Solid Waste Management Plan for Lincoln and Lancaster County

Solid Waste Plan 2040

System Definition - DRAFT

CITY OF LINCOLN NEBRASKA

LANCASTER COUNTY NEBRASKA

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System Definition – DRAFT (June 2013)

The System Definition serves as the basis for the development of the Solid Waste Management Plan for Lincoln and Lancaster County (Solid Waste Plan 2040). The System Definition combines information on existing solid waste management programs and program options considered for managing solid wastes in the future. The System Definition describes programs that move the integrated solid waste management system from current levels of waste diversion and existing disposal practices toward greater resource conservation, waste reduction, waste diversion and resource recovery efforts.

The System Definition will be presented to the public in one or more open-house formats and through an on-line website. The Advisory Committee will consider feedback received from the public during these open house(s) and the on-line website when developing the recommendations which will make up the Solid Waste Plan 2040.

Reference documents listed in this System Definition can be found on the Solid Waste Plan 2040 website (http://lincoln.ne.gov/city/pworks/waste/sldwaste/solidwasteplan2040/indes.htm). The Solid Waste Plan 2040 website may also be accessed by searching on the keywords: Solid Waste Plan at www.lincoln.ne.gov.

1.1 Benefits of Resource Conservation, Waste Reduction, Waste Diversion and Resource Recovery

Resource conservation, waste reduction, waste diversion and resource recovery programs are essential components of an integrated solid waste management system. An integrated solid waste management system reduces the reliance on landfilling and has positive local, regional, and, in some cases, national and global benefits. Select benefits are listed in the following paragraphs:

Economic

- Enhances the economy through job creation and new business opportunities (recycling, reuse, waste exchange)
- Provides low cost resources – such as plastics, metals, glass, paper - for manufacturing new and recycled content products
- Produces a local source of compost which has economic benefits in terms of reducing erosion and lowering water costs (prevents water loss when incorporated into soils)
- Provides a management option for yard waste that is less expensive than landfilling
- Reduces the community's long term environmental and financial liability associated with landfills
- Reduces costs to small businesses by providing programs whereby hazardous waste can be managed properly without all of the financial burdens of regulatory compliance
- Extends the number of years the current landfill has disposal capacity, and in doing so ensures disposal capacity remains in close proximity to waste generators – which assists in limiting transportation costs - and delays significant expenditures required for permitting and constructing a new landfill

Energy

- Decreases energy consumption associated with providing consumer products (made from recycled materials)
- Prevents increased fuel consumption associated with transporting waste to remote (away from population centers) regional disposal facilities by conserving disposal capacity in the current location

Human Health and Environmental Protection

- Reduces air, soil and water pollution and associated health impacts.
- Reduces greenhouse gas emissions linked to climate change
- Minimizes environmental degradation by reducing the need to extract, transport and process raw/virgin materials
- Reduces risks posed by toxic wastes, including poisoning of children and pets in households and occupation exposure of employees in workplaces
- Reduces risk posed by hazardous waste, including sometimes irreversible or long-term damage to the environmental.

Natural Resource Conservation

- Preserves and protects natural resources, such as timber, water oil and minerals for future generations
- Recovers valuable materials from the waste stream, thus minimizing the need for extraction of finite natural resources

Waste management is one of seven priority sustainability indicator areas identified in the Sustainable Lincoln Plan. The Sustainable Lincoln Plan establishes a target of developing a comprehensive, integrated "Solid Waste Management Plan" for Lincoln and Lancaster County that promotes waste prevention, toxicity reduction, diversion, reuse and recycling as waste management strategies with higher and better use of natural resources that land disposal. Additionally, and as part of the Cleaner Greener Lincoln initiative and the resulting Sustainable Lincoln Plan, Mayor Beutler has communicated to the community his goal of "putting Lincoln in the fore at the green capital city of the Great Plains".

1.2 Vision, Guiding Principles and Plan Goals

The vision statement in the Lincoln-Lancaster County 2040 Comprehensive Plan (LPlan 2040) begins, "The core promise embedded in LPlan 2040 is to maintain and enhance the health, safety and welfare of our community during times of change, to promote our ideals and values as changes occur, and to meet the needs of today without sacrificing the ability of future generations to meet their needs."

A Vision Statement, five Guiding Principles, and Plan Goals related to the Waste Management Hierarchy (Figure 1-2) were developed early in the planning process; these can be found in the document titled: Vision, Guiding Principles and Goals on the Solid Waste Plan 2040 website.

The Guiding Principles are:

- engage the **COMMUNITY**
- encourage **PUBLIC-PRIVATE PARTNERSHIPS**
- ensure sufficient **SYSTEM CAPACITY**
- emphasize the **WASTE MANAGEMENT HIERARCHY**
- embrace **SUSTAINABLE PRINCIPLES**

Detailed technical papers were prepared for the Advisory Committee on a wide range of solid waste management topics. The key information for each topic was presented to and reviewed with the Advisory Committee.

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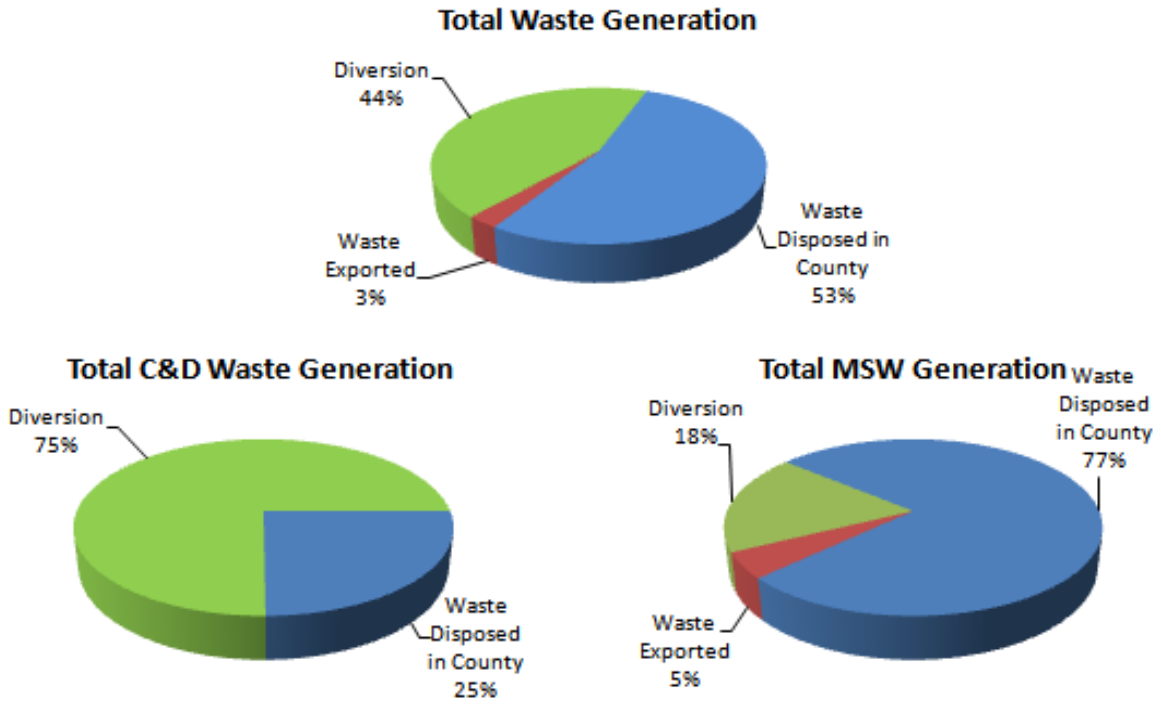
The technical papers/topics include:

- Source Reduction (Definitions/Framework/Options)
- Zero Waste
- Product Stewardship
- Household Hazardous & Conditionally-Exempt Small Quantity Generator (Small Business) Hazardous Waste
- Universal, Special and Unique Wastes
- Yard Waste
- Residential Recycling and Diversion
- Commercial Recycling and Diversion
- Construction and Demolition Materials Recycling
- Recycling Incentives
- Organic Waste Diversion (Composting)
- Waste Conversion Technologies
- Municipal Solid Waste Disposal
- Construction and Demolition Waste Disposal
- Collection Systems
- Bioreactor/Bio-Stabilization Technologies
- Transfer Station and Processing Facilities
- Markets (for recovered/recycled materials)

1.3 Needs Assessment and Baseline Assessment/Survey

The Needs Assessment (November 2012) and the Baseline Assessment/Survey (October 2012) identified the current (baseline) conditions for solid waste management in Lincoln and Lancaster County. Figure 1-1 summarizes waste disposal and waste diversion in Lincoln and Lancaster County (Planning Area) for 2011, by percentage (by weight).

Figure 1-1 – 2011 Waste Disposal and Diversion, by Percentage



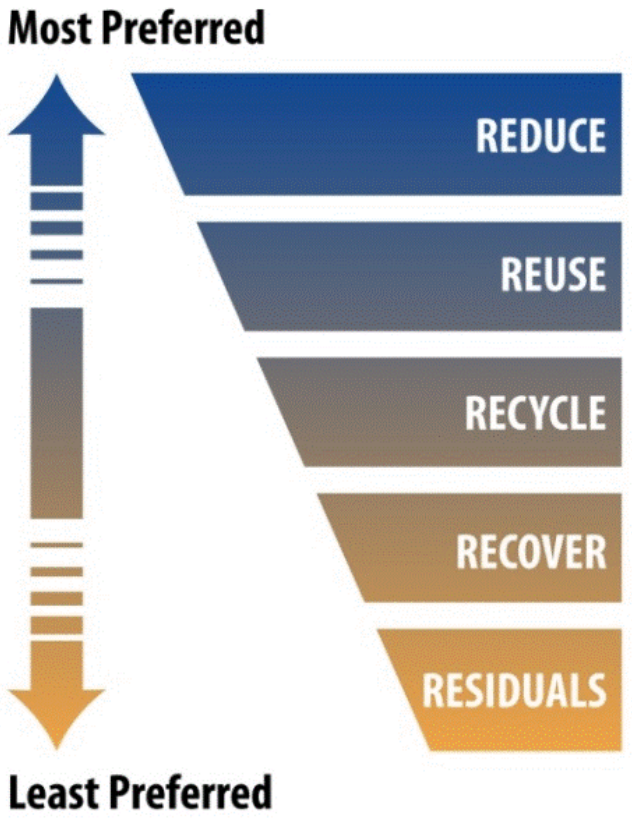


Figure 1-2- Waste Management Hierarchy

The Needs Assessment addressed the volumes and types of waste being generated, the existing waste management practices, and the future needs in the Planning Area

The Needs Assessment established the foundation for solid waste management planning, system and facility identification, and sizing of components. Regulatory and environmental information was included to provide a broad-based perspective on existing conditions and possible future practices. The Needs Assessment serves as a tool for communicating the basis for future actions.

The Baseline Assessment/Survey provided a quantitative assessment on a number of topics ranging from garbage collection, residential recycling, management of yard waste, participation in the household hazardous waste collection program and satisfaction levels regarding various solid waste management services and current costs for services.

1.4 Solid Waste Management Continuum and Waste Management Hierarchy

The Advisory Committee discussed, in general, solid waste management program options which progressively move the community toward an integrated solid waste management system that further reduces dependence on landfilling and places greater emphasis on resource conservation, source reduction, waste diversion and resource recovery efforts. The Advisory Committee discussed program options that were consistent with the Waste Management Hierarchy (Figure 1-2) and the Solid Waste Management Continuum (Figure 1-3), and reviewed key aspects of Nebraska's Integrated Solid Waste Management Act and the Federal Resource Conservation and Recovery Act (RCRA) of 1976 (Regulatory Background), and the Evaluation/Screening Criteria developed specific to the planning process.

The Solid Waste Management Continuum illustrates several ideas: 1) as waste diversion and resource recovery efforts increase the cost of managing wastes generally increases; and, 2) at low levels of waste diversion the community is largely dependent on landfilling.

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The first options for reducing the amount of materials sent to disposal are resource conservation, and source reduction and material reuse, followed by recycling and composting. By themselves these are only a partial solution to reducing the amount of materials that may require disposal (landfilling). The Solid Waste Management Continuum recognizes that even with aggressive resource conservation, source reduction, material reuse, and recycling and composting programs a significant amount of resources are still available for recovery from the waste stream, and the community would still be dependent on landfilling as a solid waste management strategy.

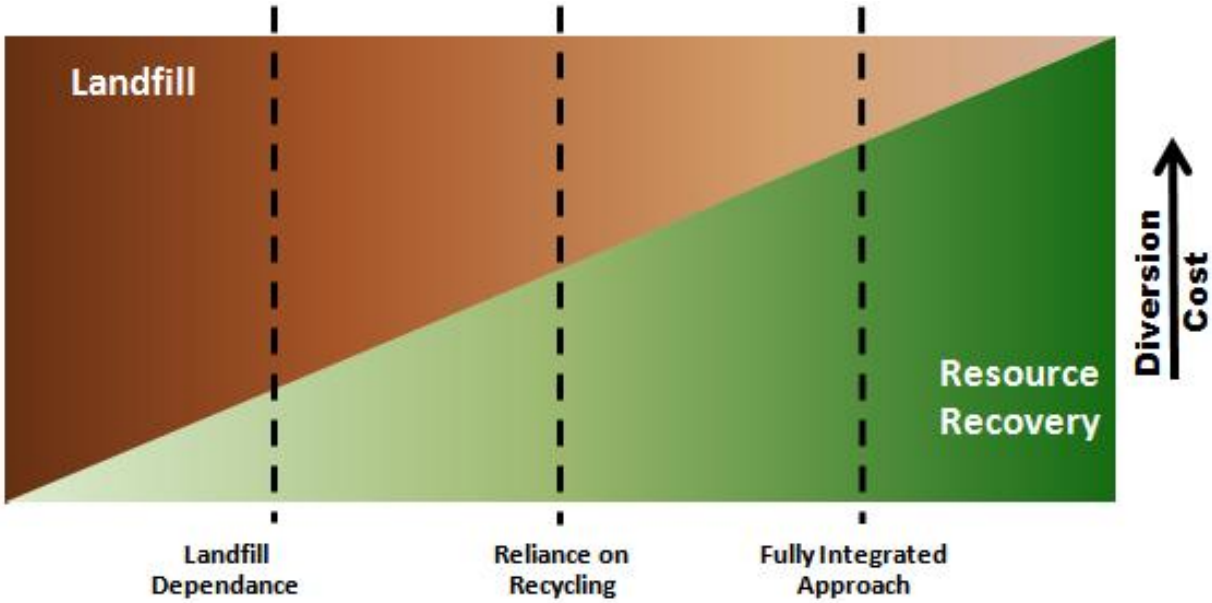

Figure 1-3 – Progression of Solid Waste Management Alternatives along a Continuum

Even with very progressive waste reduction and waste diversion programs targeting both residential and commercial waste generators, it is unlikely that the combined efforts will exceed a 40 to 50 percent reduction in the amount of wastes requiring disposal (landfilled).

Additional systems, facilities, programs and strategies, such as organic waste diversion and waste conversion technologies, would likely be required to increase the amount of waste materials diverted beyond the 40 to 50 percent range.

1.5 Preferred Path

The Advisory Committee reviewed program options for many solid waste management topics.
Following discussion of the program options for each solid waste management topic, an initial poll of the Advisory Committee was taken to identify the program option most preferred. The poll results (percentage of votes for each program option) were immediately reported to the Advisory Committee. Additional discussion occurred among the Advisory Committee members after the initial poll. A final poll of the Advisory Committee was then taken to confirm the program option the Advisory Committee wished to be considered in developing the System Definition; the outcome of this process was the "Preferred Path". The five step process (depicted graphically below) was utilized for each of the solid waste management topics reviewed by the Advisory Committee.

The System Definition is based on the resulting direction – the Preferred Path – determined by the final poll results for each solid waste management topic reviewed, and the general discussion of the Advisory Committee regarding the major program options. Table 1-1 summarizes the Preferred Path.

Table 1-1 - Preferred Path for System Definition

Option/Topic	Options Decision for System Definition
Source Reduction	Expand Programs that Lead to Greater Source Reduction.
Toxics Reduction	Expand the Toxics Reduction program and create a place to provide year round access.
Yard Waste	Maintain Status Quo (Seasonal Ban)
Residential Recycling and Diversion	Residential Curbside Recycling to be provided [(1)] to all single family and duplex dwellings City wide.
Commercial Recycling and Diversion	Commercial Recycling to be provided [(2)] to multi-family dwellings, businesses, industries and institutions.
Construction and Demolition Materials Recycling	Preferred Path not yet identified
Organic Waste Diversion (Composting)	Develop/Support programs to reduce the quantity of organics, especially food waste, going to the City's MSW disposal site.
Waste Conversion Technologies	Pursue the development of Waste Conversion Technology(ies) as a part of a long-term strategy for energy recovery and resource conservation.
Municipal Solid Waste Disposal	Expand on City-owned property to the east of the currently permitted site.
Construction and Demolition Waste Disposal	Expand on City-owned property.
Bioreactor/Bio-Stabilization Technologies	No further consideration is given in the System Definition to pursuing the development of a bioreactor/bio-stabilization technology.
Transfer Station and Processing Facilities	Develop a municipal solid waste Transfer Station if a feasibility study shows it can be cost effective.

Notes:

1. The term "provided" was explained in the meeting as meaning "Universally Available" which was further defined as being mandatory that recycling services be provided to all single family and duplex dwellings but resident participation would be voluntary.
2. The term "provided" was explained in the meeting as meaning "provided by ordinance" which would mean it would be mandatory that it be provided to all multi-family dwellings, businesses, industries and institutions either as hauler provided or building owner/operator provided.

The Preferred Path indicated a preference for status quo, new and enhanced resource conservation, waste reduction, and waste diversion programs, and options to provide secure long-term disposal capacity for the Planning Area. While not a specific polling topic, discussions suggested a desire to achieve waste diversion levels at least equal to the national average (34 percent) as reported by the USEPA.

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1.6 System Definition

The System Definition is based on the Preferred Path determined by the Advisory Committee. The Solid Waste Plan 2040 will include recommendations for short- and long-term solid waste management systems, facilities and programs for the Planning Area.

1.6.1 Benefits and Costs

The Advisory Committee received general information on the costs and environmental benefits associated with various resource conservation, waste reduction, waste diversion and resource conservation program options, through the technical papers prepared and reviewed for each solid waste management topic. Not all program options are quantifiable in terms of short-term economic benefit, nor can they be evaluated with a traditional cost/benefit ratio type analysis.

1.6.2 Source Reduction: Expand programs that lead to greater source reduction.

Strategies

- Increase education and promote waste minimization.
  - Expand outreach to K-12.
  - Increase promotion in public places.
  - Increase education and promotion to the commercial sector.
  - Partner with existing education organizations such as Keep Lincoln-Lancaster County Beautiful.
- Support the efforts of the Nebraska Product Stewardship Coalition.
- Increase support of reuse and waste exchange programs – non-City operated.
- Develop additional reuse and waste exchange programs – private or City operated.

Qualitative/Quantitative Goals

- 1 to 2 percent increase in waste-reduction with education (behavioral change) programs alone.
- 2 to 4 percent increase in diversion with increased reuse and waste exchange programs.
- 4 percent increase when coupled with programs such as volume based fees for waste collection.

Benefits

- Less materials requiring management or disposal.
- Conservation of natural resources.
- Decrease in greenhouse gas emissions.
- Decrease in energy-consumption needed to produce new products and materials.
- Economic benefits from material reuse.

Cost Considerations

Existing source reduction education efforts would remain in place. Additional costs are program specific. Expanded education would support elements of other existing and new programs, such as increased recycling, toxics-reduction, and other waste reduction and waste diversion efforts.

Capital Costs

None.

Operating Costs

Costs would be approximately $300,000 or $1 per person per year or the equivalent of $0.21 per single family household per month. A very progressive program (e.g., zero waste) might cost $3 per person per year.

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Funding
Occupation Tax and grants. Each $1 per ton of Occupation Tax generates about $300,000.

Diversion
A basic program could result in a 1 to 2 percent reduction in MSW going to the City's landfills; roughly 4,100 and 8,200 tons. Additional education efforts, material exchange programs, or incentives could increase this to 2 to 4 percent.

1.6.3 Toxics Reduction: Expand the toxics reduction program and create a place to provide year round access.

Strategies
- Mobile Household Hazardous Waste (HHW) collection events paired with a hazardous material/waste storage building.
- Fixed and permanent household / small business materials hazardous waste facility.
  - Reduced mobile events (e.g., 2-4 per year).
  - Possibly including waste exchange for useable household products.

Qualitative/Quantitative Goals
- Less than 1 percent increase in diversion.
- Divert at least 100,000 pounds (50 tons) of toxic material per year from the landfill.
- Increase small business participation opportunities.

Benefits
- Protects human health and the environment by: reducing risks and exposures to hazardous materials (e.g., accidental poisonings, injuries to waste handlers, etc.); assuring proper management and disposal of special wastes; preventing hazardous waste from being illegally disposed of in the environment or in the Bluff Road Landfill, which could adversely impact air, water and land resources; and, preventing illness and disease caused by improper waste management.
- Increased safety for staff and residents or business employees who manage and utilize program services.
- Year round accessibility and convenience to residents and conditionally exempt small quantity generator (CESQG) small businesses.
- Increased toxics-reduction opportunities and processing may create additional jobs and possible economic development opportunities.

Cost Considerations
Costs are very specific to program modifications and facility size.

Capital Costs
Capital costs for a small (modular) hazardous material/waste storage container is estimated at $30,000 - $60,000; this is equivalent to less than $0.01 per single family household per month

Capital costs for a small waste storage building are estimated at $40,000 - $100,000; this is equivalent to $0.01 per single family household per month.

Capital costs for a permanent facility would be in the range of $1,000,000 to $3,500,000 and are heavily dependent upon building size (construction costs), land purchase costs and site development requirements. This equivalent to $0.05 to $0.19 per single family household per month

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Operating Costs
In FY 2011, the costs for the Lincoln-Lancaster County Health Department's (LLCHD) toxics-reduction/hazardous materials management program for households and small businesses were $357,303.

With a permanent facility a decrease may be considered in the number of mobile events (e.g., from 6 to 8 (currently) to possibly 2 to 4 per year). Such a decrease in events would translate to an overall decrease in program costs in the range of $20,000 - $40,000 per year. These savings could help offset operation of a fixed and permanent facility that would provide year round access.

The operating costs for any toxic-reduction program expansion option will be driven in large part by the quantities of waste handled and transported to disposal. With expanded waste collection via a fixed/permanent facility, or other option allowing for year round collection, operational costs would generally increase in direct correlation to the amount of waste collected and managed.

Reducing the number of mobile collections coupled with a permanent HHW facility (and assuming additional annual program grant funding of approximately $100,000 per year), the City might expect a $50,000 to $150,000 increase in annual operating costs. This is equivalent to approximately $0.03 to $0.10 per household per month. When combined with capital costs for a permanent facility the total program cost increase is in a range of $0.08 to $0.29 per household per month.

Funding
Occupation Tax and grants. Small businesses (CESQG) would continue to pay for their own waste disposal costs.

Diversion
A fixed permanent household hazardous waste facility in combination with mobile collection events is estimated to divert less than 1 percent of the Municipal Solid Waste. Added accessibility and convenience would likely drive a considerable increase in public participation and quantity of waste collected. This increase is estimated to be 50 tons per year or more.

1.6.4 Yard Waste: Maintain the status quo (seasonal ban on grass and leaves); long term consideration may be given to banning grass and leaves year round

Strategies
- Maintain the current seasonal ban (status quo) on grass and leaves.
- Implement a ban on grass and leaves year round.

Qualitative/Quantitative Goals
- No change in landfill diversion rate with status quo.
- 1 to 2 percent increase in diversion rate with year round ban on grass and leaves.

Benefits
- Continued diversion of the majority and grass and leaves from the landfill.
- Conserves space in the landfill/extends the number of years the landfill is available to the community for disposal.
- Compost produced from grass and leaves will provide macro-and micro-nutrients, reduce erosion, and prevent water loss when incorporated into clay rich soils.

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Cost Considerations
No increase or decrease in the City's compost operation costs.

Capital Costs
None.

Operating Costs
The operating costs for the City's composting program would not change if the seasonal ban remained in place. A year round ban of grass and leaves is not anticipated to change the per ton user fee at the City's composting site. Costs for collection of yard waste might increase if a year round ban were implemented.

Funding
User fees, Occupation Tax, grants and revenues from the sale of compost fund the City's composting operation. Residents and businesses who subscribe to separate yard waste collection services pay for the collection and hauling costs.

Diversion
There would be no additional diversion if the status quo is maintained. A year round disposal ban for grass and leaves would result in an additional 1 to 2 percent of the MSW waste stream being diverted from the City's landfill; roughly 4,100 to 8,200 tons per year.

1.6.5 Residential Recycling and Diversion: Residential curbside recycling to be provided to all single family and duplex dwellings City-wide.

The term "provided" was explained in the Advisory Committee meeting as meaning "Universally Available" which was further defined as being mandatory that recycling services be provided to all single family and duplex dwellings but resident participation would be voluntary.

Strategies
- Require waste haulers to provide a minimum level of service that includes curbside recycling.
- Franchise recyclables collection and management.
  - Exclusive or non-exclusive franchise.
- Contract recyclables collection and management of recyclables.
- Franchise or contract for both solid waste and recyclables collection and management of recyclables.

Qualitative/Quantitative Goals
- 100 percent of all single family and duplex dwellings will be provided curbside recycling services.
- 5 to 8 percent increase in total MSW diversion (10 to 15 percent increase in residential waste diversion). This will be a function of number of materials targeted, convenience provisions (e.g., carts and containers) and participation levels.
- 8 to 10 percent increase in total MSW diversion (16 to 20 percent increases in residential waste diversion) with incentivized fee structures (e.g., "volume based") for garbage collection.

Benefits
- Satisfies public desire for greater recycling convenience.
- Conserves valuable and finite resources (timber, metal ores, coal and oil (energy), water, precious metals, etc.).

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- Conserves space in the landfill and extends the number of years the current landfill is available to the community for disposal.
- Reduces greenhouse gas emissions.
- Potential cost reductions for current curbside recycling subscribers.
- Creates additional jobs and economic development opportunities.

Cost Considerations
Costs are very program specific and will be a function of the implementation strategy and program details. The costs presented are considered representative but may not represent actual costs paid by residents in the Planning Area; it is possible that not all residents would experience cost increases.

Capital Costs
The annualized capital cost for standardized containers is estimated to be in the range of $6 to $8 per household per year ($0.50 to $0.67 per household per month), assuming a ten year service life for the containers.

Operating Costs
The cost of recyclables collection will vary significantly by program type, materials collected and frequency of collection.

The following generalized estimates – excluding costs for carts/containers and including material processing and residuals management - are provided for comparison:

- Service provided by refuse or recycling firms on a free market basis - $5 to $7 per household per month, based on weekly collection of single stream recyclables.
- Service provided by franchise or contract - $3.50 - $5.00 per household per month, based on weekly collection of single stream recyclables.
- Service provided for combined waste collection and curbside recycling by franchise or contract - $0 or less per household per month, based on weekly collection of solid waste and single stream recyclables.

Communities that have organized collection systems (contracted or franchised) typically have lower costs per household. The technical paper on Collection Systems contains additional information.

If curbside recycling services are provided to all single family and duplex dwellings it should be possible to reduce the number of recyclables drop-off sites provided by the City. Eliminating approximately half of current number of recycling sites would result in operating cost reductions of approximately $180,000 per year. The revenue derived from the sale of recyclables would also be reduced.

Funding
Residents would pay for curbside recyclables collection, hauling and processing service.

Diversion
The range of diversion, depending upon program types and incentives, is estimated to be a 5 to 10 percent increase over current efforts; roughly 20,600 to 41,000 tons per year.

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1.6.6 Commercial Recycling and Diversion: Commercial recycling to be provided to multi-family dwellings, businesses, industries and institutions.

The term "provided" was explained in the Advisory Committee meeting as meaning "provided by ordinance" which would mean it would be mandatory that recycling be either hauler provided or building owner/operator provided for all multi-family dwellings, businesses, industries and institutions.

Strategies

Recycling services will need to be tailored to the specific situation and needs of a given waste generator and the types of recyclables generated. The technical paper on Commercial Recycling and Diversion provides additional information on this topic. Ordinances would define a minimum level of service to be provided.

- Refuse hauler or recycler provided recycling services.
- Franchise recyclables collection and management.
  - Exclusive or non-exclusive franchise.
- Contract recyclables collection and management of recyclables.
- Owner/operator provided recycling services – direct contract between owner/operator and selected service provider.
- Post disposal processing facilities (select waste streams high in recyclables). This is not considered a stand-alone program but may be used where separation of the materials at the source is impractical or ineffective.

Qualitative/Quantitative Goals

- 6 to 12 percent increase in diversion if recycling is required to be provided to all multi-family units, as well as businesses, industry and institutions.
- 100 percent of the residents residing in multi-family dwelling units would have access to on-site recycling services.
- 100 percent of businesses would have a minimum level of recycling service.

Benefits

- Conserves valuable and finite resources (timber, metal ores, coal and oil (energy) water, precious metals, etc.).
- Conserves space in the landfill and extends the number of years the current landfill is available to the community for disposal.
- Reduces greenhouse gas emissions.
- Potential cost reductions for some waste generators.
- Create additional jobs and economic development opportunities.

Cost Considerations

Cost considerations include delivering/supplying containers/dumpsters, and service/collection costs. Service/collection costs will also vary by container size, mix of material in a single container (separation requirements), and the frequency of collection. Due to the wide variety of options and need to tailor them to the commercial generator it is difficult to provide specific costs for commercial recycling services. Generally, commercial solid waste services are priced based on the size of the container, type of waste, and frequency of collection. Absent additional source reduction, it can be assumed that a

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commercial waste generator will require the same amount of materials to be removed from the generator's site/location. The savings from less frequent waste collection and reduction in disposal costs may (to varying degrees) offset the cost of an additional container for recyclables and collection of the recyclables.

For certain high quality (and high volumes of) recyclables (e.g., office paper or clean corrugated cardboard containers) the market/processors may be willing to provide free containers and collection services (or possibly even revenue) in exchange for recyclables. For small quantity generators or generators of mixed recyclables the collection cost may be similar to those for residential collection services and may actually be provided by the same style of collection program (e.g., wheeled carts).

Capital Cost
As stated above, additional infrastructure will be required in conjunction with increases in commercial recycling. The costs for this infrastructure are anticipated to be passed on to the waste generators in the collection fees they pay. These costs may or may not be off-set by the value of the recyclables and reduced waste disposal costs.

Operating Costs
Service/collection costs will vary by container size, materials handling and processing requirements, frequency of collection, and any off-setting revenues. The cost of collection for commercial recycling containers will likely be comparable to similar size solid waste containers; however, because the material is recycled rather than landfilled, the management of the collected recyclables would be expected to be less than the costs for the management of refuse (because of the disposal costs).

Funding
It is anticipated that any added cost for commercial recycling would be borne by the program participants – building tenants, commercial establishments, institutions, etc.

Diversion
The amount of material diverted will depend on a number of factors including program types and incentives. The range of diversion is estimated to be a 6 to 12 percent increase over current efforts; roughly 24,700 to 49,400 tons per year.

1.6.7 Construction and Demolition Material Recycling: ((statement of Preferred Path not yet determined)).

Strategies
- Continue to support and encourage private recycling/diversion efforts for concrete, asphalt and other recyclable C&D materials.
- Xxxxx

Qualitative/Quantitative Goals
- Xxxxx

Benefits
- Recovers valuable resources.
- Conserves space in the landfill.
- Increased recycling and processing may create additional jobs and possibly economic development opportunities.
- Xxxxxx

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Cost Considerations
Xxxxxxxxx

Capital Costs
Xxxxxxxx

Operating Cost
Xxxxxxxx

Funding
Based on current practices it would be anticipated that any added cost for C&D materials recycling would be borne by the construction and demolition project.

Diversion
C&D materials recycled are not included in calculations of MSW recycling rates. The amount of additional C&D materials diverted will depend on the targeted materials and the requirements for separation; this may require further analysis.

1.6.8 Organic Waste Diversion (Composting): Develop/Support programs to reduce the quantity of organics, especially food waste, going to the City's MSW disposal site.

Strategies
- Monitor development of organic waste diversion programs and markets in the United States.
- Identify opportunities for public-private partnerships.
  - Processing.
  - Marketing.
- Undertake pilot program (up to 1,000 cubic yards per year) using commercial sources of waste.
- Evaluate costs and implementation considerations for full-scale programs.
  - Aerobic composting or anaerobic digestion with energy recovery.
  - Co-composting with sewage sludge with energy recovery.

Qualitative/Quantitative Goals
- Less than 1 percent diversion through added education.
- Less than 1 percent through pilot program.
- 5 to 10 percent diversion through large volume programs.

Benefits
- Conserves space in the landfill and extends the number of years the current landfill is available to the community for disposal.
- Reduces greenhouse gases.
- Provides potential source of renewable energy (anaerobic digestion).
- Provides compost and soil amendment.
- Reduces long-term risk associated with biologic activity in landfill.
- Create additional jobs and economic development opportunities.
- Enhances reputation of business as an environmental steward

Cost Considerations
Costs are very program specific and would include collection, processing, possibly energy/power sales, renewable energy credits, end-product distribution and utilization. Some revenue/cost reduction may be

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generated from the sale/use of the bio-gas (methane) as an energy source if anaerobic digestion is implemented. Revenue from end-product will significantly affect total costs.

Capital Costs
The data available on organic composting/digestion facilities is generally presented on a per ton basis, which combines construction debt, operation and maintenance, offset energy revenues, by-product management, and residuals disposal.

Operating Costs
Tipping fees for an aerobic composting facility processing 75 to 100 tons per day are anticipated to be in the range of $25 to $40 per ton (including construction debt, operation and maintenance, and offsets by revenues from compost sales). Tipping fees for an anaerobic digestion facility processing 75 to 100 tons per day are anticipated to be in the range of $70 to $100 per ton (including construction debt, operation and maintenance, offset energy and compost revenues, by-product management, and residuals disposal). Collection and transportation costs are not included in these tipping fee estimates.

The cost for organic waste collection can also be a function of the management technology utilized. If food waste from residential sources is combined with yard waste the collection component of the costs may be similar to current collection costs (plus the added costs for composting). If residential food waste is collected separately from other wastes the cost per ton for collection is anticipated to be higher (due to less tons per collection event and possibly the need for more frequent collection).

Commercial organic waste collection program costs will vary with container size and frequency of collection.

Funding
It is anticipated that any added cost for organic waste composting/digestion would be borne by waste generators and the program participants.

Diversion
The amount of organic material diverted will depend on a number of factors. A, large scale effort could divert 5 to 10 percent; roughly 20,600 to 41,200 tons per year.

1.6.9 Waste Conversion Technologies: Pursue the development of Waste Conversion Technology(ies) as a part of a long-term strategy for energy recovery and resource conservation.

Strategies
- Monitor costs of developing such facilities in other communities in the United States.
- Develop facility(ies) as a form of alternative energy to off-set fossil fuel emissions.
  - Energy generation may off-set fossil fuel usage for roughly 5,000 to 8,000 homes.
- Develop facility(ies) in partnership with large scale energy user or utility company.
- Develop facility(ies) as part of an integrated solid waste management program (resource conservation, waste reduction, waste diversion and resource recovery).

Qualitative/Quantitative Goals:
- 40 to 50 percent reduction in quantity of MSW disposed of by landfilling.
- Recover the energy value of waste which might otherwise be buried in a landfill.
- Provide a new source of renewable energy.

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Benefits

- Significantly extends the life of the City's current landfill.
- Reduces uncontrolled emissions from landfill and offsets fossil fuel emissions.
- Provides significant source of renewable energy.
- Recovers valuable energy resource from waste and provides opportunities to recover other resources (e.g., metals).
- Inert residue reduces long-term liabilities associated with landfilling.

Cost Considerations

Costs are very program specific and facility specific and are significantly influenced by factors such as facility size, technology and revenue from the sale of energy.

Capital Costs:

Costs are generally presented on a per ton basis, which combines construction debt, operation and maintenance, offset energy revenues, and residuals disposal.

Operating Costs:

Tipping fees for a facility processing 500 tons per day might be in the range of $120 per ton. Collection and transportation costs are not included in this tipping fee estimate, but would be comparable to the cost of collecting and transporting municipal solid waste to the Bluff Road Landfill. The cost per single family and commercial waste generators could only be calculated once all the components of the integrated solid waste management systems are established. Costs would need to be estimated when such systems are given further consideration.

Funding

The capital cost would likely be financed with revenue bonds based upon current practices in the waste-to-energy/waste conversion technology industry. Third party service providers are often involved in the design, construction, operation and possibly ownership of such facilities. The combined cost for debt service on the bonds, operating cost, and residuals disposal is paid for by a combination of tipping fees and revenues from the sale of energy (and other recyclables). To guarantee repayment of debt some form of waste flow control will be required to guarantee an adequate quantity of waste (generated in the facility service area) is directed to the waste conversion facility.

Diversion

The amount of material diverted will depend on a number of factors. Up to 40 to 50 percent of the waste generated might be anticipated to be managed by such a technology; the amount available would be largely dependent upon the success of other diversion programs. Assuming an 80 percent reduction in weight, and assuming 40 to 50 percent of the waste generated is managed with waste conversion technologies, roughly 168,000 – 206,000 tons per year would be diverted from landfilling.

1.6.10 Municipal Solid Waste Disposal: Expand on City-owned property to the east of the currently permitted site.

Strategies

- Modify the permit for the existing Bluff Road MSW Landfill to include the City property to the east (of the current landfill) into the permitted site boundary.
- Obtain all zoning and land-use approvals necessary to allow construction and ensure future use of this site as a solid waste disposal area landfill.
- Evaluate options to prevent conflicting development near the landfill boundary.

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Qualitative/Quantitative Goals

- Provide disposal capacity for municipal solid waste beyond 2040.
- Assure stable, long-term, low cost disposal option.

Benefits

- Secures long-term disposal capacity beyond 2040 for the Planning Area.
- Site is close to the City and provides a relatively short haul distance which helps keep long-term costs low.
- Soil excavated for the construction of the (new) landfill can be used as capping material for the closure of the existing landfill.

Cost Considerations

A master plan would be needed for any expansion of the current Bluff Road Landfill. A master plan would address additional roadway and infrastructure costs, sequence of site development and other aspects necessary to permit the construction and operation of the new disposal area.

Capital Costs

Approximately $10,000,000 to $15,000,000 (2013$) would be necessary to fully develop the area to the east of the current Bluff Road Landfill as the next disposal facility. This estimate includes an allowance of $5,000,000 for additional off-site land acquisition and $500,000 for master planning and permitting. The costs of developing a new landfill on land not owned by the City might be in the range of $20,000,000 to $25,000,000 (2013$).

If the $10,000,000 to $15,000,000 is assumed to be accrued over the remaining volume of the Bluff Road Landfill (ignoring cost escalation and time value of money) it would increase tipping fees approximately $1.45 to $2.15 per ton to accumulate the money in advance of site development. This cost translates to approximately $0.16 to $0.24 per single family household per month.

Operating Costs

The current tipping fee at the Bluff Road Landfill is $14.00 per ton, excluding the Occupation Tax. The tipping fee revenue provides for capital expenditures and operations and maintenance expenditures for the Bluff Road Landfill. Operating costs will increase over time as a function of inflation and in response to overall costs of site development and closure; however, at this time the future expansion of the landfill on the City owned property east of the Bluff Road Landfill is not projected to include elements that are significantly different than current operations. As such the use of this adjoining property is not projected to result in added operating costs.

Funding

Bonds (revenue or general obligation), which would be repaid from tipping fees.

Diversion

Not Applicable.

1.6.11 Construction and Demolition Waste Disposal: Expand on City property.

Strategies

- Provide C&D waste disposal capacity beyond 2040.
- Assure stable, long-term, low cost disposal.
- For the North 48th Street site, C&D waste disposal provides a cost effective way to address on-going site maintenance requirements.

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- If C & D waste disposal were to be pursued at the Bluff Road site, the potential disposal location would take advantage of existing excavation to provide a largely screened and concealed disposal area and allow for the use of C&D waste to restore pre-existing site grades.

Qualitative/Quantitative Goals

- Secure long-term C&D waste disposal capacity beyond 2040 for the Planning Area.
- Preserves a relatively short haul distance for haulers, which helps keep long-term costs low.
- Shared support with the transfer station and other solid waste services provides for cost effective operations.

Benefits

- Provides C&D waste disposal capacity beyond 2040.
- Current location likely results in cost savings for transportation of C&D materials; more remote sites (greater distance from the city) would add to overall C&D waste hauling costs.

Cost Considerations

A master plan will be needed to permit either of the North 48th Street site or the Bluff Road site for future disposal of C&D wastes.

Capital Costs

Minimal costs are anticipated for expansion on the North 48th Street site.

Costs for master planning and permitting are estimated at $75,000 (2013$) if the future disposal area is developed at the North 48th Street site. A similar cost might be anticipated for the Bluff Road site. $150,000 may be needed for off-site land purchase for adequate buffer from operations of the landfill. The costs of developing a new C&D waste landfill on land not owned by the City might be in the range of $5,000,000 to $10,000,000.

If the $225,000 is accumulated over the remaining volume of the currently permitted North48th Street C&D Landfill and the added volume is gained with a southern expansion (ignoring any time value of money) it would represent an increase in tipping fees of approximately $0.10 per ton.

Operating Costs

The revenue collected from the tipping fee at the North 48th Street C&D Landfill funds the operation and maintenance expenditures and capital expenditures for the landfill. Operating costs will increase over time as a function of inflation however, at this time the future expansion of the landfill on City owned property is not projected to include elements that are significantly different than current operations.

Funding

Tipping fee and, if necessary, the Occupation Tax, or from bonds issued by the City.

Diversion

Not Applicable

1.6.12 Bioreactor/Bio-Stabilization Technologies:

The System Definition does not discuss the bioreactor/bio-stabilization landfill technology.

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1.6.13 Transfer Station and Processing Facilities: Develop a municipal solid waste Transfer Station if a feasibility study shows it can be cost effective.

Strategies

- Undertake a feasibility study to determine if implementing a new transfer station is cost effective.
  - Evaluate transfer station alone.
  - Evaluate transfer station in combination with a recycling processing or other waste diversion programs (e.g., facility for year round management of HHW/Small Business Hazardous Waste, waste processing, waste exchange).
- If economically feasible begin land acquisition and additional siting, permitting and implementation efforts.
  - Possibly establish user agreements with waste haulers, if deemed appropriate.

Qualitative/Quantitative Goals

- Reduced fuel consumption and air emissions due to shorter distances for collection vehicles.
- 0 to 5 percent increase in waste diversion assumes processing of select loads of wastes to remove large quantities of recyclable materials.

Benefits

- Convenience and reduced costs for waste haulers/users.
- Reduce air pollution/emissions.
- Strategically control waste delivery at the Bluff Road Landfill.
- Facilitate recycling and other waste diversion programs, such as:
  - Household and CESQG hazardous wastes.
  - Waste exchanges.
  - Drop-off area for select reuse and recyclable materials.
  - Concentrated loads of recyclables.

Cost Considerations

A feasibility study would determine and present more detailed cost considerations.

Capital Costs

Approximately $6,000,000 to $8,000,000 (2013$) would be necessary to build a transfer station designed to handle 300-400 tons of MSW per day; capital costs for additional processing and diversion capabilities integral to a transfer station are heavily dependent upon the size and functions undertaken and are not estimated.

Operating Costs

Operating and transportation costs are also very facility specific and are not estimated. To be considered economically feasible the cost (tipping fee) for using the facility should be off-set by the savings realized by not having to transport waste to the Bluff Road Landfill and the increased efficiency by returning waste collection vehicles to their routes in a shorter amount of time.

Funding

Capital costs would be funded either by revenue from the Occupation Tax or by revenue bonds. The facility operation and maintenance costs would be funded by tipping fee.

Diversion

A feasibility analysis would identify the additional diversion opportunities possible through additional processing or ancillary functions integral to the transfer station.

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1.7 Diversion Rates and Resource Recovery

Diversion rates and levels of resource recovery are dependent upon a wide range of variables, including program specific elements, degree of promotion and education/behavior change, and level of participation.

Based on the Preferred Path identified by the Advisory Committee, three system scenarios have been created to illustrate potential landfill diversion rates (see Table 1-2). These three system scenarios reflect different levels of effort in terms of waste diversion and resource recovery strategies as well as short- and long-term program outcomes.

Prior to the development of technical topic papers a common set of evaluation/screening criteria were developed. Table 1-3 provides an evaluation of the listed options (Preferred Path) relative to the evaluation/screening criteria.

1.8 Cost Summary

Table 1-4 summarizes cost information based on the above described programs and the Preferred Path (options) identified for this System Definition.

Table 1-5 summarizes the estimated annualized capital and operating cost information for the described programs and the Preferred Path.

It is important to recognize that the values in Table 1-4 were created to provide a general perspective on how various options relate to increases in management costs. The timing of such expenditures and refinement of values can, in most instances, only be determined when more specific implementation strategies are determined. Additionally, while costs are forecast for expansion of the City owned/operated landfill it is important to recognize that option of expanding on City owned property represents a substantial cost savings over other options for a future disposal facility; no credit is provided for cost saving because no revenue is generated by avoiding such expenditures.

1.9 Implementation Considerations

The process of implementing the solid waste management systems, facilities and programs described in this System Definition, if ultimately incorporated into the Solid Waste Plan 2040, may consist of a wide array of actions including the following:

- Changing laws, regulations and ordinances.
- Executing cooperative agreements or arrangements between units of government or private entities.
- Performing additional studies or evaluation.
- Monitoring and enforcing laws, regulations, ordinances and policies.
- Communicating with residents, businesses, and stakeholders.
- Educating users of the system and promoting programs and the goals of the Solid Waste Plan 2040.

Table 1-6 provides a matrix of probable implementation actions.

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Table 1-2 - Estimated Diversion by Scenario

	Scenario 1		Scenario 2		Scenario 3	
Program Area	**Strategy**	**% increase in TOTAL MSW Diversion**	**Strategy**	**% increase in TOTAL MSW Diversion**	**Strategy**	**% increase in TOTAL MSW Diversion**
Source Reduction	Increased Education	1 - 2%	Increased Education in conjunction with more progressive diversion efforts	2-4%	Increased Education in conjunction with incentivized programs (e.g., "volume-based" residential recycling and waste exchanges)	4-6%
Toxics Reduction	Year round facility	<1%	Year round facility	<1%	Year round facility	<1%
Yard Waste	Status Quo	0%	Status Quo	0%	Year round landfill ban for grass and leaves	1-2%
Residential Recycling	Universal with Minimum Levels of Service	5-7%	Universal - more enhanced program	6-8%	Universal with incentives (e.g. volume based rates)	8-10%
Commercial Recycling	Universal with Minimum Levels of Service	6-8%	Universal - more enhanced program	8-10%	Universal with incentives (e.g. volume based rates and space provisions for recycling in new construction)	10-12%
Organic Waste Diversion	Status Quo with added educational emphasis	<1%	Pilot program for food composting	1%	Commercial scale organics composting/digestion, food and soiled papers	5-10%
Waste Conversion Technologies	Status Quo	0%	Status Quo	0%	Waste Conversion facility targeting majority of non-diverted wastes	40 to 50%
Transfer Station	Transfer Station with no processing	<1%	Transfer Station with no processing	<1%	Transfer Station with limited diversion of materials delivered as waste	2-5%
% INCREASE in TOTAL MSW Diversion (above current 18%)		12-18%		17-24%		57-62% (1)
% TOTAL MSW Diversion (including current 18%)		30-36%		35-42%		75-80% (1)

Notes: (1) Values cannot be added directly. If direct addition is required it will be necessary to determine the split of waste materials to organics diversion, various recycling programs and waste conversion technologies. The likely result being approximately 20 to 25% of waste goes to landfill.

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Table 1-3 – Evaluation/Screening Criteria for Solid Waste Management Options/Strategies

	Waste Reduction/ Diversion	Technical Criteria	Environmental Impact	Economic Impacts	Implementation Viability
Source Reduction	↑	↑	↑	↑	↑
Toxics Reduction	↑	↑	↑	↑	↑
Yard Waste	--	--	--	--	--
Residential Recycling and Diversion	↑	↑	↑		↑
Commercial Recycling and Diversion	↑	↑	↑	--	--
Construction and Demolition Materials Recycling					
Organic Waste Diversion (Composting)	↑	--	↑	↓	↓
Waste Conversion Technologies	↑	--	↑	↓	↓
Municipal Solid Waste Disposal	--	↑	↓	↑	↑
Transfer Station and Processing Facilities	--	--	↑	--	--

N/A – Not Applicable

Notes: ↑ Indicated option is favorable in terms of evaluation/screening criteria.
↓ Indicated option is not favorable in terms of evaluation/screening criteria
-- Indicated option is neutral or has favorable or not-favorable aspects in terms of evaluation/screening criteria.

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Table 1-4 – Cost Information

Program Area	% increase in TOTAL MSW Diversion [1]	Estimated Tons Diverted per Year[1]		Annualized Cost Equivalent (2013$)		Cost/Household/Month (2013$)	
Source Reduction	1-4 %	4,100	16,500	$300,000	$900,000	$0.21	$0.63
Toxics Reduction	less than 1%						
Modular Storage Container(s)				$2,300	$4,600	$0.00	$0.00
Small Storage Building				$3,100	$7,600	$0.00	$0.01
Permanent Facility		50	50	$126,000	$417,000	$0.08	$0.29
Yard Waste							
Status Quo	0%						
Year Round Ban	1-2%	4,100	8,200	No Estimate	No Estimate	No Estimate	
Residential Recycling							
Containers	N/A	N/A	N/A	$500,000	$700,000	$0.50	$0.67
Universal with Minimum Levels of Service	5-7%	20,600	28,800	$5,100,000	$7,100,000	$5 - $7 Free Market	
				$3,600,000	$5,100,000	$3.50 - $5.00 Franchise/Contract	
				N/A	N/A	$0 or less if Franchised/Contracted with Solid Waste Collection	
Universal - More Enhanced Program	6-8%	24,700	32,900	$5,100,000	$7,100,000	$5 - $7 Free Market	
				3,600,000	$5,100,000	$3.50 - $5.00 Franchise/Contract	
				N/A	N/A	$0 or less if Franchised/Contracted with Solid Waste Collection	
Universal - Incentivized	8-10%	32,900	41,200	No Estimate	No Estimate	No Estimate	
Commercial Recycling	6-12%	24,700	49,400	No Estimate	No Estimate	Not Applicable	
Organic Waste Diversion	5-10%	20,600	41,200	$824,000	$4,100,000	No Estimate[2]	
Waste Conversion Technologies	40-50%	168,000	206,000	No Estimate	$20,000,000	No Estimate[2]	

Notes: (1) Based on estimates of Total MSW generated in the Planning Area in 2013 (411,576 tons from Waste Generation Projections in Appendix B of the Needs Assessment (November 2012)).

(2) Because these are viewed as long-term options with numerous implementation considerations, which would require further evaluation and integration of costs with other systems, facilities and programs, no estimate is provided.

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Table 1-5 – Estimated Annualized Capital and Operating Expenses (2013$)

Option/Topic	Annualized Capital Expense	Annual Operating Expense	Total Annual Expenses
Source Reduction (Education/Behavior Change)	0	$300,000 - $900,000	$300,000 - $900,000
Toxics Reduction • Modular Storage Container • Small Storage Building • Permanent Facility	$2,300 – $4,600 $3,100 - $7,600 $76,400 - $267,000	$0 Not Estimated $50,000-$150,000	$2,300 - $4,600-- Not Estimated $126,000 - $417,000(1)
Yard Waste	$0	N/A	$0
Residential Recycling and Diversion • Containers • At $5 to $7 per household/month • At $3.50 - $5.00 per household/month	Containers Only $500,000 -$700,000	Collection Only $5,100,000 - $7,100,000 $3,600,000 - $5,100,000	$5,600,000 - $7,800,000(2) $4,100,000 - $5,800,000(2)
Commercial Recycling and Diversion	(3)	(3)	(3)
Construction and Demolition Materials Recycling	(3)	(3)	(3)
Organic Waste Diversion (Composting)	(3)	(3)	$824,000 - $4,100,000(7)
Waste Conversion Technologies	(3)	(3)	$20,000,000(4)
Municipal Solid Waste Disposal • Expand on adjacent City property	$487,000-$722,000(5)	N/A	$487,000-$722,000(5)
Construction and Demolition Waste Disposal • Expand on adjacent City property	$7,900(5)	N/A	$7,900(5)
Transfer Station and Processing Facilities	$450,000 - $610,000	Not Estimated	Not Estimated(6)

N/A – Not Applicable

Notes:

(1) Annual costs are assumed to be reduced by grants and other funding sources for both capital and operations costs.

(2) Costs are a function of program and method of providing added services. Annual costs are estimated increases for City-wide service and reflect the overall program cost. Collection costs are assumed to include all labor, equipment, fuel, and other incidental costs and any revenue off-sets.

(3) No estimates of annual capital or operating costs are provided.

(4) Costs are based on $120 per ton and an assumed 168,000 tons per year managed by this technology.

(5) Assumes costs are accrued annually to fund future capital expenditures. Actual costs may need to be incurred on per ton basis to reflect the effects of variations in tonnage on site life. This assumes advanced funding of future construction, which has not been the method of cost accounting utilized in the past.

(6) Annual costs for debt, operations, maintenance, and hauling are assumed to be off-set by user fees if a facility is deemed economically feasible.

(7) Costs are based on $40 to $100 per ton and 20,000 to 41,200 tons per year assumed to be managed by this technology. Costs do not include collection.

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Table 1-6 – Implementation Actions for System Definition Options

	Changes in Laws, Regulations and Ordinances	Cooperative Agreements or Arrangements between Units of Government or Private Entities	Additional Studies or Evaluation	Monitoring and Enforcement	Costs and Funding	Educational Initiatives and Promotion of Behavioral Changes	Changes to Existing Programs	Markets
Source Reduction	No	-	No	No	Yes	Yes	No	-
Toxics Reduction	-	-	Possibly	No	Yes	Yes	Yes	No
Yard Waste	No	No	No	No	Yes	No	No	Yes
Residential Recycling and Diversion	Yes	Yes	Possibly	Yes	Yes	Yes	Yes	Yes
Commercial Recycling and Diversion	Yes	Yes	Possibly	Yes	Yes	Yes	Yes	Yes
Construction and Demolition Materials Recycling								
Organic Waste Diversion (Composting)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Waste Conversion Technologies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipal Solid Waste Disposal	No	No	No	No	-	No	No	No
Construction and Demolition Waste Disposal	No	No	No	No	-	No	No	No
Transfer Station and Processing Facilities	Possibly	Possibly	Yes	No	Yes	No	Yes	No

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Changes in Laws, Regulations and Ordinances refers to major actions without which implementation might not occur. An indication of "No" or "-" indicates that change would be minor in nature including clarification, changes in definitions, changes incidental to the overall program change or to accommodate program modification not anticipated to have major cost implications. This may also include changes requiring legislative approval.

Cooperative Agreements or Arrangements between Units of Government or Private Entities refers to formal agreements for services requiring approval by the City Council or Mayor. This does not include agreements for such items as building construction. Examples of this might be processing agreements, collection franchises or contracts, energy sales agreements, system operating agreements, or waste supply agreements.

Additional Studies or Evaluations refers to action that may be necessary to better define or help select specific programs, program changes or to establish feasibility. This may also include assessment of markets, costs or rate structures.

Monitoring and Enforcement refers to additional requirements anticipated to be necessary by the City to assure that systems, facilities or programs are performing in accordance with applicable laws, regulations, ordinances or agreements with the City.

Costs and Funding refers to program options where the stakeholders may incur added costs or where municipal participation in funding may be required.

Educational Initiatives and Promotion of Behavioral Changes refers to public outreach and educational efforts, efforts to promote or inform stakeholders of changes, and efforts to help ensure program success or maximize outcomes.

Changes to Existing Programs refers to changes to the status quo. These would be changes deemed necessary to implement the Preferred Path or to achieve a goal (e.g., reduced waste generation, increased diversion of waste from landfill, resource conservation and recovery, reduction in air emissions, etc.).

Markets refers to the need to evaluate or secure markets as part of the implementation of an option or program change.

1.9.1 Implementation Timeline

As a part of the development of the final Solid Waste Plan 2040 an implementation timeline will be developed. Ultimately decisions on the implementation timetable will fall upon elected officials.

If Preferred Path options are implemented, the general implementation timelines presented in Table 1-9 might be applicable.

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Table 1-7 – Implementation Timeline

Option/Topic	Implementation Timeline	
	Short-Term (less than 5 years)	Long-Term (greater than 5-years)
Source Reduction (Education/Behavior Change)	X	
Toxics Reduction	X	
Yard Waste	--	X(1)
Residential Recycling and Diversion	X	
Commercial Recycling and Diversion	X	X(2)
Construction and Demolition Materials Recycling		
Organic Waste Diversion (Composting)	X(3)	X(3)
Waste Conversion Technologies	N/A	X
Municipal Solid Waste Disposal	X(4)	X(4)
Construction and Demolition Waste Disposal	X(4)	X(4)
Transfer Station and Processing Facilities	X(5)	X(5)

N/A – Not Applicable

Notes:

(1) Assumes long-term ban on yard waste at City MSW landfill

(2) Depending upon the various program elements which might be applicable to multi-family dwellings, business, industries and institutions some aspects may be phased in or refined over time.

(3) Short-term aspects may involve pilot programs. Available markets and costs may determine the feasibility and timing of full scale programs. Full scale programs will also require changes to waste collection programs.

(4) The construction of new disposal areas is considered a long-term implementation effort. Short-term efforts may involve permitting, zoning and land acquisition, as appropriate.

(5) Timing would be a function of the outcome of a feasibility study and the ability to locate a suitable site.

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