral

As stated above, this ZWP establishes a goal of 90 percent diversion of waste by the year **2050**, and proposes a number of options which are designed to achieve that goal. The economic analysis of the ZWP shows that implementation should be cost neutral, requiring approximately the same expenditures as currently experienced in the solid waste program. The options in the plan are summarized below and the resulting projections for waste diversion, both short and long-term, are shown in the figure above.



- **Increasing Recycling.**

One of the centerpieces of the ZWP is increasing recycling by switching to an automated cart collection system. Three collection options are discussed in the ZWP, and each of these options involves providing separate carts to residents for refuse and recyclables. By 2015, all recyclables would be collected in a single cart which would also be provided to apartment buildings, Oberlin College, and businesses for collection of recyclables.

In the immediate future, the City will need to purchase new trash and recycling collection trucks as the existing vehicles have been in service for many years and must be replaced. As a result, the necessary capital expenditure for trucks provides an excellent opportunity to consider the more



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modern cart collection system. The benefits of switching to an automated cart collection system are many and include:

- It's easier for residents to roll trash and recycling carts to the curb than carry bags, trash cans, or other containers.
 - More storage space for recyclables.
 - Reduced litter and limited impact from animals scavenging for food because the carts have lids.
 - Recyclables such as cardboard and paper are protected from rain and snow making them easier to handle.
 - Reduced injuries to public service workers who no longer are required to lift trash and recycling bags, etc., and as a result, the potential for a reduction in workers compensation claims.
 - Increased efficiency – more houses can be serviced per day.
 - Provides a uniform system for all residents, and more aesthetically pleasing on collection days.
 - Implementation of cart collection systems across the United States have resulted in significant increases in waste diversion. Communities in Lorain County have shown an average increase of 108 percent in recycling after three years.
- **Implement the Strategic Plan.** The strategic plan developed by the RCRC consists of four goals with a number of objectives within each goal. The goals include: develop a ZWP; promote waste reduction and recycling through involvement with “green teams” in companies and institutions located in the City; develop a detailed outreach program through social media; and identify needed processing or waste management facilities for the City.
 - **Source Reduction and Reuse Opportunities.** Achieving source reduction and reuse goals will be dependent in large part upon green teams providing technical assistance to businesses, institutions, and perhaps Oberlin College. Waste audits are the key to establishing a successful source reduction program, and green teams (volunteers or City employees) could perform waste audits, or simply provide education to a company's or organization's employees for conducting a waste audit and conveying the associated benefits.
 - **Increasing Food Waste Recovery.** A pilot program for collecting food waste is proposed for 2020, with a full-scale collection program implemented City-wide by 2020. These options may include the exploration of composting and anaerobic digestion for processing the food waste.
 - **Other Program Options.** The ZWP also includes options designed to improve opportunities to recycle HHW, construction and demolition debris, electronics,

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and wood waste. A complete listing of programs recommended for implementation during the first phase of the ZWP is shown in Table ES-1.

**Table ES-1
Summary of Phase 1 Programs: 2014 through 2020**

Program No.	Description	Year Initiated	Responsible for implementing
1	Business plan for fully-automated cart collection system	2014	City of Oberlin, Dept. of Public Works
2	Oberlin College Waste Management Recommendations	2014, ongoing	Oberlin College
3	Implement the Strategic Plan	2014 and ongoing	City of Oberlin, Dept. of Public Works
4	Waste audits	2014	City of Oberlin, Dept. of Public Works
5	Data Tracking and Management	2014 and ongoing	City of Oberlin, Dept. of Public Works
6	Recycling processing fee and landfill disposal fee	2014	City of Oberlin, Dept. of Public Works
7	Special wastes, electronics, and HHW	2014	City of Oberlin, Dept. of Public Works
8	Reuse and Source Reduction Programs	2014, ongoing	City of Oberlin, Dept. of Public Works
9	Fully-automated cart collection system	2015	City of Oberlin, Dept. of Public Works
10	Rubber recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works
11	Wood recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works
12	Yard waste management	2016, ongoing	City of Oberlin, Dept. of Public Works
13	Maximizing recycling and waste reduction in City buildings and downtown	2017, ongoing	City of Oberlin, Dept. of Public Works
14	Multi-family residential recycling	2018	City of Oberlin, Dept. of Public Works
15	Business plan for food waste recovery pilot program	2019	City of Oberlin, Dept. of Public Works
16	Food waste recovery pilot program	2020	City of Oberlin, Dept. of Public Works

Changes Will Be Required

Implementation of the ZWP will require a number of changes in the City with respect to recycling and waste reduction. All recyclables will be placed into a single cart instead of separate containers. Food waste must be kept separate from other waste materials and placed into another cart when the food waste recovery program is initiated. As the ZWP is implemented, and programs are evaluated and fine-tuned, reducing the frequency of

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collection for recyclables (and possibly refuse) will be given careful consideration in order to reduce: (1) energy usage, (2) related carbon emissions, and (3) costs.



Support and Participation is Vital

Reaching 90 percent diversion is an ambitious goal; it is achievable, but will require continual evaluation to improve programs and to reduce the amount and types of materials currently being disposed. Finally, the support and participation of every resident, business, and institution within the City is vitally important to successful implementation of this plan. The importance of this fact cannot be overstated.

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SECTION 1 – INTRODUCTION

What is Zero Waste?

The term “zero waste” was first used publicly in the United States in the 1970s, and gained more widespread use since the late 1990s as communities such as: San Jose, California; Austin, Texas; and Boulder, Colorado developed comprehensive plans to implement strategies associated with this concept. There are a number of different interpretations of zero waste, and it is useful to examine the various definitions established by entities engaged in promoting this objective.

Zero Waste “means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.” (Seattle Public Utilities)

Zero Waste “maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace.” (Grassroots Marketing Network)

Zero Waste “is a goal that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable natural cycles, where all discarded materials are designed to become resources for others to use. Zero Waste means designing and managing products and processes to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them. Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.” (Zero Waste International Alliance)

“When waste is defined differently – as everything that isn’t needed to deliver value to customers – achieving **zero waste** requires a lot more creative work. Eliminating waste is a continuous process of removing material resources (including fuels) from every part of your business, even – and perhaps most importantly now – from your product. It’s about drastically improving resource performance by using strategies like dematerialization and lightweighting, while delivering more benefits to your customers. It involves a willingness to reorient your thinking”. (dMass)

“The pathway to zero waste requires a shift in thinking. Previously, we treated waste as waste. We must think of waste as material that can be used and capitalized upon. We must move toward a comprehensive and integrated approach that manages materials throughout their lifecycles and encourages stakeholders to take their share of responsibility, through smartly designed incentives. That shift in thinking means we will focus on:

- Reducing the production of waste;

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- Promoting more efficient use of materials;
- Increasing the recycling of materials that have served their useful purpose;
- Reducing the amount of waste requiring disposal;
- Reducing the toxicity of the waste requiring disposal; and
- Improving the environmental performance of solid waste management facilities”.
(Massachusetts 2010 – 2020 Master Waste Plan; Pathway to Zero Waste)

All of the above definitions attempt to capture the meaning of zero waste. Even though there are many more definitions, it is obvious that each one has a similar objective, goal, theme, and quite possibly even a new way of thinking. The overarching theme for zero waste is an effort to improve the earth’s environment by eliminating waste, using fewer resources to create products, and eliminating discharges to the environment. There are many permutations on this theme and they all cannot be captured here. For the City of Oberlin, Ohio (City) and the purposes of this Zero Waste Plan (ZWP), zero waste is defined as follows:

“Zero Waste is the City’s goal to minimize the final disposal of waste materials as completely and rapidly as possible. This reduction will be achieved using a combination of environmentally sound strategies with an emphasis on education, on source reduction and reuse and on recycling and composting.”

The zero waste plan goals will be achieved both incrementally and in more significant steps based on:

- A new (or renewed) understanding of “waste” as a misplaced resource;
- Recycling program improvements that make it easier to recycle;
- Recycling program improvements that make it possible to recycle more kinds of materials; and
- Improvements in product development that result in products that are more easily recycled or reused.

For purposes of this ZWP, the City’s goal is to achieve a maximum of **90%** waste reduction (or waste diversion) by 2050 or sooner. Waste minimization through incineration shall not count towards ZWP goals. Future energy recovery methodologies must be examined to ensure that they are environmentally and economically sustainable and in compliance with ZWP goals.

How Did This ZWP Get Started?

The Lorain County Solid Waste Management District (District) provides technical assistance to political subdivisions, businesses and institutions on waste reduction, recycling and minimization. The District has recently assisted a hospital and community

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college with sustainability and strategic planning. In 2013, the District identified zero waste planning for political subdivisions as an area of focus.

The District's emphasis on zero waste planning merged neatly with the City's Climate Action Plan. The City and the College had previously made commitments, including to the Clinton Climate Positive Development Program, to become "climate-positive" by reducing greenhouse gas emissions below zero by 2050. The City's most recent Climate Action Plan, adopted in early 2013 is our roadmap to this goal. It includes both present and future strategies in six broad categories: renewable energy, energy efficiency, transportation, green building, waste management, and education & awareness. Under waste management, the most important strategy is to develop and implement a ZWP to provide the framework for reducing greenhouse gas emissions related to waste management activities.

The City was contacted to determine their interest in the development of a ZWP. A meeting was held to discuss the ZWP development process and the District's commitment to the process. The City agreed to participate through its Resource Conservation & Recovery Commission (RCRC). A Memorandum of Understanding was prepared between the City and the District that outlined the process for development of this ZWP (Appendix A). The District is assisting in the process by providing professional consulting assistance in the development of the ZWP. The RCRC is the "ZWP team" that will be a sounding board and provide direction and advice to the professional consulting team. Ultimately, the RCRC will submit the ZWP to the City Council and recommend that it be adopted as the guide and roadmap for the future.

The RCRC is an advisory board to Oberlin City Council made up of five citizen volunteers. The RCRC meets monthly to discuss issues related to solid waste management in the City. Public Works staff provides technical and secretarial support to this commission. While the activities of the Refuse and Recycling staff are ultimately directed by the City Manager, the RCRC serves as a "sounding" board for City staff. The RCRC will continue to consult with staff and to advise City Council during the development and implementation of this ZWP.

Waste Hierarchy

Managing waste and embarking on a path to zero waste requires a roadmap. The United States Environmental Protection Agency has ranked the most environmentally sound strategies for managing municipal solid waste. Source reduction (including reuse) is the most preferred method, followed by recycling and composting, energy recovery, and, lastly, treatment and disposal. The ZWP will follow this path and work toward recommendations that rank as the most preferred in the waste management hierarchy.

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Strategic Plan

The first activity that was completed for the ZWP was to work with the RCRC to develop: (1) a mission statement which is based upon the “Duties; Responsibilities” for the RCRC as defined in City Ordinance 156.02; and (2) goals and objectives for year 2013. The Mission Statement, goals and objectives are discussed below.

Zero Waste Planning Mission Statement of the City of Oberlin Resource Conservation and Recovery Commission

To provide advice regarding sustainable and efficient practices for the management of waste and procurement of sustainably produced goods to the following:

- City Council,
- Oberlin residents,
- Businesses,
- Institutions,
- State of Ohio,
- Lorain County Departments, and
- Other Public Agencies.

The advice may be presented through the following methods:

- Recommended changes to City of Oberlin ordinances;
- Policy changes regarding the management of waste;
- Policy changes regarding the procurement of goods and services by the City of Oberlin;

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- Recommendations for entities doing business or providing services within the City with regard to solid waste management and sustainability;
- Development of a Zero Waste Plan;
- Assist with the creation, collaboration and coordination of other “green teams” from schools, hospitals, Oberlin College, businesses, associations and the Lorain County Solid Waste Management Policy Committee.

Resource Conservation and Recovery Commission 2013 Strategic Goals

Goal 1-2013 – Complete a draft zero waste plan for the City of Oberlin.

- Objective 1-1-2013 – Zero Waste Plan shall provide recommendations and priorities for City Council on procurement policies, recycling program, organics, reuse and waste reduction activities, and construction and demolition debris management for the City as well as entities doing business in the City.
- Objective 1-2-2013 – Zero Waste Plan shall provide direction and a road map for refuse and recycling services provided by the City.
- Objective 1-3-2013 – Zero Waste Plan shall include cost estimates for programmatic changes showing savings or increased costs.
- Objective 1-4-2013 – Zero Waste Plan shall include public information/education opportunities including newsletter, web articles and other social media presentations.
- Objective 1-5-2013 – Zero Waste Plan shall be consistent with the Lorain County Solid Waste Plan.
- Objective 1-6-2013 – Zero Waste Plan shall incorporate activities for the College and other institutions.

Goal 2-2014 – Provide assistance to commercial, institutional, and industrial “green teams” that are focused on waste diversion in their organizations.

The RCRC and the City recycling coordinator should invite environmental managers or green teams from businesses and institutions throughout the City to make presentations at RCRC meetings. The green teams will be encouraged to present their programming and plans for waste diversion. The RCRC members and City staff may provide the green teams with suggestions and technical assistance, or organize other volunteers (e.g., students from Oberlin College) to provide the services necessary to implement the green team’s goals for waste diversion. During each meeting, the RCRC and City staff will present the ZWP to the green team to promote waste diversion for the community. In addition, if appropriate, the City and RCRC will invite the SWMD to participate and present County goals and programming. It could be appropriate for a green team to apply to the SWMD for revolving loan funds, and this subject could be discussed at the meetings with green teams.

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- Objective 2-1-2014 – RCRC and/or City shall invite commercial, institutional, and industrial entities to present waste diversion plans for their establishments.
- Objective 2-2-2014 – Review the priorities and recommendations of the Zero Waste Plan with the commercial, institutional, and industrial entities.
- Objective 2-3-2014 – Provide recommendations with regard to waste diversion.
- Objective 2-4-2014 – Include successful green team initiatives on the City's social media.

Goal 3-2013 – Develop detailed outreach program through social media.

- Objective 3-1-2013 – Working with City Council and Service Department, prepare Resource Conservation and Recovery Commission Facebook or City website page with semi-annual committee message.
- Objective 3-2-2013 – Prepare topical videos which focus on sustainable practices that could include backyard composting, recycling, providing re-useable materials to Habitat Restore, etc. Distribution of the videos would take place through social media.
- Objective 3-3-2013 – Provide information on participating in solid waste district's Collection Center.
- Objective 3-4-2013 – Develop and promote a web-based directory of local reuse and recycling options for all types of materials.

Goal 4-2013 – Identify needed processing or waste management facilities.

- Objective 4-1-2013 – Create a list of needs for processing or waste facilities for the City of Oberlin and southern Lorain County.
- Objective 4-2-2013 – Present the list of needs to the Lorain County Solid Waste Management Policy Committee.
- Objective 4-3-2013 – Identify other political subdivisions to engage in a discussion about shared processing or waste management facilities.

ZWP Sections

The remainder of the ZWP for the City is presented in the following sections:

- Section 2: Inventory – This section discusses the current waste generation and the services currently provided by the City.
- Section 3: Oberlin College – The solid waste management programs operated by the College are explained in this section.
- Section 4: Improving City Waste/Recycling Collection System – There are a number options which could be chosen by the City to reduce waste generation,

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improve efficiency of collection, and meet the goals of this plan. Those options are discussed in this section.

- Section 5: Moving toward Zero Waste – What is a reasonable and achievable percentage goal for reduction of waste disposal, yet will provide a continual challenge to the City and incentives for additional waste diversion? What are the short-term vs. long-term goals for the City with regard to zero waste? What programs and options explained in Section 4 are recommended for implementation? These questions are addressed in Section 5. The success of any program or strategy is at least somewhat dependent on the collection of data. The data is then used to measure progress of implementation, and can be very helpful for making necessary changes to programs and policies. A survey of local businesses was conducted as part of the ZWP development to ascertain interest in food waste recovery. (See Section 5 for further discussion of the survey results.) Section 5 also discusses the collection of data as well as other recommendations which will allow the ZWP to remain a viable document for years to come.

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SECTION 2 – INVENTORY

Demographics

The City of Oberlin is located in northeast Ohio in Lorain County, and as of 2012, the population was estimated at 8,300 people. The City is the home of Oberlin College, a liberal arts college and music conservatory with approximately 3,000 students.

Services Provided by the City

The City provides solid waste management services to residents, Oberlin College, government offices and programs, schools, as well as commercial establishments within the City. These services include collection of trash, recyclables, and yard waste.

1. Trash Collection

Single-family Residents. Collection is provided once/week by one person using a side-load compactor truck. Service is provided to approximately 2,074 households Tuesday through Friday on routes with roughly 500 households each day. The fee for collection is \$6/household/month for a maximum of three 32 gallon containers per week. For residents needing collection of additional trash, bags may be set out at a charge of \$1 per bag.

Commercial. The City services about 80 dumpsters that are placed around town and also provides collection to approximately 10 customers using bags. In addition to local businesses, the City provides refuse collection service to Oberlin College, the public schools, apartment buildings, nursing homes, and other institutions.

A schematic of services provided by the City is shown in Figure 2-1.

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Figure 2-1
Oberlin Solid Waste Services



2. Collection of Recyclables

Single-family Residences. Collection service is provided for single-family residences through the City Public Works Department. Residents are encouraged, but not required, to sort recyclables into one of the following five categories and set them out for pickup:

- Aluminum, steel, and bi-metal cans
- Plastic containers (#1 through #7 plastics)¹
- Glass bottles
- Cardboard
- Mixed paper (newspaper, magazines, office paper, junk mail, and paperboard)

Metal cans, glass bottles, and the plastic containers must be placed into one of three 5-gallon plastic buckets. The cardboard and mixed paper must be bundled separately and placed at the curb with the other recyclables. Recyclables are typically collected by one person using a compartmentalized truck (see Figure 2-2). The City provides public information in the form of informational tags, brochures, news articles and web-based information to assist residents in understanding recycling program guidelines.

¹ Food and beverage cartons and aseptic containers should be included in this list and is mixed with the plastics.

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**Figure 2-2
Oberlin Residential Recycling Truck**



Commercial Recycling. Approximately 40 “cardboard only” dumpsters are located around town and are serviced by the City using a rear-load compactor truck (see Figure 2-3).

Other Recycling Services. The City provides collection 5 days per week to Oberlin College through a co-mingled “blue bag” program. The City also provides collection of source-separated recyclables for a limited number of businesses and a couple of apartment buildings that meet program guidelines (i.e., source-separation of the recyclables). Finally, Abitibi paper retriever boxes are placed throughout the City for collection of paperboard (or boxboard), newspaper, magazines, and office paper.²

**Figure 2-3
Commercial Refuse and Cardboard Recycling Dumpsters
in the Central Business District**



² Abitibi also accepts cardboard, phone books, paperback books, catalogs, school papers, mail and junk mail.

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3. Yard Waste Management

Leaf collection is provided at no charge in late fall with 4 to 5 separate passes of two, trailer-mounted vacuum trucks. Bagged yard waste can also be collected for a fee (\$1 per bag) from March through December and is managed at the City's registered Class IV compost site (see Figure 2-4). Brush collection is provided in the fall and spring with 1 or 2 trailer-mounted chippers.

**Figure 2-4
City of Oberlin Registered Class IV Compost Site**



4. Procurement Policy

The first recycled-content purchasing policies were put in place by many governmental entities and companies a number of years ago. Generally, the intent of such policies is to increase the demand for materials which include recycled-content, through a financial incentive or legislative mandate, and thus improve the economics of recycling efforts. More recently, these policies have become more comprehensive (apply to a much wider array of products) and are often known as “environmentally preferable” purchasing policies. Criteria used to define environmentally preferable products can include:

- Conserves natural resources, materials, and energy;
- Reduces toxicity;
- Reduces the amount of material sent to landfills;
- Maximizes recyclability and recycled content;

The City has an existing procurement policy, which the City Manager signed in 1994, addressing the purchase of recycled-content materials. In part, this policy states the following:

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“1. City purchasing contracts will be reviewed by the City’s purchasing agent in consultation with the recycling coordinator, to determine if the products being acquired can be manufactured with recycled materials.

2. When it has been determined that recycled content products are available, are compatible with existing equipment and needs, and are competitively priced, their purchase will be prioritized by the City officials.”

The City has historically used grant monies from the Lorain County Solid Waste Management District to off-set the cost of purchasing recycled-content copy paper used in all municipal offices. The City has also used grant funding to purchase recycled-content products such as engineered wood mulch for playgrounds.

5. Other Services/Programs

The City also organizes and participates in events which result in additional recycling or reuse of materials. As an example, the City and Goodwill Industries, Inc. of Lorain County worked together in promoting Pride Day in May 2013 which offered four recycling options including collection of working and non-working electronic devices and accessories, and a drop-off for recyclables typically collected through the curbside recycling program. In addition, the City has provided a one-day drop-off for recycling of scrap metal and document shredding. The City also sponsored a styrofoam collection held in September 2013.

Other events include an electronics collection for the community in November 2012 in conjunction with *America Recycles Day*. Also, a litter/recycling pickup day was held in association with Earth Day in April 2013.

Summary of Services

Tables 2-1 through 2-3 show a summary of the solid waste management services provided by the City, including the type of equipment used and the frequency of pickup.

**Table 2-1
Summary of Services – Disposal of Refuse (or Trash)**

	Sector			
	Residential – Single family	Residential – Multi family	Commercial	College
Households/entities served	2,074	10 apartment buildings	68 customers using dumpsters, 10 w/ bags	38 dumpsters/ 4 bag stops
# of Routes	4	6	6	6 routes

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**Table 2-1
Summary of Services – Disposal of Refuse (or Trash)**

	Sector			
	Residential – Single family	Residential – Multi family	Commercial	College
Days of pickup	Tues. - Friday	Mon. - Fri., 5 hrs. Sat.	Mon. - Fri., 5 hrs. Sat.	Mon. - Fri., 5 hrs. Sat.
Frequency of Pickups	once/week	varies	varies	varies
Service charge	\$6/month	varies	varies	
Equipment used	2006 Autocar w/ LaBrie side-load compactor	2009 Crane Carrier w/ Heil rear-load packer body	2009 Crane Carrier w/ Heil rear-load packer body	2009 Crane Carrier w/ Heil rear-load packer body
# of Persons per vehicle	one	two	two	two

**Table 2-2
Summary of Services – Collection of Recyclables**

	Sector			
	Residential – Single family	Residential – Multi family	Commercial	College
Households/entities served	2,074	Source-separate	22 cardboard dumpsters; limited source separation collection	18 cardboard dumpsters & blue bag collection
# of Routes	4 (same day of week as trash collection)		5	5
Days of pickup	Tues. - Friday		Mon. - Fri.	Mon. – Fri.
Frequency of Pickups	once/week		varies - some serviced all 5 days	5 days/week
Service charge	no charge	no charge	no charge	\$17,500/yr. ^a
Equipment used	2002 Crane Carrier w/ Kann compartmentalized body	2002 Crane Carrier w/ Kann compartmentalized body	2002 Crane Carrier with a Leach packer for cardboard	1999 Crane Carrier w/ rear-load packer body rebuilt in 2004
# of Persons per vehicle	one person	One person	Two persons	Two persons

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**Table 2-2
Summary of Services – Collection of Recyclables**

	Sector			
	Residential – Single family	Residential – Multi family	Commercial	College
Recyclables collected	Aluminum/steel/ bimetal cans, glass bottles, #1 through #7 plastics, cardboard, mixed paper	Aluminum/steel/ bimetal cans, glass bottles, #1 through #7 plastics, cardboard, mixed paper	Cardboard, limited collection of other recyclables	Cardboard, co-mingled recyclables (blue bag)

^a This charge is to provide collection and transfer of mixed recyclables 5 days per week.

**Table 2-3
Summary of Services – Collection of Leaves and Brush**

	Sector			
	Residential – Single family	Residential – Multi family	Commercial	College
Households/entities served	2,074	No collection	No collection	College manages their yard waste
# of Routes	--			
Days of pickup	fall and spring (for brush)			
Frequency of Pickups	4 to 5 collections of leaves in fall; bagged yard waste on Mondays, March to December			
Service charge	no charge, except for extra collection of bagged YW (\$1/bag)			
Equipment used	Vacuum collection of leaves; chippers and pickup/dump truck for brush			
# of Persons per vehicle	3 to 4 for brush/leaves			

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Current Waste Generation

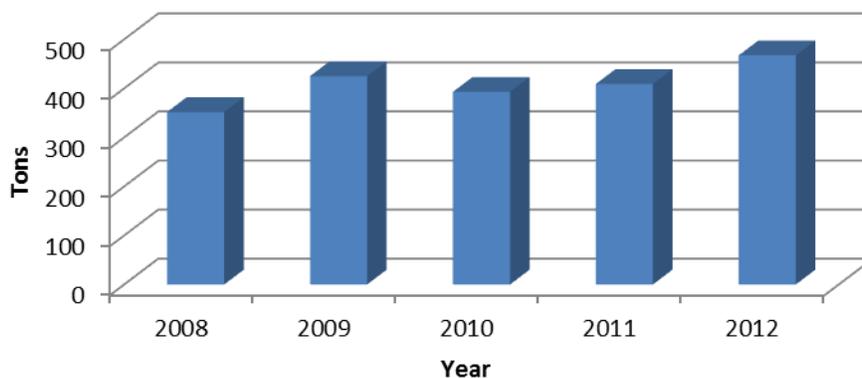
1. Municipal Solid Waste (MSW)

Disposal. The City's ordinances provide the exclusive right to provide residential, commercial, institutional and industrial solid waste collection. (See Ordinances 925.06 and 925.08.) The City collects solid waste destined for disposal from both the residential and commercial sectors. Trash is collected from single-family dwellings, apartment buildings, Oberlin College, businesses within the City, and institutions such as public schools and government offices. Trash collection routes do not readily allow waste categorization by residential, commercial, institutional or industrial categories.

It is interesting to note that the total amount of waste sent for disposal from 2008 through 2012 has decreased by 350 tons, or a 9 percent drop in disposal during this time period.

Yard Waste. The City collects yard waste (brush, leaves and bagged yard waste) from residents³ while Oberlin College manages their own yard waste. The City composts collected yard waste at a Class IV composting facility located at the City's wastewater treatment plant. The College composts leaves on Campus, but do not have estimates of the amount of yard waste collected or composted. Some residents also compost yard waste and/or food waste in their back yards; however, estimates of the amount of materials managed in this manner are not available. Figure 2-5 shows the amount of yard waste collected by the City.

**Figure 2-5
Yard Waste Management**



Recyclables. Like trash sent for disposal, data is not readily available to determine the amount of recyclables recovered from the residential sector vs. the commercial and institutional sectors.

³ Almost all of the yard waste collected by the City is generated from the residential sector.

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The amount of recyclables recovered in Oberlin has steadily increased since 2008, with the exception of 2011. Overall, recycling tonnages have increased by 28 percent from 2008 through 2012.

Total Generation. The total generation of solid waste within the City of Oberlin consists of waste sent for disposal, recyclables, and total organics. (Total organics is comprised of yard waste from the City and food waste collected and hauled to a composting facility at the College. Food waste generation and collection at the College is discussed in more detail in Section 3.) Figure 2-6 shows the three components of waste generation.

**Figure 2-6
Oberlin Waste Generation**

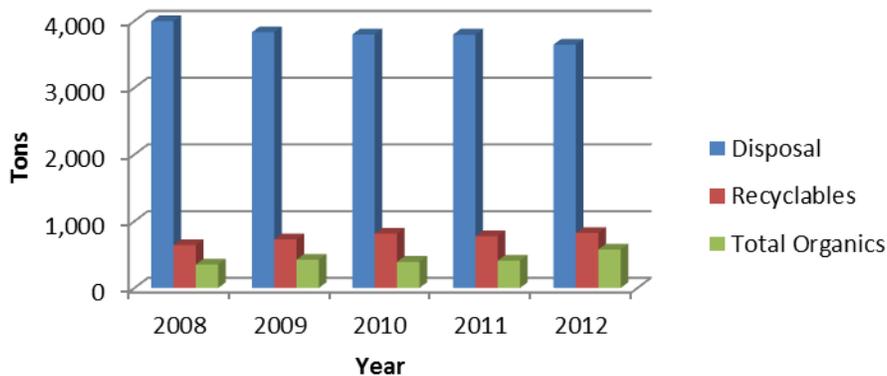
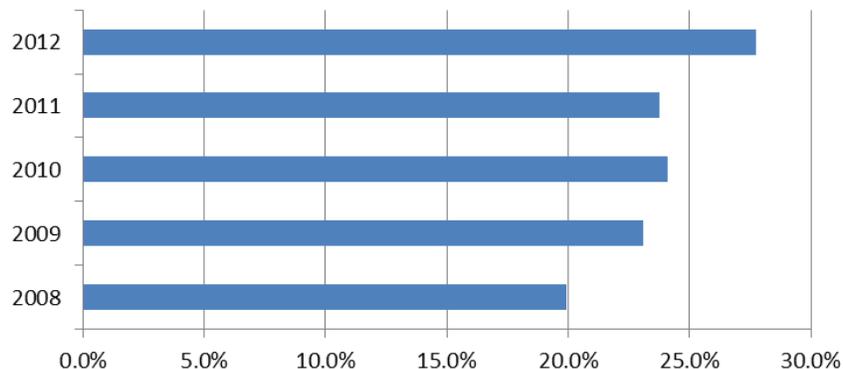


Figure 2-7 shows the total amount of diversion as a percentage of total generation for the same time period. Total diversion based upon recovery of recyclables, yard waste composting, and food waste composting was almost 20 percent in 2008 and approximately 28 percent in 2012.

**Figure 2-7
Total Diversion**



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2. Construction and Demolition Debris

Construction and demolition debris (C&D) is generated from new construction, modifying existing buildings, and demolishing structures no longer wanted or needed. Although C&D is not considered a component of municipal solid waste in Ohio, it can be generated in large quantities and many times significant quantities of this material is disposed, usually in landfills specifically designed for C&D waste. Recycling and reuse of C&D has become more common in recent years, but remains a challenge.

Data is not currently available to estimate the amount of C&D generated, nor the amount of C&D materials which are recycled/reused. The Republic Landfill in Lorain County disposed an average of 27,400 tons of C&D waste during both 2010 and 2011 which was generated in Lorain County.⁴ In order to estimate the amount of this C&D which was generated from Oberlin, it was assumed that C&D is generated in proportion to population, resulting in just over 750 tons of C&D from Oberlin disposed at Republic annually.

Although the City does not have a C&D recovery program, the Public Works Department did implement a materials recycling specification for the “Green Acres” demolition project. The specification required the contractor to submit a “Demolition Waste and Recycling Plan” prior to beginning demolition, and a “Reuse, Recycling and Disposal” report to document materials flow. The City also established a baseline of 65 percent reuse/recycling of demolition materials, and included a \$750 incentive/disincentive for the contractor for each five percent above (or below) the baseline reuse/recycling rate which is achieved by this project. As of this writing, the contractor has diverted significant quantities of masonry, metals and organic materials from the landfill (see Table 2-4).

**Table 2-4
Material Reuse, Recycling, and Disposal:
Green Acres Project**

Description	Tons
a. Materials Reused and Recycled	3,608.88
b. Materials Disposed	498.67
c. Total Materials Generated (a. + b. = c.)	4,107.55
d. Landfill Diversion Rate (Tons Only)*	88%

3. Summary of Waste Flows in the City

In order to better understand the sources and types of waste generation, and the destinations of the waste, a materials flow (or mass balance) diagram was created.

⁴ Two licensed C&D disposal facilities currently operate in Lorain County, but the amount of materials disposed at these facilities is not available.

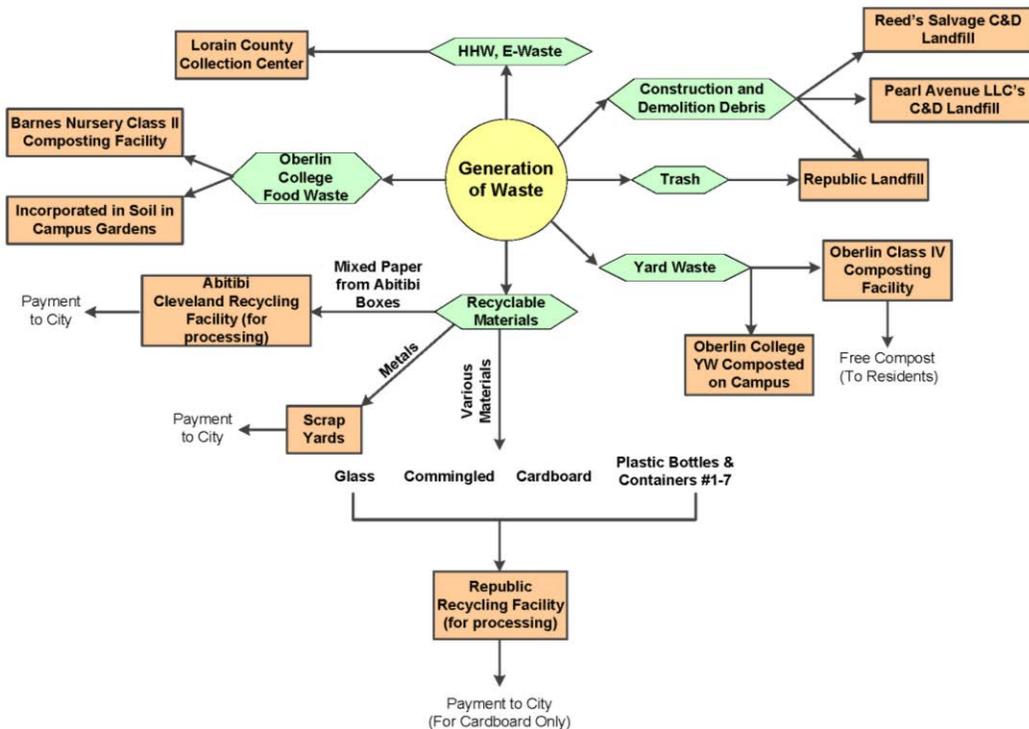
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(See Figure 2-8.) The City generates municipal solid waste, some of which is sent to a landfill for disposal, a portion is collected as yard waste and delivered to the City's Class IV composting facility, and the recyclable materials are sent to a number of different locations for processing.

Collection boxes have been placed throughout the City by Abitibi, ("Abitibi paper retriever boxes") and are available to residents, the College, and businesses to collect paperboard, newspaper, and office paper for recycling. (See further explanation of materials collected through Abitibi on page 2-3.) Mixed paper collected at curbside by the City is delivered to Abitibi collection boxes at the City's service complex. Source separated aluminum, steel, and bi-metal cans as well as steel scrap is sold to a local scrap dealer. Glass containers, plastics, mixed recyclables and source-separated cardboard are delivered to the Republic recycling facility for processing.

It is likely that at least some construction and demolition debris from projects within the City is disposed at the Republic Landfill in Lorain County. City residents can deliver household hazardous waste (HHW) and electronic waste such as computers and printers to the Lorain County Collection Center in Elyria which is operated by the Lorain County SWMD. Special collection events have also been sponsored (or co-sponsored by the City) to collect electronics, scrap metal, and other recyclables. (These efforts are discussed in more detail in the previous section, "Services Provided.")

**Figure 2-8
City of Oberlin Solid Waste and Recycling Flow**



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Figure 2-9 shows the actual locations of the facilities which receive and process materials generated in Oberlin. As illustrated in the figure, most materials are sent to facilities which are located relatively close to the City. Transportation costs (and also the overall cost of services) decrease with the use of facilities which are located near Oberlin. Reducing the hauling distance also improves the efficiency of providing services to City residents and businesses.

Figure 2-9
Locations of Facilities Receiving Oberlin Materials



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Recycling: Materials, Participation, and Revenue

1. Materials Collected by the City

For the residential sector, the City provides source-separated collection of the following materials for recycling:

- Aluminum, steel, and bi-metal cans
- Plastic containers (#1 through #7 plastics)
- Cardboard cartons
- Glass bottles
- Cardboard
- Newspapers, magazines, office paper, junk mail, and paperboard

The “blue bag program”⁵ used for Oberlin College collects aluminum, steel, and bi-metal cans, glass, plastics, and mixed paper.

From the commercial sector, the City collects cardboard, and from a limited number of businesses, other source-separated recyclables. Table 2-5 shows the total amount of recyclables recovered from the Oberlin waste stream from 2008 through 2012. In addition, Figure 2-10 illustrates the same data for 2008 through 2012. Mixed rigids, mixed paper, cardboard, and the blue bag program have consistently shown the highest amounts of recovery from the City.

**Table 2-5
Tons Recycled by Material: 2008-2012**

Materials	Year				
	2008	2009	2010	2011	2012
Cardboard	189	160	244	209	200
Mixed Paper	244	202	209	194	230
Mixed Rigids	219	235	229	229	257
Aluminum	0	2	2	3	2
Steel	0	7	3	3	2
Steel Scrap	1	1	13	18	10
Blue Bag	205	119	115	120	123
<i>Totals</i>	<i>642</i>	<i>727</i>	<i>814</i>	<i>775</i>	<i>823</i>

⁵ The blue bag program collects co-mingled recyclables in blue bags and is used at the College.

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**Figure 2-10
Recycling by Material Type**

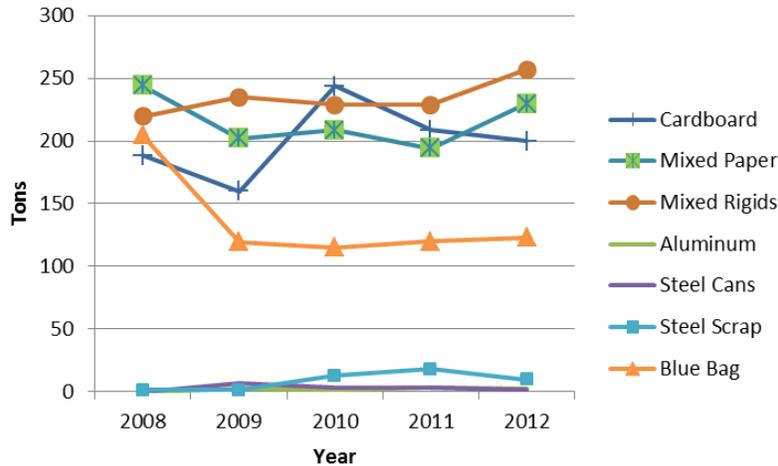
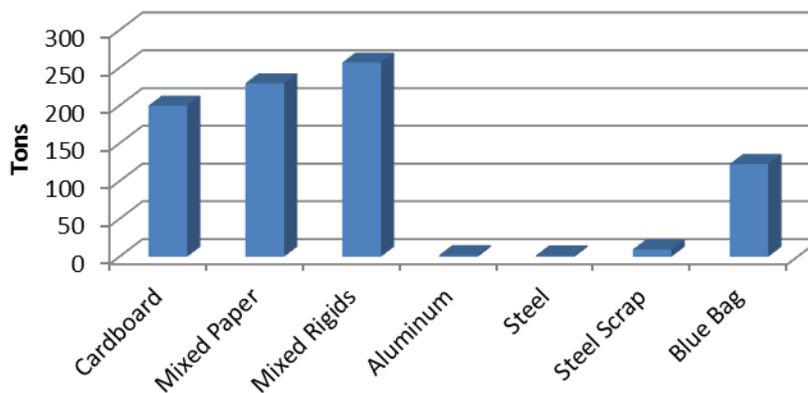


Figure 2-11 clearly illustrates that mixed rigids, mixed paper, cardboard, and the blue bag program contribute to most of the recycling, in fact **98 percent** of the total.

**Figure 2-11
Tons of Recycling: 2012**



2. Participation Rates

Data regarding residential rates of participation in recycling has been informally collected by the recycling collection crew in 2010. In addition, a review of recycling tonnages collected over a randomly-selected eight week period in 2010 confirmed that participation is much higher on Tuesday through Thursday compared to Friday.⁶ Based

⁶ Recyclables are collected from different routes each day, Tuesday through Friday, so the lower participation rates on Friday may be more closely correlated with the area of the City being serviced and characteristics of that sub-population rather than the day of the week which service is provided.

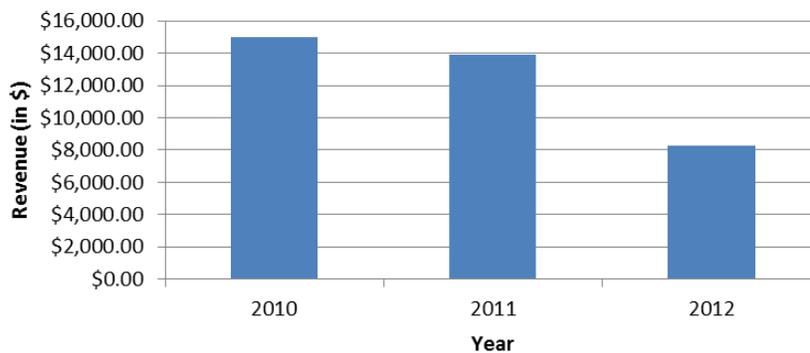
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upon 2010 information, the City concluded that the overall participation rate was 50 to 60 percent, with 25 to 31 percent of participating households sorting their recyclables. (Participating households that do not sort recyclables typically place materials at the curb for pickup in a single container or box.)

3. Revenues Collected from Recycling

The City collects revenue from the sale of the following materials which are collected separately: cardboard, aluminum cans, steel cans, steel scrap, and mixed paper. (When collected as mixed recyclables, or co-mingled, the City does not realize any revenue.) Figure 2-12 shows that revenue from recyclables reached nearly \$15,000 in 2010 and dropped to approximately \$8,000 in 2012.

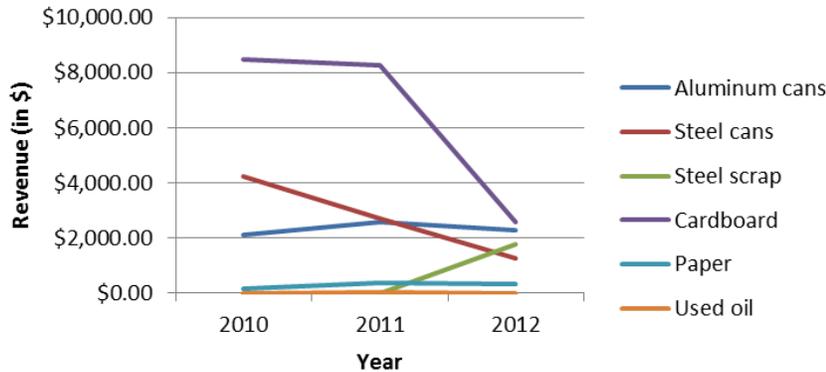
**Figure 2-12
Revenue: Source-Separated Recyclables**



The sale of cardboard produced the most revenue over the last three years as shown in Figure 2-13. However, steel cans and aluminum cans contributed sizable portions of the total revenue stream as well. Figure 2-13 also illustrates the variability of the recycling markets and associated revenues.

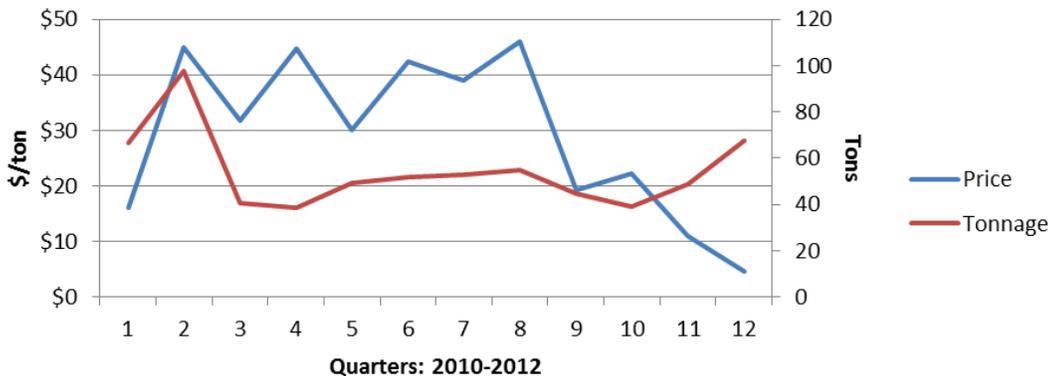
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**Figure 2-13
Revenue by Material**



Revenue from cardboard has shown the greatest change during the past three years. Comparing the revenues received and the tons of cardboard collected on a quarterly basis reveals that the price per ton for cardboard has fluctuated greatly during this time period. Figure 2-14 shows the calculated price per ton received vs. tons recovered from 2010 through 2012 for cardboard. This data indicates that the tonnage recovered has been somewhat variable, but nearly as much as the price of cardboard.

**Figure 2-14
Cardboard: Revenue vs. Tonnage for 2010-2012**



4. Household Hazardous Waste, Electronic Waste, and Tires

As discussed above, residents from Oberlin can take their household hazardous waste (HHW), electronic waste (E-waste), and tires to the Lorain County Collection Center in Elyria for recycling and/or disposal. The Collection Center maintains a record of the number of vehicles which drop off materials at the facility and the pounds of materials delivered. This information is organized by zip code, and since zip code 44074 approximates the City of Oberlin corporation limits and population, Table 2-6 can be used to estimate of the number of residents from Oberlin utilizing the Collection Center

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in 2011 and 2012. Table 2-6 also shows that materials delivered to the Center from Oberlin increased significantly in 2012, primarily due to scrap tires.

**Table 2-6
Materials Collected from 44074 Zip Code at
Lorain County Collection Center**

Vehicles/Materials	Year	
	2011	2012
<i>Vehicles</i>	400	434
<i>Materials (in pounds)</i>		
HHW	11,449	12,908
E-waste	22,341	23,955
Lamps & ballasts	4,419	4,296
Scrap tires	23,768	34,852
Other materials	--	5,145
<i>Totals</i>	61,977	81,156

Revenues for Operating the City's Solid Waste Management Programs

The City collects revenue from several sources, with the most important being property taxes and user fees assessed for both the residential and commercial sectors. Fees from the residential sector from single-family dwellings are:

- \$6/household/month for basic service which consists of trash collection, recyclables collection, and yard waste collection;
- \$1/bag of trash if the three-container limit for trash collection is exceeded; and
- \$1/bag of yard waste set out from March through December.

Recyclables are collected from the residential sector with no user fee. Likewise, leaves (using vacuum collection) and brush are collected from residents without a user fee. Oberlin College pays the City \$17,500 per year for the collection of recyclables through the blue bag program five days per week.

Commercial user fees are based upon the size of the dumpster and the frequency of collection. Trash collection is provided to Oberlin College as part of the commercial routes.

Property taxes comprise the other major portion of revenue for the City's solid waste budget. Table 2-7 provides the actual amount of revenues by category for 2010 through 2012, and the budgeted revenue totals for 2013. Fees and property taxes for the

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residential vs. commercial sectors have been estimated based upon total amounts collected and historical percentages collected from each sector.

**Table 2-7
City of Oberlin Revenues for Solid Waste Management Programs**

Revenue Category	Year			
	2010	2011	2012	2013 ^f
Fees				
Fees-Residential ^a	\$163,077	\$165,006	\$163,832	\$163,832
Fees-Commercial ^b	\$331,096	\$335,012	\$332,628	\$332,628
College (recyclables collection)	\$17,500	\$17,500	\$17,500	\$17,500
Property Taxes				
Taxes-Residential ^c	\$234,660	\$227,763	\$234,353	\$224,908
Taxes-Commercial ^d	\$120,885	\$117,332	\$120,728	\$115,861
Excess Trash	\$14,386	\$14,088	\$14,535	\$12,000
Miscellaneous Sales ^e	\$23,966	\$23,730	\$16,728	\$16,000
<i>Totals</i>	<i>\$905,571</i>	<i>\$900,430</i>	<i>\$900,304</i>	<i>\$885,229</i>

^a Calculated from "Refuse Multi-Year Budget", total "Refuse Fees" (\$494,174) x 33%

^b Calculated from "Refuse Multi-Year Budget", total "Refuse Fees" (\$494,174) x 67%

^c Calculated from "Refuse Multi-Year Budget", total "Levy Proceeds" (\$355,545) x 66%

^d Calculated from "Refuse Multi-Year Budget", total "Levy Proceeds" (\$355,545) x 34%

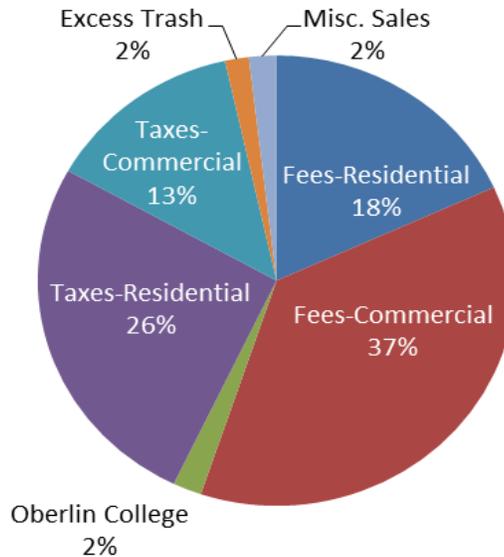
^e Includes revenue from sale of recyclables.

^f Budgeted

Figure 2-15 presents a pie chart representation of revenues for year 2012. User fees from the commercial sector (37 percent) and property taxes collected from the residents (26 percent) comprise the largest portions of the revenue stream.

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**Figure 2-15
Revenue Sources**



Costs for Operating the City's Solid Waste Management Programs

For 2010 through 2012, the actual costs of the City's solid waste management programs are shown in the following Table 2-8. The costs and planned expenditures budgeted for each category is shown for 2013. Although these expenditures represent total program costs, some of the cost categories in the table show the amounts which are transferred into other accounts. For example, costs under "Equipment Reserve Transfer" are actually expended in another account when the City needs to purchase new equipment. The "Recycling Grant Transfer" line item represents money shifted into the recycling fund to pay for expenditures in that program.

**Table 2-8
Solid Waste Program Expenditures**

Expense Category	Year			
	2010	2011	2012	2013
Payroll/Benefits	\$239,718	\$226,587	\$234,310	\$223,820
Operating/Contractuals ^a	\$238,725	\$207,327	\$187,048	\$221,557
Equipment Reserve Transfer	\$74,500	\$94,500	\$148,000	\$57,000
Vehicle Maintenance Transfer	\$82,009	\$81,340	\$79,663	\$86,525
General Fund Transfer	\$38,879	\$45,279	\$45,022	\$45,015
Joint Facilities Transfer/Debt	\$79,688	\$79,928	\$78,825	\$77,650
Recycling Grant Transfer	\$145,000	\$108,000	\$193,553	\$170,000

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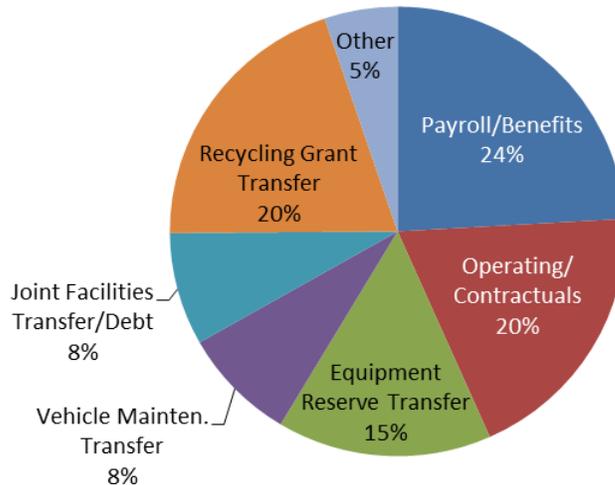
**Table 2-8
Solid Waste Program Expenditures**

Expense Category	Year			
	2010	2011	2012	2013
Miscellaneous Transfer	\$0	\$0	\$5,500	\$5,500
Miscellaneous Capital	\$1,500	\$0	\$0	\$1,500
Totals	\$900,018	\$842,961	\$971,921	\$888,567

^a The majority of funds in this category represent expenditures paid to Republic Waste Services for trash disposal.

Figure 2-16 shows the percentage of solid waste funds spent in each of the six largest categories for 2012. (The “other” category includes General Fund Transfers, Miscellaneous Transfers, and Miscellaneous Capital.) The categories of Payroll/Benefits, Recycling Grant Transfer (used to pay for the recycling program), and Operating/Contractuals (primarily used to pay the tipping fee at the Republic Landfill) comprise 64 percent of total expenditures.

**Figure 2-16
Expenditures: 2012**



The City does not maintain expenditure accounts by program, so data is not readily available to determine the annual costs for the following programs:

- residential refuse collection
- commercial refuse collection
- residential recycling collection
- commercial recycling collection
- yard waste collection
- yard waste composting

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SECTION 3 – OBERLIN COLLEGE

The presence of Oberlin College and its 3,000 students creates a significant impact on solid waste management within the City. The College not only comprises more than 36 percent of the City's population, but also contributes much of the solid waste collected for disposal as well as recycling. The City provides refuse and recyclables collection services, discussed in the previous section.

Environmental Policy

Oberlin College has demonstrated a strong commitment to resource management and environmental stewardship over the years. The College took a leadership role when former President Nancy Dye established Oberlin as one of the nation's first institutions of higher education to accept the goal of climate neutrality¹ by signing the American College and University Presidents' Climate Commitment (ACUPCC). The plan to be carbon neutral was adopted in 2009, and establishes 2025 as the year when the goal will be achieved.

In June 2006, the Oberlin College Board of Trustees adopted a policy that all new construction and major renovations on campus have to be designed and built in accordance with the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) silver standard. The College believes that the adoption of this standard will significantly reduce the use of resources on campus in the future, providing more efficient construction and performance of campus buildings.

During the 2003-2004 academic year, the College also initiated a strategic planning process focused on developing a plan that would ensure academic, artistic, and musical excellence as well as financial sustainability in the years ahead. One of the key components of the strategic plan which resulted from this process is a commitment to move towards environmental sustainability.

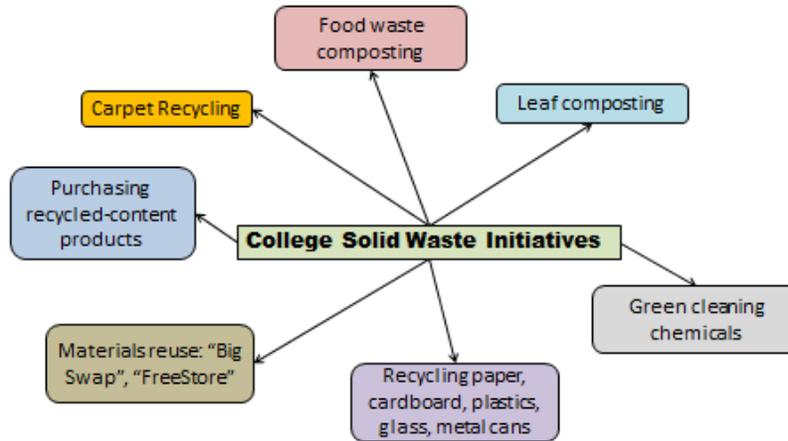
The Office of Environmental Sustainability

The Office of Environmental Sustainability (OES) at the College is the entity which is primarily responsible for coordinating implementation of the environmental policy on campus, including the commitment to carbon neutrality. OES interacts with the administration, faculty, staff, and students to focus attention on ways to maximize the environmental performance of Oberlin College and develop the awareness and tools required to respond dynamically to issues affecting them. OES also reaches out to the wider community, including the City.

¹ The American College and University Presidents Climate Commitment defines climate neutrality as having no net carbon (greenhouse gas) emissions. This is to be achieved by "minimizing carbon emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions."

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Figure 3-1
Oberlin College's Solid Waste Initiatives



There are a number of ongoing initiatives at the College associated with environmental policy and sustainability which involve solid waste management. These initiatives include:

- carpet recycling,
- food waste composting,
- C&D material reuse and recycling,
- purchasing recycled-content products, and
- other programs. The schematic shown in Figure 3-1 is an attempt to represent the various ongoing efforts at the College to manage their solid waste more responsibly. These programs are discussed in more detail below.²

Carpet Recycling. Oberlin College purchases all of the carpet on campus through Legacy Commercial Flooring. The College also recycles all of its carpet through this company. In 2003, the College won the State of Ohio Department of Administrative Services “STS Recycler of the Year Award” for the amount of carpet it recycled. Over the past four years, the College has recycled 111,507 pounds (or more than 55 tons) of carpeting.

Food Waste Composting. Since 2006, both OSCA (Oberlin Student Cooperative Association) and the Campus Dining Services have participated in collection of pre-consumer food waste for vermicomposting (food composting with worms) which took place at the George Jones Farm, approximately 1.5 miles east of campus. In 2011, Campus Dining Services installed a grinder and pulper for use in dining halls and in the community. This equipment pulverizes and extracts liquids from organic

² Information in the following sections was obtained from the OES web pages on the Oberlin College website found at: http://new.oberlin.edu/office/environmental-sustainability/index_dot .

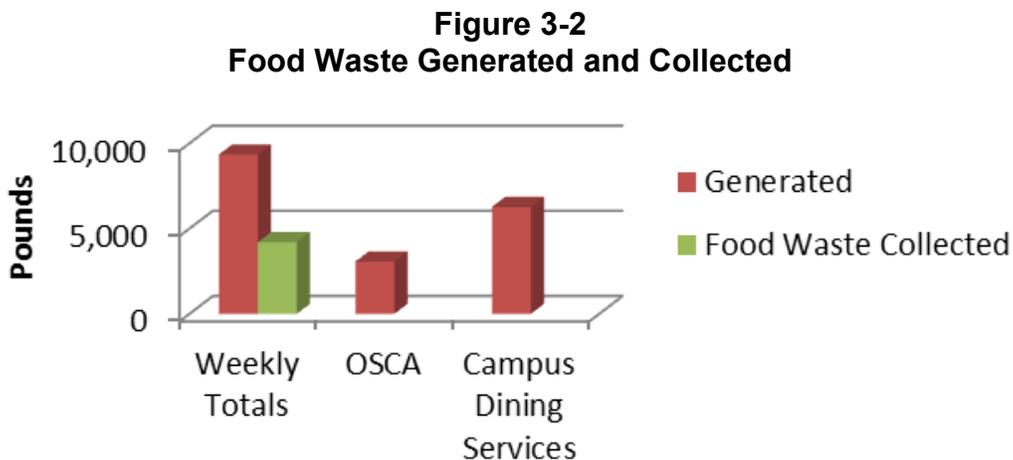
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products, allowing for more efficient composting of post-consumer cooked organic waste, napkins, and biodegradable containers.

In 2011, George Jones realized they could not take the full capacity of compost from Oberlin College. Now, only organics from only a few dining halls goes to the George Jones Farm. Currently, most of the food waste collected is picked up by Rosby Resource Recovery and hauled to Barnes Nursery, a Class II composting facility near Huron, Ohio. Residential food waste is also delivered to on-campus gardens and incorporated into the soil.

Based upon a study conducted in 2012 in collaboration with the Oberlin Project and the Oberlin College Office of Government and Community Relations, the four dining halls operated by the Bon Appetit Management Company and the eight dining cooperatives operated by the OSCA generate an average of between 1,400 to 1,500 pounds of food waste per day.

Figure 3-2 shows the total weekly amount of food waste generation, as well as, the amounts generated by the OSCA and Campus Dining Services. This data suggests that roughly one-half of the food waste at the College is collected for composting. The data presented in Figure 3-2 also indicates that Campus Dining Services generates approximately twice as much food waste as the OSCA.



Robert Lewis Kahn Hall, the 'sustainability' dorm for first-year, has a compost program called the Kahn Compost Project where residents separate and recycle their food waste. The project was designed by Oberlin students in the Compost Working Group, with support from Residential Education and Facilities Operations, as a pilot to test the feasibility of a student-run, residential compost system, and to measure how much food waste a typical residence hall produces. The system is coordinated by student leaders, known as Compost Captains, and overseen by student workers from the Resource Conservation Team (RCT).

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The College has begun increasing the number of near zero waste events. Each September, the Community & Culture Fest (formerly Community Block Party) hosts a dozen restaurants, arts & crafts, bounce house, ride raffle, and more for a day of community fun. With hundreds of people in attendance, this is the biggest zero-waste event of the year. The zero-waste component was first successful in 2012 and spurred other events to consider zero-waste. This included Solarity, college student-run arts and music festival, and office luncheons to strive for zero-waste.

Purchasing Recycled-Content Products. In an effort to implement Oberlin's Environmental Policy and address students' interest in ethical apparel, a committee called the Eco-Purchasing Committee was created in September 2006. The Purchasing Department has initiated various efforts to encourage the purchase of environmentally preferable products with varying degrees of success. The Purchasing Department hired a student Eco-Purchasing Intern beginning during the summer of 2006 to spearhead this effort, leading to the creation of the Eco-Purchasing Committee. In April 2007, the Eco-Purchasing Committee finalized a comprehensive policy on environmentally preferable purchasing designed to unite the campus in this initiative. By implementing this policy, the college "...will commit to supporting businesses that are strong stewards of natural, social, and economic resources..."

The Oberlin College Green Purchasing Policy was approved by the Committee on Environmental Sustainability on April 19, 2007. When determining whether a product is environmentally preferable, the policy states that all phases of the product's life cycle are to be considered, including: raw materials acquisition, production, manufacturing, packaging, distribution, operation, maintenance, disposal, potential for reuse and ability to be recycled. A list of desirable environmental attributes was also established for consideration when implementing the policy, such as:

- Biodegradable
- Carcinogen-free
- Chlorofluorocarbon (CFC)-free
- Compostable
- Durable
- Energy efficient

Materials Reuse and Waste Reduction. Twice a year, the Resource Conservation Team (RCT) holds a campus-wide event called "The Big Swap." Bags of clothing, books, furniture, and domestic items are collected from each dorm and taken to a centralized location in the student union building. For about a week thereafter, people come and take items they can put to use. At the end of that week, RCT then takes the remaining items to local charities. During Commencement week of 2012, RCT collected approximately 615 bags, along with a 16 ft. trailer filled with furniture and household items. All of these items were taken to local charity organizations for reuse.

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The RCT also runs the Little Swap, a smaller-scale Big Swap that occurs at the end of the semester. For the first time in 2012, the RCT ran a Fresh Swap, which was a sale geared towards first-year students. Items for sale include trash cans, hangers, bedding, and other popular items for dorms.

The “Free Store” is another example of ongoing material reuse on Oberlin’s campus. The Free Store now has a permanent space in the basement of one of the campus buildings where reusable items of all kinds can be donated or taken for reuse at no charge.

Two other programs include both reuse and waste reduction. The Dascomb container program is a free program which allows students, faculty, and staff to take out food from Dascomb Dining Hall in reusable containers rather than disposable ones. Other waste reduction-related efforts involve Campus Dining Services which has eliminated trays in two of the dining halls, and has eliminated disposable plastic containers for bottled water in all of its facilities and vending machines. In both retail locations, CDS also offers a \$0.25 discount for bringing your own cup or mug.

Campus Recycling Program. As discussed in Section 2, the City of Oberlin provides collection service for recyclables at the College. Cardboard is collected in “cardboard only” dumpsters, and metal cans, glass bottles, and paper, and plastics are collected through the blue bag program. Newspaper, magazines, and office paper can also be recycled through the use of Abitibi boxes which are placed at two locations within the campus area.

Green Cleaning Chemicals. The College switched to the use of an environmentally-friendly multi-purpose cleaner which is hydrogen peroxide-based and is biodegradable. The product is far less toxic than typical cleaning solutions due to the elimination of chemicals used in common janitorial cleaning products and is non-toxic to humans and aquatic life. The use of greener cleaning products also results in trash disposal which is less harmful to the environment. All daily cleaning chemicals used by custodial staff are Green Seal certified.

Yard Waste Management. The College manages their own yard waste by collecting leaves with a vacuum truck and composting them on campus. No data is collected on the quantity of yard waste collected and managed by Oberlin College.

C&D Program. Construction and demolition projects on campus recycle 100 percent of the materials removed from existing structures which undergo renovation or replacement.

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SECTION 4 – IMPROVING CITY REFUSE/RECYCLING COLLECTION SYSTEM

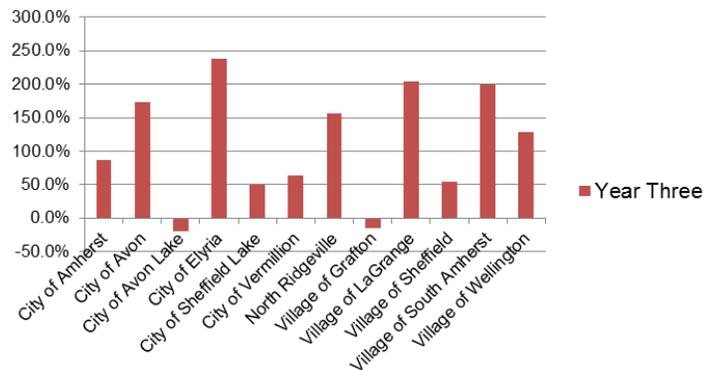
Maximizing the effectiveness and efficiency of the City’s refuse and recycling collection system is one of the strategies that will be employed to achieve the zero waste goals. As described in detail within Section 2 of this report, the City of Oberlin provides refuse and recycling collection services to the residential sector, the commercial sector, and Oberlin College. The trucks which are used for residential collection need to be replaced due to their age so the development of the ZWP provided a good opportunity to evaluate alternative systems for the collection of all refuse and recyclables from the City. This section presents three different collection systems for consideration.

Residential Collection

Many communities throughout the United States, including many within Lorain County, have switched to a volume-based automated collection system for refuse and recycling using carts. Under these volume-based systems (VBS), each household is provided a cart for refuse and a cart for recyclables. Households can be given the option to choose the size of cart, with higher collection fees charged for larger carts.¹ No fees are charged for collection of recyclables. VBS provides financial incentives for residents to reduce the amount of refuse as much as possible and increase recycling rates.

Communities in Lorain County that implemented a volume-based collection system in recent years have achieved substantial increases in recycling rates. Figure 4-1 presents the percentage increase in recycling for cities and villages in Lorain County after the third year of VBS implementation. The average increase in recycling for all communities listed was 108 percent.²

**Figure 4-1
Increase in Recycling**



¹ The size of carts typically ranges from 64 gallons to 96 gallons.

² It is possible that the cart system could also increase recycling from the commercial sector, including Oberlin College.

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The City of Oberlin has implemented a form of volume-based collection by:

- limiting residents to three 32-gallon bags,
- charging extra if residential households exceed the three-bag limit, and
- providing free recycling services.

Description of Three Collection Scenarios

The three scenarios presented in this section will provide the City with a collection system that has new automated collection features providing efficiency opportunities that were unavailable using the current equipment. It is possible that these alternative scenarios could also result in the following benefits when compared to the current collection system:

- Reduced costs
- Improved efficiency
- Fewer hours and/or days required for collection
- Less physically-demanding for collection crew
- Increased collection of recyclables

Each scenario includes the use of carts for collection of refuse from single-family households and the collection of recyclables from all sectors of the City. Each scenario also involves fully-automated or semi-automated mechanical collection of refuse and recyclables. Three different types of trucks are used in these scenarios:

1. Rear-loaders with lift arms attached to the rear of the vehicle, requiring a two-person crew;
2. Side-loaders with a mechanical arm which extends from the side of the vehicle, requiring a one-person crew; and
3. Front-loaders with a modified dumpster with lift mechanism (Curotto Can) requiring a one-person crew.

The initial analysis required a number of assumptions which are listed in Tables 4-1 and 4-2. A driver using a fully-automated collection vehicle can typically service 700 to 800 households per day within an urban area. Based upon this information, it has been assumed that number of days required for collection of all refuse and recyclables from single-family households could be reduced to three days. The initial analysis also includes the use of a 64-gallon cart for recyclables, with collection once every week.

Wages and benefits per employee were estimated based upon the weighted average hourly rate required for refuse and recyclables collection under the current waste management system. An hourly rate of \$28 per hour multiplied by 2080 hours per year

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resulted in an annual salary cost of \$58,240 per employee.³ The total employee hours required providing collection of refuse and recyclables in full-time equivalents (FTEs) of an employee's work time were calculated as follows:

$$\text{FTEs required} = \# \text{ of collections per week} \times \text{days/week required} \times \# \text{ of crew}$$

For example, Table 4-1 shows that refuse would be collected once every week, 5.5 days would be required for collection of commercial refuse, and a two-person crew needed per truck. Using the equation above, the FTEs required for commercial refuse collection would be:

$$\begin{aligned} \text{FTEs required} &= 1/\text{week} \times (5.5 \text{ days required}/5 \text{ day normal work week}) \\ &\quad \times 2 \text{ crew members} \\ &= 2.2^4 \end{aligned}$$

The incorporation of labor costs in the analysis also assumes that employees would be assigned other work within the solid waste program (e.g., collection of yard waste) if collection of refuse and recyclables did not require a full work week.

Annual maintenance costs for existing trucks were determined by subtracting an estimated annual fuel cost of \$37,440 from a total maintenance budget of \$105,000, then dividing the amount by the number of collection vehicles (four). It was assumed that annual maintenance costs for new trucks would be slightly less than existing trucks.

Scenario 1. This alternative includes the purchase of two new side-loading packer trucks which would provide fully automatic collection with the use of a mechanical arm extending from the side of the vehicle. Side-loaders would be used for collection of refuse from single-family households, and the collection of recyclables from all sectors of the City. The existing rear-loading packer trucks owned by the City would be used for all refuse collection from the commercial sector, multi-family homes (i.e., apartment buildings), institutions, and Oberlin College.

Each of the rear-loaders would be fitted with a lift arm to dump the refuse (or recycling carts) into the back of the vehicle in the event one of these trucks were needed as a backup for the side-loaders. The side-loaders would be operated with a one-person crew, while the rear-loaders would continue to require two crew members.

Scenario 2. The second scenario would also involve purchasing two new side-loaders, and also two new rear-loaders. The other aspects of scenario 2 are identical to those of scenario 1.

³ The weighted average hourly rates for commercial refuse, residential refuse, commercial recycling, and residential recycling collection in Oberlin ranged from approximately \$24/hour to \$28/hour for 2012.

⁴ This value of 2.2 FTEs compares to 1.93 FTEs required for commercial refuse collection for Oberlin based upon 2012 data, and assuming employees work a total of 2080 hours per year.

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**Figure 4-2
Side-Loading Packer Truck**



Scenario 3. The third alternative assumes the use of front-loading packer trucks for all refuse collection and collection of recyclables. Three, new front-loaders would be purchased and each truck would include a small container attached to the front forks (Curotto Can) for collection of refuse and recyclables from carts. A mechanical arm would extend from the side of the truck, grasp a cart, and then dump the cart's contents into the small container. When the container was full, it would be lifted and dumped into the front-loader.

**Figure 4-3
Front Loading Packer Truck with Small Container**



The small container would be removed from the front of the truck when servicing dumpsters at the College, apartment buildings, and businesses. This option involves the purchase of new dumpsters throughout the City and College, and would require a one-person crew for each front-loader. An existing rear-loading packer truck could be used as backup for servicing the recycling or refuse carts.

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**Table 4-1
Explanation of the Three Collection Scenarios**

	Scenarios		
	#1 - New Fully-Automated Side-Loaders & Existing Rear-Loaders	#2 - New Fully-Automated Side-Loaders & New Rear-Loaders	#3 - New Front-Loaders w/Curotto Can
New trucks			
Rear-loaders			
Capital cost		\$165,000	
# of trucks required		2	
# of crew required per truck	2	2	
Side-loaders			
Capital cost	\$225,000 ^a	\$225,000 ^a	
# of trucks required	2	2	
# of crew required per truck	1	1	
Front-loaders			
Capital cost			\$244,000
# of trucks required			3
# of crew required per truck			1
Existing trucks used...			
# used regularly	2		
# used as backup			1
Amortization period			
New trucks	7	7	7
Carts	10	10	10
New Dumpsters			10
Collection frequency			
Refuse and Recyclables	once per week	once per week	once per week
Days required to complete collection for:			
Refuse			
Single-family	3 days	3 days	3 days
Commercial, College, multi-family	5.5 days	5.5 days	5.5 days
Recyclables			
Single-family	3 days	3 days	3 days
Commercial, College, multi-family	3 days	3 days	3 days
Cardboard	5 days	5 days	5 days
Miscellaneous:			
Average route mileage	40	40	40
Miles/per gallon for collection vehicle	4	4	4
Fuel cost per gallon	\$4.00	\$4.00	\$4.00

^a The cab-over option (vs. a conventional cab) would add \$20,000 to \$30,000 to the price. Also, giving drivers the ability to get out of the cab and pick up bags of trash would add another \$30,000 to \$40,000.

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Cost Comparison of Collection Alternatives

Table 4-2 shows the estimated capital costs and annual costs for each collection alternative. While total capital costs are considerably less for scenario 1 due to the purchase of only two new trucks, total annual costs are slightly lower for scenario 3. It is important to recognize that this comparison is not designed to be a detailed analysis. Each alternative would require more research and potential adjustment in any number of cost estimates or expected performance parameters. It has been assumed that the cart system and fully automatic collection would reduce the number of days required for collection. However, prior to selection of an alternative, further investigation of this assumption is recommended. The labor costs have been calculated based upon the assumption that employees will have additional work responsibilities to fill out their work week if refuse collection (or recyclables collection) is completed in three days. This assumption will need further evaluation as well. An interest rate of 5 percent has been used for the calculation of all annualized capital costs.

Scenario 3 uses front-loaders for all collection of refuse and recyclables. These trucks are typically longer than any other packer truck and also require more overhead clearance since containers are raised above the truck to be dumped. Each route within Oberlin would need to be carefully investigated to determine if overhead utility lines, trees, or other structures would interfere with the safe operation of these trucks.

It is important to understand that the total annual costs shown in Table 4-2 cannot be directly compared to current expenses for the Oberlin solid waste program. Certain cost categories such as yard waste collection and compost facility management need to be added to the analysis in order to capture all expenses for Oberlin. The revenue from the sale of recyclables would also need to be incorporated into the calculations. However, the addition of additional cost categories will not change the relative ranking of the three scenarios presented in this report.

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**Table 4-2
Cost Comparison of Collection Alternatives**

Cost Category	Scenarios		
	#1 - New Fully Automated Side-Loaders & Existing Rear-Loaders	#2 - New Fully Automated Side-Loaders & New Rear-Loaders	#3 - New Front-Loaders w/Curotto Can
Capital Costs			
New Trucks			
# of trucks	2	4	3
Total costs	\$450,000	\$780,000	\$732,000
Lift Arm for Rear-loaders			
cost/arm	\$8,500	\$8,500	\$8,500
# of lift arms	2	2	1
Total costs	\$17,000	\$17,000	\$8,500
Carts for Recyclables			
cost/cart	\$55	\$55	\$55
# of carts (single-family)	2,200	2,200	2,200
# of carts (multi-family, businesses, & College)	600	600	600
Total costs	\$154,000	\$154,000	\$154,000
Carts for Refuse			
cost/cart	\$55	\$55	\$55
# of carts (single-family)	2,200	2,200	2,200
Total costs	\$121,000	\$121,000	\$121,000
New Dumpsters			
cost per dumpster	\$900	\$900	\$900
# of dumpsters	0	0	100
Total costs			
Total Capital Costs	\$742,000	\$1,072,000	\$1,105,500
Annual Costs			
Total Annual Amortized Capital Costs (@ 5% interest)	\$113,488	\$169,459	\$171,691
Labor for Collection			
Refuse - Single family FTEs (Full-time Equivalents)	0.6	0.6	0.6
Refuse - Multi family, businesses, & College FTEs	2.2	2.2	1.1
Recyclables - Single family and Multi family FTEs	0.6	0.6	0.6
Recyclables - Businesses & College FTEs	0.6	0.6	0.6
Cardboard – Businesses and the College FTEs	2	2	1
Wages & Benefits per employee	\$58,240	\$58,240	\$58,240
Supervisory costs	\$25,000	\$25,000	\$25,000
Total Labor Costs	\$374,440	\$374,440	\$252,136
Maintenance			
New Trucks (@ \$15,000 per truck)	\$30,000	\$60,000	\$45,000
Existing trucks (@ \$17,000 per truck)	\$33,780	\$0	\$16,890

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**Table 4-2
Cost Comparison of Collection Alternatives**

Cost Category	Scenarios		
	#1 - New Fully Automated Side-Loaders & Existing Rear-Loaders	#2 - New Fully Automated Side-Loaders & New Rear-Loaders	#3 - New Front-Loaders w/Curotto Can
Lift arms	\$1,000	\$1,000	\$500
Dumpsters	\$3,000	\$3,000	\$2,500
Refuse Disposal Costs			
Tons disposed annually	3,646	3,646	3,646
Cost/ton	\$42	\$42	\$42
Total annual disposal costs	\$153,132	\$153,132	\$153,132
Recycling Processing Costs			
Tons recycled annually	823	823	823
Cost/ton	\$37	\$37	\$37
Total annual processing costs	\$30,451	\$30,451	\$30,451
Miscellaneous			
Program Promotion/Education	\$25,000	\$25,000	\$25,000
Fuel costs	\$37,440	\$37,440	\$37,440
<i>Total Annual Costs</i>	<i>\$801,700</i>	<i>\$853,900</i>	<i>\$734,700</i>

Cost Comparisons Using Alternate Assumptions

Total annual costs were re-calculated based upon changing some key assumptions or parameters to determine the overall cost effects. The results of this sensitivity analysis which are shown in Table 4-3 suggest that total costs will change marginally, but the ranking among the three scenarios does not change. The first alternate calculation uses disposal and recyclable tonnages based upon implementation of a fully-automated cart collection with concentrated educational and green team efforts to increase recycling in the commercial and institutional sectors, and an associated 75 percent increase in recycling amounts.⁵ Using these tonnages, total annual costs were determined assuming three different costs for the recycling processing fee. As shown in the table, overall costs would be reduced by approximately \$60,000 if the processing fee were reduced to \$0 per ton.

The second alternate calculation uses all the same assumptions and tonnages as the first, except that recyclables would be picked up every other week instead of once every week. This change reduces the total costs by approximately \$35,000.

⁵ Although the average increase in recycling for Lorain County communities implementing a volume-based cart collection system was 108 percent after three years (see page 4-1), it is assumed that Oberlin's increase would be less dramatic since the City already operates a viable recycling program.

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Finally, the last set of calculations uses all the assumptions included in #2, and changes the number of days required for single-family refuse collection from 3 days per week to 4 days per week. Approximately \$12,000 is added to the total cost with this change.

Additional sensitivity analyses could be developed based upon the identification of other factors or parameters which may be variable and potentially affect the overall ranking of scenario costs. For example, two existing collection vehicles would be required under Scenario 1, none for Scenario 2, and one existing vehicle required for Scenario 3. The unneeded vehicles in each scenario could be sold for perhaps \$15,000 or more per vehicle.

**Table 4-3
Sensitivity Analysis**

	Collection Scenarios		
	#1	#2	#3
1. Year 2017 after implementation of fully-automated cart collection system			
Tons disposed	2,980	2,980	2,980
Total disposal costs	\$125,200	\$125,200	\$125,200
Tons recycled	1,440	1,440	1,440
Total annual costs			
@ \$37/ton recycling processing	\$796,600	\$848,800	\$729,600
@ \$15/ton recycling processing	\$764,900	\$817,100	\$697,900
@ \$0/ton recycling processing	\$743,300	\$795,500	\$676,300
2. Recyclables picked up every other week (other assumptions same as #1)			
Total annual costs			
@ \$37/ton recycling processing	\$761,700	\$813,800	\$694,700
@ \$15/ton recycling processing	\$730,000	\$782,200	\$663,000
@ \$0/ton recycling processing	\$708,400	\$760,600	\$641,400
3. Four days required for single-family refuse collection (other assumptions same as #2)			
Total annual costs			
@ \$37/ton recycling processing	\$773,300	\$825,500	\$706,300
@ \$15/ton recycling processing	\$741,600	\$793,800	\$674,600
@ \$0/ton recycling processing	\$720,000	\$772,200	\$653,000

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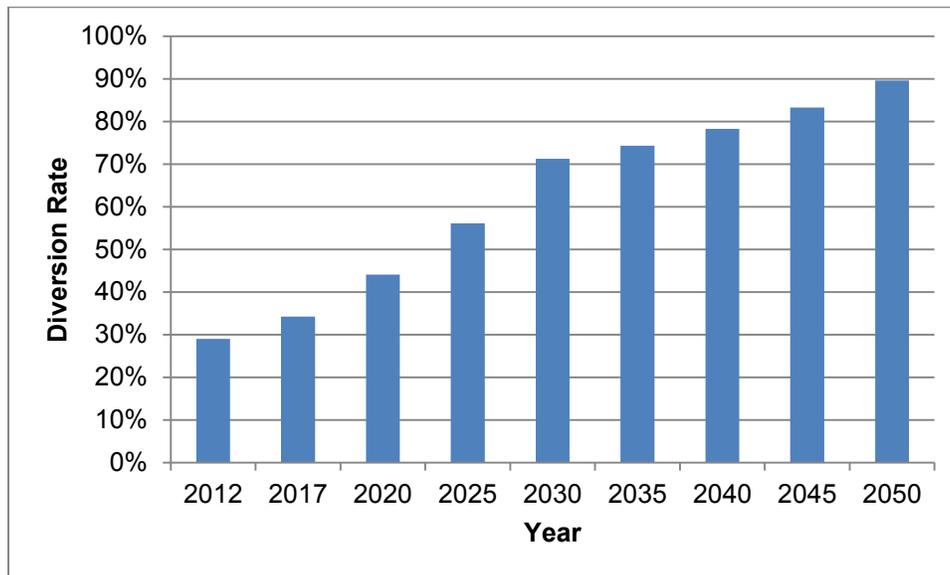
SECTION 5 – MOVING TOWARD ZERO WASTE

Moving toward zero waste is the goal for the City of Oberlin and the RCRC. The City has established a diversion goal of 90 percent by 2050, with a series of interim goals to be achieved prior to this date. This section of the ZWP will outline alternatives and options to consider in following a road map to achieve significant waste diversion on the path to zero waste. This section also presents percentage goals for reduction of waste disposal. Goals are expected to continually challenge the City and provide incentives for additional waste diversion. Both short-term and long-term goals for the City with regard to zero waste are discussed in this section.

Percentage Goals, Long-term vs. Short-term: How do we get there?

Figure 5-1 shows the current diversion rate using 2012 data, and projected diversion in subsequent years based upon the implementation of a variety of programs and expected recovery rates and/or a reduction in waste generation. For example, the increase in diversion for year 2017 assumes that a fully-automated cart collection system will be implemented in Oberlin in 2015 and a considerably higher recovery rate for recyclables would be achieved within three years.

**Figure 5-1
Projected Diversion Rates**



More detailed calculations of the diversion rates throughout the planning period can be found in Table 5-1. Total generation decreases throughout the planning period based upon the projected reuse and source reduction quantities. Disposal projections have been determined by deducting total recovery from total generation.

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**Table 5-1
Projections for Recovery, Disposal, and Diversion: 2012 – 2050**

Materials Recovered	Year								
	2012	2017	2020	2025	2030	2035	2040	2045	2050
Recyclables	823	1,069	1,512	1,976	2,396	2,396	2,396	2,396	2,396
Rubber	73	74	74	75	76	77	77	78	79
Wood	0	16	17	18	19	20	21	22	23
Yard waste	467	472	476	481	486	486	486	486	486
Food waste	109	110	141	219	439	439	439	439	439
Total Recovery	1,472	1,741	2,221	2,770	3,416	3,417	3,419	3,421	3,423
Disposal									
	3,646	3,351	2,820	2,171	1,377	1,183	951	687	398
Reuse/source reduction	0	26	51	101	148	192	230	262	288
Total generation	5,118	5,092	5,041	4,940	4,792	4,600	4,370	4,108	3,821
Diversion rate	29%	34%	44%	56%	71%	74%	78%	83%	90%

Table 5-2 complements the projections in Table 5-1 by providing additional information for each of the programs to be implemented and diversion/recovery assumptions incorporated into the analysis.

**Table 5-2
Summary of Programmatic Alternatives**

Program Description	Year of Implementation	Assumptions
Education/Green teams – reuse/source reduction	2014	<ul style="list-style-type: none"> - 0.5% of total generation reduced by 2017 - 1% of total generation reduced by 2020 - 3% of total generation reduced by 2030 - 7% of total generation reduced by 2050
Data tracking	2014	<ul style="list-style-type: none"> - Initiate more comprehensive data management program for all areas of the solid waste stream and C&D programs
Education/Green teams – wood recovery	2014	<ul style="list-style-type: none"> - 5% recovery rate in 2017 - After 2017, 5% increase in recovery every 5 years
Fully-automated cart collection system; concentrated educational and green team efforts; increased cardboard recovery	2015	<ul style="list-style-type: none"> - 30% increase in current recycling by end of 2017 - 30% of total generation recovered through recycling by 2020 - 40% of total generation recovered through recycling by 2025 - 50% of total generation recovered through recycling by 2030 then constant recovery rate

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Program Description	Year of Implementation	Assumptions
Education/Green teams – rubber recovery	2015	- 1% increase in scrap tire recycling every 5 years
Yard waste program - education	2016	- 1% increase in recovery each 5 years until 2030; after 2030, constant recovery rate
Food waste pilot program	2020	- 100 families in program, 10 pounds collected from each family weekly - 200 pounds collected weekly from restaurants, groceries, and institutional cafeterias
Full-scale food waste program	2022	- 30% recovery rate of food waste generation by 2025 - 60% recovery rate of food waste generation by 2030
ZWP Reassessment and update	Every 5 years	- Evaluate success of each program, including rate of diversion - Assess need to revise goals - Assess need to revise or add new programs such as conversion technologies (e.g., anaerobic digestion, etc.) to divert more materials from disposal - Evaluate possibility of including C&D materials in goals and projections for waste diversion

The remainder of this section discusses the implementation of the ZWP in greater detail and the programs recommended in order to achieve the percentage diversion rates shown in Figure 5-1 and Table 5-1. The implementation of the ZWP has been divided into three phases. Most programs are recommended for initiation in one phase, and then continued in the next phase. Alternatively, certain portions of a program may be implemented in one phase while other parts of a program are to be implemented in the subsequent phase.

Phase 1: 2014 through 2020

Phase 1 programs and projects should be initiated in the year indicated in the tables below. However, if following this schedule is not possible, implementation in a later year within Phase 1 is recommended as an alternative. A summary of Phase 1 programs is shown in Table 5-3.

**Table 5-3
Summary of Phase 1 Programs**

Program No.	Description	Year Initiated	Responsible for implementing
1	Business plan for fully-automated cart collection system	2014	City of Oberlin, Dept. of Public Works
2	Oberlin College Waste Management Recommendations	2014, ongoing	Oberlin College

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**Table 5-3
Summary of Phase 1 Programs**

Program No.	Description	Year Initiated	Responsible for implementing
3	Implement the Strategic Plan	2014 and ongoing	City of Oberlin, Dept. of Public Works
4	Waste audits	2014	City of Oberlin, Dept. of Public Works
5	Data Tracking and Management	2014 and ongoing	City of Oberlin, Dept. of Public Works
6	Recycling processing fee and landfill disposal fee	2014	City of Oberlin, Dept. of Public Works
7	Special wastes, electronics, and HHW	2014	City of Oberlin, Dept. of Public Works
8	Reuse and Source Reduction Programs	2014, ongoing	City of Oberlin, Dept. of Public Works
9	Fully-automated cart collection system	2015	City of Oberlin, Dept. of Public Works
10	Rubber recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works
11	Wood recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works
12	Yard waste management	2016, ongoing	City of Oberlin, Dept. of Public Works
13	Maximizing recycling and waste reduction in City buildings and downtown	2017, ongoing	City of Oberlin, Dept. of Public Works
14	Multi-family residential recycling	2018	City of Oberlin, Dept. of Public Works
15	Business plan for food waste recovery pilot program	2019	City of Oberlin, Dept. of Public Works
16	Food waste recovery pilot program	2020	City of Oberlin, Dept. of Public Works

Each of the programs listed in Table 5-3 is discussed in the following paragraphs.

Program No.	Description	Year Initiated	Responsible for implementing
1	Business plan for fully-automated cart collection system	2014	City of Oberlin, Dept. of Public Works

During the first quarter of 2014, the City should develop (or contract to have developed) a detailed business plan for implementation of the fully-automated cart collection system. The plan should specify the types and numbers of trucks to be purchased, and the features to be included for each truck including the capacity. The business plan should also specify the size, number, and color of carts for both refuse and recyclables. A routing analysis should be undertaken to improve (or maintain) cost effectiveness, and help to determine the number of routes and trucks needed to service Oberlin residents, businesses, and

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institutions. An overall detailed cost analysis should also be included within the business plan. The development of the business plan needs to be closely coordinated with Facilities Operations and the Office of Environmental Sustainability at Oberlin College to address the College's needs. The City may also want to work closely with the owners of apartment buildings to ensure that the needs of the owners and tenants will be met by the cart collection system. (See Program No. 14 in Phase 1 for further discussion of recycling at apartment buildings.)

Program No.	Description	Year Initiated	Responsible for implementing
2	Oberlin College Waste Management Recommendations	2014, ongoing	Oberlin College

As described in Section 3 of this report, Oberlin College currently operates a number of programs designed to reduce the amount of waste requiring disposal. The majority of these activities are conducted by, or at least associated with, Facilities Operations and the Office of Environmental Sustainability. The following activities are suggested for the College's consideration to supplement the success of existing programs, recognizing that the College may currently be implementing many of these activities to varying degrees.

- **Recyclables collection.** As described above, the College should be consulted when the City develops the business plan for the cart collection system. The College would need to determine the proper placement of these carts.¹ In general, refuse and recycling containers (or carts) should be paired so that students, faculty, and staff always have an opportunity to select the proper container. Proper and consistent labeling is also critical for reducing contamination and improper placement of waste materials.
- **Waste sorts.** These events should be conducted in high-visibility areas so students can view the process and ask questions. As a result, waste sorts can be useful as an awareness tool, as well as a planning tool to determine which recyclable materials are being disposed or which buildings may benefit from more education regarding proper placement of refuse and recyclables as well as delivery to the loading dock for pickup. The findings from waste sorts should be publicized through means such as a posting in the student/local paper, and by creating a display for the campus library or frequently visited building which illustrates the sorting results.

¹ Carts should be different colors to minimize contamination. For example, black carts should be used for refuse, blue carts for recycling, and green for organics.

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- **Early education.** The College should send a clear message to new students as soon as possible about waste reduction. Figure 5-2 shows a scene from Ohio University's move-in weekend.

Figure 5-2
Ohio University's Move-in Weekend



- **Interaction with Other Colleges.** If not already a member, the College or the Office of Sustainability should consider subscribing to the "College and University Recycling Coalition" (or CURC). There is no charge for becoming a member of this organization and utilizing the resources offered through its website. The website presents information on recycling and waste reduction programs at college and university campuses as well as related topics of interest to persons responsible for planning and implementing such programs. For example, webinars are offered for such topics as food waste recovery and recycling bins. The CURC also includes a listserv which can be subscribed to at no charge; subscribers can pose troubleshooting questions to a national group of peers and obtain quality feedback. The website address for the listserv is:

<http://www.curc3r.org/resources/recyc-l-listserv>

- **Higher than normal disposal.** The College should consider taking steps to identify instances when campus disposal is higher than usual (e.g., move-in, move-out, before breaks, etc.), and increase diversion efforts during these periods. Student volunteers can assist facilities

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management staff and haulers by coordinating efforts; volunteers can focus efforts on affected dumpsters/sites, pull out recycling and reusable materials from dumpsters, and help educate students who are improperly disposing of materials. Donation stations should be set up around dorms and in some places that are accessible to off-campus students for non-perishable food items, clothing, furniture, and other reusable items. This effort is underway to some extent by the Resource Conservation Team (RCT) and should be continued and expanded. (See Figure 5-3.)

**Figure 5-3
Donation Station at a College**



The College should begin educating students well before “higher than normal disposal periods” (i.e., move-out or breaks), and encourage students to plan ahead in order to take advantage of diversion opportunities. Communication efforts regarding diversion opportunities could include: (1) mass-emails, (2) posters on bulletin boards, (3) Facebook events/social media, and (4) hanging a bag (grocery stores will usually donate these) a week before move out on each occupied dorm door knob with a note attached including instructions. Students would be asked to fill the bag with reusable items they don’t plan on taking with them after they move, and a list of locations for depositing the bag when it is full.

- **Food waste recovery.** As described in Section 3, the College has an ongoing food waste recovery program. Expansion of this program should be considered to recover post-consumer food waste during peak dining hours as well as food waste from additional sources on campus. Although food waste is currently collected and hauled off-campus, the College could explore the possibility of on-site processing with in-vessel composting

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options such as the “EarthTub,” a model used by Youngstown State University. The EarthTub is advertised as, “...ideal for composting at schools, universities, restaurants, hospitals and supermarkets.” There are several other in-vessel composting technology options for the college to consider.

- **Sporting events, concerts, etc.** The College should inventory campus events that are not zero-waste, prioritize by the amount of waste generated at each event, and identify strategies to improve diversion. The College should consider an “Adopt-a-Game” program for basketball games and other sizable sporting events; student groups and organizations can “adopt” home games and volunteer to take trash and recycling from spectators in stands before it is improperly disposed. Volunteers carry a trash and recycling bag and provide proper sorting as they collect materials. Results can be weighed or full bags can be counted so student groups could compete with one another to determine who diverted the most materials.
- **Data collection.** The success of any waste management program cannot be properly determined without data. The College should consider developing a program to collect information for the amount and types of waste disposed, recycled, and reused. The management of construction and demolition materials should be included in the data collection efforts. The compilation and subsequent analysis of data, supplemented with the findings from waste sorts, can provide very useful information for re-focusing existing programs or implementing new programs. The College and the City should also consider establishing a system (or process) for sharing data collection results.

Program No.	Description	Year Initiated	Responsible for implementing
3	Implement the Strategic Plan	2014 and ongoing	City of Oberlin, Dept. of Public Works

The Strategic Plan presented in Section 1 was prepared as a guide for the RCRC to help focus their efforts to achieve zero waste. The first goal of the Strategic Plan is to draft a ZWP which was reviewed by the RCRC. The alternatives and programmatic options were debated and revised based upon comments and suggestions from the RCRC and City of Oberlin staff. The ultimate goal is to finalize and present the ZWP to City Council for consideration and adoption. The ZWP should be a living document and not constrained by outdated information or programs. As the waste technologies and industry changes, this ZWP should be adjusted by the RCRC. The remaining goals of the Strategic Plan are discussed below.

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- Goal 2 of the Strategic Plan is to provide assistance to commercial, institutional, and industrial “green teams” that are focused on waste diversion in their organizations. The RCRC and City should approximately once each calendar quarter invite green teams or environmental managers to make presentations at RCRC meetings to explain their plans for waste diversion. The City recycling coordinator and the RCRC could also invite other individuals from the College, local businesses, etc. to these meetings who may have expertise related to the waste diversion issues faced by the company or institution making the presentation.

Representatives from companies and institutions that are without environmental managers or green teams should also be identified by the City recycling coordinator and invited to an RCRC meeting so that the goals of the ZWP can be explained, and options for waste diversion can be explored. These companies and institutions may be identified through one or more of the following:

- Business Round Table
- Paper Survey
- Social Networking
- Public Forums
- Identification of Largest Generators in Oberlin

The City recycling coordinator may participate in the establishment of green teams directly, or do so indirectly by organizing groups of volunteers who would work with green teams. Ideally, volunteers would have some degree of expertise related to the type of company, organization or activity for which a green team is being established, and perhaps could be recruited from businesses and Oberlin College for short-term participation. As contact with more green teams and/or environmental managers is established, the City should be able to compile a database of individuals with expertise in implementation of recycling and waste reduction programs who would be willing to volunteer a limited amount of time towards ZWP implementation. The City recycling coordinator would contact these individuals to request their assistance in providing technical assistance.

The development of green teams and volunteers who would provide assistance to green teams is critical to the long-term success of the ZWP. Diversion of materials from disposal will become more difficult as the City moves closer toward the ultimate goal of 2050, and the involvement of green teams within businesses, schools, and other institutions will grow in importance.

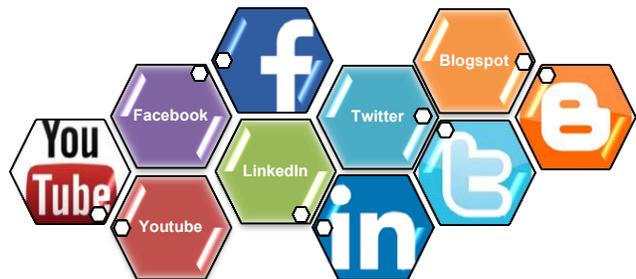
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The RCRC may consider the following steps for creation and implementation of green teams:

- Step 1:* A kickoff meeting with the selected candidate company or institution should be held to describe the goals and objectives of the RCRC. The role of the RCRC in assisting the candidate green team should be discussed. (RCRC must clearly define their role in this process prior to engaging discussions with a candidate.)
- Step 2:* The current ZWP should be presented along with the current strategic plan and mission statement.
- Step 3:* Meeting 2 should include a brainstorm session with the candidate green team to identify appropriate goals, objectives and even a mission for the Green Team. For example, a goal could be to inventory waste generation and diversion programs.
- Step 4:* Meeting 3 should include a tour of the candidate's facilities.
- Step 5:* Meeting 4 should include benchmarking of improvements in managing waste.

Section 1 of the ZWP includes further discussion of the use of green teams.

- Goal 3 of the Strategic Plan is to develop a detailed outreach program through social media. The RCRC should work closely with the Public Works Department to develop a program via social media to reach most residents and businesses in Oberlin. The objective is to publicize the ZWP and the goals outlined in the in the Plan. The program should consider the following social media and internet opportunities as a start.



- Upgrade website for RCRC
- Twitter
- Facebook
- BlogSpot
- LinkedIn
- YouTube

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- Goal 4 of the Strategic Plan is to Identify needed processing or waste management facilities. The RCRC should work with the City Public Works department to identify specific waste diversion and zero waste planning needs. The opportunities and needs identified by the RCRC should be presented to the following:
 - City Council
 - Lorain County Policy Committee
 - Lorain County Commissioners
 - Other Political Subdivisions

The list of waste management facilities should be developed before the end of 2013 and presented to the Lorain County Solid Waste Management Policy Committee in late 2013 or early 2014 meetings to ensure consideration in the next solid waste plan update.

Program No.	Description	Year Initiated	Responsible for implementing
4	Waste audits	2014	City of Oberlin, Dept. of Public Works

Waste audits can provide better understanding of the materials which are in the trash, and determining the types of materials available for recovery. The material-specific generation estimates for Oberlin presented in this report are all based upon national statistics which may not be entirely applicable to the City. Conducting one or more waste audits early in Phase 1 should allow better design of and expectation from recycling and waste diversion programs.

The City could provide all the resources necessary to conduct waste audits, or instead serve as the organizer and supervisor of waste audits, with groups of volunteers who would be responsible for performing the sorting and characterization. Students from Oberlin College may be a possible source of volunteers, and this option should be explored in conjunction with the College's Office of Environmental Sustainability. College "credit" for participation by student volunteers should be explored as well.

Program No.	Description	Year Initiated	Responsible for implementing
5	Data Tracking and Management	2014 and ongoing	City of Oberlin, Dept. of Public Works

The City should consider developing a more comprehensive data collection program in order to track the amounts and types of materials disposed, recycled, and reused. The ability to separate data by sector (e.g., single-family residential, multi-family residential, commercial, and institutional) could also be important for

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making adjustments to recycling and waste reduction programs or adding new programs. Data tracking and management should include exploring methodologies to measure the amount of source reduction and reuse. Data collection efforts for construction and demolition materials generated from the City as well as private sector projects should be initiated. More complete disposal, recycling, and reuse data will be very helpful in future program development and measuring success for ZWP implementation.

Program No.	Description	Year Initiated	Responsible for implementing
6	Recycling processing fee and landfill disposal fee	2014	City of Oberlin, Dept. of Public Works

The City currently pays \$37 per ton for co-mingled recyclables delivered and deposited at the Republic Recycling Facility. The City should explore the possibility of negotiating a lower cost for processing recyclables through a multi-year contract with a recycler and materials processor. (See the end of Section 5 for further discussion of this topic and the potential cost savings resulting from a lower recycling processing fee.) Oberlin should also consider negotiating a long-term contract for solid waste disposal.

Program No.	Description	Year Initiated	Responsible for implementing
7	Special wastes, electronics, and HHW	2014	City of Oberlin, Dept. of Public Works, Lorain County SWMD

The City currently has access to the Lorain County Collection Center which provides a drop-off location for electronics, tires and HHW materials. Section 2 of this report shows that Oberlin residents use the Collection Center. However, having a similar type facility located closer to Oberlin in the southern part of the County would likely increase participation from City residents and increase the recycling of old computers, scrap tires, paints, and other items. In early 2014, the RCRC should explore the establishment a second facility of this nature with the Lorain County SWMD to provide greater access to County residents. Having this discussion with the SWMD at the beginning of the SWMD plan update process may improve the chances for locating a facility close to Oberlin.

Program No.	Description	Year Initiated	Responsible for implementing
8	Reuse and Source Reduction Programs	2014, ongoing	City of Oberlin, Dept. of Public Works

The City currently promotes reuse of materials through participation in activities such as “Pride Day” and works with the College to promote other events associated with reuse or source reduction. The City should consider continuing these special reoccurring recycling collection events, including annual document

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shredding and Styrofoam collection in the fall. These events are important for the types of materials which are recovered and the opportunity to increase awareness for greater recycling and waste diversion.

In conjunction with the data tracking and management, one of the first objectives for this program should be a focus on data collection to document the amount of reuse and source reduction resulting from existing activities, whether it is a one-time event or an established organization such as Habitat for Humanity.

Expanding reuse and source reduction opportunities will likely be dependent upon green teams providing assistance to businesses, institutions, and perhaps Oberlin College. According to U.S. EPA, "...Waste audits are the key to establishing a successful source reduction program. They involve assessing the material flow..." Green teams could actually perform waste audits, or simply provide education to a company's or organization's employees for conducting a waste audit and the associated benefits.

The City should also consider other opportunities for expanding reuse and source reduction. Continued promotion of Habitat for Humanity and "Swap" events hosted by the College is important. Although usually associated with industry, a formal waste exchange with materials listed in an online database could increase reuse within the residential and commercial sectors, and could be developed through a green team working with a host organization or institution.

Some cities in the United States have established programs to repair all types of items which otherwise would be disposed. Volunteers, who have expertise in fixing computers, household appliances, tools, toys, etc. come together once a month and provide free repair services. "Community Glue" is an example of this type of project which could serve as a model for the City. (See <http://communityglueworkshop.org/> for the website of Community Glue.)

The amount of reuse and source reduction achieved by the City and incorporated into the percentage goal projections is based upon the development of programs to begin measuring reuse and source reduction, and the implementation of programs such as those described above. It is assumed that 0.5 percent of total generation could be reused or source reduced by 2017, and by 2035 would increase to 4 percent. Finally, the projections show that 7 percent of total generation would be reduced by 2050.²

² Based upon a credit program developed by the State of Maryland, a 7 percent reduction by 2050 seems reasonable. Maryland has currently established a maximum credit of 5 percent for reuse and source reduction activities, and based upon their checklist of activities, achieved a statewide source reduction credit of 3.4 percent in 2005.

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Program No.	Description	Year Initiated	Responsible for implementing
9	Fully-automated cart collection system	2015	City of Oberlin, Dept. of Public Works

One of the most important options for increasing recovery of recyclables is the implementation of a fully-automated cart collection system for the City of Oberlin. It is expected that such a system with carts provided to each household for both refuse and recycling will substantially improve recycling. Carts for collection of recyclables would also be provided to multi-family dwellings (i.e., apartment buildings), Oberlin College, institutions such as schools, and businesses within the City. An increase in recycling would also be expected from these entities by using carts for recyclables collection.

After the initial increase in recycling, it is assumed that further increases can be achieved through education efforts and greater familiarity of the system.³ By the year 2025, a 40 percent recovery rate of total generation is projected. Currently, few curbside recycling programs are able to achieve greater than 40 percent recovery; however, with the consistent use of green teams and continual, focused educational efforts, it is projected that an ultimate recovery rate of 50 percent for recyclables can be realized by the year 2030.

Program No.	Description	Year Initiated	Responsible for implementing
10	Rubber recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works

Based upon national statistics, rubber materials⁴ comprise approximately 8.2 percent of the solid waste stream. Since a substantial portion of this category is represented by scrap tires which have been banned from landfill disposal in Ohio, it is likely that much of this material is already being recovered or recycled. The amount of rubber recovery for 2012 is based upon an estimate of scrap tire recycling for City residents and this amount is projected to increase at the rate of one percent every five years. Achieving the projected recycling rates for rubber will be dependent upon residents continuing to deliver scrap tires to drop-off locations, developing detailed information concerning other forms of rubber as well as leather and textiles which is in the solid waste stream in Oberlin, and can be reduced or recycled. Education will be a key component of the success of these efforts.

³ Lorain County communities implementing a fully-automated cart collection system have increased recycling an average of 108 percent after three years. However, a much lower rate of 30 percent increase has been assumed for Oberlin since the City has operated a recycling program for a number of years. Also, directly comparing Oberlin with other Lorain County communities is not possible because Oberlin's data includes recyclables from the College and the commercial sector (which may be substantial).

⁴ Leather and textiles also comprise a small portion of this category.

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Program No.	Description	Year Initiated	Responsible for implementing
11	Wood recovery program	2015, ongoing	City of Oberlin, Dept. of Public Works

Wood recovery is not currently documented for the City, so the projections assume an initial recovery rate of five percent by 2017, and then a five percent increase in recovery every five years for the remainder of the planning period.

Achieving the projected recycling rates for wood will be dependent upon developing accurate data collection techniques, and education programs with volunteer and/or green team participation. Nationwide, U.S. EPA estimated that approximately 15.9 million tons of wood materials were generated as solid waste in 2010, with a recovery rate of only 15 percent. Potentially, the City of Oberlin has an opportunity to increase recovery of wood substantially by first developing a program to inventory the type of wood being discarded as solid waste (i.e., pallets, construction materials, wooden furniture, cabinets, etc.), and then putting together programs to prevent these materials from being landfilled. Small businesses which utilize reclaimed or salvaged wood are increasingly common-place across the country, and also have the potential of adding jobs to the local economy.

Program No.	Description	Year Initiated	Responsible for implementing
12	Yard waste management	2016, ongoing	City of Oberlin, Dept. of Public Works

The City already achieves a relatively high recycling rate for yard waste (approximately 69 percent in 2012). This analysis has assumed that yard waste recovery could be increased by one percent every five years until 2030 with educational efforts. Then the recovery rate would remain constant through the remainder of the planning period.

In order to reduce the generation of yard waste, the City could promote residents' participation in sustainable landscaping programs. Such programs represent a "whole systems approach" to the design, construction, and maintenance of the landscape in order to reduce the generation of waste and increase recycling of materials, as well as reduce storm water runoff and create wildlife habitat.

Program No.	Description	Year Initiated	Responsible for implementing
13	Maximizing recycling and waste reduction in City buildings and downtown	2017, ongoing	City of Oberlin, Dept. of Public Works

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The City should consider helping to maximize waste reduction, recycling and composting at all City buildings, including leased buildings, and at all City events by adopting the following:

1. Ensure that every City department is equipped with the appropriate recycling containers and undergoes basic training on how and where to recycle.
2. Initiate a recognition program to encourage City departments to recycle 100% of recyclable materials.
3. Ensure that all City departments coordinate event planning with the City's Public Works Department. The Public Works Department could agree to provide the appropriate recycling containers as well as compostable utensils, cups, plates, etc. once a composting program is in place.
4. Limit the use of single-use plastic beverage bottles in City buildings and at City events.
5. Keep records regarding City government paper use and limit its consumption by ensuring that "duplex" is the default setting for all printers and copiers, and by encouraging the electronic distribution of documents whenever possible.

The City should also ensure that the downtown area has a sufficient number of trash and recycling receptacles for the public, and these receptacles are clearly labeled.

Program No.	Description	Year Initiated	Responsible for implementing
14	Multi-family residential recycling	2018	City of Oberlin, Dept. of Public Works

The City should continue providing recycling assistance to multi-family residential buildings, and potentially expanding the services offered. Assistance could include:

1. Providing on-site assistance and containers for building managers to set up recycling and composting systems in existing buildings.
2. Designing model lease language that outlines the responsibility of both building managers to provide recycling systems and of tenants to properly recycle waste.
3. Organize tenant meetings to provide recycling education and training.
4. Develop standards to ensure new and remodeled buildings are designed to include appropriate space and facilities for recycling and green waste receptacles/systems.
5. Enact a local ordinance requiring managers of multi-family buildings to provide tenants with the opportunity to recycle, including the provision of the appropriate receptacles and tenant education.

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6. Integrate a “waste audit” into local efforts to conduct residential energy audits (such as through POWER). The waste audit would be designed to educate tenants regarding what materials can and cannot be recycled and when and where to recycle.

Program No.	Description	Year Initiated	Responsible for implementing
15	Business plan for food waste recovery pilot program	2019	City of Oberlin, Dept. of Public Works

Oberlin College operates a food waste collection program which currently sends 109 tons annually to a facility for composting. Substantial opportunity exists within the City for increasing the amount of food waste recycling as the total amount of food waste generated is estimated at slightly more than 730 tons using national generation statistics.

Initially, the City should consider the implementation of a pilot program for food waste collection in 2020. This program would include only a limited number of households (100 families has been assumed in this analysis) and a subset of the restaurants, groceries, and institutional cafeterias within the City.

A detailed implementation plan for the food waste recovery pilot program needs to be developed prior to 2020. The households and businesses to be included in the pilot program must be identified, with routing information for collection of materials. The vehicle (or vehicles) used for collection, types of containers or carts for the food waste, and the destination for the materials (i.e., composting facility, anaerobic digester, etc.) must also be determined. The City may consider the option of contracting with a private hauler for collection of the food waste.

Program No.	Description	Year Initiated	Responsible for implementing
16	Food waste recovery pilot program	2020	City of Oberlin, Dept. of Public Works

During the pilot program, recovery rates and participation rates would be tracked and used to make predictions regarding full-scale implementation of food waste recovery. In addition, participants would be surveyed to elicit comments, suggestions, and problems which could all be used to improve the program.

Phase 2: 2021 through 2030

The programs recommended for implementation in Phase 1 should be continued in Phase 2. Most of these programs are not individually listed below, but referenced in

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Table 5-4 through Program No. 1, “Ongoing waste reduction and recycling programs.” A summary of the programs in Phase 2 are shown in Table 5-4.

**Table 5-4
Summary of Phase 2 Programs**

Program No.	Description	Year Initiated	Responsible for implementing
1	Ongoing waste reduction and recycling programs	2021	City of Oberlin, Dept. of Public Works, Oberlin College
2	Waste audits – continued	2021	City of Oberlin, Dept. of Public Works
3	Business plan for full scale implementation of food waste recovery program	2021	City of Oberlin, Dept. of Public Works
4	Food waste recovery program – full scale implementation	2022	City of Oberlin, Dept. of Public Works
5	Construction and demolition materials	2023	City of Oberlin, Dept. of Public Works
6	Procurement policy	2023	City of Oberlin, Dept. of Public Works
7	Regional facilities – transfer station	2025	City of Oberlin, Dept. of Public Works, Lorain County SWMD
8	Regulatory and financial incentive options	2025	City of Oberlin, Dept. of Public Works
9	ZWP reassessment and update	2025, or sooner as needed	City of Oberlin, Dept. of Public Works
10	Strategic plan re-evaluation	2025, or sooner as needed	City of Oberlin, Dept. of Public Works

Programs 2 through 10 listed above in Table 5-4 are discussed in the following paragraphs.

Program No.	Description	Year Initiated	Responsible for implementing
2	Waste audits – continued	2021	City of Oberlin, Dept. of Public Works

The results from waste audits can be increasingly important as a community implements a ZWP, especially after initiation of a major recycling or waste reduction program. The materials in the waste stream which are easiest to recover or reduce are typically addressed first and usually provide the largest increases in the diversion rate. Eventually, recovery becomes more difficult, but waste audits can provide much needed assistance in determining the proper focus of future recovery and reduction efforts. Periodic waste audits conducted for residential and commercial sectors’ refuse could identify the need for recovery

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programs aimed at specific materials, or perhaps less effort devoted in another area.

Program No.	Description	Year Initiated	Responsible for implementing
3	Business plan for full scale implementation of food waste recovery program	2021	City of Oberlin, Dept. of Public Works

The business plan for full-scale implementation of this program would be similar to the plan developed for the pilot program. Experience gained from the pilot program as well as information from other cities which have implemented food waste recovery programs should be incorporated into this plan.⁵

Program No.	Description	Year Initiated	Responsible for implementing
4	Food waste recovery program – full scale implementation	2022	City of Oberlin, Dept. of Public Works

Full-scale implementation of a food waste collection program for all residents, businesses, and institutions would occur in 2022, and could involve the provision of another cart which would allow all organics (food waste and yard waste, with the exception of branches and brush) to be collected in a single container. This analysis has assumed that a 30 percent recovery rate for food waste could be achieved by 2025, and a 60 percent recovery rate by 2030.⁶ The implementation of full-scale food waste collection would add approximately \$100,000 annually to the City's solid waste program. This cost estimate includes the cost of providing another cart for food waste, the labor costs for operating another route, and estimated fuel costs.⁷

The success of a food waste collection program for the City is partly dependent upon the siting, construction, and operation of a Class II composting facility near Oberlin, preferably in the southern section of the county. The Lorain County Solid Waste Management District has solicited proposals for an organic waste facility to be built within Lorain County, and having a facility located near Oberlin would reduce transportation costs for food wastes and improve the financial feasibility of this program. The City could also evaluate the feasibility of a joint

⁵ Pilot programs for food waste collection as well as full-scale collection programs have been implemented in other cities, and Oberlin should take full advantage of the lessons learned and experience gained in these other cities.

⁶ A study conducted in England and Northern Ireland in 2009 showed that recovery of food waste from households averaged 59 percent during collection trials. Based upon this study, it seems reasonable to assume that full-scale implementation and the inclusion of commercial entities (i.e., restaurants and groceries) would allow an overall recovery rate of 60 percent to be achieved.

⁷ The potential need of adding another collection vehicle to Oberlin's fleet has not been analyzed and is beyond the scope of this study. It is possible that an additional vehicle would not be necessary.

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project with the Oberlin wastewater treatment plan to divert commercial food waste to an anaerobic digester.

Surveys were mailed to 126 businesses and institutions in Oberlin in order to obtain information regarding their current recycling and food waste management programs, and also to determine interest in a food waste collection program. Only eight surveys were returned, but at least two of the returned surveys indicating an interest in food waste recovery represented by companies/institutions with the potential for large amounts of food waste generation.

In addition to food waste collection, the City could explore the feasibility of initiating a local “excess harvest program” in which residents are encouraged to donate excess produce from gardens and fruit trees to local food banks and homeless assistance programs. Such a program not only has the potential of supplementing the food supply in the City, but also decreasing the generation of food waste.

Program No.	Description	Year Initiated	Responsible for implementing
5	Construction and demolition materials	2023	City of Oberlin, Dept. of Public Works

Construction and demolition materials can be generated in large quantities in some communities, and can provide opportunities for substantial amounts of recycling and reuse. Recycling Construction and Demolition Wastes: A Guide for Architects and Contractors estimates that “...90% to 95% of all construction and demolition waste materials can be recycled.” Nationwide, approximately one-half of C&D results from construction and renovation projects, while demolition projects also contribute about one-half of the total.

The City should consider developing:

- a data collection system for C&D materials in order to track the amount generated, disposed, recycled, and reused. This type of information would facilitate establishing higher rates of recovery.
- a materials recycling specification for all construction and demolition projects within its jurisdiction. Once established, private sector construction and demolition projects could also be encouraged to adopt the specification.
- incentives within the materials recycling specification to promote private sector adoption. There are a number of examples of incentives used by cities across the country which could be investigated by Oberlin for possible inclusion in this policy.

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- a means to provide technical assistance to contractors and construction firms to improve recycling of construction and demolition debris, giving priority to salvage and reuse of materials.

Program No.	Description	Year Initiated	Responsible for implementing
6	Procurement policy	2023	City of Oberlin, Dept. of Public Works

The City has an existing procurement policy which was adopted almost 20 years ago. The City should consider re-visiting this policy and incorporating some financial incentives for the purchase of recycled-content products and broadening its scope. As discussed in Section 2 of this document, up-to-date procurement policies are often known as “environmentally preferable” purchasing policies, and address a wide array of materials. Such a policy could also be used to help determine the type of services to provide to City residents and businesses. Efforts should be made to encourage private sector businesses and other institutions to adopt similar policies. The direct impact from procurement (or environmentally preferable) policies may not be large and many times not immediate, but they can help to improve markets for recycling and send a message to the public that recycling can make a difference.

Program No.	Description	Year Initiated	Responsible for implementing
7	Regional facilities – transfer station	2025	City of Oberlin, Dept. of Public Works, Lorain County SWMD

The City should consider asking the Lorain County SWMD to evaluate the feasibility of siting a transfer station within Lorain County. Such a facility may reduce transportation costs enough that Oberlin, in addition to other communities in the County, could consider additional options for landfill disposal in the future.

Program No.	Description	Year Initiated	Responsible for implementing
8	Regulatory and financial incentive options	2025	City of Oberlin, Dept. of Public Works

The City could explore a number of regulatory options as well as financial incentives to improve recycling and waste reduction. It may be advisable to consider these types of approaches after the results from programs such as the cart collection system and food waste recovery can be evaluated. Some examples of options are listed below.

- **Commercial recycling.** In order to ensure that commercial tenants have the opportunity to recycle, the City could enact a local ordinance requiring

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managers of commercial buildings to provide a recycling option, including the provision of shared storage containers and tenant education.

- **Mandatory recycling and composting.** San Francisco’s Mandatory Recycling and Composting Ordinance requires San Francisco residents and businesses to properly separate recyclables and compostables, and prohibits placing these materials in refuse (or trash) carts.
- **Mandatory recycling at public events.** The City could explore adoption of mandatory recycling at all public events. As part of this program, organizers would be required to develop recycling plans, and the City could provide recycling containers, and other assistance upon request. The City should also consider preparing a recycling guide and checklist for local event organizers/planners.
- **Disposal bans.** Most states and some communities have established disposal bans for certain materials or types of waste. (See http://www.nerc.org/documents/disposal_bans_mandatory_recycling_united_states.pdf.) The Massachusetts Department of Environmental Protection has proposed a commercial food waste ban, to take effect by July 1, 2014, that would require any entity that disposes of at least one ton of organic waste per week to donate or re-purpose the useable food.
- **Financial incentives.** Financial incentives may be explored by the City to increase reuse and source reduction. Taxes could be imposed to discourage certain types of packaging such as plastic bags or plastic bottles. Repair businesses which prevent or delay the disposal of equipment could be given small subsidies to encourage their development within the City.

Program No.	Description	Year Initiated	Responsible for implementing
9	ZWP reassessment and update	2025, or sooner as needed	City of Oberlin, Dept. of Public Works

The factors contributing to waste generation and recovery of waste materials constantly change over time, which may require more (or less) focus on certain waste management programs and the possible development of new programs. Better data collection will facilitate making these decisions, however, it is suggested that this process will be better accomplished in the context of updating the ZWP periodically, perhaps as often as every five years. Available technologies, waste generation amounts, and the financial feasibility of waste management options can change substantially within five years, so the following updates to the ZWP should be considered:

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- Evaluate all waste generation estimates.
- Determine the status and success of each program designed to divert waste from disposal.
- Re-calculate recovery and reduction rates, and percentage goals if necessary.
- Determine necessary changes to existing programs and implementation of new programs.
- After a good dataset is available, consider the possibility of including C&D in the total generation estimates and the percentage goals as well as programs to meet required diversion. Alternatively, it may be advisable to establish a separate waste diversion goal (or a series of goals) for C&D. It is likely that including C&D with solid waste will significantly change the City’s waste diversion percentage, and has the potential of masking the efforts needed to reduce and recycle increasing amounts of solid waste.
- After full-scale implementation of the food waste recovery program, examine the option of reducing collection frequency for refuse to once every two weeks. By collecting food waste in a separate cart, it may be possible to reduce collection frequency for refuse, since odors (one of the primary factors resulting in once per week collection of refuse) are generally associated with food waste.

Program No.	Description	Year Initiated	Responsible for implementing
10	Strategic plan re-evaluation	2025, or sooner as needed	City of Oberlin, Dept. of Public Works

The strategic plan should be re-evaluated by 2025, or sooner if circumstances substantially change prior to this date.

Phase 3: 2031 through 2050

Unless the ZWP update and reassessment suggests otherwise, the programs initiated during Phase 1 and Phase 2 should be continued in Phase 3. At this time, there are no new programs envisioned for implementation during Phase 3. A number of the programs initiated in Phase 2, such as “Regulatory and financial incentive options”, should be periodically re-evaluated throughout Phase 3.

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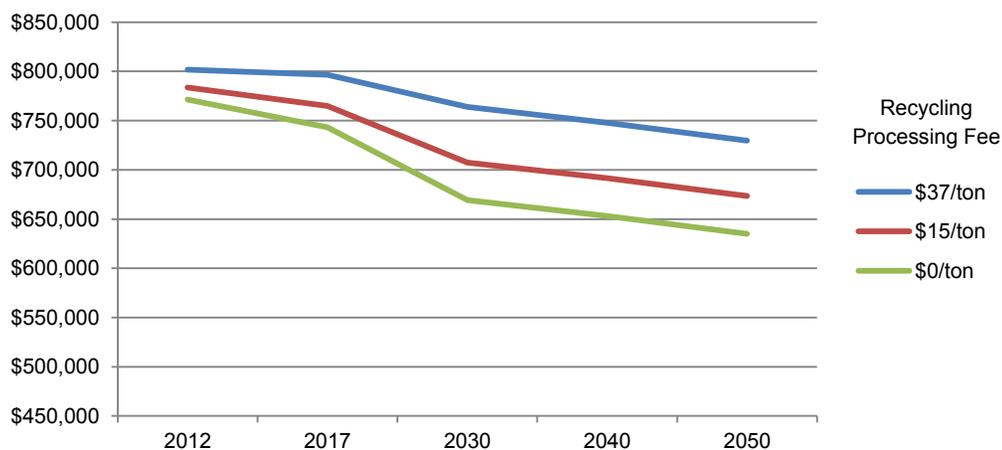
**Table 5-5
Summary of Phase 3 Programs**

Program No.	Description	Year Initiated	Responsible for implementing
1	Ongoing waste reduction and recycling programs	2031	City of Oberlin, Dept. of Public Works, Oberlin College
2	ZWP reassessment and update	Every 5 years	City of Oberlin, Dept. of Public Works
3	Strategic plan re-evaluation	Every 5 years	City of Oberlin, Dept. of Public Works

Potential Cost Savings

Implementation of the ZWP and achieving the diversion goals shown in Table 5-1 have the potential of resulting in substantial cost savings for the City with regard to the provision of waste management services. Figure 5-4 projects a reduction in costs throughout the planning period for collection scenario 1, based upon increased recovery of recyclables, increasing amounts of reuse and waste reduction, and decreasing amounts of disposal.⁸ (Proportional decreases in costs would also be achieved from collection scenario 2 and scenario 3.) Figure 5-4 also illustrates that negotiating a more favorable processing fee for co-mingled recyclables would save expenditures in greater amounts as the ZWP continues to be implemented. For example, the savings difference between the current processing fee of \$37/ton vs. a fee of \$0/ton would have been approximately \$30,000 for 2012; however, for the year 2030, the cost saving difference becomes almost \$100,000.

**Figure 5-4
Cost Savings for Scenario 1**



⁸ Future costs in this analysis have not been adjusted for inflation.

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As discussed in Section 4 of this report, the costs developed in this ZWP and shown in Figure 5-4 cannot be directly compared to the current solid waste fund expenditures for the City since the City's current expenses (roughly \$900,000 annually over the last three to four years) include categories such as yard waste collection, compost facility management and transfers to the General Fund, etc. However, this analysis does provide a benchmark to which these other cost categories may be added once the costs for yard waste collection, compost facility management, etc. are clearly delineated.

Appendix A

Memorandum of Understanding between City and District

**MEMORANDUM OF UNDERSTANDING
Lorain County Solid Waste Management District
City of Oberlin, Ohio**

**Technical Assistance to Develop
Zero Waste Plan**

This Memorandum of Understanding (MOU) is entered into by and between the Lorain County Solid Waste Management District (District), and the City of Oberlin, Ohio (City) regarding the development of a Zero Waste Plan (ZWP).

Whereas, the District and the City desire to have a ZWP developed to provide strategic waste diversion planning and recommendations to the City;

Whereas, the District agrees to provide consulting assistance to the City of Oberlin to help develop the ZWP;

And, Whereas, the District and the City of Oberlin desire to enter into this MOU to recognize and agree to the development of the ZWP as described herein.

Now Therefore, the District and City agree to perform the following scope of services:

Scope of Work

The District will use their consultant, GT Environmental, Inc., to provide consulting assistance, strategic planning and the development work to complete the ZWP.

1. GT will develop an information request for data and information to assist with the development and evaluation of ZWP initiatives. GT will provide the information request to the City by May 7, 2013. The City will provide data and information in advance of the May 28th meeting.
2. Kickoff Meeting – Tuesday, May 28th – with Public Works Director and staff to obtain and review current available data on solid waste infrastructure including:
 - Solid waste generation (disposal) (amounts and characterization);
 - Recycling (amounts and characterization);
 - City Resource Committee ZWP Plan Status;
 - Commodity pricing;
 - Contracts with Republic (and other entities) for disposal, recycling, fuel surcharges, environmental fees and other solid waste management services;
 - Residential waste collection costs;

- Commercial and large institutions waste collection costs;
 - Multi-family waste collection costs;
 - Data collection and separation procedures for residential, commercial, industrial and institutional customers;
 - Analysis and review of collection costs for new collection system including automated trucks and carts;
 - Review of financing options for capitization of new equipment;
 - Construction and demolition debris data (generation, disposal, and recycling by material and costs);
 - Purchasing policies;
 - Source reduction/reuse activities;
 - Organics management and data, if available; and
 - Other appropriate inventory and available data.
3. Kickoff Meeting - Tuesday May 28th 6:30 p.m. - with Resource Conservation & Recovery Commission for the development of strategic initiatives for a ZWP.
- Identify zero waste planning mission
 - Outline goals and objectives, short term and long term
 - Identify strategic initiatives with milestones and deadlines. Could include:
 - Evaluation of existing solid waste management system
 - Determination of improvements needed in solid waste management system to increase recycling and reuse
 - Promotion of source reduction strategies such as product substitution or redesign to reduce toxicity or the amount of packaging
 - Environmentally preferable procurement
 - Exploring new rules and incentives for promoting zero waste goals for all sectors included in ZWP
 - Improving resident engagement/participation in zero waste programs;
 - Targeted demographics
 - Recycled/recycled-content building material policy for new city structures
 - Develop necessary infrastructure to support ZWP
 - Measurement and quantification of implementation
 - ZWP benchmarking and review established on periodic basis
4. June 2013 - Visual tour and survey of City facilities/buildings to determine waste stream in-puts and waste stream management.
5. June 2013 – Survey of commercial/institutional and industrial facilities regarding recyclables and organics. Discuss the potential random sampling residential survey to determine interest in organics recycling.
6. June 25, 2013 – Resource Conservation & Recovery Commission meeting to refine strategic initiatives for ZWP.

7. July 23, 2013 – Compile survey results and present to Resource Conservation & Recovery Commission at July meeting.
8. July 2013 - Facilitate and host a public forum to review data collected and work completed. Review the strategies identified by the Resource Conservation & Recovery Commission. Conduct a session providing those in attendance the opportunity to rank draft strategic initiatives.
9. Identify:
 - Targeted waste streams for opportunities for increased waste diversion (e.g., organics, cardboard, paper, etc.)
 - Targeted sectors for opportunities for increased waste diversion (e.g., residential, schools, businesses, government offices, etc.) Identify rules, policies, etc. which are potential barriers to zero waste goals.
 - Targeted business corridors for opportunities for increased waste diversion (e.g., restaurants, bars/taverns, hotels.) Identify rules, policies, etc. which are potential barriers to zero waste goals.
 - Identify rules, policies, incentives necessary to support zero waste plan
10. Determine opportunities to reduce GHG emissions through data developed through Oberlin grant and additional recycling opportunities.
11. August 2013 – Initiate development of draft zero waste plan recommendations.
12. September 24, 2013 – Present draft plan to Resource Conservation & Recovery Commission. Make revisions to ZWP and submit final recommendations to the Commission and Public Works Director.
13. GT will work with the City via GoTo "pre-meetings" as necessary prior to meetings in Oberlin.

A. Procedures and Contingencies

Should extenuating circumstances require an adjustment of the timeframes specified in this MOU, they will be adjusted through mutual agreement of all parties to the MOU.

B. Effective Date and Signature

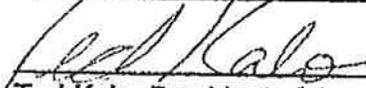
This MOU is effective upon the date all parties listed below have signed this MOU.

The signatories to this MOU represent that they are authorized to enter into this MOU and do enter into this MOU as evidenced by their signature below.

Representing the District:

Date:

4-26-13

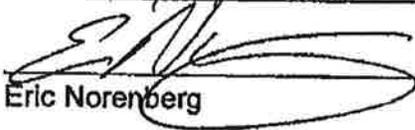


Ted Kalo, President of the Board of Lorain County Commissioners

Representing the City of Oberlin
City Manager: Eric Norenberg

Date:

2/24/13



Eric Norenberg

APPROVED AS TO FORM

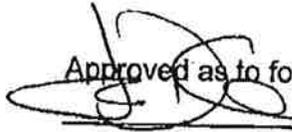
DATE 4-23-13

Dennis P. Will, Lorain County Prosecutor

By:


Assistant County Prosecutor

Approved as to form:



Jon D. Clark,
Law Director

4/25/2012