



City of Owen Sound

Planning for Sustainability: Long Term Waste
Management Plan
2007-2031

August 2007



This report was prepared by Lura Consulting in association with Trow Consulting Engineers Limited, Golder Associates and 2cg Inc. For more information, please contact:

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About Owen Sound's Sustainable Waste Management Plan

2007

Owen Sound's new Sustainable Waste Management Plan charts a course for the next 25 years. It has been developed by our Consulting Team and informed by the guidance and advice of the City's Environmental and Waste Advisory Committee (Chaired by Councillor Bill Twaddle), staff member Chris Hughes, Environmental Superintendent, and representatives of the Owen Sound community who attended two workshops.

The Plan incorporates the principles of a sustainable community, and is designed to "meet the needs of the present without compromising the ability of the future to meet its own needs". This plan reflects the balance and integration between the environmental, economic and social values of the Owen Sound community.

The Plan combines technical work with community input. It is accompanied by a number of background documents, including:

- Project Charter – October 2006 – Lura Consulting
- City of Owen Sound – Facility and Service Review – December 2006, Lura Consulting
- City of Owen Sound – Waste Characterization – December 2006, Lura Consulting
- City of Owen Sound – Residential Waste Management Baseline Survey – November 2006, Lura Consulting
- City of Owen Sound – SSO Composting Options – February 2007, 2cg and Golder Associates
- City of Owen Sound – Disposal Options – February 2007, Trow Consulting Engineers Limited
- City of Owen Sound – Report on the Public Participation Program - Lura Consulting, March 2007.

The Plan is an iterative document, and can be monitored annually and formally updated every five years.

EXECUTIVE SUMMARY

In 2006, the City of Owen Sound won the Recycling Council of Ontario's prestigious Platinum Award for achieving 55% diversion of recyclable materials and organic wastes from landfill.

To build on this remarkable accomplishment, the City of Owen Sound wishes to move towards sustainability by achieving maximum waste diversion and providing a long-term disposal solution for the residual wastes.

As a first course of action, in September 2006, the City embarked upon the development of **"Planning for Sustainability: Owen Sound's Long Term Waste Management Plan"**. The Plan provides a comprehensive waste minimization program – with the potential to achieve up to 70% waste diversion by 2015, and identifies reliable alternatives for residual waste disposal. It also sets out an implementation and continual improvement framework for the future. The Plan was developed by Lura Consulting, along with a team of technical consultants comprising 2cg Inc., Golder Associates and Trow Consulting Engineers Limited. Input and advice was received from the City's Environmental and Waste Advisory Committee, Staff, and members of the public who participated both through a survey and at two public workshops.

1.0 Current Situation

The City of Owen Sound is responsible for providing waste management services to its residents. The City currently provides a diverse range of residential, commercial, industrial and institutional waste diversion and management programs.

Residential waste minimization programs. These include comprehensive waste reduction and re-use, recycling, backyard home composting, a leaf and yard waste composting facility, and household special waste recovery. Recycling programs for electronic equipment, polystyrene, Styrofoam™, metal and tires are also provided. Curbside collection is offered for recyclables and garbage. The system is cost effective, performs well, and residents have a high level of satisfaction with the program.

Residential waste disposal, user pay and bag limits. Through a user pay program and bag limits, the quantity of residual waste has declined since 1999. Residual waste is taken to a privately owned Transfer Station in Owen Sound and exported to the USA.

Industrial, Commercial and Institutional Programs. The City has implemented a by-law restricting recyclables going to landfill. Along with waste audit, signage and communications advice, the City encourages this sector to minimize wastes.

Waste Characterization and Future Waste Generation

Planning for sustainable, long-term waste management program relies on sound waste characterization and population data. Since Owen Sound has not conducted a waste audit, the Study utilized other similar communities in Canada to estimate the characteristics of the domestic and IC&I waste streams. Population is expected to increase from 22,000 residents in 2005, to over

27,000 residents in 2030. Waste generation is expected to remain constant, at 1.1 tonnes/household/year¹.

Performance of Existing System

Owen Sound's current waste management system is one of the most comprehensive in Canada. The public indicated a high level of satisfaction with the City's diverse programs. In comparison to other Ontario and Canadian programs, the programs offered are highly cost effective, convenient, effective and have a great deal of community support.

2.0 Vision and Goals for Future Waste Management in Owen Sound

The following **Vision and Goals** were developed by the community and have been used to establish the basis for Owen Sound's future waste management system.

VISION FOR SUSTAINABLE WASTE MANAGEMENT IN OWEN SOUND
<p>By the year 2031, Owen Sound's waste management program will be affordable, self-reliant and environmentally sound. Through active pursuit of waste elimination, the community's highly successful and innovative programs have resulted in an educated population resulting in reduced consumption and waste generation from production through to disposal.</p> <p>Partnerships will be created with all levels of government, community organizations and businesses ensuring shared responsibility and stewardship over post-consumer resources.</p> <p>The program will be accessible and supported by all who live and work within the community.</p>

The following goals have been established to provide the basis for a set of measurable targets, that, if achieved, should enable the community's vision to be realized.

¹ Numbers include domestic and IC&I waste.

GOALS	
General Goals	
<ul style="list-style-type: none"> ❑ The City will work with all levels of government to promote producer-responsibility in the reduction of waste in industrial processes. ❑ The waste management system will achieve and exceed the provincial waste diversion target of 60%. ❑ Homes, businesses and institutions will be guided by waste reduction principles in their purchasing decisions. ❑ The system will have the least possible negative impact on the natural environment. ❑ The system will be affordable and fiscally responsible. ❑ The system will be user-friendly, providing the most effective method of collecting, recovering, and reusing the material resources produced and consumed by our community (recycling, composting). ❑ The community will be aware of the impact of hazardous waste on our health and environment. ❑ The City will work with neighbouring municipalities and other government agencies, businesses and organizations to maximize the benefits of waste management system components. ❑ The city will promote green industry. ❑ The Long Term Waste Management Plan will be compatible with, and contribute to the achievement a Sustainable Community Plan. ❑ The program’s performance will be monitored annually. ❑ The City will encourage innovation and continual improvement of its waste management system. 	
Community Goals	
<ul style="list-style-type: none"> ❑ Waste reduction and re-use behaviours will become part of our way of life. ❑ Residents will actively participate in curbside organic and recycling programs. ❑ In program delivery, the City will promote collaboration with other levels of government, businesses, and institutions where appropriate. ❑ Community participation will be encouraged in developing supporting policies and programs. ❑ 	
Economic Prosperity Goals	
<ul style="list-style-type: none"> ❑ The City’s waste management system will be affordable and cost-effective. ❑ Economic incentives will be utilized to encourage maximum participation. ❑ Economic development will be stimulated through attracting green industry and businesses to the City. 	
Natural Environment Protection Goals	
<ul style="list-style-type: none"> ❑ The City’s waste management system will minimize the environmental impact and contribute to the overall reduction of the City’s ecological footprint. 	

In summary, Owen Sound has demonstrated a strong commitment to waste elimination through its existing practices and expressed a future desire to continue to work towards this goal.

3.0 Recommended Waste Management System

Identification and Evaluation of System Options

A number of options were considered for Owen Sound's future waste management system. They included various approaches to:

- ❑ Waste Reduction, Re-Use and Recycling through community leadership, policy development and program implementation;
- ❑ Source separated organics, through curbside collection and processing; and,
- ❑ Waste disposal options including pre-processing and stabilization, thermal processes and landfill disposal.

The consulting team developed an evaluation approach and consulted with the City and the community when conducting the evaluation. The evaluation included the following general criteria groups:

- ❑ Cost and affordability;
- ❑ Environmental effects; and
- ❑ Social impact and acceptability.

Evaluation Results

The recommended waste management system for Owen Sound consists of two-phases: 1) Achieving 60% waste diversion by 2010, and 2) Achieving 70%+ by 2015. The approach will provide the opportunity to:

- ❑ Obtain certainty over waste composition and quantities;
- ❑ Implement and determine the success of waste reduction measures;
- ❑ Obtain funding for innovative programs and determine appropriate staffing;
- ❑ Explore partnerships with the County and neighbouring municipalities for various reliable disposal opportunities;
- ❑ Attract green businesses;
- ❑ Explore alternative business models for managing and financing waste management programs; and,
- ❑ Measure performance.

The 60%+ Waste Diversion Program (2008-2010) includes:

- ❑ Continue with political leadership on the international, national and provincial stage to encourage packaging reductions, organic bans and other policy tools;
- ❑ Incorporate waste management policies in the City's Strategic Plan, enhance waste minimization and environmental policy at City facilities;
- ❑ Incorporate the long term waste management plan into any future Sustainable Community Plan;
- ❑ Conduct a waste audit to more accurately determine the quantities and characteristics of the waste to be managed (including domestic and IC&I generators);

- ❑ Consider reducing the garbage bag limit from 3 to 2 once enhanced waste diversion programs are in place;
- ❑ Continue and enhance the City's Household Hazardous and Special Wastes program;
- ❑ Enhance waste reduction through:
 - Encouraging residents to increase backyard home composting;
 - Partnering with local organizations for re-use and reduction programs; identify ambassadors to promote waste reduction and monitor achievements;
 - Continue with Goods Exchange programs; develop re-use facilities, develop partnerships to promote electronic goods exchanges, such as "Freecycle™" and www.iWasteNot.com;
- ❑ Enhance waste recycling through:
 - Promoting recovery of plastics, paper, aluminum containers, foil and drinking boxes;
 - Promoting recovery of discarded electronics, polystyrene, tires and metals at the depot;
- ❑ Consider expansion of the current Leaf and Yard waste composting program, to include:
 - Evaluating the feasibility of collecting and processing leaf, yard and food wastes (SSO);
 - Determine partnership potential with County and neighbouring municipalities;
- ❑ If feasible, move forward with siting and regulatory approvals for a SSO facility;
- ❑ Develop a professional, comprehensive education and communications program including community-based social marketing techniques to encourage community participation in the enhanced programs;
- ❑ Residual waste management plans should provide certainty that Owen Sound will have an environmentally sound location for disposal of its wastes. The Plan outlines an approach to ensure these certainties through:
 - Exploring, with both the private and the public sector, the business case for both thermal and land disposal of residuals;
 - Exploring collaboration potential with local/regional partners for the identification of a local/regional landfill site; and
 - Implementing a contingency plan for disposal should the US border close and the current contractor be unable to handle Owen Sound's residual wastes.

The net operating cost for this system, including capitalizing of the SSO facility but exclusive of planning, approvals and waste auditing costs, is \$96.85/tonne. This compares favourably with the existing net operating cost of \$90.58 per tonne.

The 70%+ Waste Diversion Program

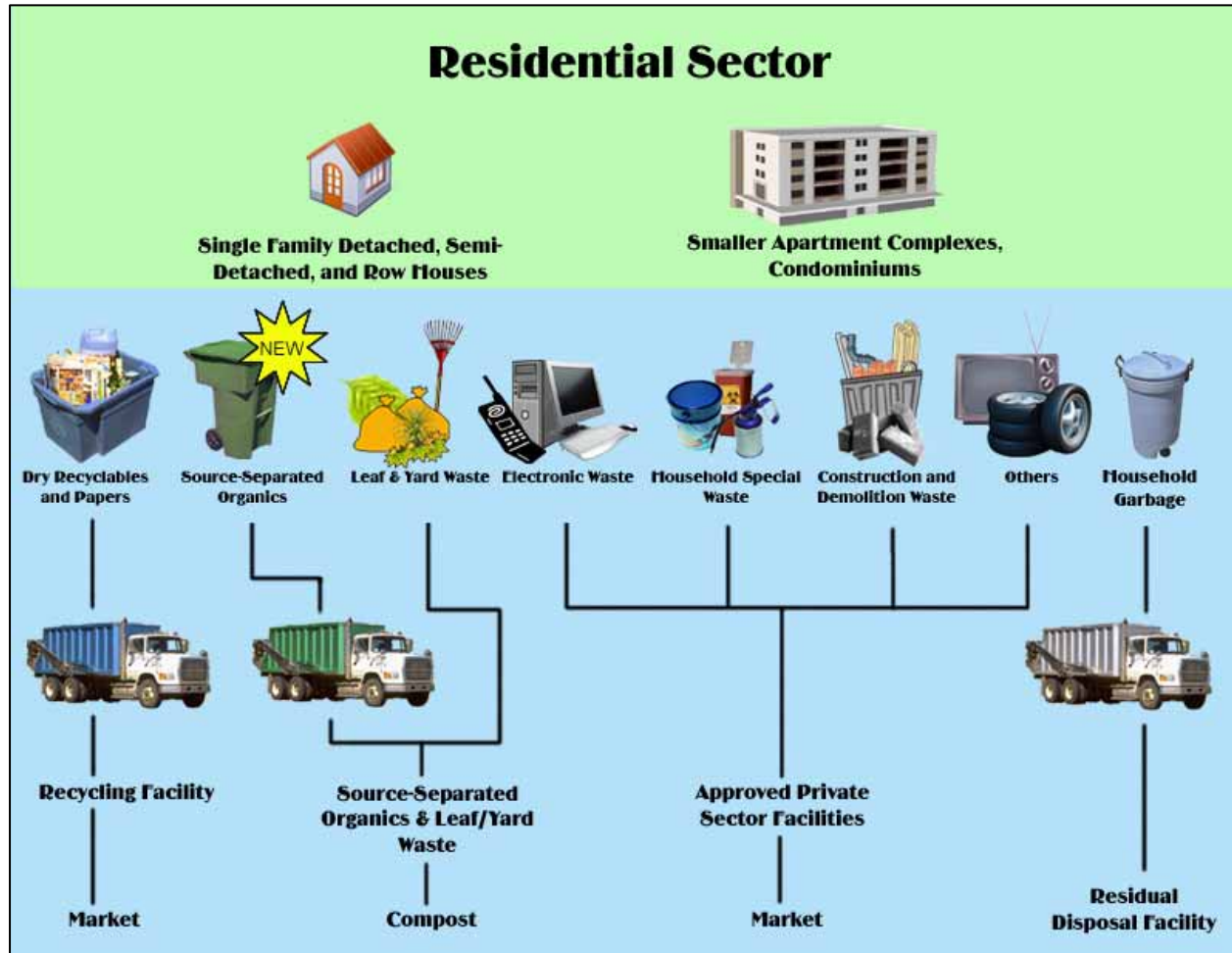
Subject to performance of the 60% program that will be measured over the next 3 years, the 70%+ system relies on the addition of the diversion of construction and demolition waste to a private sector facility. To encourage this, a construction and demolition materials ban should be put in place to enable planning and development time. Additional funds will be required to promote this ban.

It is anticipated that additional materials, such as plastic bags, will be added to the recyclable materials stream and that improvements will be realized in both backyard home composting and the SSO program, enabling the City to achieve maximum diversion.

The operational costs for this system shows a reduction to \$93.67 per tonne.

Over time, the community of Owen Sound can continue to shift towards implementing a “conservation culture”. This culture will contribute to other City initiatives such as energy conservation, transit and transportation, recreation and land use, water and waste water, and air quality.

The residential maximum waste diversion system is illustrated below.



4.0 Plan Implementation

Successful plan implementation will require an analysis of management options and alternative systems delivery to ensure the best value approach is taken. It involves expanding program delivery capacity through potential partnering with area municipalities and the County, as well as diverse groups such as Georgian College, non-government organizations such as Green Owen Sound, Salvation Army, and the private sector.

A number of funding opportunities are available, and Owen Sound should take advantage of Waste Diversion Ontario E & E Funding, and the Federation of Canadian Municipalities’ Sustainable

Community Funding for a number of these initiatives. Consideration could be given to combining funding applications with other sustainable development initiatives promoted by the City.

Community Engagement is a crucial part of the success of the waste reduction, re-use, recycling and composting components of this plan. The Plan sets out a framework for developing a multi-stakeholder committee to assist the City with this Plan's implementation.

Green economic development is a foundation stone of Owen Sound's Vision and Goals. As such, every opportunity should be identified and promoted to encourage local green businesses to benefit from this Plan's implementation.

Monitoring and continual improvement should be performed, with the City reporting progress on an annual basis.

An implementation and funding plan should be prepared upon approval of "Planning for Sustainability: Long Term Waste Management Plan", but the City of Owen Sound Council.

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1.0 INTRODUCING THE SUSTAINABLE WASTE MANAGEMENT PLAN

1.1 Background and Purpose

The City of Owen Sound is located on the southwestern shore of Georgian Bay, on the Niagara Escarpment. With a population of 22,000, the City was named one of five Cultural Capitals of Canada in 2004. A picturesque harbour city, Owen Sound is the hub of Grey County and the Bruce Peninsula, with deep cultural and historical roots.

Over the past decade, the City and neighbouring municipalities in Grey County have attempted to develop a collaborative waste disposal system to manage wastes locally, but this did not lead to success.

Under the *Municipal Act, 2001*, the City of Owen Sound has the responsibility to plan for and manage municipally-generated solid waste within its boundaries. With the lack of access to neighbouring disposal sites, Owen Sound is currently exporting its residual wastes to a landfill site in Michigan, under a 10-year contract with Miller Waste Systems (2005-2015). Relying on exporting Owen Sound's waste as a disposal solution has its challenges, as the existence of viable disposal options is subject to external political and regulatory factors outside of the City's control. Establishing local landfill disposal facilities can be contentious and can take five or more years to achieve approvals.

City Council has decided that much more emphasis needs to be put on reducing and diverting wastes from disposal. Based on best practices in other communities in Canada and elsewhere, upwards of 60% of the total municipal waste generated within City boundaries can be diverted from disposal, through waste reduction at source and improving the capture rate of both recyclable and compostable materials.

In August 2005, the City of Owen Sound committed to "give high priority to adopting a comprehensive Waste Management Strategy". In 2006, Council directed that a comprehensive waste management planning process, involving community participation and technical studies, be undertaken to assess the potential feasibility of this approach.

"Planning for Sustainability: Long Term Waste Management Plan" is the result of this work. The Plan focuses on the minimization and management of household solid wastes.

1.2 What is Sustainability? How Does Waste Management Fit Within a "Sustainable Owen Sound"?

Over the past two decades, the notion of "sustainable development", first introduced by The World Commission on the Environment, has evolved into the desire of many of Canada's municipalities to become "sustainable" communities. These cities are taking steps to enhance their economic, social and environmental viability. They implement decisions that balance these factors within the cultural and political context of their communities. These cities take into account the impact that their

policy, planning and development decisions make on their community's "ecological footprint"². The City of Owen Sound is one such community.

The City's commitment to community sustainability is documented in a number of initiatives within its "Strategic Plan for the Corporation of the City of Owen Sound"³:

Mission Statement

The City of Owen Sound governs and advocates on behalf of all citizens by providing infrastructure and services **which respect the environment and allow individuals and businesses to prosper.**

Themes

The City should commit itself to the principles of **effective environmental management** in all aspects of service delivery.

Initiatives

The City should be governed by the **principles of sustainable development** and planned growth in retaining long-term lifestyle and economic opportunities.

The management and disposal of wastes that each one of us generates affects the sustainability of our environment in a number of ways, including:

- ❑ One-time use of valuable renewable and non-renewable resources;
- ❑ Consumption of non-renewable energy sources;
- ❑ Impacts on the transportation network – through long-distance haulage, traffic, congestion and air emissions;
- ❑ Potential environmental, economic and social effects of waste disposal including possible water contamination, gas emissions (contributing to global climate change), and potential lost revenue from recyclables;
- ❑ The cost to the taxpayer of collection, processing and disposal of wastes; and,
- ❑ Lost green-economic opportunities.

The more waste that is generated, the more that these issues can affect the economic, social and environmental prosperity of the City. The City has taken on the challenge of viewing its current waste management system through the "sustainability" lens.

² An ecological footprint is the calculation of the amount of productive land and water a community needs to support what it needs and what it discards.

³ August 8, 2005

1.3 Why do we need a Sustainable Waste Management Plan?

Waste generation in the City of Owen Sound is approximately 1.0 metric tonne per household, slightly above the national average of 0.971 kg (Statistics Canada, 2002). Residents and apartment dwellers can separate their waste into two general streams: the recyclable stream (destined for processing into “new” materials) and the garbage stream (destined for disposal). In 2005, a total of 9,935 metric tonnes of residential recyclable materials, yard wastes and garbage was managed by the City of Owen Sound.

Owen Sound has one of the most comprehensive recycling programs in the country. In 2006, the City received the prestigious Recycling Council of Ontario’s “Platinum” award for achieving 55% diversion of its residential solid waste from landfill.

Notwithstanding this impressive performance, almost half of Owen Sound’s waste is being transported long distances to Michigan, USA. Managing large quantities of wastes in this fashion is unsustainable in the long-term for two reasons:

- ❑ Lack of certainty through reliance on external, export disposal solutions - the border to Michigan State from Ontario will be closed to waste shipments in 2010; and,
- ❑ The City is losing opportunities to maximize the environmental and economic benefits of post-consumer wastes through improved waste diversion programs such as beneficial re-use of source separated organics, achieving waste reduction through behaviour change programs, and re-use of materials.

1.4 How the Plan was Developed

The City’s Environmental and Waste Advisory Committee, together with a Study Team led by Lura Consulting (in association with Trow, Golder and 2cg Inc.) followed five steps in completing this plan:

- ❑ Understanding and Assessing the Current Waste Management System;
- ❑ Developing a Vision and Goals for Future Waste Management In Owen Sound;
- ❑ Understanding and Assessing the Options ;
- ❑ Selecting Waste Management System Components; and
- ❑ Preparing the Plan.

The community participated in the process through a public survey and two interactive workshops. A report from the Public Consultation Program is attached in Appendix A. Input from the public has been incorporated throughout this report.

2.0 UNDERSTANDING AND ASSESSING THE CURRENT WASTE MANAGEMENT SYSTEM

Before embarking on the planning process for Owen Sound's long-term future waste management plan it was necessary to understand and assess the performance of the current waste management system and its competencies. To achieve this objective, the Study Team conducted a "Facility and Service Review" at the outset of the study to determine the effectiveness and performance of Owen Sound's existing waste management system. The methodology for conducting this review included:

- ❑ Data collection and public survey;
- ❑ Analysis of results; and,
- ❑ Consideration of Opportunities for Improvement.

Each component of the current waste management system was assessed from the following perspectives:

- ❑ Performance and Capture rates;
- ❑ Participation by residents;
- ❑ Tonnages diverted or disposed;
- ❑ Cost;
- ❑ Opportunities for improvement; and
- ❑ Benchmarking Owen Sound's program against other similar programs.

The results are summarized below. For the full report, please see Appendix B – Facility and Service Review Lura Consulting, December 2006, and Appendix C – Residential Waste Management Baseline Survey –Lura Consulting, November 2006.

2.1 Description of Owen Sound's Existing System

The current system comprises a comprehensive set of residential and industrial, commercial and institutional (IC&I) programs.

Domestic Programs

The domestic programs currently operating within Owen Sound's existing waste management system include:

- ❑ **Waste reduction** (including backyard home composting and grasscycling);
- ❑ **Recycling and garbage collection** at the curb;
- ❑ **Transfer Station** (for recycling, electronics, Household special wastes (HSW), white goods, tires, scrap metal and garbage);
- ❑ **Leaf, yard and brush composting facility;**
- ❑ **Recycling processing and marketing;** and,
- ❑ **Waste transfer** to processing and landfill facilities.

The program is supported by a communications and education program that encourages waste reduction and recycling. The program also promotes consumer use of the City's leaf and yard waste facilities.

Industrial, Commercial and Institutional Sector Programs

The City is not legally responsible for providing waste management services to this sector. The City collects recyclables and waste from a portion of the commercial sector, and the balance is privately contracted through individual arrangements between businesses and Miller Waste Services. Recyclables are processed at Miller's Material Recycling Facility in Owen Sound and waste is taken to the Transfer Station and hauled to Michigan for disposal.

2.1.1 Domestic Waste Programs

The following discussion describes the waste management programs available in the City today followed by an assessment of their performance.

Waste Reduction and Re-Use

The City employs a number of financial and regulatory instruments in order to reduce waste. These include a user pay system and material and waste disposal bans that encourage and mandate waste diversion. Other waste reduction initiatives include:

- Consumer awareness programs to encourage residents to reduce their consumption of waste (e.g. using re-usable bags and containers, purchasing goods in bulk, buying less packaging);
- Two Goods Exchange Days per year, where residents set out their re-usable items at the curb for scavenging; and,
- There are a number of programs operated within the City by other organizations, such as Salvation Army, Freecycle™ (a free computerized waste exchange program), and a community re-use center.

When the user pay system was implemented in July of 1999, the quantity of waste collected at the curb dropped significantly. The waste collected curbside in 2000, the first full year of the bag tag program, was 25% less than in 1998, the last full year without any user pay component to garbage collection.

There is no reliable data on the performance of the waste reduction and re-use program at the current time.

Recycling

The City's domestic recycling program collects over 30 types of material, making it one of the most comprehensive programs in Ontario. Bottles and cans are sorted in a blue box, paper sorted in a plastic bag, and cartons, paperboard and kraft paper are sorted in a third stream. The material is collected bi-weekly and processed by Miller Waste Systems.

Residents in apartment buildings have access to an extensive recycling program operated by the City, with material sorted into wheeled containers. Miller Waste Systems collects the materials on behalf of the City.

In addition, all residents can take recyclable materials to the Transfer Station, where they can also take polystyrene, end-of-life electronics, white goods, scrap metal, tires and other materials for recycling. The table below lists the types of materials that are collected at the curb through the City’s recycling program.

**Table 1
Recyclable Materials Collected**

Metal	
<ul style="list-style-type: none"> • Food tins and pop cans • Steel paint cans • Aerosol cans • Aluminum pie plates & foil • Metal Pots & Pans, cutlery and kitchen utensils 	
Plastic	
<ul style="list-style-type: none"> • #1 PETE plastic containers & trays • #2 HDPE screw-top plastic bottles (except motor oil and 5-gallon pails) • # 3 V or PVC plastic bottles • # 4 LDPE plastic bottles • # 5 PP plastic bottles, tubs, lids and bottle caps • # 7 OTHER plastic bottles • Tupperware 	
Glass bottles & jars	
Paper	
<ul style="list-style-type: none"> • Newspapers and inserts • Magazines • Catalogues • Office paper • Construction paper • Envelopes (with the plastic windows removed) • Paperback books • Telephone books 	<ul style="list-style-type: none"> • Drinking boxes • Milk and juice cartons • Frozen food cartons • Wax & plastic coated paper cups • Paper bags • Cereal, detergent, tissue boxes, etc • Paper egg cartons • Greeting cards • Gift wrap

Program Assessment

- The program is successful with 94% of residents reporting participation and recycling paper, cans, bottles, and cardboard;
- The City diverts 20% of its waste through its recycling program;
- The program captures approximately 60% of available materials;
- Recycling tonnages have risen 55% between 2000 and 2005;

- The program has tremendous support from its users. Over half of surveyed residents reported that it is a “great program”;
- The capture rates of some materials are quite low, such as aluminum foil, and drinking boxes; and,
- Net cost of the program, after revenue from sale of material but before provincial grants are factored in, is \$88.45 per tonne. This compares favourably with the provincial average, where net costs range from \$88.00 to \$108.00 per tonne. These costs are expected to rise to reflect recent changes to the proportion of recyclables and other contractual arrangements.

Backyard Composting

The City provides educational guidance and sells kitchen collectors and subsidized backyard composters to encourage backyard composting.

Program Assessment

- The rate of capture for food and vegetable waste as managed at home is unknown, but using Waste Diversion Ontario (WDO) criteria, the City estimated backyard composting diversion to be 459 tonnes in 2005;
- 47% of residents reported using a backyard home composter. This number is higher than average, possibly due to the bag tag program and the subsidy;
- Since 1998, over 1,400 composters have been sold (representing approximately 15% of households); and,
- The City provides a \$15.00 subsidy per unit, and sells kitchen collectors at \$5.00 each.

Leaf and Yard Waste

The City operates a central leaf and yard waste composting facility that is open daily and accepts grass, leaves, branches, weeds and many other yard waste materials. The facility is not staffed and is open 7 days per week dawn until dusk for the convenience of residents. Residents take compostable material to the facility, as there is no curbside collection. The commercial sector also uses the facility, particularly for brush and stumps.

Program Assessment

- 55% of residents reported using the composting site; 37% do not use it; and 8% report that they do not have any yard waste;
- In 2005, approximately 2,774 tonnes of material was dropped off at the composting site. Of this, an estimated 1,700 tonnes came from the residential sector;
- The facility composts significant amounts of shrubs and brush from commercial grubbing operations;
- Users are very satisfied with the program and most believe that it is convenient;
- Cost per tonne is \$43.21 (for the residential portion only), comparing favorably with costs in other municipalities between \$48 and \$106; and,

- There are no scales at the facility and quantities are calculated using a visual estimate of the volume and a weighed sample of a portion of the material. A more accurate assessment would be beneficial to determining the feasibility of future composting programs.

Household Hazardous or Special Wastes (HHSW)

The City of Owen Sound holds seven Household Special Waste (HHSW) days per year, where residents can take Hazardous and other Special Wastes to the Public Works Facility (depot) for safe disposal. The program is also open to residents from neighbouring municipalities on a fee for service basis. The table below lists the accepted materials.

Table 2
Household Special Wastes Collected at Depot

Household Special Wastes
<ul style="list-style-type: none">• Pharmaceuticals• Paint• Aerosols• Pesticides• Oxidizers• Acidic materials• Caustic materials• Automotive/Recreational Vehicle Fluids• Miscellaneous Organic• Batteries

The program is well used and popular with residents.

Program Assessment

- More than 50% of residents reported using the HSW Program;
- Over 60% of residents reported that it is a great program (more than those reported as using the program);
- A small number (3%) would like to see more frequent availability for the program;
- The equivalent of 71 tonnes of HSW were diverted from disposal in 2005; and,
- The cost of the program is \$593/tonne, comparing favourably to reported program costs in other areas of between \$1,000 and \$2,000 per tonne.

Transfer Station

Miller Waste Systems owns and operates a Transfer Station in Owen Sound. The Transfer Station has facilities for garbage and recyclables including Blue Box and other curbside collected materials, polystyrene, electronic waste, white goods, tires and scrap metal. The City pays Miller for bins and transport of material for certain programs (specifically, Blue Box material recycling, polystyrene recycling and electronic waste). The others do not require a financial contribution from the City.

Electronic Waste, Polystyrene and Styrofoam™ Recycling: Electronic wastes comprise high levels of heavy metals and lead (in CRT monitors), constituting a toxic waste stream that should be diverted from disposal. Residents can take their discarded electronic appliances and computers to the Transfer Station for recycling. In 2005, 41 tonnes of electronic waste was recycled. The assessment of the electronics recycling program showed that:

- 30% of residents reported using the program;
- Users are satisfied with the program; and,
- The cost of the program is \$613/tonne – well below the best practice estimate of \$980/tonne.

The City accepts polystyrene and Styrofoam™ at the Transfer Station for recycling, collecting 11 tonnes in 2005. Although polystyrene and Styrofoam™ is light and does not constitute much tonnage, it takes up a great deal of volume in landfills and in trucks transporting waste. Besides the environmental benefits of recycling the material rather than disposing of it, there is significant cost avoidance in not having to transport it to far away disposal facilities.

There is no charge to residents to take polystyrene and Styrofoam™ to the Miller Waste Systems Transfer Station. The City pays the cost of recycling the material and bin rentals, which was approximately \$1,500 per tonne in 2005.

Metal and Tire Recycling: Tires and scrap metal, including large appliances, are accepted at the Transfer Station for recycling. In 2006, 41 tonnes of metal and 20 tonnes of tires were recycled.

Program Assessment

- Over 60% of residents use the Transfer Station, with over 30% using it at least monthly for recycling non-Blue Box materials and additional refuse disposal;
- Users expressed satisfaction with the facility;
- There is no cost to residents for recycling polystyrene, and all electronics are accepted free of charge. Businesses are charged \$10 for monitors, but other electronics are accepted free of charge; and,
- Scrap metal and tire recycling does not cost the City anything.

Waste Disposal, User Pay and Bag Limits

Curbside garbage collection is provided weekly by City crews and trucks. The City implemented a user pay program in July 1999 for the collection of garbage. At that time, all residential units were given 52 “courtesy” tags a year. Residents purchased more as needed. Free bag tags were reduced to 35 per household in 2005, and eliminated altogether in 2006.

Residents can set out up to 3 bags of garbage for collection and they must affix a \$2.00 bag tag to each bag or container to be collected. Garbage is taken to the central Transfer Station and exported. Almost 5,000 tonnes of residential waste are disposed in the landfill each year.

The intent of the user pay program is to minimize waste, encourage waste diversion and to cover the cost of the waste management program.

- The bag tag program has been successful in reducing the amount of waste going to landfill;
- Patrons pay Miller Waste Systems directly for refuse disposal, and tonnage figures are estimated. In 2006, the public took approximately 2,040 tonnes of residential waste to the Transfer Station. This impacts on the City's revenues;
- The City's collection costs are \$83.63/tonne and Miller Waste charges \$93 (in 2006/7) per tonne of waste for haulage and tipping at the landfill in Michigan. This collection includes the cost of providing extra collection to the downtown core and curbside collection of old corrugated cardboard. The total cost for waste collection and garbage transfer and tipping is \$177/tonne; and,
- Revenue from the bag tags in 2006 fell below the forecast amount. However, it was the first year of the new bag tag system, so there was no history upon which to base the budget. In the future, the budget of expected bag tag revenue should be reduced. In 2006, that revenue was supplemented from the landfill reserve fund to cover the full cost of disposal.

Communications and Education Programs

Communications and Education(C&E) is an important component of Owen Sound's waste management programs. Current initiatives include web-based information, a waste management calendar delivered free-of-charge to households annually, and a series of informative print materials. C&E is a component of a number of programs, each of which has its own C&E component in its budget. The table below lists the 2005 C&E costs for each of the City's waste management programs.

**Table 3
Communication and Education Costs (2005)**

Program	C&E Cost
Recycling	\$5,626.68
Garbage Collection	\$148.00
Goods Exchange	\$668.48
HSW	\$3,795.81
Leaf and Yard	\$1,036.00
BYC	\$1,622.71
Bag Tags	\$1,793.69
Total	\$14,691.37

Program Assessment

- Residents report that they are satisfied with the current C&E effort;
- There appears to be a need to increase promotion and instill a consistent, professional approach about what can be recycled, as many people do not recycle all of the material.

Program Costs

The following table summarizes the current cost of each component of the current system. It is based on 2005 and 2006 data, using the best available information.

Table 4
Current Diversion System – Based on 2005 and 2006 Data

Program	Diversion/ disposal (tonnes)	Residential Diversion %	Satisfaction	Capital Cost	Net Operating Cost (NOC)	NOC/ hhld	NOC/ capita	Operating Cost per tonne
Blue Box	2,030	20%	High	\$0	\$190,481	\$19.98	\$8.88	\$93.83
BYC & Grasscycling	1,014	10%	High	\$0	\$6,000	\$0.63	\$0.28	\$5.92
Leaf and Yard Organics	1,774	18%	High	\$0	\$76,654 ⁴	\$8.04	\$3.58	\$43.21
HSW & C&D	79	1%	High	\$0	\$36,000	\$3.78	\$1.68	\$454.74
Electronics	52	1%	High	\$0	\$24,631	\$2.58	\$1.15	\$473.67
Polystyrene	11	0%	High	\$0	\$16,066	\$1.69	\$0.75	\$1,530.10
Scrap Metal & Tires	61	0%	High	\$0	\$0	\$0	\$0	\$0
Garbage Collection	2,904	0%	Good	\$0	\$242,864	\$25.48	\$11.32	\$83.63
Garbage Disposal	2,904	0%	Good	\$0	\$269,700	\$28.29	\$12.58	\$93.00
Garbage at Transfer Station	2,040	0%	High	\$0	\$0	\$0	\$0	\$0
P & E	0	0%	High	\$0	\$16,000	\$1.68	\$0.75	\$2.02
Totals	9965	50.00%		\$0.00	\$878,396	\$94.70	\$42.09	\$88.15

For some programs, costs are not separated out or costed. The scrap metal and tires program is operated by Miller Waste Services, as is the garbage that is brought to the Transfer Station.

2.1.2 Industrial, Commercial and Institutional Programs

While the focus of the waste management planning process is on Owen Sound's jurisdictional responsibility for domestic waste management, it is prudent to consider opportunities to integrate the IC&I sector into the waste management planning process where appropriate. Industry, businesses and institutions are required, by by-law 2006-001, to recycle in Owen Sound. Because the residential sector is diverting a significant portion of its waste already, it is the IC&I sector which holds the most opportunity for significant increases in overall diversion.

Miller Waste Systems collects wastes and recyclables from businesses which pay directly for this service.

In order to assist the IC&I sector, the City provides waste audit materials, signage and advice.

⁴ The Net Operating Cost of the Leaf and Yard Waste Program was higher in the study period due to a severe winter storm which took down a significant number of trees in Owen Sound and surrounding area. As a result, more material was taken to the facility and a contractor had to be paid more in order to chip a large number of trees, branches and stumps. The cost used in the table is for 2005, before the storm took place.

2.2 Waste Characterization

Understanding a City's waste stream and composition is important information for planning a waste management system. By analyzing the components of the stream and comparing this with other similar municipalities, the Study Team can estimate the amount of materials and wastes that could be available for improving the City's diversion programs.

The Study Team conducted a waste characterization study of the entire waste stream at the outset of this project to provide a basis for planning the new system. The report "Waste Characterization" is attached in Appendix D.

Like many municipalities, the City of Owen Sound has never audited its waste stream in order to develop a characterization of its waste. Such a study would normally entail taking samples of the entire waste stream, over four seasons, sorting them into fractions (such as glass, metal, food, and so on) and weighing them. While this is an accurate method of determining the content of a municipality's waste stream at a given time, it is outside of the scope of this project.

Instead, the City's waste stream has been calculated as a part of this project based on weighed data and characterizations that have been conducted in other parts of Ontario and Canada.

Certain assumptions have been made in determining the characterization of Owen Sound's waste stream. These include:

1. The weighed data is accurate and has not been changed;
2. The calculated data is based on best estimates and can be adjusted if a significant anomaly is found;
3. The resulting estimates are considered a reasonable basis for planning;
4. The Owen Sound waste stream is not significantly different than published amounts for Ontario;
5. Because the waste from Georgian Bluffs and the Town of Meaford are processed through the Transfer Station in Owen Sound it is considered to be handled by the City and has, for the purposes of this study, been grouped with the Industrial, Commercial and Institutional Sector data, since this sector is not within the municipal jurisdiction;
6. The refuse collected from the Industrial, Commercial and Institutional Sector is mixed with the residential refuse from apartments and other multi-unit dwellings when collected by a collection contractor; and,
7. Yard waste, stumps, wood waste, electronics and Household Special Wastes all included a mix from residential and non-residential sources.

Table 5 presents the domestic waste characterization data for Owen Sound.

Table 5
Residential Waste Characterization Data for Owen Sound
with a Sample of Representative Data from other Canadian Jurisdictions

Based on 2005 Owen Sound Data

	Ontario (%)	Canada (%)	Calgary, Alberta (%)	Cochrane, Alberta (%)	Markham (%)	London (%)	Owen Sound (tonnes)	Owen Sound (%)	Owen Sound Calculated (tonnes)	Owen Sound Calculated (%)	Owen Sound Estimated (tonnes)	Owen Sound Estimated (%)
Paper	24%	26%	22%	21%	38%	33%	1393	14%	2384	24%	2384	24%
Organic		40%		23%		29%						
- Food & HHLD, if broken out	25%		21%		37%				2484	25%	2484	25%
- Yard, if broken out	13%		31%		1%		2774	28%	1292	13%	1500	15%
Glass	5%	3%	2%	2%	6%	7%	371	4%	497	5%	497	5%
Ferrous	2%	4%	3%	4%	2%	3%	228	2%	199	2%	228	2%
- Aluminum, if broken out	1%								99	1%		
Plastic	4%	9%	8%	8%	2%	10%	81	1%	397	4%	397	4%
Other	26%	18%	11%	9%	15%	16%			2583	26%		
- HHW, if broken out			2%			1%	71	1%			71	1%
- Electronics, if broken out							53	1%			53	1%
- Tires, if broken out							20	0%			20	0%
- Wood and Soil, if broken out				19%								
- C&D, if broken out				14%								
- Refuse, if broken out							4944	50%			2301	23%
Total	100%	100%	100%	100%	101%	99%	9935	100%	9935	100%	9935	100%

Notes:

1. Ontario data is from *Ontario's 60% Waste Diversion Goal – A Discussion Paper*, Ontario Ministry of the Environment, June 10, 2004
2. Canada data is from *Human Activity and the Environment Annual Statistics 2005 Feature Article Solid Waste in Canada*, Statistics Canada, 2004
3. Calgary and Cochrane, Alberta data is from *Provincial Waste Characterization Framework*, Alberta Environment, Government of Canada, Action Plan 2000 on Climate Change(Enhanced Recycling Program) and the Recycling Council of Alberta, 2005
4. Markham data is from *Markham's Mission Green Program Waste Audit Results Fall 2004*, RIS International, 2004
5. London data is from a 2006 study conducted by the City and available on the *Stewardship Ontario* website.
6. Owen Sound data is from the WDO Datacall 2005, landfill annual reports and other data as provided by the City of Owen Sound
7. Some residential data includes material from IC&I sources, particularly in the case of drop-off materials
8. Data from Markham and London does not include Leaf and Yard Waste
9. Some totals do not add up to 100% because of rounding errors

Industrial, Commercial and Institutional and other Municipalities

There is no data available on the amount of waste diverted from disposal by the IC&I sector in Owen Sound. Nor is there any data on the characterization of the IC&I waste in Owen Sound.

The values for the IC&I sector have been calculated based on the published Ontario IC&I characterization data. Because the Meaford and Georgian Bluffs residential and IC&I waste is also routed through the Transfer Station in Owen Sound, that data has been included in the following Table.

**Table 6
Owen Sound IC&I Waste Characterization Data**

Items	Ontario	Owen Sound (tonnes)	Owen Sound %	Meaford (tonnes)	Meaford %	Georgian Bluffs (tonnes)	Georgian Bluffs %	Total Meaford and Georgian Bluffs (tonnes)
Paper	23%	2015	23%	322	23%	224	23%	546
Glass	5%	438	5%	70	5%	49	5%	119
Metal	11%	964	11%	154	11%	107	11%	261
Plastic	3%	263	3%	42	3%	29	3%	71
Wood	21%	1840	21%	294	21%	204	21%	499
Organic	11%	964	11%	154	11%	107	11%	261
Other	26%	2278	26%	365	26%	253	26%	618
Total	100%	8760	100%	1402	100%	973	100%	2375

Notes:

1. Ontario data is from *Ontario's 60% Waste Diversion Goal – A Discussion Paper*, Ontario Ministry of the Environment, June 10, 2004
2. Owen Sound, Meaford and Georgian Bluffs data provided by the City of Owen Sound
3. Because of the rural nature of the area, there may be more compostable organic material than the provincial average, due to the presence of a local agricultural industry

Implications of the Characterization Data

The following observations have been made about the calculated waste stream for Owen Sound, which is represented by the two right-most columns in Table 5.

- It appears that the City could capture significantly more paper waste than the 58% it is currently achieving through the Blue Box collection program.
- Although in the weighed data the portion of the paper collected is only 14% of the total waste stream, it is expected that the actual proportion is higher. That is because the estimate of the yard waste material appears to be higher than it should be, partially because of a large presence of stumps and material from grubbing operations, which is not a normal part of the residential waste stream.
- Glass recovery in the Blue Box program appears to be significant, in the order of 74%.
- Only 20% of available plastic is being recovered.

As the estimated data is largely based on observations in Owen Sound and extrapolations from other jurisdictions, it likely does not reflect any anomalies that might be present in Owen Sound. Conducting a waste audit would provide more accurate data and is a recommendation of this Plan.

2.3 Waste Quantity Projections

The generation of waste for the next 25 years has been forecast using data from two reports: City of Owen Sound Official Plan Background Study – Biglieri Group, 2003, and Development Charges Background Study – County of Grey – Hensom Consulting Limited, 2005.

According to Biglieri, an optimistic average annual population growth rate for Owen Sound, based on economic renewal, is just under 1% per year. The growth rate could be lower if the economic growth does not materialize, but this Plan is based on this potential for growth. According to the Hensom report, Georgian Bluffs grew 11% and the Town of Meaford grew 2% from 2001 to 2004. This average annual growth was calculated and applied to the overall generation of waste from each of the municipalities. Table 7 below forecasts the waste generation for the next 25 years based on the planning forecast. It is important to note that the waste generation forecast assumes no changes in the content of the waste stream and no changes to per household generation rates.

As the Table shows, the growth of waste generation over the next 25 years is modest. Given that, if a greater amount of waste is required to ensure there is sufficient material to make a facility or program viable (such as in-vessel composting), more material may be needed from outside of the City. If the facility is to be located in Owen Sound, there may have to be a partnership on a regional level, or material may have to be exported to another jurisdiction.

**Table 7
Waste Generated and Number of Households**

Year	Waste Generated (tonnes)				Permanent Households				Household Generation Rate (tonnes/yr)
	Owen Sound	Georgian Bluffs	Meaford	Total	Owen Sound	Georgian Bluffs	Meaford	Total	
<i>Growth</i>	0.95%	2.75%	0.50%		0.95%	2.75%	0.50%		
2005	18695	973	1402	21070	9532	3970	5000	18502	1.1
2006	18873	1000	1409	21281	9736	4027	5193	18956	1.1
2007	19052	1027	1416	21495	9828	4138	5219	19185	1.1
2008	19233	1056	1423	21712	9922	4252	5245	19418	1.1
2009	19416	1085	1430	21930	10016	4368	5271	19656	1.1
2010	19600	1114	1437	22152	10111	4489	5298	19897	1.1
2011	19786	1145	1445	22376	10207	4612	5324	20143	1.1
2012	19974	1176	1452	22603	10304	4739	5351	20394	1.1
2013	20164	1209	1459	22832	10402	4869	5378	20649	1.1
2014	20356	1242	1466	23064	10501	5003	5404	20908	1.1
2015	20549	1276	1474	23299	10601	5141	5431	21173	1.1
2016	20744	1311	1481	23537	10701	5282	5459	21442	1.1
2017	20941	1347	1488	23777	10803	5427	5486	21716	1.1

Year	Waste Generated (tonnes)				Permanent Households				Household Generation Rate (tonnes/yr)
	Owen Sound	Georgian Bluffs	Meaford	Total	Owen Sound	Georgian Bluffs	Meaford	Total	
<i>Growth</i>	0.95%	2.75%	0.50%		0.95%	2.75%	0.50%		
2018	21140	1384	1496	24020	10906	5577	5513	21996	1.1
2019	21341	1423	1503	24267	11009	5730	5541	22280	1.1
2020	21544	1462	1511	24516	11114	5887	5569	22570	1.1
2021	21748	1502	1518	24769	11220	6049	5596	22865	1.1
2022	21955	1543	1526	25024	11326	6216	5624	23166	1.1
2023	22164	1586	1534	25283	11434	6387	5653	23473	1.1
2024	22374	1629	1541	25545	11542	6562	5681	23785	1.1
2025	22587	1674	1549	25810	11652	6743	5709	24104	1.1
2026	22801	1720	1557	26078	11763	6928	5738	24429	1.1
2027	23018	1767	1565	26350	11874	7119	5766	24760	1.1
2028	23237	1816	1572	26625	11987	7314	5795	25097	1.1
2029	23457	1866	1580	26903	12101	7516	5824	25441	1.1
2030	23680	1917	1588	27185	12216	7722	5853	25792	1.1

Notes:

1. Number of households is from Statistics Canada, 2006, extrapolated based on planning data from *City of Owen Sound Official Plan Background Study – Biglieri Group, 2003*, and *Development Charges Background Study – County of Grey – Hensom Consulting Limited, 2005*.
2. Waste tonnage is total of residential and IC&I from Table 5 and 6.

2.4 Summary

The City's waste management system has been built upon the notion of diverting waste from landfill through supplementing the garbage collection with collection of source separated recyclables, the promotion of waste reduction (through the provision of backyard home composters), and the provision of recycling and yard waste facilities and HSW depot at various City facilities.

This approach has been tremendously successful for the City. Community support for the program as it exists today is widespread and participation is enthusiastic.

Overall, the total waste diversion is comparatively high, and the costs of the total program comparatively low. Customer satisfaction with the system is also relatively high. The system works well today and provides a solid foundation for moving forward with enhancements.

3.0 OWEN SOUND'S SUSTAINABLE WASTE MANAGEMENT PLAN

Developing the waste management plan involved the following steps:

- ❑ Developing the Vision and Goals for the future Waste Management Plan with the community;
- ❑ Identifying Waste Management System Options; and,
- ❑ Evaluating and Selecting the Recommended Waste Management System.

3.1 Vision and Goals for Future Waste Management in Owen Sound

Through review of provincial and City objectives and goals, and discussions with stakeholders and members of the public, a Vision and Goals for the future has been developed. This vision and goals have been used to develop the waste management plan. They will provide a basis for the development of performance measures once the Plan is adopted by the City.

Provincial and Local Context

Owen Sound's Sustainable Waste Management Plan is developed within the context of Provincial and local policy.

Provincial Directives

The Provincial Waste Diversion Act (WDA), June 2002, sets a waste diversion goal of 60% by 2008. The Province has established Waste Diversion Ontario to develop, implement and operate waste diversion programs for a wide range of materials. Recently however, the government has recognized that this target will not likely be met and that much more needs to be done to achieve it.

To date, the Minister of the Environment has designated recyclable materials to include used tires, used oils, waste electronic and electrical equipment and household hazardous or special waste. Potential future designations include fast food and convenience food packaging, food waste, pharmaceuticals and fluorescent tubes. Once the Minister designates a material through a regulation under the WDA, the Minister requests WDO to work cooperatively with industries that produce and distribute products that result in designated materials, and to establish diversion programs for these materials.

In June 2007, the Ministry of the Environment released a draft Policy Statement on Waste Management Planning, for consultation. This policy statement, released after the completion of this draft plan, sets out guidance for municipalities on how to develop and implement long term waste management plans. Owen Sound's Long-Term Plan meets and exceeds the guidance contained in this document.

The Study Team has reviewed the provincial directives, and considered current and future potential directives in developing Owen Sound's Sustainable Waste Management Plan.

City Objectives

The City of Owen Sound wishes to meet or exceed the 60% diversion target, reducing its dependence on waste haulage and disposal and processing more of its waste within its own boundaries. The City wishes to extract as much value out of the waste stream as it can, in an economically viable and socially acceptable manner.

Public Perspectives

Through payment of city taxes, the public is entitled to an efficient waste collection system, one that achieves maximum diversion and is economically achievable. The public has demonstrated willingness to reduce and recycle waste materials and to make use of the compost site and Transfer Station to recycle special wastes and electronics.

At two workshops held by the City during the preparation of this Plan, participants were asked to first, identify elements of their vision for waste management in Owen Sound, and second, review a draft vision and goals prepared by the Study Team.

The vision was subsequently used in developing the Plan. The vision and goals are presented below.

VISION FOR SUSTAINABLE WASTE MANAGEMENT IN OWEN SOUND
<p>By the year 2031, Owen Sound's waste management program will be affordable, self-reliant and environmentally sound. Through active pursuit of waste elimination, the community's highly successful and innovative programs have resulted in an educated population resulting in reduced consumption and waste generation from production through to disposal. Partnerships will be created with all levels of government, community organizations and businesses ensuring shared responsibility and stewardship over post-consumer resources. The program will be accessible and supported by all who live and work within the community.</p>

GOALS	
General Goals	
<ul style="list-style-type: none"> ❑ The City will work with all levels of government to promote producer-responsibility in the reduction of waste in industrial processes. ❑ The waste management system will achieve and exceed the provincial waste diversion targets. ❑ Homes, businesses and institutions will be guided by waste reduction principles in their purchasing decisions. ❑ The system will have the least possible negative impact on the natural environment. ❑ The system will be affordable and fiscally responsible. ❑ The system will be user-friendly, providing the most effective method of collecting, recovering, and reusing the material resources produced and consumed by our community (recycling, composting). ❑ The community will be aware of the impact of hazardous waste on our health and environment. ❑ The City will work with neighbouring municipalities and other government agencies, businesses and organizations to maximize the benefits of waste management system components. ❑ The city will promote green industry. ❑ The Long Term Waste Management Plan will be compatible with, and contribute to the achievement a Sustainable Community Plan. ❑ The program’s performance will be monitored annually. ❑ The City will encourage innovation and continual improvement of its waste management system. 	
Community Goals	
<ul style="list-style-type: none"> ❑ Waste reduction and re-use behaviours will become part of our way of life. ❑ Residents will actively participate in curbside organic and recycling programs. ❑ In program delivery, the City will promote collaboration with other levels of government, businesses, and institutions where appropriate. ❑ Community participation will be encouraged in developing supporting policies and programs. 	
Economic Prosperity Goals	
<ul style="list-style-type: none"> ❑ The City’s waste management system will be affordable and cost-effective. ❑ Economic incentives will be utilized to encourage maximum participation. ❑ Economic development will be stimulated through attracting green industry and businesses to the City. 	
Natural Environment Protection Goals	
<ul style="list-style-type: none"> ❑ The City’s waste management system will minimize the environmental impact and contribute to the overall reduction of the City’s ecological footprint. 	

The City’s new waste management plan sets out a path to achieve these goals and objectives, identifies targets, and outlines a method for monitoring success.

3.2 Options to Enhance Owen Sound's Waste Management System

Over the past 20 years, opportunities to achieve waste minimization and maximize waste diversion have been tested and implemented across Ontario, Canada and internationally. There are a number of keys to success that have been identified:

- ❑ Build an awareness in the community about the importance of a “conservation culture”, leading to waste reduction and changes in consumption habits;
- ❑ Approach waste management from a “materials” perspective, by generating a solid understanding of the quantities of potentially recoverable materials available for diversion from different fractions of the waste stream;
- ❑ Develop systems that separate “wet” waste (principally organic food wastes) from “dry” recyclables, thus minimizing contamination, reducing leachate generation, and maximizing recovery rates;
- ❑ Remove toxic wastes from the domestic waste stream to ensure protection of the environment at disposal sites; and,
- ❑ Developing a financially sound system that is affordable and focused on revenue generation and full cost recovery.

Building on Owen Sound's current success, the Study Team investigated options that would enhance the system and provide long term stability for the community over the next 25 years.

The following categories of options were investigated:

- ❑ Policy options at other levels of government, including federal, provincial and regional to encourage the minimization of waste and identify cost-effective waste management alternatives through partnerships;
- ❑ Waste reduction programs at source, including maximizing the use of backyard home composting;
- ❑ Identify mechanisms to improve recycling capture rates and increase the amount and type of materials collected at the curbside;
- ❑ Increase composting through curbside collection of separated compostables (source-separated organics);
- ❑ Consider maximizing the diversion of leaf and yard wastes from disposal;
- ❑ Remove HSW from the waste stream; and,
- ❑ Considering environmentally sound waste disposal options to achieve long term self-reliance and security for waste disposal.

3.2.1 Options for Increasing Waste Reduction and Reuse

A number of options for increasing waste reduction and re-use have been identified. Since waste reduction and re-use require behavioural change and a focus on conservation, a principal method for increasing education and knowledge in the community is through establishing local policy and conducting a comprehensive education and communications program, supported by community-based social marketing.

Public Policy

Owen Sound can continue to take a leadership role in waste management at the federal, provincial and local level. This can be achieved through influencing government policy at all levels, including internationally through participation in national and provincial advisory committees, passing municipal resolutions and other leadership activities. Regulatory instruments, such as bans (like the HSW ban) can play a huge role in encouraging local behavioural change. Implementing green business practices within municipal operations is another way to demonstrate political commitment (e.g. encouraging waste free events)

Community-Based Social Marketing (CBSM)

CBSM is an innovative approach to facilitate behaviour change and an attractive supplement to traditional information-based outreach campaigns. It involves identifying the barriers to an activity, designing a strategy to overcome these barriers using knowledge from the social sciences, testing the strategy to ensure that it is successful, and implementing it on a broader scale.

In reality, behavioural change involves a fundamental shift in personal philosophies towards resource use, in this case waste management. With domestic and industrial, commercial and institutional waste production at approximately 1 tonne per person per year in Owen Sound, there is a critical need for behavioural change programs that promote resource conservation at all levels, domestic, institutional and IC&I.

CBSM strategies have been shown to have a substantial impact upon responsible environmental behaviours. For example, when these approaches were used to target waste reduction in Halton Region in 2000 with their pilot “WasteLess” campaign, up to 14% waste reduction was experienced over a 9 month period. Sustained achievement, however, was not monitored.

It is important for Owen Sound to develop a sustainable waste reduction program, such that facilities to manage recycling, source separated organics and disposal can be appropriately planned and sized.

Additional Tools and Techniques

To effectively support a successful waste reduction campaign, the following mechanisms are available:

- ❑ Increased promotion of backyard composting;
- ❑ Establishment of a re-use depot in a convenient location, possibly at the Transfer Station or depot;
- ❑ Partnering with Salvation Army or other clothing re-use organizations;
- ❑ Partnering with “FreecycleTM” and www.iWasteNot.com to promote year-round, “virtual” goods exchange programs; and,
- ❑ Monitoring program performance.

Although the amount of waste reduction currently taking place in Owen Sound is not known, it is believed that a target of 5% more waste reduction could be achieved through the implementation of

these programs within 5 years. Reliable methods to measure waste reduction will need to be in place in order to measure performance. 2007 Baseline data can be utilized on targeted materials/products (e.g. plastics, organics, use of re-use depots, use of Freecycle™ and www.iWasteNot.com) such that the performance of a waste reduction campaign can be measured.

3.2.2 Enhancing Recycling

There are a number of options for increasing recycling rates:

- ❑ Increase promotion for capturing paper, aluminum foil/containers; drinking boxes, and plastics;
- ❑ Weekly collection (at additional cost);
- ❑ Addition of textiles (can include clothing, curtains, towels, blankets, sheets, table cloths, and other fabric items); using bags and/or alternative collection containers;
- ❑ Bag limit reductions; and,
- ❑ Addition of more materials as markets come available.

In an effort to push forward on achieving the provincial goal, in February 2007, the Ontario Ministry of the Environment implemented a deposit-return system for bottles purchased at the LCBO outlets. This is anticipated by the Province to result in an increase in capture rates of approximately 5 % for beverage containers.

While weekly collection can increase recycling in some municipalities, generally at a higher collection cost, this could largely be due to the limited size of the containers or that the boxes become full too soon within a two-week collection period. In Owen Sound, materials are separated into three recyclable streams and the system is considered to be highly acceptable to participants.

A target of 28% diversion could be achieved through implementing these programs, representing an increase of 8%.

3.2.3 Source Separated Organics

A principal focus of this waste management plan is to explore the potential to reduce waste going to landfill by separating food and yard wastes, offering curbside collection of these materials, and composting them either at the City facility or a new regional facility, or by exporting materials to remote composting sites.

Residents and businesses currently take their leaf and yard wastes to the City's composting facility. Based on the public survey, 55% of the residents participate in this program. The quantity of leaf and yard waste managed at the facility is unusually high for a City of this size, which is due at least in part to the large amount of stumps and brush from land-grubbing operations being taken to the site. Total available quantities of leaf and yard waste are not known at this time, but it can be estimated that an additional 1,000 to 1,200 tonnes may be diverted from disposal annually.

There is an estimated 1,750 tonnes per year of food waste going to landfill from the residential and IC&I sectors. If composted with the leaf and yard waste, a facility in the order of 5,000 tonnes per year could be developed. The high nitrogen content of the food waste mixes well with the high

carbon content of the leaf and yard waste, providing the essential ingredients for effective composting.

An additional opportunity for organic feedstock is from the sludge generated at the sewage treatment facility. A recent study has assessed the costs of dewatering the sewage sludge and composting the resulting solids. Approximately 1,500 tonnes may be available annually, depending upon the quality of the feedstock.

A number of options are explored in “Report on SSO Composting Options. City of Owen Sound” prepared by Study Team members 2cG Inc. and Golder. This report is attached in Appendix E.

Underscoring the Team’s consideration of the following options is the need for a domestic waste audit. This is based upon the unusually high quantities of leaf and yard waste currently being managed at the composting facility.

The table below presents a summary of the SSO options that were considered.

**Table 8
Options for Source Separated Organics**

Composting Option	Considerations	Costs
Leaf & Yard waste at City facility (Status quo)	<ul style="list-style-type: none"> <input type="checkbox"/> Cost effective <input type="checkbox"/> Could be expanded through promotion 	Minimal
Food waste collection	<ul style="list-style-type: none"> <input type="checkbox"/> Determine collection containers (carts/bags) 	\$25-\$80/unit. Capital cost \$190K-\$520K
Yard waste Collection	<ul style="list-style-type: none"> <input type="checkbox"/> Determine quantities of material available 	Waste Audit: \$15-75K
	<ul style="list-style-type: none"> <input type="checkbox"/> Consider collection vehicle type for both food and yard waste 	\$460K-\$580K (municipal forces)
Compost Processing Facilities <ul style="list-style-type: none"> <input type="checkbox"/> City owned <input type="checkbox"/> Private contractor 	<ul style="list-style-type: none"> <input type="checkbox"/> Pre-processing <input type="checkbox"/> Windrow <input type="checkbox"/> Aerated static pile <input type="checkbox"/> Enclosed channel <input type="checkbox"/> container/tunnel 	Included as applicable \$40-\$60/tonne \$45-\$65/tonne \$80-\$100/tonne \$110-\$130/tonne
Export to Distant Private Composting Facility	Facilities potentially available further than 150kms from Owen Sound	\$85-\$155/tonne \$170K-\$310K/year (excluding collection)

An effective source separated organics program could achieve between 15-18% additional waste diversion from landfill.

3.2.4 Waste Disposal Options

To provide certainty and to minimize risk due to the US border closing scheduled for 2008-2010, the study team reviewed available residual waste disposal options. Emerging technologies were also

reviewed. Trow Consulting prepared the report “Residual Waste Management Options”, contained in Appendix G to this report. A summary is provided below.

Pre-Processing and Stabilization

Reductions in waste requiring disposal can be achieved by pre-processing wastes to remove compostables and recyclables. Public support for these processes is high, since the stabilized materials are generally inert and non-putrescible, and thus no leachate is generated. With this system in place, communities can develop “dry” landfills, which are considered to be more socially acceptable. Compost generated from such processes cannot be sold as a compost product, but can be used as landfill cover, or landfilled directly. The quantity of available waste in Owen Sound is not considered to be sufficient for a stand-alone operation, which requires a minimum of 20,000 tonnes per year to achieve economic viability. As such the municipality would need to partner with other municipalities.

Thermal Processes

There are a number of thermal processes, such as incineration with energy recovery, gasification, pyrolysis, thermal cracking and pelletization to produce a refuse-derived fuel. Thermal processes could reduce the amount of residual wastes going to landfill by 75% or more. The costs of these processes range from \$150/tonne to \$450/tonne. There are a number of private sector initiatives that are interested in Owen Sound’s waste stream. Public concerns center around emissions and the safe disposal of fly and bottomash. Studies have been undertaken at the Peel Incineration facility to extract metals from the ash, thereby potentially reducing the toxicity of the fly ash such that it can be disposed in regular landfills. Given the quantity of Owen Sound’s residual wastes, thermal processes could be considered in collaboration with other municipalities.

Waste Disposal at Landfill

Without a local landfill, Owen Sound must rely on exporting its waste to facilities owned and operated by others. While its priority may be on self-reliance, there are a number of constraints associated with developing and operating a City-owned landfill. The Study Team looked at a variety of options for Owen Sound’s waste, focusing on available landfill capacity in private sector sites. Three sites were identified. For the full report, please consult “Residual Waste Management Options” in Appendix G.

Owen Sound could also consider developing and operating a local or regional landfill site. Efforts to achieve a local disposal solution in the past did not reach fruition for a number of reasons. However, based on the survey and the input received through the public consultation, there appears to be community support for Owen Sound to discuss this option with neighbouring municipalities both within and outside of Grey County.

Landfill Mining, Reclamation and Re-Use

Landfill mining has been used successfully to gain landfill capacity in both North America and Europe. The mining operation generally entails excavating the site, screening to separate cover material from waste material, and some limited recovery of recyclable material like metal. New

landfill capacity can be gained within the same footprint by more efficient placement and compaction of remaining waste and more effective and controlled use of landfill cover.

Consideration could be given to reclaiming the former Genoe Landfill for reclamation and re-use. This option was neither raised nor discussed during the consultations, and although reclamation may have environmental benefits, re-using the site as a landfill may lack community support.

Options Summary

The following tables 9 and 10 summarize a selection of options and describe the potential for diversion and disposal together with approximate costs. These were discussed with the public at two waste management workshops held in October 2006, and January 2007.

**Table 9
Waste Diversion Options**

Diversion Option	Description
<p>1. Policy Options</p> <p>Political leadership to influence the reduction of packaging and household hazardous wastes</p>	<p>Description: Owen Sound could increase its efforts to work with all levels of government to encourage the implementation of packaging reduction targets and the minimization of household special waste products available in the market place. Some options include:</p> <ul style="list-style-type: none"> ❑ Implement waste reduction policies at municipal facilities; ❑ Work with the Federation of Canadian Municipalities, the Federal Department of the Environment, and the Ontario Government to promote the reduction of packaging. ❑ Promote and enforce the City's pesticides and pharmaceuticals disposal ban.
<p>2. Waste Reduction and Re-Use</p>	<p>Description: Reduce the amount of waste at the source through initiatives such as backyard composting, waste reduction and re-use centres, and implementing a communications and education program to instill a culture of conservation and encourage environmentally friendly purchasing behaviours.</p> <p>Waste Diversion Potential: Approximately 5-10%</p> <p>Cost: \$1-\$2/household – Re-use center/partnerships cost not included here.</p>
<p>3. Optimized Blue Box</p>	<p>Description: Weekly collection; addition of new materials (such as textiles)</p> <p>Waste Diversion: +8%</p> <p>Cost: \$100-\$200/tonne for weekly collection</p>

Diversion Option	Description
<p>4. Electronics Recycling</p>	<p>Description: Examples of electronic goods include computers, monitors, VCRs, clock radios, and cellular telephones. Improved use of the facility by residents could be achieved through communications and education. Consideration of curbside collection of electronic wastes.</p> <p>Waste Diversion: 1%</p> <p>Cost: A curbside collection program could cost as much as \$300/tonne as a stand-alone program but could be considerably less when included as part of a comprehensive diversion system. Funding from Waste Diversion Ontario may be available to offset costs in the future.</p>
<p>5. Bi-weekly yard waste collection</p>	<p>Description: Typical municipal yard waste programs collect grass, leaf and brush materials.</p> <p>Diversion: Collection of leaf and yard waste every other week from April to November could divert approximately 10 to 15% of the waste stream.</p> <p>Cost: Collection costs can range from \$70-\$100 per tonne. Processing costs range from \$40 to \$60 per tonne.</p>
<p>6. Source Separated Organics Collection</p>	<p>Description: Source separated organics include household compostable material such as food waste, pet waste, diapers and soiled paper products. Like recyclables, household organics would be source separated from regular garbage and put into a special bag or container. The organics are then collected at the curb to be composted at a central composting facility. Composting can be conducted in open or covered windrows (aerobic), or in-vessel (anaerobic). The resulting product can be given-away or sold for use as a soil amendment product.</p> <p>Waste Diversion: Approximately 16-20%</p> <p>Cost: \$85-\$95/tonne for collection; \$30-\$60/tonne operating; \$500K-\$1.5M for capital cost</p>

Diversion Option	Description
<p>7. Residential Construction & Demolition Waste</p>	<p>Description: Construction and demolition (C&D) materials can include materials such as drywall, lumber, metals, brick, concrete, carpet, plastic, piping and earth. The City would need infrastructure available to recycle and reuse the material.</p> <p>The City could implement a formal “ban” to prevent residents from disposing of this material in the garbage.</p> <p>Waste Diversion: Approximately 7%</p> <p>Cost: Promotional materials and enforcement</p>
<p>8. Bag Limits</p>	<p>Description: Bag limits restrict the number of bags of garbage a resident is allowed to set out for collection. Owen Sound currently has a 3 bag limit in place. Reducing bag limits to 2 bags or less could significantly increase waste diversion. This option could be implemented in tandem with other waste reduction initiatives, such as a food and yard waste program.</p> <p>Diversion: Bag limits of 2 or less can decrease waste generation by as much as 5%.</p> <p>Cost: Negligible - promotional materials and enforcement.</p>
<p>9. Comprehensive promotion and education/social marketing campaign</p>	<p>Description: The use of multi-media and public engagement techniques to create awareness and change public behaviour toward environmentally sustainable practices.</p> <p>Waste Diversion: While hard to quantify, a comprehensive awareness and social marketing campaign is proven to increase awareness and change behaviour.</p> <p>Cost: Dependent on campaign components. Approx. \$2-\$5/household.</p>
<p>10. Household Special Waste collection (Toxic Taxi)</p>	<p>Description: This program would include the curbside collection of household special waste items such as paint, motor oil, antifreeze and household cleaners. Owen Sound has banned the disposal of HSW in household garbage in 2005.</p> <p>Diversion: Ontario municipal waste audits indicate that household hazardous waste makes up approximately 1% of the waste stream.</p> <p>Cost: Approximately \$110,000 per annum</p>

Waste Disposal Options

The Study Team considered the types of waste disposal options that could be available to handle Owen Sound's residual wastes. Residual wastes are wastes left over from waste diversion programs and destined for disposal. The feasibility of the following disposal options must be considered based on the quantities of wastes remaining after diversion.

Table 10
Waste Disposal Options

Residual Waste Disposal	Description
<p>1. Incineration and ash disposal (Energy from Waste)</p>	<p>Description: Energy from Waste processes include gasification, pyrolysis, and pelletization that incinerate waste to produce energy. Residual waste is a by-product of EFW and would include bottom ash and fly ash which must be disposed. Fly ash typically requires management and disposal as a hazardous waste.</p> <p>Management Potential: Energy from Waste could reduce landfill requirements by 75% or more. There are a number of initiatives being considered in Ontario for implementation of energy-from-waste projects, using different technologies. Only one plant is operating in Peel Region. Capacity may become available in 2014.</p> <p>Cost: \$150-\$400+/tonne</p>
<p>2. Residue Waste Composting (including Mechanical Pre-Processing)</p>	<p>Description: Municipally collected garbage can be further processed by mechanical separation prior to final disposal. Composting (aerobic or anaerobic) residual waste could reduce waste disposal requirements by up to 40%. Composting has the benefit of producing a stabilized, non-biodegradable waste suitable for disposal.</p> <p>Mechanical separation of waste prior to disposal could recover 5-10% additional recyclable materials within the residual waste stream. Mechanical separation of waste typically includes magnetic separation of metals and screening. Most recovered products from pre-processing are considered "B" grade, with fewer markets and lower resultant revenue.</p> <p>Management Potential: Processing equipment would need to be available either at the Transfer Station or at the final disposal site.</p> <p>Cost: \$100+/tonne</p>

Residual Waste Disposal	Description
<p>3. Landfill (export)</p>	<p>Description: Regardless of the chosen waste diversion or residual waste processing options, there will always be some quantity of waste requiring landfilling. Without a landfill, Owen Sound is required to export their waste for final disposal. The options for export currently include exporting to the U.S.A. and could include exporting to other available landfills in Ontario.</p> <p>Cost: \$85+/tonne</p>
<p>4. Landfill (local)</p>	<p>Description: Develop a municipal or partner operated landfill within the area for disposal of Owen Sound’s/Grey County residual waste.</p> <p>Management Potential: This option would require an individual Environmental Assessment process that could take up to 5 years to obtain approval. The site would need to be properly engineered and create no net impact on the environment. Utilizing pre-processed, stable material, or implementing a program that removed organics from the waste stream, would ensure that a “dry” environmentally sustainable site could be developed. This would be the first of such sites in Ontario. As such, funding programs may be available.</p> <p>Cost: \$100-\$250/tonne</p>

3.3 Community Evaluation of Waste Management System Options

3.3.1 Evaluation Methodology

The Study Team and members of the public generated a number of options for Owen Sound’s long term waste management system. The evaluation of these options was conducted as follows:

- ❑ Describing the options and their potential for achieving sustainable waste management;
- ❑ Developing a number of criteria against which to assess the options. These criteria included:
 - Cost/Affordability
 - Positive environmental effects
 - Positive social impact and acceptability
 - Proven technology
 - Ease of implementation
 - Extent of local control
 - Scalability – can be expanded over time.

- Development of three broader categories for discussion with the public:
 - Positive environmental effects
 - Social acceptability
 - Cost effectiveness

The description of the options was presented to the public and discussed using the broad criteria categories as a guide. Some members of the public indicated that they wished values or levels of importance to be assigned to the criteria groups. However, for the purposes of developing this Plan, the values were considered equal amongst the three categories.

The results of the public assessment of the options are presented below. Subsequently, the Study Team met to consider the input from the public and develop a preferred set of options for implementation. The Study Team supported the options selected by the public, and their ideas for implementation.

3.3.2 Evaluation of Waste Management System Options

Workshop participants and the survey participants were asked to consider the waste management options. Workshop participants used three basic criteria to assess the system options: cost/affordability; environmental effects and social impact/acceptability. The following Table provides the results of this evaluation, which is supported by the Study Team’s internal evaluation. The overall impression of the mechanism from both the survey participants and the public is summarized on the right hand column of the chart.

**Table 11
Evaluation of System Options**

System Component	Cost/ Affordability	Environmental Effects	Social Impact/ Acceptability	Overall Impression/mechanism
Policy Options	√	√	√	Simple and cost effective
Waste Reduction	√	√	√	Improve education and promotion towards a “conservation culture” (Survey: 76%)
Waste Reuse	√	√	√	Promote “Freecycle™” and www.iWasteNot.com and increase goods exchange events, existing re-use centers and add re-use centre at Depot.
Optimize Blue Box – bi-weekly program	√	√	√	Continue to add materials. Promote lesser known materials. (Survey – 89%)
Electronics	√	√	√	Must be cost effective. Enhance use of depot program to start.
SSO (Food wastes)	√	√	√	Must be cost effective (Survey: 59% favoured collection, 65% favoured building a facility)

System Component	Cost/Affordability	Environmental Effects	Social Impact/Acceptability	Overall Impression/mechanism
Yard Waste	√	√	√	Must be cost effective – Enhance use of depot to start. (Survey: 67% favoured yard waste collection)
Construction and Demolition	?	√	?	Needs more consideration Consider later.
Bag Limits	√	√	?	Not considered a key tool. Consider implementation with SSO program. (Survey: 36% supported)
Education	√	√	√	Implement ASAP (Survey: 64% support)
HHW Collection	X	√	√	Improve use of depot; Implement local ban from disposal Consider curbside collection later in the planning period.
Incineration	?	?	?	Survey participants are in favour of this option to be built within the City (75%). Workshop participants uncertain. Option needs further exploration. Concerns about toxicity, cost, and quantities. Could pursue with regional partner over the longer term.
Pre-Disposal Processing	?	√	√	Needs further research. Partially dependent upon landfill solution
Landfill - Export	X	X	X	Need to minimize disposal to utmost extent.
Landfill - Local	√	?	?	Pursue with local Partners; Properly engineered, dry site. Organics ban and/or pre-processing; Minimize local traffic effects; Minimize disposal quantities to utmost effect.
	√	?	X	Consider reclaiming the former Genoe Landfill site. Likely unacceptable to neighbours and local municipality and, Not discussed with the public

Notes:

√ = Meets criteria

X = Does not meet criteria

? = No agreement on whether criteria are met

Notably, there is widespread support for the following program enhancements:

- ❑ Maximize waste reduction;
- ❑ Maximize waste re-use;
- ❑ Maximize recycling;
- ❑ Maximize diversion of yard wastes; and
- ❑ Implement collection and processing of food wastes.

Opinions begin to divide over the social, environmental and economic viability of energy-from-waste and incineration. Survey participants supported the development of a facility within the boundaries of Owen Sound. Workshop participants encouraged the City to conduct further research into the cost, environmental and social acceptability of such an option, both with Owen Sound alone, and as a partnership option with other municipalities in the area.

Regarding the disposal options, local/regional disposal is preferred over exporting wastes. Participants at the workshops indicated that this is a matter for regional and county action. The Study Team anticipates that any consideration of reclaiming and re-using the former Genoe Landfill site as an alternative would be unacceptable to the area's neighbours and local municipality.

4.0 RECOMMENDED WASTE MANAGEMENT SYSTEM FOR OWEN SOUND

There is a clear consensus on the overall net benefits of reducing the generation of wastes and of minimizing the amount of waste generated for disposal. A clear target for waste minimization is the industrial, commercial and institutional sectors who are large generators of recoverable wastes. The residential sector is already achieving the best diversion rates in the Province. To achieve more, a paradigm behavioural shift will be needed to further entrench the existing conservation ethic in Owen Sound's residents.

Implementing a system that focuses on eliminating waste could, at the outset, achieve a 60% diversion target by enhancing existing programs and adding the collection and composting of source separated organics. With the implementation of an SSO program, the bag limit could further be reduced to 2 from 3 to further encourage conservation, along with the implementation of a ban on disposal of organics as an environmental improvement measure. However, these measures need to be carefully considered based on reduction achievements and the potential impact on the financial viability of the system.

Adding additional components to the system, such as construction and demolition waste facilities, could increase the diversion rate to upwards of 70%. The City could attract businesses to recycle and process these materials, in combination with the implementation of a construction and demolition waste ban.

Achieving total self-reliance would involve the development of local or regional disposal facilities. This could include an energy-from-waste facility and/or a local landfill. Further investigations and discussions between City Council and neighbouring municipalities is key to achieving a local solution and a path forward. Environmental Assessment Act approvals would be required and the approvals could take as long as 5 years.

Thus, the Study Team believes there is merit in implementing a staged approach to Owen Sound's Waste Management System – with a short term target of 60%+, a mid-term target of 70%, with further reductions taking place through behavioural change and new materials, methods, or opportunities coming on stream over time.

Staging implementation would give the City and its residents the opportunity to:

- Develop certainty over waste composition and quantities of waste from discreet sources (e.g. IC & I, multi-residential) through both municipal and IC&I waste audits, to identify available tonnages for future SSO, incineration and landfill;
- Implement waste reduction measures, including a behavioural change program and partnerships with local organizations;
- Obtain funding for Owen Sound's innovative programs;
- Explore partnership opportunities with the County and neighbouring municipalities for disposal options;
- Attract Green Businesses interested in establishing a construction and demolition facility;

- Explore various business models for managing and financing the waste management program based on various partnership opportunities;
- Measure results through performance indicators and modeling; and,
- Explore local energy-from-waste and local/regional landfill opportunities.

Two strategies have been identified for staged implementation, taking the City to 2031. The first step is to achieve 60% diversion by 2010, and the second step, based on results from the first, is to achieve 70% diversion by 2015.

Beyond 2015 Owen Sound should continue to evaluate best available practices, and continually improve its system.

4.1 Achieving 60% Waste Diversion by 2010

The following describes the recommended program to achieve 60% waste diversion. By implementing the system as described, it is estimated that 60% diversion would be achieved in the 2008-2010 timeframe, depending on when the initiatives were undertaken.

4.1.1 Waste Reduction and Minimization Programs

While it is not possible to determine the amount of waste that is currently being minimized in Owen Sound, we have assumed that City residents are “avid” recyclers and conservationists. This is demonstrated by the following:

- There is a large population of senior citizens in Owen Sound. This demographic is well known for its interest in recycling and conservation.
- The survey indicated that:
 - 63% of residents participate in the City’s Goods Exchange Program;
 - Almost half of the residents take leaf and yard waste to the city yard waste composting site and 67% supported curbside collection of leaf and yard wastes;
 - More than half of the residents use the City’s HSW program;
 - Participation in the curbside recycling program is high and support for adding materials to the program was 89%;
 - Participation in the City’s backyard home composting program is almost 50%;
 - Support for the implementation of a waste reduction campaign was 76% with 64% indicating support for increased promotion and education initiatives; and,
 - The survey indicated that over 70% of the informants support the waste plan focusing on recycling, composting, waste minimization and reuse, and support a local disposal solution.

Based on these indicators, it can be assumed that residents in the City are well aware of the impact their consumption activities have on the environment, and thus practice excellence in waste management. Input from the public obtained at the two public workshops underscored this support.

Thus, the focus of the first step in Owen Sound's new waste management system is placed on improving waste reduction, re-use, recycling and composting – the four key components of an effective waste minimization plan.

4.1.1.1 Waste Reduction

The following steps could be taken to improve waste reduction, re-use and recycling activities within the community.

Influencing the Reduction of Packaging at the Provincial, Federal and International Levels

- ❑ Continue to promote packaging reduction, standards, etc., with the provincial and federal governments. Owen Sound should, through the Federation of Canadian Municipalities and the Association of Municipalities of Ontario, lobby for packaging reductions at the federal level, and for changes in international packaging standards.

Incorporating waste reduction into the City's Strategic Plan and Policy Initiatives

The City's Strategic Plan outlines a comprehensive set of strategies describing Owen Sound's goals and objectives. Demonstrating to residents and businesses that Owen Sound is moving towards a sustainable City will mean that the goal of sustainable waste management needs to be incorporated in detail in Owen Sound's policy documents. Leading by example is an appropriate way to demonstrate to residents and businesses that waste reduction will play an important role in how the City does business. Now that the Waste Management Plan has been developed, the City can update its Strategic Plan and policy initiatives as follows:

- ❑ Incorporate the Waste Management Plan objectives within the City's Strategic Plan;
- ❑ Conduct a waste audit in City Departments, and implement waste minimization program enhancements where possible;
- ❑ Continue to minimize the use of cosmetic pesticides and hazardous wastes in managing City properties and parks;
- ❑ Continue to encourage waste-free public events;
- ❑ Incorporate the use of recycled materials within the City's own operations; and,
- ❑ Provide an annual report that sets out the City's achievements.

Cost: Minimal.

Enhancing the Waste Reduction Program

Through increased effort in promotion and education, the City can continue to encourage residents to compost more material in their backyards, leave cut grass on lawns, and buy less packaging. Along with saving energy, reducing pollution and saving landfill space, waste reduction also reduces costs for the municipality. Currently, collection and disposal of wastes costs approximately \$177 per tonne. Reducing waste at source by as little as 5% (or 500 tonnes/year), the municipality could reduce the City's curbside collection and disposal costs significantly. This can be achieved through:

- ❑ Designing and implementing an aggressive waste reduction campaign to achieve behavioural change, including:
 - Improved seasonal promotion of backyard home composters;
 - Providing educational materials on the benefits of waste reduction;
 - Providing waste reduction materials on the City web site;
 - Partnering with a community organization(s) e.g. Boy Scouts/Guides/Green Owen Sound/EarthDay Canada/Recycling Council of Ontario, to identify ambassadors to promote waste reduction; and,
 - Developing mechanisms to measure success.

Cost: Combined with educational program.

4.1.1.2 *Re-Use*

Enhancing Material Re-Use Opportunities

Material re-use opportunities can be enhanced through:

- ❑ Continuing with Goods Exchange Days;
- ❑ Partnering, through co-promotion, with the local Salvation Army and Habitat for Humanity re-use facilities and co-promoting clothing drop-off boxes in shopping centers/malls, etc.;
- ❑ Providing a re-use facility at the Transfer Station or other appropriate facility;
- ❑ Partnering, through co-promotion of the “Freecycle™” and www.iWasteNot.com internet goods exchange; and,
- ❑ Developing mechanisms to measure success.

Costs: The costs of implementing a Re-Use Depot at the Transfer Station would need to be discussed with Miller Waste. Funding opportunities have been identified for partnering opportunities with other organizations. These opportunities are discussed in Section 5.6.

4.1.1.3 *Recycling*

Enhancing the City’s Household Hazardous or Special Waste Program

The City should continue to promote proper handling of HHSW through:

- ❑ Implementing an education program, in collaboration with partners such as Green Owen Sound, local hardware stores, nurseries, on the benefits of using alternatives to cosmetic pesticides;
- ❑ Enforcing, through communications, the City’s Household Hazardous Waste ban, implemented in 1995; and,
- ❑ Developing means to measure success.

Stewardship Ontario (a provincial government organization promoting recycling) is developing a funding program to enhance HHSW recovery. Owen Sound should apply for this funding as soon as it becomes available.

Citizens participating in the planning workshops noted that it is important that HHSW programs are accessible to all residents. The drop-off depot program, while successful and cost-effective, may preclude participation by people with disabilities, or without vehicles. Consideration could be given to obtaining funding from Stewardship Ontario for a special pilot program to accommodate these needs.

Cost: Combined with educational program.

Improving Capture Rates and Materials for Recycling

Many communities in Ontario are beginning to provide residents with larger curbside containers, such as wheeled bins, to accommodate the increased quantities of materials being collected, . The residential survey conducted for this study indicated some support for weekly collection, but this was not widespread. Additionally, residents appeared to be generally satisfied with the collection system as it is today. As such, we are not suggesting any changes to the collection system at the current time. It is also expected that additional vehicle capacity will be available, due to the initiative by the LCBO/WDO (February 2007) to remove beverage containers purchased at the LCBO from the recycling stream.

Should the City move forward with additional curbside collection programs (e.g. source separated organics, leaf and yard waste, toxic taxi, clothing), it should work with City crews and its waste collection contractor to make any necessary adjustments. These could include:

- ❑ Co-collection of recyclables and garbage; or collection on alternate weeks;
- ❑ Co-collection of organics with recyclables and garbage on alternate weeks; and,
- ❑ Provision of larger containers, requiring alternate vehicles or the retrofitting of existing vehicles and accommodations by the recycler.

A waste audit to determine anticipated quantities of recyclables, organics and garbage, and a selection of appropriate containers for SSO, recycling, yard waste, etc., should be conducted prior to investment decisions being made.

Enhancements to the Existing Curbside Recycling System

The following improvements could be made to increase the capture rates:

- ❑ Increase promotion for the following materials:
 - Plastics;
 - Paper
 - Aluminum containers and foil
 - Drinking boxes
- ❑ Co-promotion with LCBO/Beer Store regarding the deposit/return system for beverage containers, with the goal of minimizing these in the curbside collection system.
- ❑ Add additional materials as markets come on line.

Cost: Included in the Communications and education program. Co-promotion opportunities through the LCBO and the Association of Municipalities of Ontario should be explored to minimize costs.

Enhance Use of Depot System for Electronics, etc.

Currently, residents and businesses can use the electronics recycling program free of charge, except for a nominal charge to businesses of \$10 per monitor, which reflects the cost of recycling that particular piece of equipment.

There is an opportunity to increase the material that is recycled through the program by adding televisions to the already lengthy list of acceptable materials, by more aggressive promotion of the program, and by banning the material from disposal.

Currently, the cost of electronics recycling is approximately \$613 per tonne, so adding to current diversion will increase overall waste management costs (each tonne of electronic waste costs approximately \$190 more to divert than to collect and dispose in the landfill). Additional communications and education costs are minimal.

Although electronic waste is expensive to divert, the environmental and human health costs of improper disposal of the material is very substantial, as it comprises lead and heavy metals, which are very toxic. Stewardship Ontario is providing funding for used electronics recycling programs. The City should take advantage of this support.

Cost: Combined with education program. Apply for provincial funding when it becomes available to minimize costs.

Industrial, Commercial and Institutional Sector Waste Minimization

Owen Sound has implemented a by-law that bans recyclable materials from entering the waste streams generated by the IC & I sector. This ban provides a sound basis for encouraging IC&I sector leadership in achieving waste minimization. Owen Sound also provides the sector with waste audit guidance, model recycling policies and other useful materials to assist their programs.

Many large industries, schools and health facilities have recycling programs in place – either as a result of an Environmental Management Plan process (Such as ISO 14001), or due to an initiative started by staff.

While the focus of this waste management plan is not on the IC&I sector, considerable opportunity exists for increasing the diversion rates from this sector.

It is recommended that Owen Sound develop a comprehensive waste diversion program for this sector, and obtain funding from available sources, such as Stewardship Ontario.

4.1.2 Source Separated Organics Program

Composting both food and yard waste has the considerable potential to add between 16 and 18% to a community's waste diversion rates.

Community support for the capture and composting of source separated organics (food, leaf and yard waste) is high. Experience in other municipalities demonstrates that, although there is an initial feeling that separating kitchen waste is messy and smelly, most households take up the activity and do so with few complaints.

Enhancing Capture Rates of Leaf and Yard Wastes

There is benefit to the City to increase the capture rates of leaf and yard wastes since considerable savings can be achieved from diverting this fraction of the waste from disposal. There would be no additional land requirements and the materials could be handled at the existing facility. The City is currently saving collection costs and recovering 1700 tonnes from this fraction through the drop-off system.

Requiring residents to take leaf and yard waste to the facility is an inconvenience, and may be the reason why only 55% of the public use it, although there is also a greater than average (47%) number of households composting in their yards, according to the survey of residents. A curbside collection program might increase the amount of material at the facility if there is significant leaf and yard waste being disposed. However, since the estimates show that dropped-off material quantities are unusually high, it is unknown how much is being put in the garbage and sent to disposal. Thus, it is impossible to judge the cost-benefit of implementing curbside yard waste collection without the benefit of a waste audit, which would determine the amount of the material currently going to landfill.

There would be no additional land acquisition required to expand the program, and no additional approvals.

Source Separated Organics Collection and Processing

There is significant public and stakeholder support for implementing a source separated organics program in Owen Sound. It is estimated that up to 1750 tonnes of organics could be available for composting, thus diverting a significant amount of materials from disposal. Organic materials can be composted with leaf and yard wastes at the City's composting site. However, the City needs to carefully consider the feasibility and costs before moving forward with this option.

The following steps are proposed to determine a path forward for both leaf and yard waste and source separated organics:

- Conduct a waste audit to establish the quantities of available SSO, leaf and yard waste.

Assuming that the waste audit supports the quantities needed to support the program, the following steps are proposed:

- Prepare a feasibility study on collecting and composting organic food waste, together with leaf and yard waste, and potentially sewage sludge at the City's composting facility. Consider the following:
 - The capacity of the City's current site;
 - A separate site should quantities warrant, taking into consideration the potential to process compostable material from outside of the City;

- ❑ Determine the type of collection container (cart, bin, plastic or paper bag,) and vehicles;
 - ❑ The advantages and disadvantages of collecting with municipal forces or contracting the services out;
 - ❑ Convene discussions with local partners in Grey County and others to determine any willingness to participate in a City or partner-led program;
 - ❑ Convene discussions with the contractor regarding contractual issues;
 - ❑ Determine the type and location of the processing facility; and,
 - ❑ Prepare necessary drawings to obtain a Certificate of Approval under the Environmental Protection Act.
- ❑ In the interim, continue to promote backyard home composting through the education campaign.

Costs: There are a number of cost components to the SSO program

- ❑ Waste Audit: \$15,000-\$30,000 (assumes City manages this program, utilizing students and summer assistance. This will avoid the potential cost outlay of \$50K-\$75K should it be contracted out). The audit can also encompass the assessment of all components of the waste stream, and assess waste reduction activities. Funding may be available for this waste audit from Stewardship Ontario, FCM or other sources listed in Section 6.0.
- ❑ Feasibility Study including siting and approvals: up to \$150,000. Funding may be available for 50% of this cost.
- ❑ Collection and Operating: Range: \$85-\$95/tonne for collection; \$40-\$60/tonne operating; \$500K-\$1.5M for capital cost.

4.1.3 Promotion and Education Campaign

The City currently spends approximately \$15,000/annum on communications and education. To achieve the waste reduction and recycling targets set out in this Plan, and to ensure that residents are familiar with both the current and the new programs, an increase to approximately \$40,000/annum should be considered. This would enable the following activities to take place:

- ❑ Development of a comprehensive, 5-year promotion and education campaign strategy, including a community-based social marketing program;
- ❑ Implement a community-based social marketing campaign in the first year (subject to funding);
- ❑ Enhancement of communications materials to be more visually pleasing, effective and consistent in messaging and look;
- ❑ Establish a small seed fund to enable Owen Sound to partner other organizations to increase capacity and resources in promoting and delivering the programs (e.g. Salvation Army, Georgian College and Green Owen Sound);
- ❑ Obtain partner funding from the provincial and federal governments, along with local organizations such as TD Canada Trust, that will lever the City's dollars to at least double the \$40,000 funding;
- ❑ Developing monitoring programs to document program success and implement continual improvements.

It is anticipated that for this modest investment, Owen Sound will realize savings in waste management operating costs.

4.1.4 Waste Disposal Program

Survey results and workshop participants indicated that the City could establish a plan where waste is minimized, and the residuals managed locally. Survey participants indicated support for energy-from-waste within the City boundaries, and workshop participants suggested further research and investigation into this option. The quantity of available residuals needs to be carefully considered in light of the Plan's overall waste management goals. Some participants in this process suggested that landfill would not be required given this Plan's aggressive waste diversion goals. The success of the waste diversion plan relies heavily on the public changing their waste management behaviours and strive to achieve the goal of waste elimination. To date, there are no examples of complete achievement of the zero waste goal. However, as Owen Sound proceeds with the implementation of this Plan, it would be eligible for membership in the Zero Waste International Alliance. This Alliance has developed standards for participation and provides support and recognition for members striving to achieve virtual elimination of waste.

The Study Team reviewed both local and export waste management incineration and landfilling options. The following approach is suggested:

Incineration: Explore energy-from-waste with private sector providers by developing a business case approach to determine:

- Quantities of waste available from Owen Sound, and from other municipalities in the area;
- Proven ability of proponents to meet and obtain regulatory approvals;
- Costs;
- Social acceptability; and,
- Determine path forward by 2010.

Local/Regional Landfill: To provide absolute certainty that Owen Sound will be in a position to control and manage its own waste, consideration should be given to developing a local/regional land fill site. Owen Sound currently disposes of almost 5,000 tonnes of residential garbage per year, and approaching 13,000 in total when waste from the ICI sector, Meaford and Georgian Bluffs is taken into account. While this amount will be reduced by at least 22% over the short term in light of the implementation of this Plan's recommendations, with growth, residual waste quantities can be expected to increase over time. Public support for collaborating with neighbouring municipalities in the siting and development of a local landfill site appears to be high.

This could be a lengthy siting and approvals process, requiring an individual environmental assessment approvals. Determining the willingness of neighbouring municipalities to embark on a landfill site search process is key to the feasibility of this option. The City should initiate discussions with its neighbours (including individual municipalities, Grey County, Bruce County) to determine the potential for a viable partnership. If interest is identified, it is recommended that the partners:

- ❑ Develop a business case, based on this Waste Management Plan, to confirm the quantities of waste requiring disposal (with and without incineration), potential management options and identify the business model needed to embark on a landfill siting and development process;
- ❑ Consider pre-processing of wastes to stabilize residuals and/or an organic wastes ban to provide community certainty on the environmental acceptability of the selected site; and,
- ❑ Establish an environmental assessment process, commencing with the development of a scoped Terms of Reference, focusing on landfill, utilizing this Waste Management Plan as a basis.

Development of Contingency Plans: It is important that Owen Sound develop a contingency plan for disposal of its wastes, should, for any reason there becomes no operational alternative through the Miller Waste contract. While Miller Waste is obligated through its contract with Owen Sound to provide waste disposal facilities in the event of the border closing, risk protection is paramount. The City should:

- ❑ Explore mechanisms with other private sector providers to solicit capacity at market rates;
- ❑ Consider the Warwick Landfill in Lambton County, which received MOE approval in January 2007 for an expansion from 50,000 to 750,000 tonnes per year, and is expected to make that capacity available to Ontario municipalities;
- ❑ Consider two available but distant landfill sites that could take Owen Sound's wastes, Lafleche Environmental and Ridge Landfill.
- ❑ Confirm Miller Waste's ability to provide capacity at market rates; and,
- ❑ Over the longer term, solidify the City's waste management requirements by exporting to the KMS Incinerator in Peel Region, or other facilities that may be operational in 2015.

Disposal Plan Cost:

- ❑ Business case and management model for incineration and disposal – Estimate: \$50K - \$100K
- ❑ Terms of Reference for Environmental Assessment if needed – Estimate: \$150K - \$300K
- ❑ Contingency Plans through private sector facilities – minimal.
- ❑ Funding may be available from partners and FCM Green Municipal Fund for the development of green technology, and a “dry” landfill site.

4.2 Summary of Diversion Program - 60%+ by 2010

Table 12 below presents a summary of the recommended waste diversion program and its components. Full implementation targets up to 66% waste diversion, as shown in the table below.

Table 12
60%+ Diversion Program Summary
Based on 2008-10 Implementation

Program	Diversion (tonnes)	Diversion (%)	Capital Cost	Net Operating Cost (NOC)	NOC/hhld	NOC/capita	Operating Cost per tonne
Blue Box	2,092	20%	\$0	\$211,496	\$21.54	\$9.86	\$101.12
Organics	3,369	33%	\$1,020,000	\$301,971	\$30.75	\$14.08	\$89.63
HSW & C&D	82	<1%	\$0	\$36,000	\$3.67	\$1.68	\$441.37
Electronics	54	<1%	\$0	\$24,631	\$2.51	\$1.15	\$459.74
Polystyrene	11	<1%	\$0	\$16,066	\$1.64	\$0.75	\$1,485.10
BYC	1,045	10%	\$0	\$6,000	\$0.61	\$0.28	\$5.74
Garbage Collection	1,704	0%	\$0	\$242,864	\$24.73	\$11.32	\$127.55
Garbage Disposal	1,704	0%	\$0	\$158,472	\$15.97	\$7.17	\$93.00
P & E	0	0%	\$0	\$40,000	\$4.07	\$1.87	\$2.08
Scrap Metal & Tires	61	<1%	\$0	\$0	\$0.00	\$0.00	\$0.00
Deposit/Refund	56	<1%	\$0	\$0	\$0.00	\$0.00	\$0.00
Garbage at TX Station	2,040				\$0.00		
Totals	10,712	66%	\$1,280,000	\$1,037,500.00	\$102.61	\$46.03	\$96.85

Notes:

1. Tonnage estimates based on projected population growth
2. Blue Box includes curbside collection of textiles
3. It is expected that most of the 1,500 tonnes of SSO collected would come from the material now going to the landfill. For the purpose of this analysis, the curbside garbage collection has been reduced by 1,000 tonnes to balance the SSO organic collection.
4. The table does not include planning, approvals and waste auditing costs of approximately \$200K net of funding.

4.3 Achieving and Maintaining 70% Diversion by 2015-2031

The maximum diversion system includes all of the elements of the previous system, but adds a waste diversion program for construction and demolition wastes, enabling an additional 5% to be diverted from landfill.

Implement Construction and Demolition (C & D) material ban

Currently, C&D materials are on the City's "Prohibited Materials" list and are prohibited from being placed in the curbside garbage. However, in most municipalities, residents do set out these materials if there is no obvious enforcement. The Transfer Station currently accepts these materials.

Promotion of this ban could assist in further reducing the waste at the curb and creating green economic recycling opportunities, by up to 5%.

The City could announce that an enforceable ban will occur in the future, and encourage local businesses to establish in order to recycle the material. By ensuring that the material will be available to the private sector beginning at a future date, it allows businesses time to plan, get any financing or approvals required, and prepare for the day when the ban begins.

The cost to the City of implementing a C&D ban is minimal, as it simply requires a change to the existing by-law. Promotion of the ban is essential to its success. It is expected that a \$5,000 investment in promotion will be sufficient to launch the ban.

Table 13
Maximum Diversion System – Based on 2010 Implementation

Program	Diversion (tonnes)	Diversion %	Capital Cost	Net Operating Cost (NOC)	NOC/hhld	NOC/capita	Operating Cost per tonne
Blue Box	2,134	20%	\$0.00	\$226,372	\$22.60	\$10.55	\$106.10
Organics (SS0 and Yard)	3,437	33%	\$0.00	\$301,971	\$30.14	\$14.08	\$87.86
HSW & C&D	527	5%	\$0.00	\$36,000	\$3.59	\$1.68	\$68.36
Electronics	55	<1%	\$0.00	\$24,631	\$2.46	\$1.15	\$450.68
Polystyrene	11	<1%	\$0.00	\$16,066	\$1.60	\$0.75	\$1,455.83
BYC	1,066	10%	\$0.00	\$6,000	\$0.60	\$0.28	\$5.63
Garbage Collection	1,704	0%	\$0.00	\$242,864	\$24.24	\$11.32	\$127.55
Garbage Disposal	1,704	0%		\$158,472	\$15.97	\$7.17	\$93.00
P & E	0	0%	\$0.00	\$45,000	\$4.49	\$2.10	\$2.30
Scrap Metal & Tires	61	<1%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Deposit/Refund	56	<1%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Garbage at TX Station	2,240				\$0.00		
Totals	11,289	71%	\$0	\$1,057,376.00	\$104.58	\$46.98	\$93.67

Overview of Implementation of the Plan

Developing the maximum diversion scenario as outlined will result in a progression of increased waste reduction and diversion and reduced waste for disposal.

Figure 1 on the following page presents a graph that demonstrates the percentage of the total waste stream attributed to each program. As is demonstrated, waste disposed shrinks considerably as new diversion programs are added and existing ones are improved. A pictorial representation of the maximum diversion system is represented in Figure 2.

Figure 1
Distribution of Residential Waste Stream (by Program and Destination)

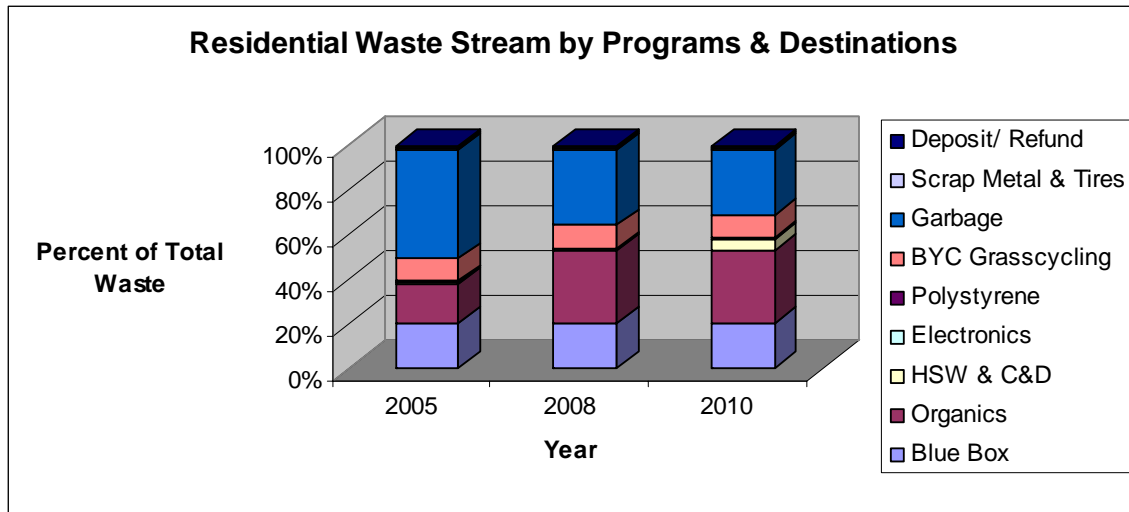
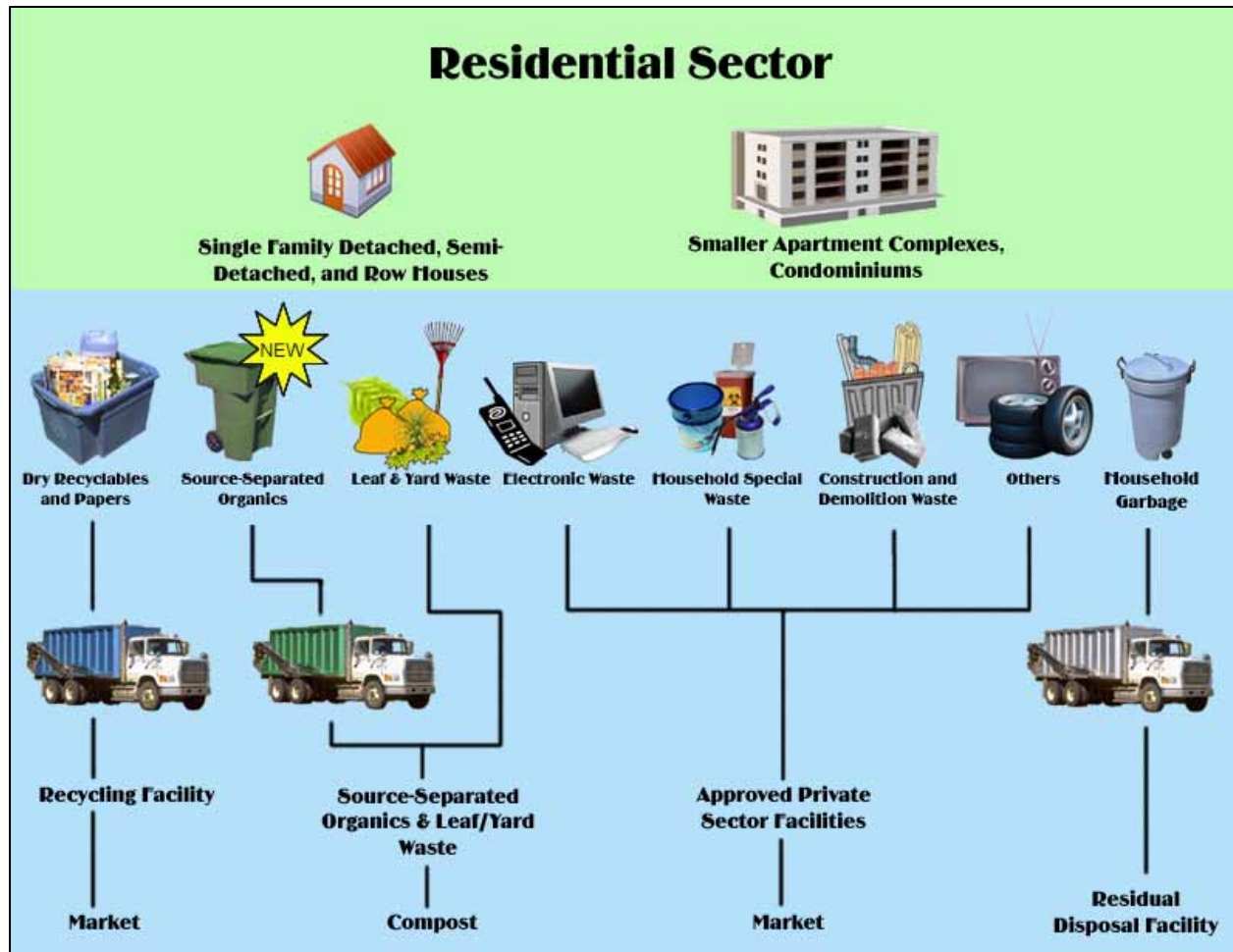


Figure 2
Residential Maximum Waste Diversion System



4.4 Monitoring and Continual Improvement

It is recognized that changes in waste management technology will continue to take place over the planning period. For this reason, it is suggested that Owen Sound report on target achievement annually. In addition, the plan should be formally updated every 5 years to enable the City to take advantage of new and emerging technologies.

Owen Sound Waste Management Model

As part of the development of this Sustainable Waste Management Plan, a computer model of Owen Sound's current system was developed, based primarily on 2005 data.

The model includes diversion, disposal, and capital and operating costs, as well as waste characterization data as developed for this project. The model also incorporates planning projections on population and households. Projections are made to 2023 as beyond that timeframe the model naturally becomes less accurate due to uncertainty over planning projections, and inflation.

The benefits of modeling the waste management system are:

1. It provides an accurate picture of the current waste management system;
2. It can be used to forecast future costs of the existing system;
3. The model can be used as a planning tool, particularly for the addition of new programs in the future;
4. The effect of a new program or policy on the overall system can be determined. For instance, the model can identify the effect a new Source-Separated Organics collection and composting system has on the amount of waste in the garbage stream and the cost of such a proposal;
5. The ability to predict the practical and financial impacts of Provincial and Federal programs, such as the recent imposition of a deposit/refund system for liquor containers; and,
6. The ability to use what-if scenarios to inform decision-making on capital expenditures and program changes.

The model has been used extensively in the development of the waste management system. Although it is complex and takes into account many parameters, it can also be used by staff after suitable training.

It is suggested that the model continue to be utilized as follows:

- ❑ Updated annually by populating it with the previous year's data. This will allow for accurate predictions in future planning;
- ❑ Utilize the information required for the WDO datacall, which takes up a considerable amount of staff time;
- ❑ Engage the model as a tool for measuring and improving the performance of the waste management system;
- ❑ Providing an annual report to the community on progress; and,
- ❑ Updating the Waste Management Plan every five years.

The Owen Sound Waste Management Model, developed for this project, is an excellent tool for measuring success, developing what-if scenarios, and planning program roll-outs and capital expenditures.

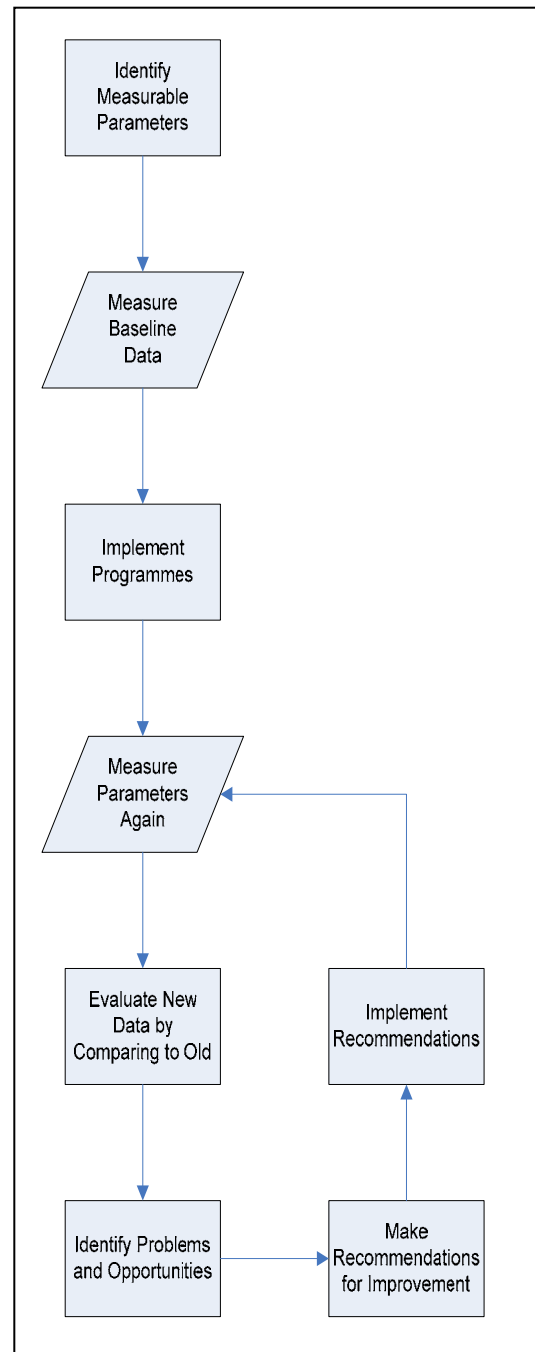
Adaptive Management and Continual Improvement Program

Owen Sound should implement an Adaptive Management and Continual Improvement Approach for the waste management system to ensure that the system continues to ensure a sound system performance. This comprehensive sustainable waste management plan covers the first two steps of a eight-step Adaptive Management and Continual Improvement Approach, which is depicted in Figure 3.

Further to recommendations for program improvement, there is also a need to fine-tune the approach itself as new programs are introduced. For example, if a new recyclable material is introduced, it is necessary to modify the measurement methodology and dataset to measure the capture rate of the new material and to accommodate it as an integrated component of the overall waste management system which will have an effect on other performance measurements.

Adoption of standardized evaluation methodologies will allow for the evaluation of programs and for the identification of best practices. The Adaptive Management and Continual Improvement Approach will allow for regular evaluation and improvement of programs, ensuring the best possible return on investment in the waste management system.

**Figure 3
Adaptive Management and
Improvement Process**



5.0 PLAN IMPLEMENTATION

Owen Sound's current waste management system has a high diversion rate and provides cost effective and efficient services to its residents. By as early as 2010, with further emphasis on waste reduction, increasing the capture rate of recyclables, adding food waste to its composting program, and for a reasonable upfront investment, Owen Sound can achieve a greater-than 60% waste diversion rate – one of the highest in the country. Further increases, up to 70%, can be achieved by diverting construction and demolition wastes to a private sector facility through the implementation of a C & D ban by 2010.

With widespread community support, these high diversion rates are considered cost effective and achievable. Effective community participation can only be achieved with a strong and consistent education and information program, modeled on a sustained community-based social marketing campaign.

Providing cost effective, self-reliant disposal for the City presents a wider challenge. Given the history of waste disposal facility siting in the community, community leaders may be reluctant to pursue a local solution. However, it is apparent that there is widespread community support for a local solution and with a successful waste diversion program in place, and an environmentally sound disposal plan, the chances of success increase exponentially.

An important consideration for further program implementation is the level of staffing in the City for waste management. The City currently has a progressive and multi-faceted waste management program, which is managed with minimal staffing. The implementation and operation of new programs likely would require an increase in the current staff complement.

There are a number of facets involved in implementing this ambitious plan that include engaging and partnering with the community, both within and outside of Owen Sound. This section sets out these considerations.

5.1 Management Options and Alternate System Delivery

Owen Sound manages its waste through its Operations Department, Public Works Division. The City oversees all matters relating to waste reduction, collection and disposal of wastes.

This Plan recommends that the City consider the following City-led management options for its future waste management system:

Table 14
Alternate Management and Service Delivery Options

Component	Management/Service Delivery Options
Waste Reduction Program	City/NGO/Institutional/IC&I Partners
Waste Recycling	City/Private sector partner
Source Separated Organics	City owned/operated City/Private sector partner Develop Business Case to determine best value operations
Waste Disposal – Incineration Waste Disposal - Landfill	City/Private Sector Partner City/Region-wide partnership or City/Private Sector partner Develop Business Case to determine feasibility

5.2 Partnership and Collaboration

A key theme of this report is the development of value-added partnerships. Partnerships can enable the City to achieve its goals through maximizing the benefit of additional materials, potentially reduced costs, and the fostering of community support.

Examples of partnerships that the City could pursue are:

- ❑ Waste Reduction: Work with non-government organizations such as Green Owen Sound, Salvation Army, FreeCycle™, www.iWasteNot.com, EarthDay Canada, Recycling Council of Ontario, local hardware stores and nurseries, waste collection contractor, and others to develop and implement waste reduction programs.
- ❑ Waste Recycling: Develop co-marketing with the LCBO and AMO to encourage returnable bottles and containers.
- ❑ Source Separated Organics: Develop a partnership with neighbouring municipalities and the IC&I sector to implement an SSO program utilizing City facilities.
- ❑ Disposal: Develop a partnership with neighbouring municipalities to plan and develop an environmentally sound landfill site.
- ❑ Program monitoring: work with Georgian College and/or students to conduct a waste audit during the first year of implementation. This will build capacity in the community and reduce outsourcing costs.

5.3 Community Engagement

Owen Sound has an active volunteer community. The current Environment and Waste Management Advisory Committee is comprised of municipal politicians, staff and citizens-at-large. Through this waste management planning process it became clear that citizens, non-government organizations, businesses, institutions and the City all have extended responsibility and thus a larger role to play in furthering the goals of this waste management plan.

It is suggested that an active multi-stakeholder committee be established to work with the City in implementing this plan. Multi-stakeholder committees are a key component to sustainable communities initiatives, since they spread the responsibility beyond the government authority into the community.

5.4 Green Economic Development

In concert with Owen Sound's Strategic Plan, Owen Sound could utilize its waste management resources to stimulate green economic development.

Examples of economic development activities are:

- ❑ Attracting construction and demolition waste recycling businesses;
- ❑ Implementing green procurement policies;
- ❑ Establishing a re-use center;
- ❑ Expanding the composting facility;
- ❑ Creating jobs through the development of a landfill site; and,
- ❑ Using local businesses to promote waste reduction.

5.5 Measuring Success

The waste audit conducted under this Plan will provide the City with a sound basis for measuring and monitoring the success of the program's achievements towards the established targets. With the use of the waste management model, and with performance and success measures built into each component of the Plan, Owen Sound will be in a position to report on its progress and adapt its Plan as necessary.

5.6 Funding Programs

Owen Sound is currently funding its waste management programs from the following sources:

- ❑ Revenue from the bag tag program;
- ❑ Provincial grants;
- ❑ Supplementary financing from the landfill reserve fund; and
- ❑ Surcharges on disposal charges from the ICI Sector Provincial funding.

There are a number of provincial and national funding agencies to which Owen Sound could apply for funding of its new program. They are listed in the table below, with a summary of requirements.

**Table 15
Funding Programs**

Initiative	Funding Agency	Conditions	Amount
Waste Reduction			
Waste Audit	Waste Diversion Ontario E & E Fund FCM-Green Municipal Fund		Up to \$70,000 to approved applicants
Communications and Education, Community-based social marketing	Environment Canada – EcoAction Fund Waste Diversion Ontario E & E Fund	Owen Sound must partner with a Non- Government Organization Matching Funding	
Communications, Education, CBSM, waste audits and SSO	Ontario Centres of Excellence	Owen Sound must partner with a private sector and academic partner (Georgian College)	Comprehensive program, multi- partner approach, must demonstrate benefit to Ontario’s economy
SSO	FCM-Green Municipal Fund	Demonstrate additional funding sources and provincial government support	50% of cost: feasibility studies
Sustainable Community	FCM- Green Municipal Fund	Demonstrate additional partners/funding sources	
HHSW and Discarded Electronics	Waste Diversion Ontario E & E Fund		

Owen Sound could take best advantage of the available funding opportunities by combining partners and packaging. For example, coupling Waste Diversion Ontario’s E & E Fund (www.wdo.ca) funding with FCM Green Municipal funding could result in 100% funding for eligible projects. Should Owen Sound decide to move forward with a Sustainable Community Plan, then additional funding could become available through FCM.

There also may be an opportunity in the future to sell carbon credits for the existing and future composting programs. This is a policy area that is under current scrutiny at the federal and provincial level.

5.7 Implementation Schedule

Upon approval of this Plan by Council, it is suggested that Staff and their consultants prepare a detailed implementation plan to guide the development of programs and planning throughout the next four years.



Long Term Waste Management Planning
Process

APPENDIX A: Report on the Public Participation Program

- I. Participants in the Process
- II. Advertising and Communications
- III. Stakeholder Meeting Reports





Long Term Waste Management Planning
Process

I. Participants in the Process

Participants

The following organizations and citizens were informed, consulted or engaged in the process:

- A & P Superfresh Food Stores Ltd.
- Bayshore Community Center
- Bayshore Broadcasting News
- Best Western Inn on the Bay
- Bluewater School Board
- Bruce Peninsula Environment Group
- Bruce Resource Stewardship Network
- Bruce-Grey Catholic District School Board
- City of Owen Sound
- Escarpment Centre Ontario
- Georgian College
- Green Owen Sound
- Grey Association for Better Planning
- Grey Bruce Health Services
- Grey County
- Grey Sauble Conservation Authority
- Grey Sauble Conservation Authority
- Hannah Walker Place
- Henderson Paddon & Associates Limited
- Heritage Place Mall
- Lee Manor – Long Term Care Facility
- Local Citizens
- Miller Waste Systems
- Ministry of Environment
- Montana's & Kelsey's
- Municipality of Grey Highlands
- Municipality of Meaford
- Municipality of West Grey
- Municipality of Northern Bruce Peninsula
- Ontario Soil & Crop Improvement Assoc.
- Owen Sound Field Naturalists
- Owen Sound Sun Times
- Pryde Schropp McComb Inc.
- Steve & Kim's Food Basics
- Summit Place
- Sydenham Waste Management Citizen Group
- Town of Collingwood
- Town of the Blue Mountains
- Township of Southgate
- Zehr's



Long Term Waste Management Planning
Process

II. Advertising and Communications

- a.) Notice of Commencement
- b.) Public Forum 1
- c.) Public Forum 2

Communications activities

- Advertisements in the Owen Sound Sun Times (Notice of Commencement, Public Forum Ads 1 and 2)
- Posters advertising Public Forum (located throughout Owen Sound)
- Flyers to local homes
- Signage throughout Owen Sound (advertising Public Forums)
- Notice of Public Forum on the Project Website:

Notice of Commencement and Advertisements are attached



Owen Sound Long Term Waste Management Plan

Involving You...

Vision 2030: Designing A Sustainable Waste Management Plan for our future

Right now, residents and businesses in Owen Sound divert close to 30% of its waste from disposal each year. Even with current waste reduction programs, 70% of the waste is still being exported for disposal in the United States.

City Council has determined that this system is environmentally unsustainable in the longer term. In response to this challenge, they have initiated a long-term waste management planning process, and they invite you to participate in designing the solution.

Through this planning process, we will explore:

- how to significantly improve waste reduction, recycling and composting; and,
- options to manage the disposal of garbage.

During the project, a number of meetings and surveys will be conducted. For further information, to complete the survey, and to register your interest in participating in this project please contact us at www.e-owensound.com or call Mr. Chris Hughes at (519) 376-1440.

The first community meeting to establish a vision and goals for Owen Sound's Sustainable Waste Management Plan is scheduled for Thursday November 2, at 7:00 p.m. and will be held in the Council Chambers at the City Hall located at 808-2nd Avenue East, Owen Sound. Please try to attend.



Owen Sound

LONG TERM WASTE MANAGEMENT PLAN

PUBLIC FORUM

Right now, residents and businesses in Owen Sound divert approximately 30% of its waste from disposal each year. Even with current waste reduction programs, 70% of the waste is still being exported for disposal in the United States.

City Council has determined that this system is environmentally unsustainable in the longer term. In response to this challenge, they have initiated a long-term waste management planning process.

We need your participation

Come and share your **KNOWLEDGE**, your **GOALS** and your **VISION** for the future of Waste Management for Owen Sound.

You are invited to join the City of Owen Sound and others who share a common interest in waste management at the first community meeting for Owen Sound's Sustainable Waste Management Plan:

Thursday November 2nd, 2006

7:00 p.m. - 9:00 p.m.

Council Chambers, City Hall

808-2nd Avenue East

Owen Sound, Ontario

For more information, please contact: **Chris Hughes, City of Owen Sound** at 519 376 1440 or chughes@city.owen-sound.on.ca or visit the website at www.e-owensound.com



Waste Management Plan Public Forum #2

**Vision 2030: Designing A Sustainable Waste
Management Plan for our Future.**

Public Forum #2 Your Opportunity for Input

Thursday January 18, 2007, 7:00 pm

In the Shore Room, Harry Lumley Bayshore Arena

The City has initiated a waste management planning process to develop a long-term plan that will provide for the sustainable management of its waste.

The first community meeting was held on November 6, 2006 and participants contributed their ideas to the vision, goals, potential system options and evaluation criteria. At the second meeting, participants will be asked to:

- Review proposed Vision and Goals for the sustainable waste management system.
- Discuss the results of the technical review for: waste diversion, re-use, recycling, composting and disposal options, and
- Participate in the evaluation process for those options.

Following this meeting, the plan will be completed and available for review. To assist us in planning the meeting, please register in advance by contacting us directly. Please check the City website for project updates.

For More Information Please Contact:

John Smith, Project Manager, Lura Consulting, smithj@lura.ca

Chris Hughes, Environmental Superintendent, 519-376-4274,
Email: chughes@e-owensound.com City Website: www.e-owensound.com



Long Term Waste Management Planning
Process

III. Stakeholder Meeting Reports

a.) Public Forum 1

b.) Public Forum 2

Owen Sound Long Range Waste Management Plan

Public and Stakeholder Workshop #1

City of Owen Sound

Waste Management Planning Process

November 6, 2006 7:00 p.m.

Council Chambers

Meeting Purpose

The purpose of the meeting was to introduce the waste management planning process, and to identify a community vision and goals for the next 30 years. Options for system improvements and criteria for choosing a new system will be explored.

Open House

Participants were invited to review a series of displays that focused on some of the components of the Owen Sound Waste Management Study.

Welcome and Introductions

Welcome and Introductions - Councillor Bill Twaddle. Councillor Bill Twaddle welcomed participants and thanked them for attending the meeting.

Sally Leppard, Lura Consulting. Sally Leppard provided a review of the proposed meeting agenda and format. A copy of the agenda is included in Appendix A.

Following the agenda review, Sally facilitated a round of introductions.

Owen Sound's Waste Management Planning Process - Sally Leppard

Project Process. Sally Leppard introduced the project schedule. The table below outlines the proposed work program for this project.

Public Forum 1 Meeting Report

Deliverable/Task	Technical Component	Committee/ Public/Stakeholder Consultation and Communications	Deliverable and timeline
Project Charter		Consultation and Communications Plan	September 29
		Notice of Commencement/ad for forum	October 4
		Promotion of forum Website	October 4-13
Assessment of Current Situation/Vision and Goals for Sustainable Waste Management Plan	Waste Characterization Review of Program Components (Waste Recycling; SSO; Disposal) Benchmarking	Newspaper article	
		Survey of Residents	October 13-18
		WM Committee/ Stakeholder Forum #1 Vision/Goals/Options (all components)	November 6
Identifying and Evaluating Alternative Solutions	Identify Options (Policy, waste recycling, SSO, disposal)	Promote Forum #2	December
		Stakeholder Forum #2 (Review/Select Options)	Early January
The Path Forward	Draft Integrated Report (Policy/WR/SSO/Disposal)	Draft Report	January
		Council Presentation	February
		Public Review	January-February
		Finalize Report Notice of Completion	February 28 th

Sally indicated that the role of the public and stakeholders was to provide input into the development of the long term waste management planning process.

Current Waste Management System - John Smith, Lura Consulting.

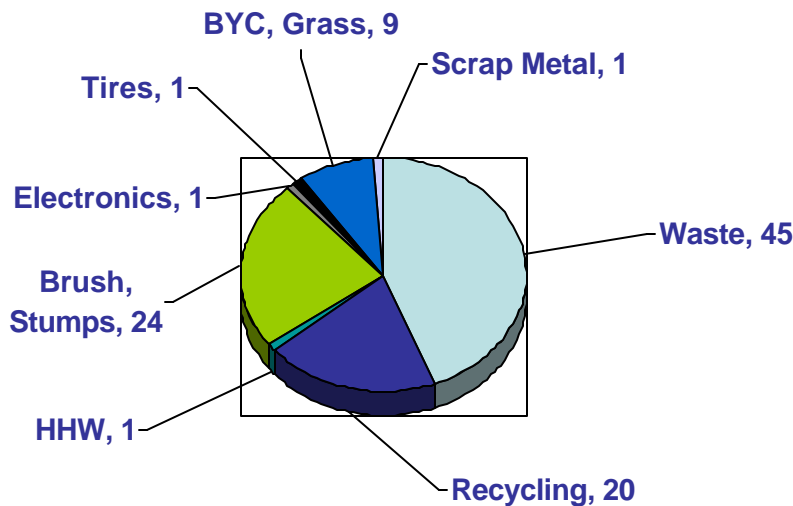
John Smith presented information about the current waste management system in Owen Sound. The following notes provide highlights about his presentation.

Owen Sound as a leader...

- One of first Municipalities to have bag tags
- One of first Municipalities to recycle electronics
- One of few Municipalities to recycle polystyrene
- One of first Municipalities to require businesses to recycle by by-law
- Has always had extensive recycling list
- Has won a Platinum Award for performance

Characterization of Waste Stream by Percentage

The following graph provides an overview of current amounts of waste characterization in the City of Owen Sound.



Disposal of Waste

- Currently the City's waste is hauled by Miller Waste Services to Michigan
- Border will close in 2010 and significant reductions are required before then
- When border closes, Contractor required to find alternative
- Owen Sound needs to minimize both reliance on, and risk associated with, export

Vision for the Future of Owen Sound

Following the presentation, participants brainstormed key elements for a Vision for the future of Owen Sound's Waste. Participants indicated that the following elements should be included in the Vision Statement. Using the information below as a basis, a Vision and strategic plan will be drafted by February 2007.

By 2030 Owen Sound's waste management system should achieve the following goals:

- Have a fiscally responsible system in place
- Reduce waste at source
- Maximize waste diversion
- Have a County wide waste management system
- Use existing Master Plan
- Have a Municipal waste management board (partnership)
- Should be living with "our own waste"
- Label all materials clearly (e.g. information whether or not it can be recycled)
- Be a leader in environmental stewardship
- Include experimental knowledge ("shouldn't be afraid" to look into other (new and emerging) areas of waste management)
- Have increased community collaboration & involvement
- End up with a clean environment
- Involve everyone responsible
- Have cooperation from the public, other levels of government and neighbouring municipalities
- Continue to facilitate public education on environmental issues
- Explore opportunities regarding small business and develop local incentives (e.g. habitat for humanity re-store)
- Include Provincial government involvement and role
- Centralize efforts (at the Provincial level)
- Include universal access (e.g. toxic taxi, curbside pickup of styrofoam)
- Be a community where it is socially unacceptable to place garbage to the curb
- Curbside collection of kitchen-waste Have a local landfill solution (local County disposal)
- Be a "zero waste" community
- Include extended producer responsibility (e.g. European auto manufacturers)
- Involve Federal government, import standards
- Include a comprehensive composting system
- Be a clean economy
- Involve incineration

Public Forum 1 Meeting Report

- Have waste minimization at the manufacturing level
- Focus on the best available solution versus the perfect solution
- Include the three pillars of community and include a fourth pillar which is the culture of the community
- Province could provide a list of approved waste diversion and disposal methods and technologies

Current Waste Management System - John Smith, Lura Consulting

The following tables outline the potential waste management options for the future of Owen Sound.

Program	Pot. Div.	Initiatives/ Technology
<i>Waste Minimization</i>		
Reduction at Source	5%	Education
Backyard Composting	7%	Education/Subsidies
Policy Instruments	1%	Deposit/Refund
Education	2%	Enhancement

Program	Pot. Div.	Initiatives/ Technology
<i>Resource Recovery</i>		
Recycling Facility		Provided by Private Sector
Composting Facility (SSO)		Indoor/Outdoor
Curbside Collection Recyclables	5%	Expansion/Frequency
Curbside Collection Organics (SSO)	30%	Introduce Collection

Public Forum 1 Meeting Report

Program	Pot. Div.	Initiatives/ Technology
<i>Waste Disposal</i>		
Landfill with Pre-processing		Waste Stabilization
Incineration and ash disposal		EFW, disposal capacity
Special Wastes (e.g. HHW)		Ship to secure landfill
Landfill (local area/export)		Find willing hosts

Following the presentation Sally asked participants if they had any suggestions in regard to options for selecting waste management programs. Participants provided the following ideas for other potential programs.

- Bio-reactor landfills
- Identify potential sources of funding
- Compact technology

Potential Criteria - John Smith, Lura Consulting

John Smith provided examples of criteria for selecting the future waste Management programs.

- Environmental Effects
- Social Impact and Acceptability
- Technology – sound and proven
- Cost effective
- Efficiencies
- Ease of Implementation
- Extent of Local Control

Following the presentation Sally asked participants if they had any suggestions in regard to criteria for selecting waste management programs. Participants provided the following ideas for other potential programs.

- Cost effective, affordability

Public Forum 1 Meeting Report

- Look at sound and proven alternatives
- Integration of different ideas
- Cooperation
- Scalability
- Education
- Extent of local control in managing waste
 - Is a driving principle
 - depends on the component
 - needs to remain a criteria
- Include Industrial And Commercial Wastes

Next Steps

Sally Leppard provided an overview of next steps for the Owen Sound Waste Management process. Sally indicated that a second workshop would be held to discuss the short-listed options for waste management.

Closing Remarks

Councillor Bill Twaddle closed the meeting by thanking everyone for participating in the process. He encouraged participants by noting that change can take years to achieve, and that Owen Sound had come a long way over the past 20 years, and could continue to excel in the future. He asked that everyone continue to participate and provide feedback.

Public Forum 2 Meeting Report

Owen Sound Waste Management Master Plan

Public and Stakeholder Workshop #2

City of Owen Sound

Waste Management Planning Process

January 18, 2007

Harry Lumley Bayshore Community Centre, Shore Room

Meeting Purpose

The purpose of this meeting was to approve a community vision and goals for waste management for the next 30 years, and apply evaluation criteria to waste diversion and disposal options. The outcome was to obtain community advice on acceptable options for the long term management of Owen Sound's waste.

Open House

Participants were invited to review a series of displays that focused on some of the components of the Owen Sound Waste Management Study.

Welcome and Introductions

Welcome and Introductions - Councillor Bill Twaddle. Councillor Bill Twaddle welcomed participants and thanked them for attending the meeting.

Sally Leppard, Lura Consulting. Sally Leppard provided a review of the proposed meeting agenda and format. A copy of the agenda is included in Appendix A.

Following the agenda review, Sally facilitated a round of introductions.

Draft Vision and Goals - Sally Leppard

Sally presented the draft Vision for the Owen Sound Waste Management Process:

In 2030, Owen Sound is a nationally recognized leader in the wise management of post consumer resources and wastes. With the goal of waste elimination, the community's innovative efforts to reduce consumption and waste are targeted at all levels of waste generation, including production, distribution, use and disposal of products. Each person who lives, works and plays in the City actively participates in the reduction and re-use of waste and recovery of resources.

The community's waste management program is affordable, self-reliant and environmentally sound. It has resulted in the creation of innovative partnerships with all levels of government, community organizations and businesses. The programs are accessible and supported by all who live and work within the community.

GOALS

- ❑ The City will work with all levels of government to promote producer-responsibility in the reduction of waste in industrial processes
- ❑ Homes, businesses and institutions will be guided by waste reduction principles in their purchasing decisions
- ❑ The system will have the least possible negative impact on the natural environment

Public Forum 2 Meeting Report

- ❑ The system will be affordable and fiscally responsible
- ❑ The system is user-friendly, providing the most effective method of collecting, recovering, and reusing the material resources produced and consumed by our community (recycling, composting).
- ❑ The community is aware of the impact of hazardous waste on the environment
- ❑ The city promotes green industry
- ❑ The program is monitored and improved continually

Community

- ❑ Waste reduction and re-use
- ❑ Active participation in curb side organic and recycling programs
- ❑ Collaboration with other levels of government, businesses, institutions
- ❑ Community participation in developing supporting policies and programs
- ❑ Encourages innovation and continual improvement

Economic

- ❑ Affordable system
- ❑ Economic incentives for participation
- ❑ Stimulate green industry and businesses

Natural Environment

- ❑ System minimizes environmental impact and reduces the City's ecological footprint

Comments on Vision and Goals

Following the presentation Sally asked participants if they had any suggestions in regard to the Vision and Goals. Participants provided the following feedback.

VISION

- The Vision may be "too wordy"; it should be short and sweet
- Consider incineration
- County level rather than each individual municipality
- Include collaboration
- Include education and active participation
- Electronic program not widely used
- Suggest providing incentives for waste reduction
- Collection options - 1st year large containers, 2nd year smaller containers
- Include processing options
- Include disposal options
- Owen Sound cannot solve its' waste problem in isolation, what happens in Owen Sound will affect every other municipality in the County of Grey
- Suggest that the Vision include a nationally recognized waste management program
- Include Grey and Bruce County should get together for waster management
- Jurisdictional responsibility
- Go beyond waste management (benefit other issues e.g. producing other resources/profitable)
- Need to be more specific
- No mention of education and school system
- The vision and goals do capture what was said at first meeting
- The vision and goals are going in the right direction

Public Forum 2 Meeting Report

GOALS

- Concern that the goals are not measurable
- Consider incineration
- Include school outreach/education
- Develop an Action Plan

System Options and Performance

John Smith, Lura Consulting presented the following Waste Diversion options for the waste management plan.

Diversion Option	Description
<p>1. Waste Reduction</p>	<p>Description: Reducing the amount of waste at the source through initiatives such as backyard composting, and changing purchasing behaviour.</p> <p>Waste Diversion: Approximately 5-10%</p> <p>Cost: \$1-\$2/household</p>
<p>2. Optimized Blue Box</p>	<p>Description: Weekly collection; addition of new materials (such as Styrofoam and textiles - can include clothing, curtains, towels, blankets, sheets, table cloths, and other fabric items); using bags and/or alternative collection containers.</p> <p>Waste Diversion: 8%</p> <p>Cost: \$100-\$200/tonne</p>
<p>3. Curbside Electronics Recycling Collection</p>	<p>Description: Electronic waste is currently collected through the waste management transfer station. Examples of electronic goods include computers, monitors, VCRs, clock radios, and cellular telephones.</p> <p>Waste Diversion: 1%</p> <p>Cost: A curbside collection program could cost as much as \$300/tonne as a stand alone program but could be considerable less when included as part of a comprehensive diversion system.</p>
<p>4. Bi-weekly yard waste collection</p>	<p>Description: Owen Sound does not have a curbside collection program for yard waste. Currently, residents must transport their yard waste material to the City's composting site. Typical municipal yard waste programs collect grass, leaf and brush materials.</p> <p>Diversion: Collection of leaf and yard waste every other week from April to November could divert approximately 10 to 15% of the waste stream.</p> <p>Cost: Collection costs can range from \$70-\$100 per tonne. Processing costs range from \$40 to \$60 per tonne.</p>

Public Forum 2 Meeting Report

Diversion Option	Description
<p>5. Residential Construction & Demolition Waste Ban</p>	<p>Description: This is a green business opportunity. A system whereby construction and demolition is brought to a station to be recycled. Construction and demolition (C&D) materials can include materials such as drywall, lumber, metals, brick, concrete, carpet, plastic, piping and earth. The City would need infrastructure available to recycle and reuse the material.</p> <p>Waste Diversion: Approximately 7%</p> <p>Cost: Promotional materials and enforcement</p>
<p>6. Bag Limits</p>	<p>Description: Bag limits restrict the number of bags of garbage a resident is allowed to set out for collection. Owen Sound currently has a 3 bag limit in place. Reducing bag limits to 2 bags or less will significantly increase waste diversion.</p> <p>Diversion: Bag limits of 2 or less can decrease waste generation by as much as 5%.</p> <p>Cost: Negligible - promotional materials and enforcement.</p>
<p>7. Comprehensive promotion and education/social marketing campaign</p>	<p>Description: The use of multi-media and public engagement techniques to create awareness and change public behaviour toward environmentally sustainable practices.</p> <p>Waste Diversion: While hard to quantify, a comprehensive awareness and social marketing campaign is proven to increase awareness and change behaviour.</p> <p>Cost: Dependent on campaign components. Approx. \$2-\$5/household</p>
<p>8. Household hazardous waste collection (Toxic Taxi)</p>	<p>Description: This program would include the curbside collection of household hazardous waste items such as paint, motor oil, antifreeze and household cleaners. Municipalities such as Toronto and Durham have operated these types of programs in the past and cancelled them due to their high cost.</p> <p>Diversion: Ontario municipal waste audits indicate that household hazardous waste makes up approximately 1% of the waste stream.</p>

Source Separated Organics

Paul Van der Werf, 2cG, provided an overview of the SSO program.

- About SSO
- Quantities of Organic Waste
- Organics Collection Options
- Organics Processing Options

Public Forum 2 Meeting Report

Diversion Option	Description
<p>9. Source Separated Organics Collection</p>	<p>Description: Source separated organics includes household compostable material such as food waste, pet waste, diapers and soiled paper products. Like recyclables, household organics are source separated from regular garbage and put into a special bag or container. The organics are then collected at the curb to be composted at a central composting facility.</p> <p>Waste Diversion: Approximately 20%</p> <p>Cost: \$85-\$155/tonne for collection; \$30-\$100 operating; \$1.5M for capital cost</p>

Disposal Options

Eric Hopkins, Trow, presented the following information about the Waste Disposal options for the waste management plan.

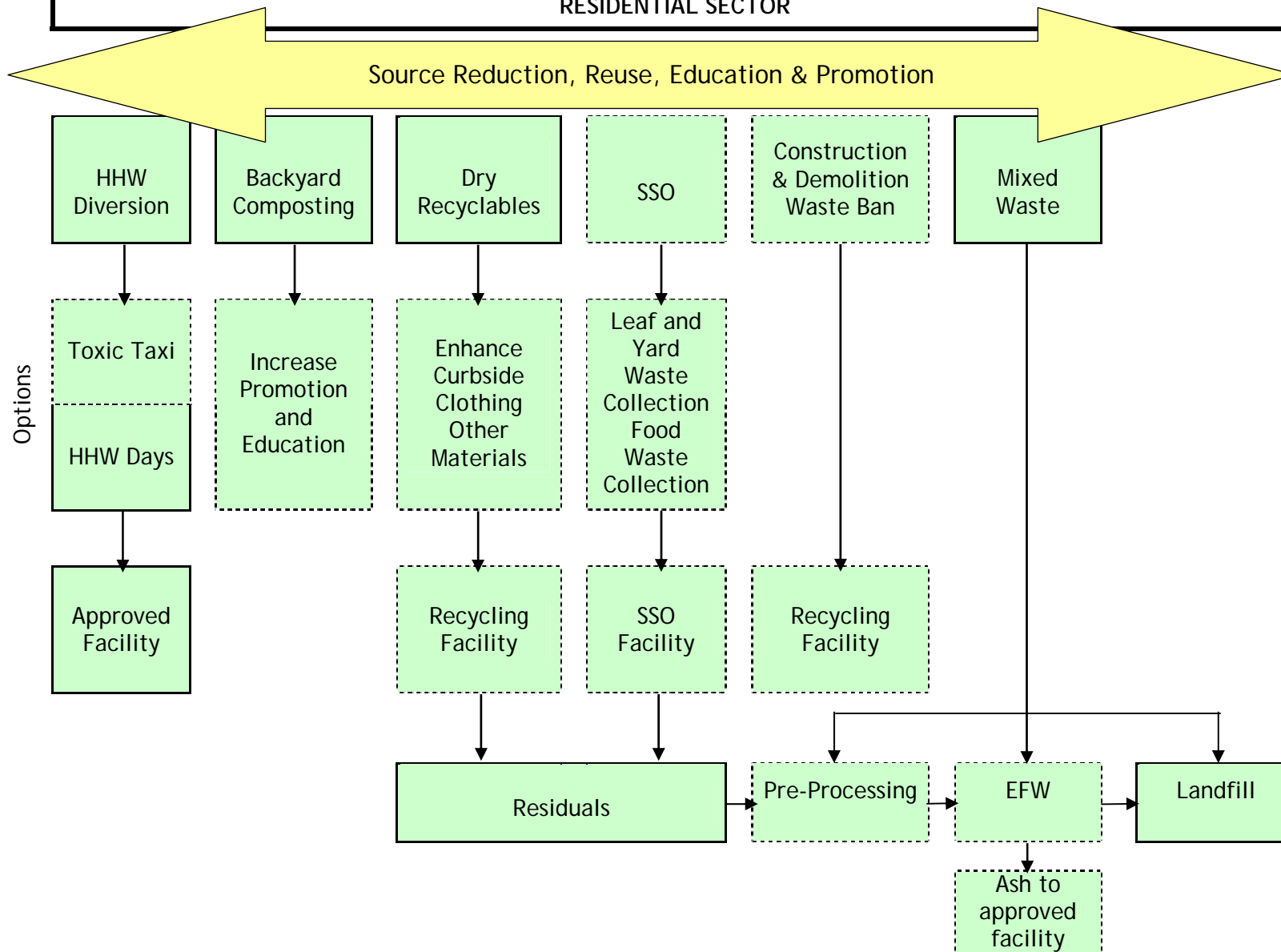
Residual Waste Disposal	Description
<p>1. Incineration and ash disposal (Energy from Waste)</p>	<p>Description: Energy from Waste could reduce landfill requirements by 75% or more. Energy from Waste processes include gasification, pyrolysis, and pelletization that incinerate waste to produce energy. Residual waste is a by-product of EFW and would include bottom ash and fly ash which must be disposed. Fly ash typically requires management and disposal as a hazardous waste.</p> <p>Cost: \$150-\$400+/tonne</p>
<p>2. Residue Waste Composting (including Mechanical Pre-Processing)</p> <p>a) Exporting to an Ontario landfill site</p> <p>b) Development of local area landfill site</p>	<p>Description: Composting (aerobic or anaerobic) residual waste could reduce waste disposal requirements by up to 40%. Composting has the benefit of producing a stabilized non-putrescible waste for disposal. Composting process options would include aerobic composting and anaerobic composting similar to SSO.</p> <p>Mechanical separation of waste prior to disposal could recover 5-10% additional recyclable materials within the residual waste stream. Mechanical separation of waste typically includes magnetic separation of metals and screening. Most recovered products from pre-processing are considered "B" grade, with fewer markets and lower resultant revenue.</p> <p>Cost: \$100+/tonne</p>
<p>3. Landfill (export)</p>	<p>Description: Regardless of the chosen waste diversion or residual waste processing options, there will always be some quantity of waste requiring landfilling. Without a landfill, Owen Sound is required to export their waste for final disposal. The options for export currently include exporting to the U.S.A. and could include exporting to available landfills in Canada.</p>

Public Forum 2 Meeting Report

Residual Waste Disposal	Description
	Cost: \$85+/tonne
4. Landfill (local)	Description: Develop a municipal or partner operated landfill within the local area for disposal of Owen Sound's/Bruce County residue waste. Cost: \$100-\$250/tonne

The following table was presented to participants. It outlines the potential Integrated Waste Management System for Owen Sound.

Potential System Components
Integrated Waste Management Plan
Owen Sound
RESIDENTIAL SECTOR



Public Forum 2 Meeting Report

Evaluation Criteria

In order for participants to select their preferred options, the following criteria were provided:

1. Cost/Affordability
2. Environmental Effects
3. Social Impact and Acceptability

Creating a Waste Management System for Owen Sound

Participants reviewed the list of Options proposed to guide development of Owen Sound's Waste Management Master Plan. In groups, participants used the criteria (above) to shortlist their preferred waste diversion and disposal options. Each table developed their preferred waste management system for the City to consider. Participants indicated that they would like the following elements to be included (or not) in the waste management plan for Owen Sound:

Table 1	Table 2	Table 3	Table 4	Table 5
<ul style="list-style-type: none"> • Promotion and Education • Optimized Blue Box (BB) • Waste Reduction • Zero yard waste • Bag limits • Composting • Household Hazardous Waste (HHW) - not at curb • Curbside electronic - not at curb <p><u>Not clear about:</u></p> <ul style="list-style-type: none"> • Incineration • Source Separated Organics • Residential Construction & Demolition 	<ul style="list-style-type: none"> • Cost prohibits implementation • Design to 2010 (not 2030) • Owen Sound could get financial incentives from Government • Source Separated Organics - include yard waste • Optimized BB • Promotion and Education • Inspire guilt in regard to consumerism • Residual compost • No Bag limits (consider economic incentive) • Residential C&D to local landfill - 10%; no export of C&D • HHW collection 	<ul style="list-style-type: none"> • Waste Reduction • Incineration/gasification • Local landfill • Bag limits • SSO (include cost) • Export - landfill • Promotion and Education • Optimized Blue Box • HHW + electronic - depot • No C&D 	<ul style="list-style-type: none"> • Waste reduction • Optimized BB • SSO • Promotion & Education • Local landfill - properly engineered <p><u>More discussion required:</u></p> <ul style="list-style-type: none"> • HHW/electronic/ land + yard • C+D waste ban • Incineration (however, cost is not clear) 	<p><u>Start Right Away</u></p> <ul style="list-style-type: none"> • Anti Packaging Lobby • Waste reduction • SSO • Bag limits • Promotion & Education <p><u>Include in system</u></p> <ul style="list-style-type: none"> • Optimized BB • Residential C+D • Incineration - if no toxicity of emissions

Public Forum 2 Meeting Report

The following table provides a summary of the feedback from participants at the workshop and individual workbooks.

System Component	Cost/Affordability	Environmental Effects	Social Impact/Acceptability	Overall Impression/mechanism
Policy Options	✓	✓	✓	Simple and cost effective
Waste Reduction	✓	✓	✓	Improve education and promotion towards a "conservation culture"
Waste Reuse	✓	✓	✓	Promote "Freecycle" and increase goods exchange events, existing re-use centers and add re-use centre at Depot.
Optimize Blue Box - bi-weekly program	✓	✓	✓	Continue to add materials. Promote lesser known materials.
Electronics	✓	✓	✓	Must be cost effective. Enhance use of depot program to start.
SSO (Food wastes)	✓	✓	✓	Must be cost effective
Yard Waste	✓	✓	✓	Must be cost effective - Enhance use of depot to start.
Construction and Demolition	?	✓	?	Needs more discussion. Consider later.
Bag Limits	✓	✓	?	Implement with SSO program.
Education	✓	✓	✓	Implement ASAP
HHW Collection	X	✓	✓	Improve use of depot; Implement local ban from disposal Consider collection later on
Incineration	?	?	?	Uncertain. Needs more work. Concerns about toxicity, cost, and quantities. Could pursue with regional partner over the longer term.
Pre-Disposal Processing	?	✓	✓	Needs further research. Partially dependent upon landfill solution
Landfill - Export	X	X	X	Need to minimize disposal to utmost extent.
Landfill - Local	✓	?	?	Pursue with Regional Partners; Properly engineered, dry site. Organics ban and/or pre-processing; minimize local traffic effects; minimize disposal quantities to utmost effect.

Public Forum 2 Meeting Report

Additional Comments

Participants made the following additional comments:

- Participants suggested that the City consider a County wide system.
- Suggest that incineration is the only option. Must lobby federal government; push local MPs and government agencies.
- Owen Sound needs to look beyond 2010, think “outside the box”. Include goals and actions within the Waste Management plan.
- The report should have 2 parts: Action and Steps to take before 2010.
- It was disappointing and extremely frustrating that there was no presence from the Provincial government, Federal government, industries that are producing Municipal Solid Waste in ever increasing amounts, and the Grey County Council. It seems nothing has changed over the past 20 years. Everything this 2007 waste management study is asking was answered in great detail in 1986 by R. Cave & Associates (from Mississauga), with exception of the electronic waste. Concerned that City Council has spent \$70,000 on outside consultants to tell us what we already know in great detail.
- At present every municipality in Grey County and Bruce County is facing the same problem. Need to look at the problem as a county wide issue. The geographic layout of the 2 counties, with Owen Sound almost in the middle, cries out for a central waste management site which would be owned and operated by the two counties and the city. This site could operate in such a way, that negative environmental impacts are negligible, while at the same time providing recession proof employment and the potential of becoming self-sustaining.
- Politicians in the city and the two counties need to find a way to consider a waste management solution based on the Bruce-Grey-Owen Sound basis in the public interest.
- Instead of selling bag-tags the city should sell clear garbage bags with the Owen Sound insignia clearly stamped on them. The advantages are as follows:
 1. It will eliminate the problem of false tagging (e.g. people scan the tags on their computer and print dozens of free tags)
 2. It will eliminate the problem that results from the use of cans (e.g. people put the tags on the garbage cans, not the garbage bags thus the tag get used again and again; staff are required to scratch or pick off tag from can to put on garbage bag which is unhealthy task; oversized cans usually contain 5 bags with only the top bag tagged; overweight cans can cause muscle strain etc for staff)
 3. It will eliminate recyclable articles ending up in the garbage truck (clear bags means the garbage handler can see what items are in the bag)
 4. Savings for those putting out small amounts (option of two different sized bags)
 5. Over sized bags eliminated
 6. Health of staff (e.g. days off due to hernia, muscle strain, infection etc. would lessen)

Next Steps and Closing Remarks

Sally Leppard provided an overview of next steps for the Owen Sound Waste Management process. Sally indicated that a report on the study would be available later in 2007.

Councillor Bill Twaddle closed the meeting by thanking everyone for participating in the process. He asked that everyone continue to participate and provide feedback.



Long Term Waste Management Planning
Process

APPENDIX B: Facility and Service Review





Owen Sound

Facility and Service Review

December 2006



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1 BACKGROUND

The City of Owen Sound has been a leader in waste diversion, recently winning a Platinum Award from the Recycling Council of Ontario for diverting 55% of its waste from disposal.

The City has been one of the first to implement User Pay, to divert End-of-life Electronics, and to recycle Polystyrene. The City has always included a broad range of materials in its recycling program and its Household Hazardous Waste scheme.

This study looks at the effectiveness of the City’s existing waste management program and makes recommendations for improvement.

2 EXISTING SYSTEM

The residents of the City of Owen Sound have access to a comprehensive suite of waste diversion opportunities, as well as incentives to reduce their waste due to a user pay system for garbage collection and disposal.

The City has been a leader in waste management, having implemented a User Pay System and diversion programs for polystyrene and electronic waste long before most other municipalities considered them.

Recently, the City won an award from the Recycling Council of Ontario for its diversion programs and achievements. The suite of programs that led to that award are discussed below.

Curbside Recycling

Currently, the City diverts 20% of its waste through a comprehensive curbside collection program. The bi-weekly collection system includes a long list of materials, including:

- Metal
 - Food tins and pop cans
 - Steel paint cans
 - Aerosol cans
 - Aluminum pie plates & foil
 - Metal Pots & Pans, cutlery and kitchen utensils
- Plastic
 - #1 PETE plastic containers & trays
 - #2 HDPE screw-top plastic bottles (except motor oil and 5-gallon pails)
 - # 3 V or PVC plastic bottles
 - # 4 LDPE plastic bottles
 - # 5 PP plastic bottles, tubs, lids and bottle caps



- # 7 OTHER plastic bottles
- Tupperware
- Glass bottles & jars
- Paper
 - Newspapers and inserts
 - Magazines
 - Catalogues
 - Office paper
 - Construction paper
 - Envelopes (with the plastic windows removed)
 - Paperback books
 - Telephone books
 - Drinking boxes
 - Milk and juice cartons
 - Frozen food cartons
 - Wax & plastic coated paper cups
 - Paper bags
 - Cereal, detergent, tissue boxes, etc
 - Paper egg cartons
 - Greeting cards
 - Gift wrap

According to a survey of residents, approximately 94% of residents participate in the curbside collection program, an excellent rate of compliance. Although there has not been a waste audit conducted to measure the amount of material in the waste stream, it is expected that the program is capturing about 60% of the primary recycling materials, such as cans, glass, paper and cardboard. Capture rates of other materials appears to be less, presenting an opportunity for improvement.

Leaf and Yard Waste

The City runs a Leaf and Yard Waste facility, which allows residents to bring material from their homes and drop it off to be composted. In 2005, it is estimated that there were 2,774 tonnes of material dropped off there. The material includes brush and stumps, much of which likely comes from commercial operations. In addition, it is expected that other material from commercial sector is taken there.



There are no scales at the facility, so the tonnage is calculated by a visual estimate of the volume and a weighed sample of a portion of the material.

It is expected that the combination of material being brought in from other sources and the visual estimate of materials have combined to create an over emphasis on Leaf and Yard waste in the City's waste stream. While the more material that is composted at the Leaf and Yard Waste facility the better, for the purposes of this study it is estimated that 1,700 tonnes of the material comes from the residential sector.

Backyard Composting

The City encourages and supports backyard composting. Residents are able to buy composters for only \$15, a price reduced by volume purchasing and a 50% subsidy on the part of the City. Over 1,400 composters have been sold since 1998, and just slightly less than 50% of residents report that they compost in their yards. This is a very high participation rate, reflecting the success of both the composter program as well as the effect of the bag tag and bag limit policies, which encourage residents to set less material out at the curb.



Household Special Wastes(HSW)

The City operates 7 special drop-off days a year, where residents can take hazardous material to the HSW facility at the City Works Yard. The program diverted the equivalent of 71 tonnes of hazardous waste in 2005, redirecting it to recycling or secure disposal facilities. Over half of City residents report that they take advantage of the opportunity to safely dispose of these hazardous materials.



Electronic Waste

The City operates an electronic waste depot at the Miller Waste Transfer Station, allowing residents to take their used computers and most other electronic equipment for recycling purposes. In 2005, there were 53 tonnes of the material taken to the facility. Electronic waste comprises high levels of heavy metals and lead (in CRT monitors), constituting a toxic waste stream that should be diverted from disposal.



Polystyrene Recycling

The City accepts polystyrene at the Miller Waste Transfer Station for recycling, collecting 11 tonnes in 2005. Although polystyrene is light and does not constitute much tonnage, it takes up a lot of volume in landfills and in trucks transporting waste. Besides the environmental benefits of recycling the material rather than disposing of it, there is a significant cost avoidance in not having to transport it to far away disposal facilities.



Metal and Tire Recycling

The transfer station accepts tires and metal, including large appliances. Last year, 41 tonnes of metal were recycled, and 20 tonnes of recycling.



Waste Collection and Disposal

The City of Owen Sound collects waste curbside from all residents. The City collects from single-family dwellings itself using its own staff and vehicles. Waste from apartments and businesses are collected together by Miller Waste Systems which charges the customers directly for the service.

The City charges \$2.00 per container for each bag or can of garbage that is collected curbside. Residents are limited to 3 bags of garbage per week. Residents can also take waste to the transfer station, where they will be charged by Miller Waste Systems for the waste delivered. This transaction between the resident and Miller is independent from the City, and there does not have to be a bag tag affixed to containers taken to the transfer station.

Under contract, Miller currently hauls Owen Sound's residual waste 300km from the Miller Waste transfer station in Owen Sound, to Pine Tree Acres Landfill near New Haven, Michigan, USA, for disposal. Miller currently charges \$104 for each tonne of waste hauled to Michigan, including the City Surcharge.

3 METHODOLOGY

The Facility and Service Review comprised:

1. Data gathering;
2. Analysis;
3. Formulation of Recommendations.

The data gathering component involved three sources of information: data collection, a telephone survey, and public consultation.

3.1 Data Collection

The City has good historical data for its programs. Tonnage data is available for all of the recycling stream material, all of the refuse stream, and the entire hazardous stream. Calculations have also been made on the yard waste that has been collected. All in all, the City has good data for its system.

That said, it is important to note that, due to the nature of the City's waste management system, there is not a clear distinction between residential and Industrial, Commercial and Institutional sources for its refuse collection and yard waste facilities. Refuse from multi-unit dwellings are collected with Industrial, Commercial and Institutional waste, so separate numbers are not available. Also, it is possible that waste from Industrial, Commercial and Institutional sources are being

brought to the Leaf and Yard Waste Facility and Household Hazardous waste facility, but it is impossible to identify the quantity from that source.

3.2 Survey

The consulting team conducted a telephone survey of City residents in order to ask the customers of the waste management system about their use of its components, the level of satisfaction with the system, and to identify barriers, both real and perceived, to use of the system.

3.3 Public Consultation

A public meeting was held to gather input from residents on the future of the waste management system. The meeting focused on looking forward rather than at the existing system, but comments and findings pertaining to the existing system were considered in this review.

4 FACILITY AND SERVICE REVIEW

4.1 Curbside Recycling

The City operates an extensive curbside recycling program that has residents separate material into three streams – containers, which are placed loosely in the Blue Box; paper, which is placed in a paper or plastic bag and includes such items as newspapers, magazines and envelopes; and boxboard products which are placed in a paper bag or carton, and includes such items as egg cartons and milk cartons. The Blue Boxes are collected every second week.



Figure 1 - Curbside Recycling

In addition, the City operates an Apartment Blue Bin Recycling Program which collects the same material, sorted into wheeled containers, and a Public Bin Recycling Program.

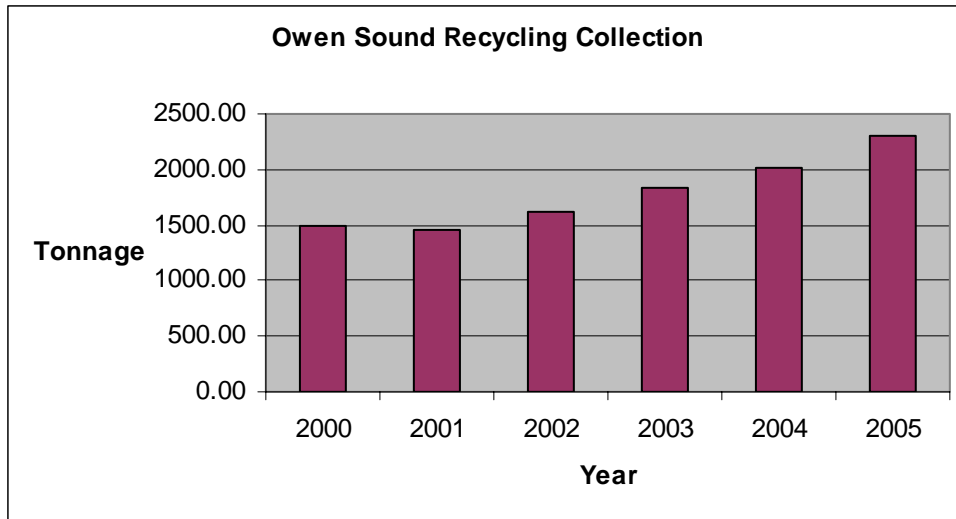
4.1.1 Capture

The program is successful. According to the survey, 94% of residents participate in the curbside recycling program, which is substantially equal to the 95% participation rate that was determined in Stewardship Ontario Effectiveness and Efficiency Fund Project 105: Enhanced Blue Box Recovery, which surveyed residents in the regions of Durham, Peel, York and the City of Toronto.

Typically, blue box capture rates range from 40% (New York City) to 60% (London, Ontario) for materials such as paper, metal, glass and plastic. These numbers have been derived from comprehensive waste characterization studies. Estimates from the figures that are available for Owen Sound and from provincial waste characterization studies indicate that the City's performance on recycling capture rates is at the high end of that range or greater for all of those materials.

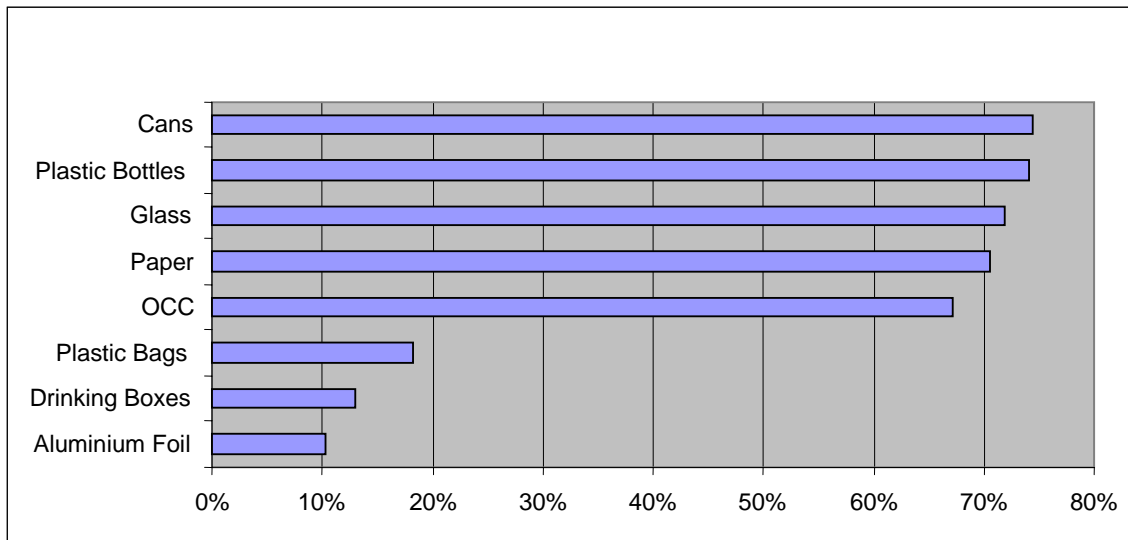
Further, overall recycling tonnage is increasing, having risen 55% from 2000 to 2005.

Table 1 - Curbside Recycling in Tonnes



The program appears to be recovering a large portion of the traditional recycling stream (i.e. paper, old corrugated cardboard, cans, glass, and plastic bottles), as approximately 70% of survey respondents reported recycling these materials.

Table 2 - Material Recycling Frequency, by % of People Recycling the Material



A smaller proportion of residents are recycling other materials in the curbside recycling program, such as drinking boxes and aluminum foil. From experience in other municipalities, it is not surprising that aluminum foil recycling would be low, as residents often cite that the aluminum foil has too much food on it to be recycled. In addition, many people may not use drinking boxes, so it is not unexpected that the survey revealed that fewer people recycle those containers. Nonetheless, there may be a need to focus communication efforts on the acceptability of other materials beyond glass, cans, OCC, paper and plastic bottles.

4.1.2 Customer Satisfaction

Ninety-four percent of Owen Sound residents participate in the curbside recycling program, and fifty-seven percent report that it is a great program. The program has been embraced by residents and has tremendous support.

Almost one in five people would like to see weekly collection.

4.1.3 Economics

The net cost of the recycling program has been steadily declining, from approximately \$66 per tonne to approximately \$51 per tonne in 2005, largely due to increased revenue from materials. This compares favourably with the average of the top third recycling contracts in Ontario, which is \$88 per tonne for Regional Urban municipalities and \$108 per tonne for Small Urban municipalities (A Study of Opportunities for Cost Savings in Municipal Blue Box Contracts – REIC Perth, 2005).



Figure 2 - Public Recycling

4.1.4 Recommendations

The curbside recycling program is performing very well. It does seem that there could be some better capture of some of the materials. Therefore the following recommendations are made.

1. The City should implement an education campaign to specifically address the fact that items such as aluminum foil and drink containers are part of the collection program. The program should increase the awareness of all of the materials in the recycling stream, and should include a behaviour-focused element to translate that awareness into action.
2. Because there has been no waste characterization analysis in Owen Sound, it is impossible to accurately measure the capture rate of the recyclable materials in the waste stream. This is true of all other diversion programs as well. Accordingly, it is recommended that the City conduct a waste characterization study that examines all waste generated in its boundaries. This data will assist the City in better assessing the performance of its existing programs, make changes where necessary, and to better plan for new initiatives.

4.2 Backyard Composting

The City buys Backyard Composters and sells them to its residents for only \$15, which reflects a \$15 subsidy. This program has resulted in 1416 composters sold from 1998 to 2006. On its website the City provides information on what should and should not be composted, and tips on how to mitigate problems.

4.2.1 Capture

Backyard Composting is not measured in Owen Sound as is the case in most other municipalities. So the capture rate is not known.

The customer survey indicates that just less than half (47%) of Owen Sound residents report that they compost in their backyards. The majority of those who do not compost on their property cite that their yards are not suitable for backyard composting or that it is inconvenient.



Figure 3 - Backyard Composters

A 47% backyard composting rate denotes success, although the reporting has to be received cautiously. Nonetheless the reported rate of participation is much higher than the measured rate of approximately 10% recorded in a comprehensive evaluation of backyard composting conducted in New York City (Backyard Composting in New York City – A Comprehensive Program Evaluation, 1999). The high participation rate in Owen Sound is likely due to the City’s program to subsidize the cost of obtaining composters and because the City’s Bag Tag program provides an incentive for householders to divert their waste. Although there is room for improvement, the current program is performing well.

4.2.2 Customer Satisfaction

Customer satisfaction is not an issue because this is not a service other than the subsidization of the composters. With 47% of residents backyard composting, the program is popular with residents.

4.2.3 Economics

The City purchases Backyard Composters at \$30 each and sells them to residents for \$15, providing residents with both a subsidy and the benefit of volume purchasing. All of the material that is composted rather than set at the curb reduces the City’s collection and processing costs. This short term capital cost to assist homeowners would appear to avoid significant operating costs of collection and disposal or composting.

4.2.4 Recommendations

Backyard Composting is a cost-effective manner of handling waste as it does not have to be collected or processed by the municipality. Even if the municipality implements Source-Separated Composting, it would make sense to encourage backyard composting as much as possible.

It is recommended that:

1. The City continue to promote Backyard Composting in the manner that they are doing, with subsidies and education;

2. The City could consider making avail of student subsidies next summer and hiring 2 students to conduct a house-to-house campaign to promote backyard composting, using Community-Based Social Marketing principles to encourage more Backyard Composting.

4.3 Leaf and Yard Waste

The City does not collect leaf and yard waste at the curb, whether or not they are in a bag with a bag tag. Residents are required to deliver their yard waste to a conveniently located central composting facility, or to compost them in their own yards.

4.3.1 Capture

Only 55% of residents report using the composting site, while 8% say they have never had to dispose of yard waste. There is a significant gap of 37% of residents who have never used the facility but have had to dispose of yard waste.

The Leaf and Yard Waste facility has a lot of material, but according to City staff, much of that is shrubs and brush coming from grubbing operations. Nonetheless, the facility has large windrows of leaves each year.



Figure 4 - Yard Waste Composting

There is a question surrounding leaves here. Are the other 45% of residents handling the leaves on their property by backyard composting or simply raking them into the surrounding property on the outskirts of the City? Or is there a significant amount of leaves going to the landfill?

4.3.2 Customer Satisfaction

Fifty percent of survey participant state that they think the Leaf and Yard Waste scheme is a great program. Thirty-three percent have no opinion.

The people who use the program are satisfied with it, but many residents do not use the composting facility. Interestingly, less than 10% of residents believe that the drop-off facility is inconvenient.

4.3.3 Economics

The Leaf and Yard Waste facility is expected to cost \$113,900 in 2006 (based on annualizing the cost of the first 10 months of operation). This is primarily due to an extraordinary ice storm which felled a large amount of trees and branches. Council approved an extra payment to the contractor to do an excessive amount of grinding.

The estimated weight of the material received at the facility in 2005 was 2774 tonnes. The budget for 2006 was \$72,496, and were it not for the extraordinary event, the budget would have been met. On this basis, the cost per tonne of yard waste processing is \$26.13 per tonne. This compares favourably to costs between \$48 (Vancouver, 1997) and \$106 (Smith Falls, 2003.)

4.3.4 Recommendations

The Leaf and Yard Waste facility is not being used by almost half of the population. Perhaps the rest of the material is being handled on property, but that cannot be determined.

The following recommendations are made:

1. Next fall, conduct a curbside and transfer station survey of bags of leaves and yard waste to determine the incidence of yard waste being disposed in the refuse stream;
2. In the fall, make a special communications effort to encourage people to take their leaves to the Leaf and Yard Waste facility;
3. Pending the outcome of the curbside survey, it may be necessary to consider the implementation of a curbside collection of leaf and yard waste.

4.4 Transfer Station

The City operates a Transfer Station, under contract to Miller Waste, for the use of residents and businesses. The Transfer Station accepts refuse, Blue Box materials, polystyrene, electronic waste, white goods, tires and scrap metal.

4.4.1 Capture

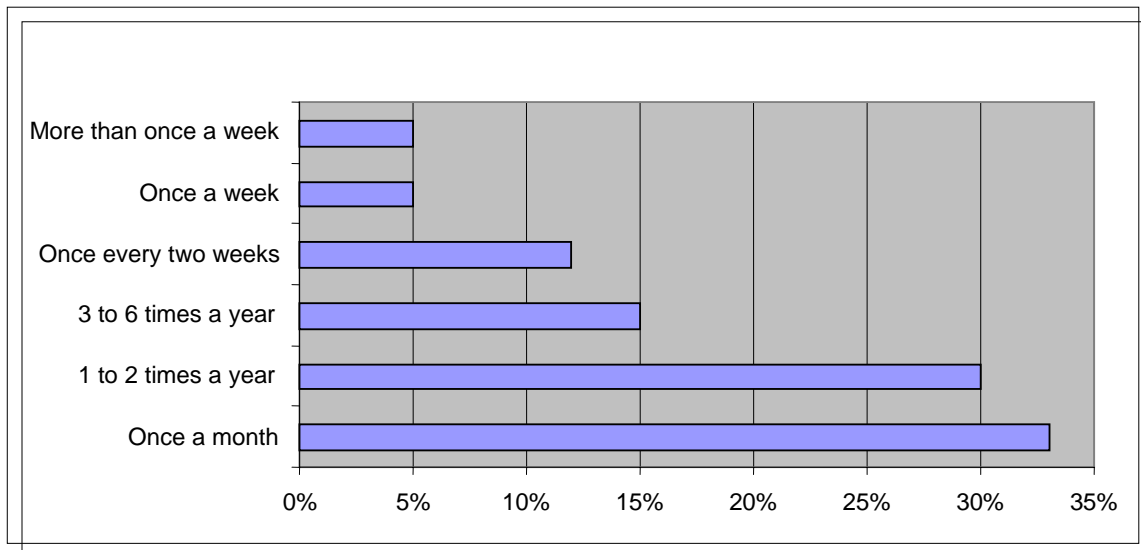
Almost 60% of residents use the transfer station for recycling and refuse disposal. The majority of residents who do use it do so frequently, with one in three using the facility monthly.



Figure 5 – Transfer Station

This level of use may be a result of the bag tag program and the opportunities to recycle more material at the transfer station.

Table 2 - Frequency of Use Of Transfer Station



4.4.2 Customer Satisfaction

Those people who use the transfer station, think it is a great program. There are very few complaints by users. Most of those that did not use it did not report any negative feelings towards it. That suggests that those who do not use it simply do not need to, as there do not appear to be significant barriers being reported.

4.4.3 Economics

Electronics and polystyrene recycling costs at the transfer station (are set under a long-term contract with Miller Waste, who own and operate the facility). A fee for waste disposed at the facility is charged to the person who brings it there in a direct transaction between Miller Waste and the customer. The municipality is not involved in waste disposed in that manner.

4.4.4 Recommendations

The Transfer Station is working well, is used a lot, is convenient to access, and it provides a significant opportunity for waste diversion. We do not have any recommendations to change the current operation.

4.5 Household Hazardous Waste

The City provides seven Household Hazardous Waste days per year, and in 2005 diverted 71 tonnes of material from improper disposal.

4.5.1 Capture

Just over half (53%) of residents report using the Household Hazardous Waste (HHW) Program. There is significant room for improvement here, and improvement is desirable as the alternative disposal methods pose significant risks to the environment.



Figure 6 - HHW Collection and Sorting

The program accepts an exhaustive list of materials. There does not seem to be a need to expand the list of acceptable materials. Where diversion can be improved is to have more people using the facility.

The program accepts material from all over the County of Grey, and municipalities outside of Owen Sound are charged \$35 per load. Approximately 50% of the material comes from other municipalities.

It is difficult to assess the capture rate of the City's HHW program as a comprehensive search for capture rates from other jurisdictions turned up empty. However, because nearly half of Owen Sound residents surveyed reported not using the HHW program, this is an area that requires more attention in order to increase the number of residents using it.

4.5.2 Customer Satisfaction

Sixty-two percent of residents report that the HHW program is a great scheme for diversion of waste. Significantly, more people report that it is a great program than actually use it. Ten percent of residents would like more information on the program; perhaps these people are good candidates for using the program in the future.

Residents have not identified inconvenience as a barrier to using the program, although a small number (3%) would like to see more programs each year.

4.5.3 Economics

Based on the first 10 months of 2006, the annualized cost of the HHW program is \$27,492. At 71 tonnes (using available 2005 data) annual collection, the cost of the program is \$387.21 per tonne.

According to the Association of Municipal Recycling Coordinators, as reported by the Recycling Council of Ontario, the cost of managing HHW in Canada is between \$1,000 and \$2,000 per year. The City's program compares very favourably to that estimate.

4.5.4 Recommendations

The HHW program operated by the City is well-regarded by residents. Seven HHW days are held each year, and there is a long list of acceptable materials. On the service side, it does not appear that the City needs to do more in order to provide opportunities for residents to divert HHW from improper disposal.

There would be significant benefit to increasing the use of the program however. The following recommendations are made in this regard:

1. Develop a campaign to improve the awareness and understanding of what happens when HHW is improperly disposed;
2. Develop a Community-Based Social Marketing campaign to convince people to take on the action of keeping their HHW separate from their other wastes, store them securely, and to take it them to a special collection event.

4.6 Electronics Recycling

The City provides Electronics Recycling at its Transfer Station. Material is taken for free except for monitors, which cost \$10 per unit for drop-off from the IC&I sector. In 2005 the program diverted 53 tonnes of material, almost a 100% increase over 2004.

4.6.1 Capture

In 2005, 53 tonnes of electronic waste were delivered to the transfer station and recycled.

Seven in ten residents do not use the electronics recycling facility. One-quarter of residents say they do not have any electronics to throw out, which may be the case, particularly given the demographics of Owen Sound and the high proportion of seniors in the community (seniors may have fewer electronic gadgets, cell phones, etc. as younger residents).



Figure 7 - Electronic Waste

Another 25% of residents report that they need more information on the program. This would suggest that many residents are not aware of the program or are not familiar with what is acceptable. Further, these residents may not be aware of the toxic nature of these materials and may not feel compelled to take care in disposing them.

Given that the percentage of people using the program is low, it is expected that the capture rate can be significantly improved.

4.6.2 Customer Satisfaction

Only 30% of residents use the program, but those who use it report that they are satisfied with it.

4.6.3 Economics

In 2005, the electronics recycling program cost \$24,631, or \$613.86 per tonne. A large portion of that cost was shipping and bin rental, which amounted to \$10,950, which is a function of the shipping distance to the processing facility in Mississauga.

A recent study conducted by PHA Consulting for the Resource Recovery Fund Board in Nova Scotia estimated that electronics recycling best practices would cost \$980 per tonne in Canada, including all shipping and processing costs. Currently, the Owen Sound program is only 63% of that figure.

Relative to recycling of curbside materials, electronics recycling is expensive. However, the risk to the environment and human health of the large quantities of lead and heavy metals, and the difficulties associated with disassembling electronic devices, makes the cost of safe disposal of these materials reasonable.

4.6.4 Recommendations

It is necessary to increase the capture rate of the program, and apparent that the best way to do so is to increase the incidence of people using the program. We recommend that:

1. An enhanced communications campaign be undertaken specifically regarding electronic waste, emphasizing:
 - a. What constitutes electronic waste;
 - b. The toxicity of electronic waste;
 - c. The impact of improper disposal of electronic waste;
 - d. The list of acceptable materials through the electronics program.

2. Develop a partnership with local stores selling electronics, to have them provide communications materials or display posters telling people how to properly dispose of electronic material they may be replacing;
3. Develop a Community-Based Social Marketing campaign to establish proper disposal of electronics as normal behaviour. The campaign should highlight that electronics recycling is part of the City's overall recycling program, and that one is not recycling all that he/she could be if they are disposing of electronics in the refuse stream.

4.7 Waste Disposal, User Pay and Bag Limits

4.7.1 Capture

The City has operated a bag tag program since 1999 in order to provide an economic incentive for residents to divert their waste from disposal.

Diversion of waste was suddenly and dramatically increased when the bag tags were introduced in July of 1999. In fact, the monthly residential refuse collected at curbside dropped from approximately 350 tonnes per month to 260, representing a 26% decrease.

Further, the high participation rate of the Blue Box collection program is an example of how effective the bag tag program has been at diverting waste from refuse.

4.7.2 Customer Satisfaction

Residents are very satisfied with waste collection, with 86% satisfaction. The main complaint of those who are not satisfied is that the bag tags are too expensive (at \$2.00 each.)

4.7.3 Economics

The revenue from the sale of bag tags currently does not meet the costs of waste management collection and disposal. Annualized net revenue for 2006 from the sale of bag tags is \$325,621, not including a \$100,000 contribution from the landfill reserve. This is far short of the budgeted revenue of \$503,843. Annualized costs for waste collection and disposal total \$581,864, not including contributions from the landfill reserve. This leaves a shortfall of approximately \$246,000.

There may be a few reasons for the shortfall:

1. In 2004 residents received 52 free tags, and in 2005 they received 35. Beginning January 1st, 2006, the free bag tag program was abandoned and residents were required to buy bag tags for all of their waste. There may be a backlog of bagtags that are now being used up by people who may have taken their waste to the landfill before it was closed; and,
2. More people may be taking their waste to the Transfer Station and paying Miller directly for disposal. This would preclude them from buying bag tags.

The success of diversion programs and the relatively small amount of waste disposed in Owen Sound suggests that the bag tags are providing a significant incentive for waste reduction and diversion. However, the revenue from the bag tags is not covering the cost of the program. In addition, the City no longer receives revenue from disposal at the now-closed Genoe Landfill, which widens the gap between revenue and expenses.

The City has elected to draw money down from its landfill reserve in order to bridge this gap, committing \$262,000 in 2006. As there is no revenue flowing into the landfill reserve, this option is limited and has the impact of depleting the reserve if it is continued, compromising the original purpose behind its establishment.

Other than the reserve, the City has three immediate options:

1. Increase the cost of the bag tag to cover the full cost of refuse collection and disposal. If the number of bag tags sold and the cost of collection and disposal remained the same as in 2006, the cost of the bag tags would be \$3.60, an 80% increase over the present cost of \$2;
2. Cover the gap between cost and revenue through general revenues; or,
3. Cover the gap through a combination of a more modest increase in the cost of the bag tags and the use of general revenues.

4.7.4 Recommendations

The bag tag program has successfully reduced waste in Owen Sound and has diverted waste to alternative and more suitable handling streams. The 3 bag limit on waste at the curb has also been a factor.

The cost of the program is an issue, and the current funding arrangement is not sustainable. Accordingly, it is recommended that the City review its funding of waste collection and disposal costs and revenues and decide upon a long-term, sustainable manner of funding that component of the waste management operations.

4.8 Communication and Education

4.8.1 Capture

There is not a capture rate associated with the communication and education component of the system, although the communication and education program plays an important supporting role for all of the components of the waste management program.

4.8.2 Customer Satisfaction

Almost 9 in 10 residents are satisfied with the waste management program's communication and education component. Residents report that they receive their information from a variety of sources, but in particular they cite the City's waste calendar as an important source of information.

Some residents do want more information on hours of operation of drop-off facilities and the materials that are being accepted.

4.8.3 Economics

In 2005, the City spent \$8,427 on communications. That is approximately \$0.65 per household, which is a modest expenditure. However, the results are strong, as residents do seem to be quite aware of the waste programs and how to use them.

However as noted above, the City could be seeing better performance in some of its programs, and the results of the survey indicate that better awareness of what can be recycled, taken to the HHW days (and the importance of doing so), and recycled at the transfer station would translate directly into better diversion. An increased budget on communications and a strategic effort to address the information gaps should be part of the effort to increase diversion.

4.8.4 Recommendations

The calendar is effective and is being used. It is identified by residents as the preferred vehicle for distribution of information on waste management programs. However, there is a need for better awareness and understanding of programs.

It is recommended that:

1. A new waste management calendar be created that provides more information on operational issues, such as hours of operation, acceptable material lists, etc. Sections on each portion of the overall program would be included, providing complete instructions on all of the programs in one easy-to-use spot that residents could post or store in the most appropriate place for them.
2. A strategic plan for education and communication be developed and implemented, which identifies gaps in awareness and understanding and specifically addresses those gaps. In addition, a Community-Based Social Marketing focus should be applied to those programs which do not enjoy the participation they should: namely, the HHW program, the Yard Waste program, the Electronics Recycling Program, and the components of the curbside recycling program which residents are using less, such as aluminum foil.



Long Term Waste Management Planning
Process

APPENDIX C: Residential Waste Management Baseline Survey





Owen Sound

Residential Waste Management Baseline Survey

Survey Results

November 2006



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Appendix A:	Owen Sound Questionnaire
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1.0 Introduction

A telephone survey of 385 randomly sampled households was conducted across Owen Sound during October, 2006 to assess people's awareness and support of the City waste management programs. The survey also evaluated the effectiveness of the City's waste management education program. A sample of 385 households is statistically accurate to within $\pm 5\%$ at a 95% confidence level. Respondents were screened to ensure they were residents of the City of Owen Sound and resided in a single or multi unit residential dwelling. They were also screened to confirm that they were not employed by the City's waste collection and transfer station contractor. The majority of respondents were female (68%) and had 1 to 2 people (71%) living at their residence.

2.0 Overview

Overall, public participation in the City's current waste management programs is good. The majority of residents recycle blue box materials (94%) and set garbage out for collection (78%) by the City's collection contractor. While residents readily recycle materials such as cans, plastic bottles, glass, paper and old corrugated cardboard (67%-75% of public recycles these materials), the public demonstrates poor participation in recycling drinking boxes (13%), and aluminium foil (10%). Therefore, greater emphasis could be placed on promoting these types of materials.

Participation in the City's waste diversion programs is highest in the Blue Box (94%) and goods exchange (63%) initiatives and much lower for programs such as taking leaf and yard waste to the composting site (55%), household hazardous waste events (53%), backyard composting (47%) and electronics recycling (28%).

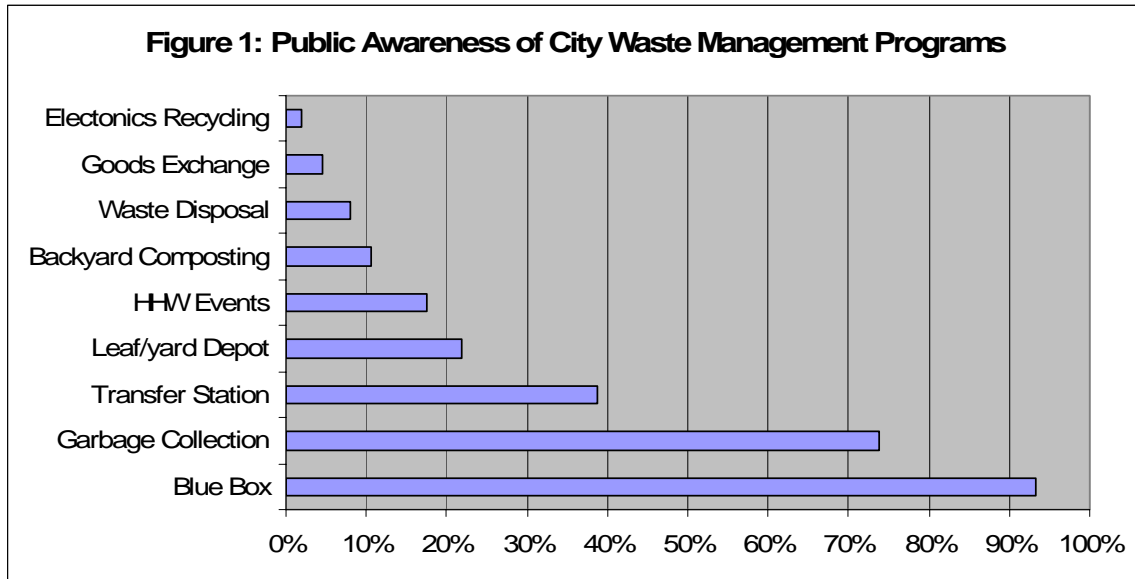
While the majority of people (87%) indicated they have enough information regarding the City's waste management programs, residents said they would like to have more information regarding City facilities and events (95%) including location, operating hours, types and quantities of materials accepted and cost. People also indicated that they would mostly prefer to receive waste management information through the City's waste management calendar (61%).

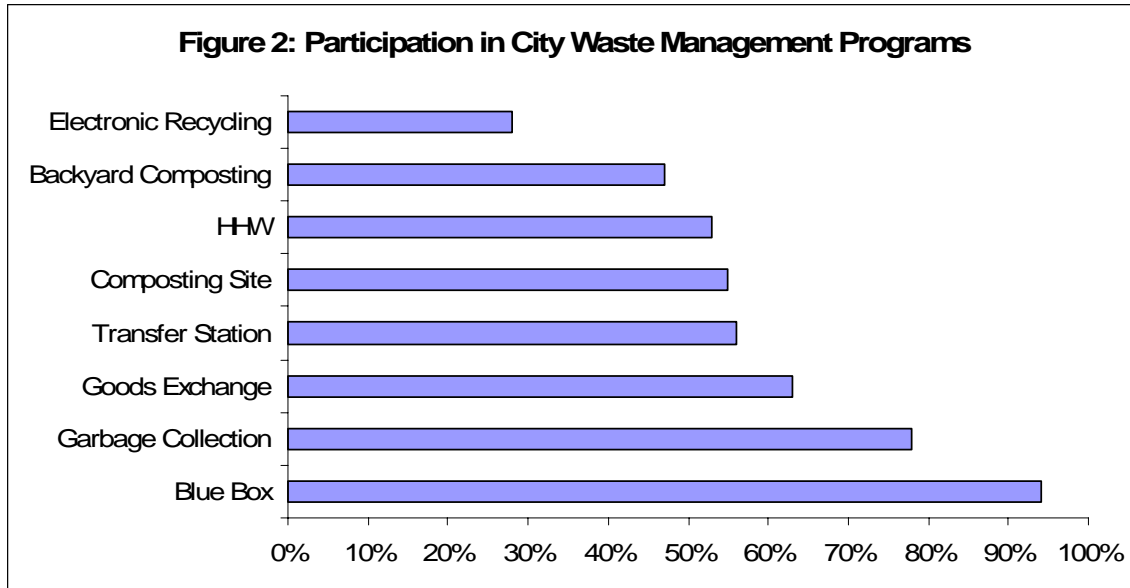
With regard to the City's long term waste management planning, the public indicated that the plan should focus on recycling and composting (79%), minimizing waste (76%), reusing materials (74%) and incinerating waste for disposal (69%). The public is most likely to support programs that add new materials to the Blue Box program (89%), reduce the amount of waste produced (76%) and dispose of materials by means of an incinerator located in Owen Sound (75%). The public is less likely to support programs that decrease the current limit of garbage bags (36%), continue to export the City's garbage (16%), and increase the cost of bag tags (7%). While only a minority of people (33%) said they would be willing to pay more to support the development of a long term waste management strategy, an additional 25% of people indicated that they might be willing to pay more but that their decision would depend on what the additional money would be used for.

3.0 Key Findings

3.1 Awareness and Use of City Waste Management Programs

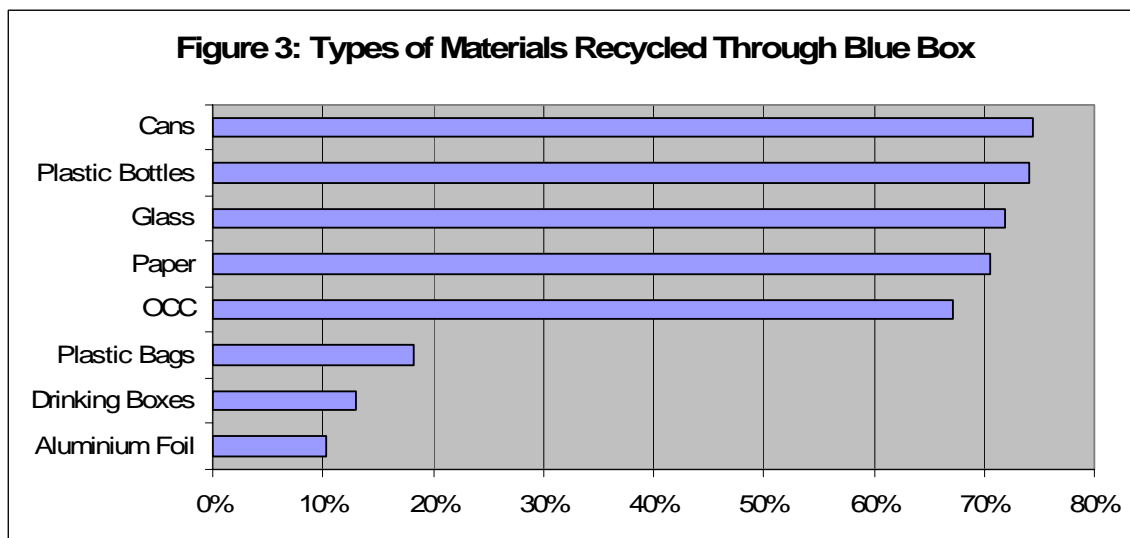
Respondents were most likely to identify the Blue Box (93%) and garbage (74%) collection programs when asked to recall City Waste Management programs (they were not read a list of programs, so failure to mention a particular program does not mean that the respondent did not know of it, but rather that it may not be as top-of-mind as other programs). When asked what City Waste Management programs they use, most people participate in the Blue Box program (94%), while 78% of people set out garbage for collection. Participation in other City programs include use of the goods exchange program (63%); the transfer station (56%); leaf and yard waste composting site (55%); and household hazardous waste events (53%). Fewer people backyard compost (47%); and recycle electronics (28%).

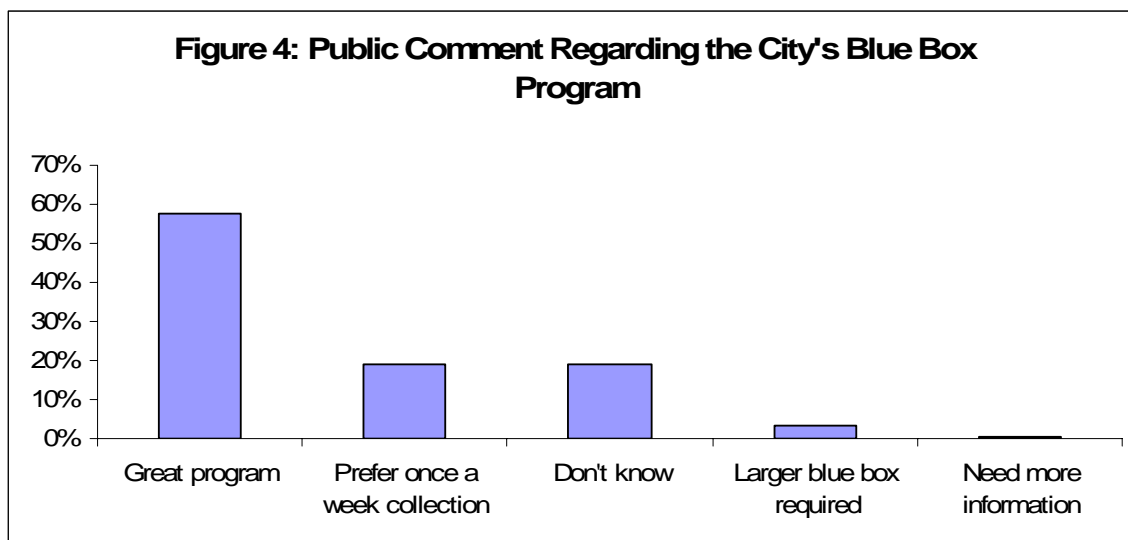




3.2 Recycling

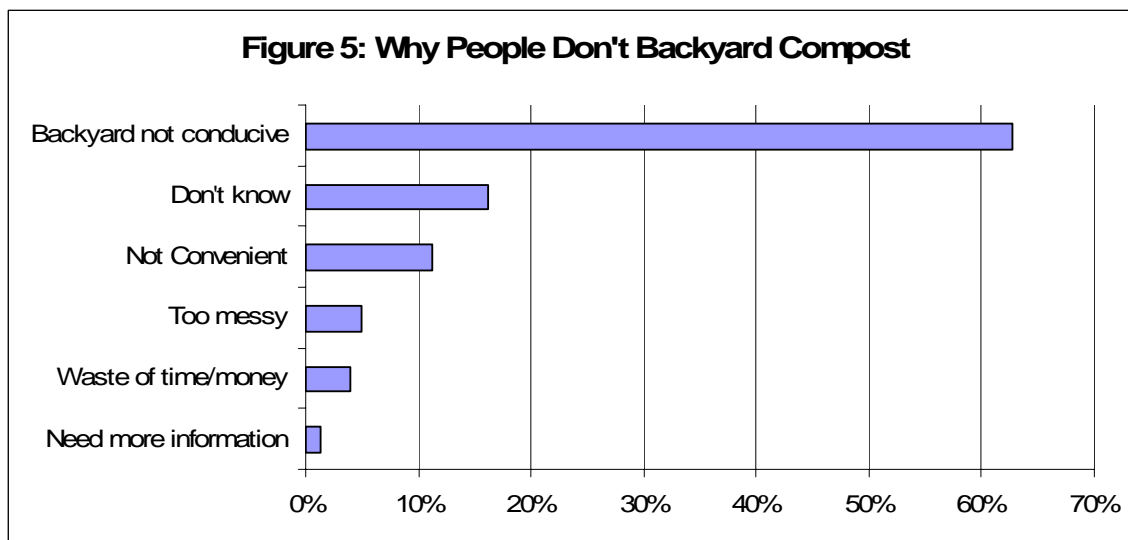
When asked what types of material they put in their blue box, people are most likely to divert cans (75%), plastic bottles (74%), glass (72%), paper (71%), and old corrugated cardboard (67%) from disposal through their blue box. They were less likely to put plastic bags (18%), drinking boxes (13%) and aluminium foil (10%) into their blue box. When asked if they would like to comment on the blue box program, more than half of the people (57%) think that it is a great program while a minority (19%) said they would like to have their blue boxes collected every week. Others requested a bigger blue box (3%) and more information (1%) on the program. Approximately 19% of people had no comments regarding the program.





3.3 Backyard Composting

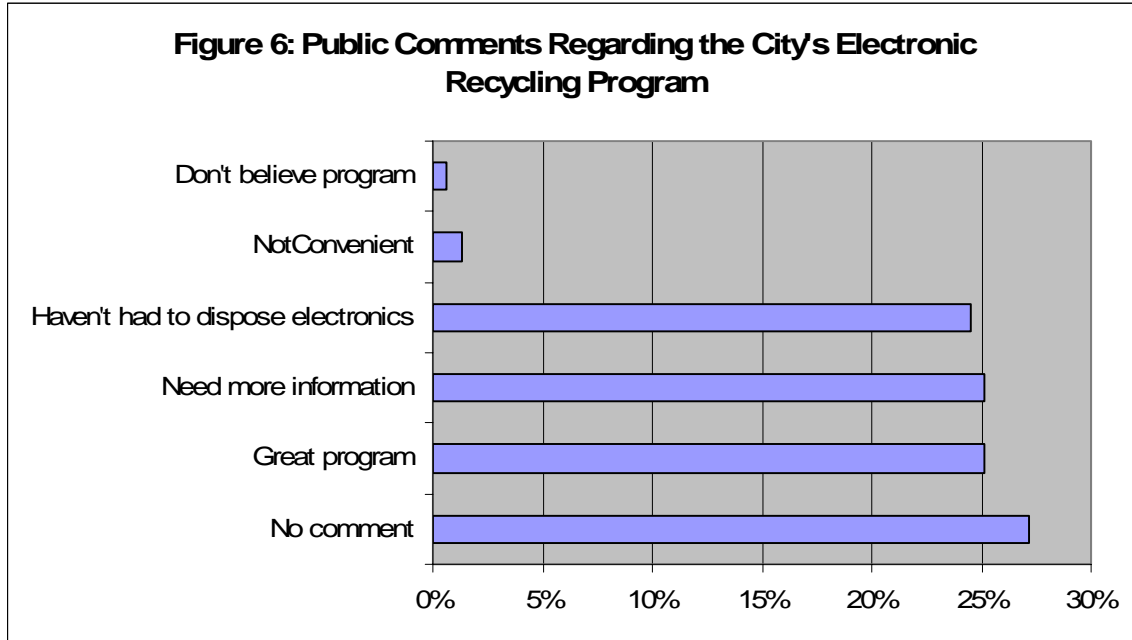
Slightly less than half (47%) of the respondents indicated that they compost materials in their backyard. People that do not backyard compost indicated that their backyard is not big enough or not conducive to having a backyard composter (63%). Furthermore, people either didn't know why they don't backyard compost (16%); felt it is not convenient to do so (11%); it is too messy (5%); or required more information (1%) on backyard composting.



3.4 Electronic Recycling

The majority of people (69%) do not use the City's electronic recycling program. When asked to comment on the program, people said that it was a great program (25%); they

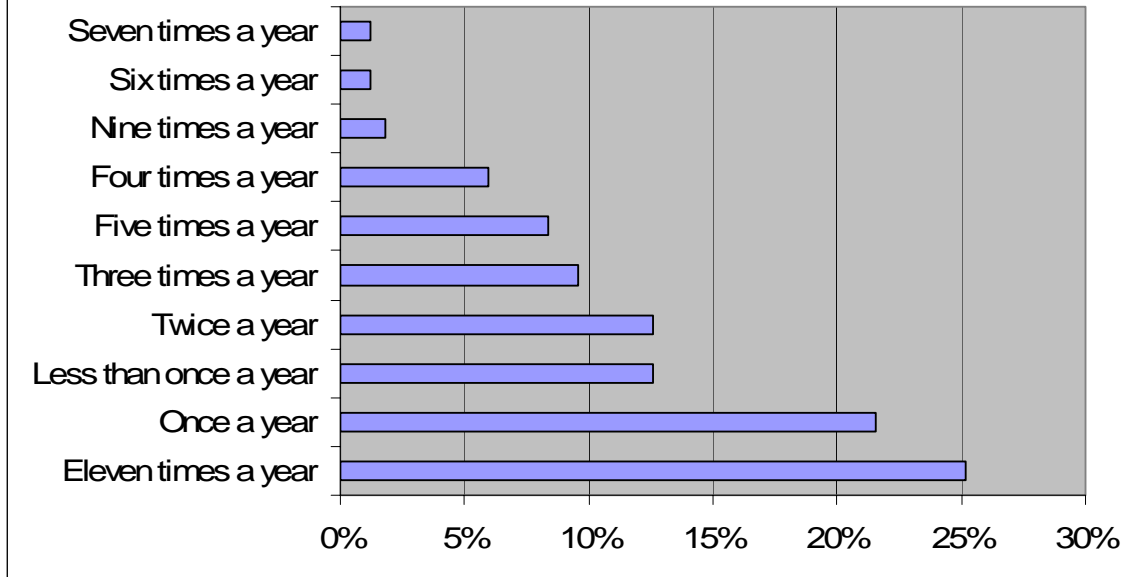
required more information regarding the program (25%); or that they haven't had to dispose of electronics (25%). A minority of people think that the program is not convenient (1%) or indicated that they don't believe in the program (1%).



3.5 City Composting Site

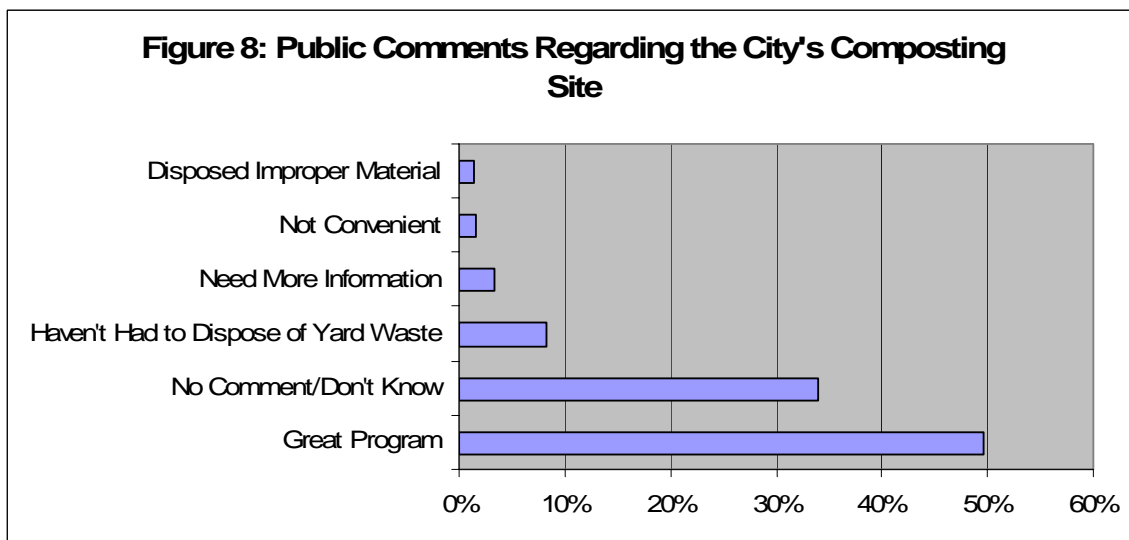
Slightly more than half of City residents (55%) take yard waste to the City's composting site. About 70% of people, who use the City's compost site, make 5 or less trips a year while 30% of people take material to the site 6 to 11 times a year.

Figure 7: Number of Trips Per Year Residents Take to the City's Compost Site



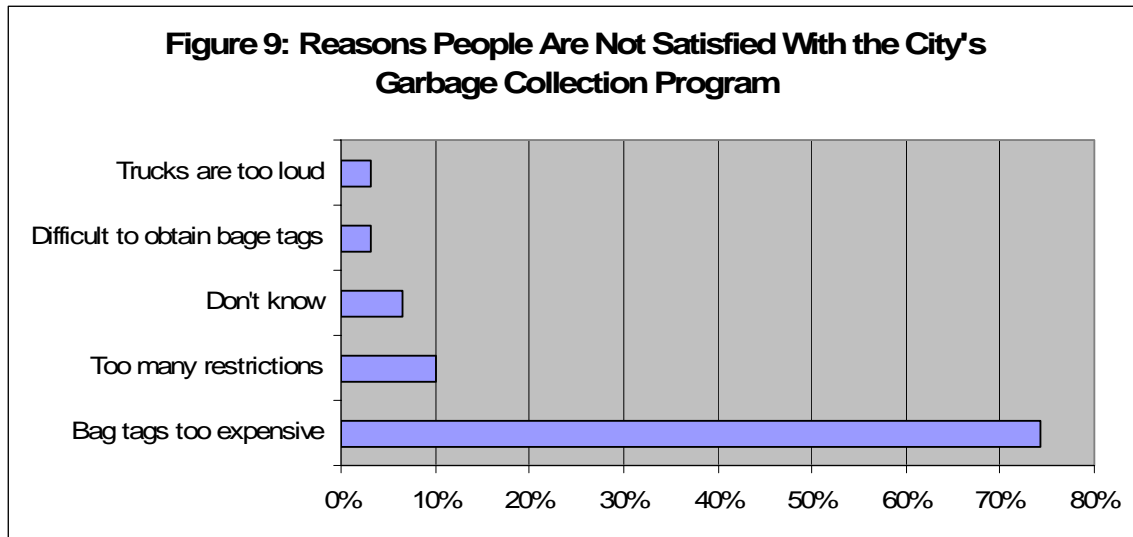
When asked to comment on the composting site program, residents stated that they liked the program (50%); didn't have any need to use the service (8%); require more information regarding the program (3%); or thought that the program is not convenient (2%).

Figure 8: Public Comments Regarding the City's Composting Site



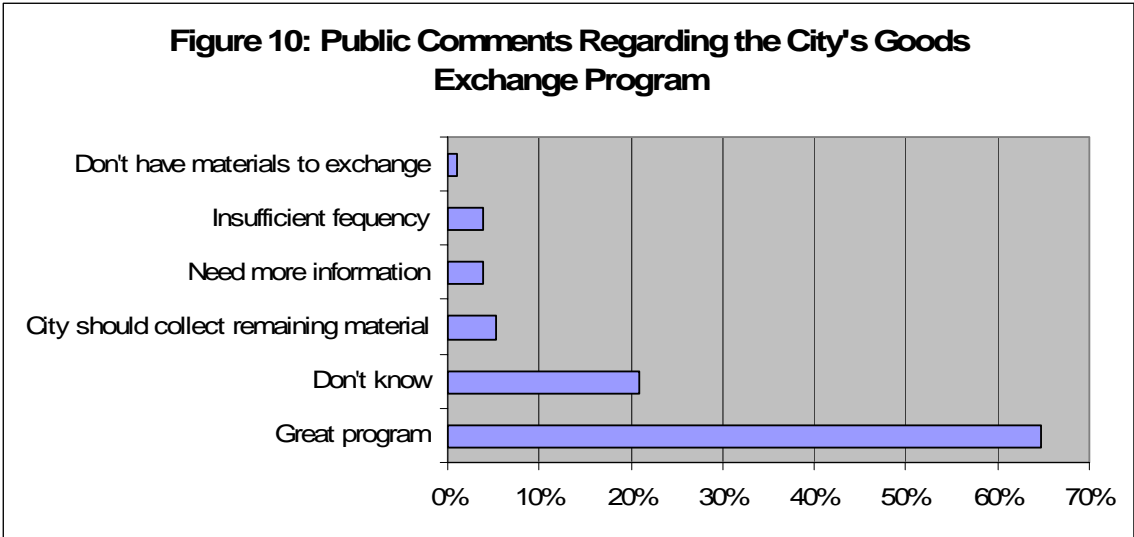
3.6 Garbage Collection

The majority of people (86%) are satisfied with the City's garbage collection program. People who were not satisfied with the program stated that the bag tags were too expensive (74%); there are too many restrictions on how and what materials can be set out for collection (10%); it is difficult to obtain bag tags (3%); and that the garbage trucks are too loud (3%).



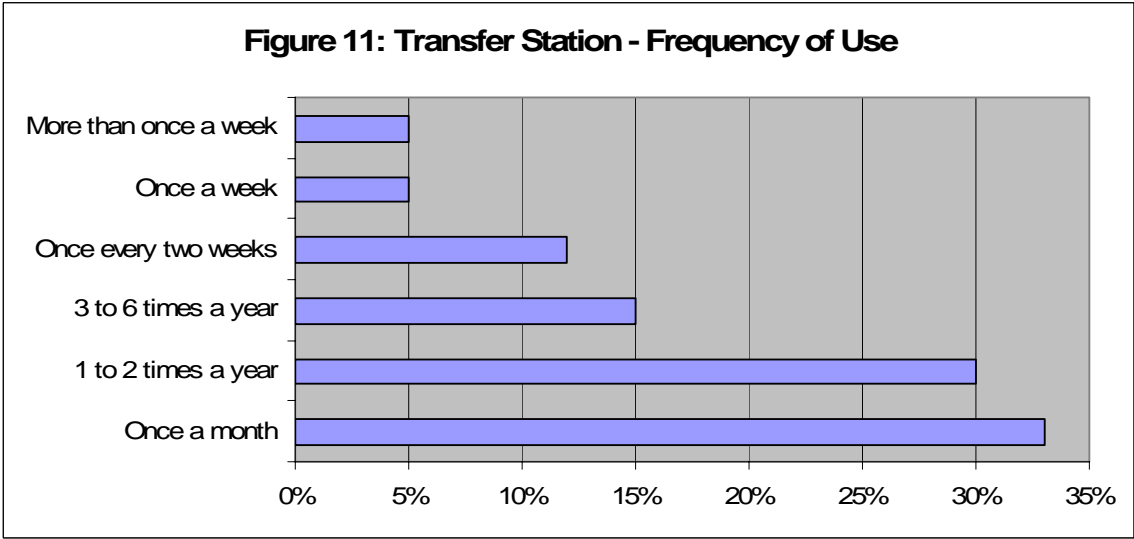
3.7 Goods Exchange Program

Almost two thirds (63%) of residents participate in the City's goods exchange program. When asked to comment on the program, the majority of people (65%) said it was a great program while 5% think the City should collect the material that remains after the event. Other public comments include the need for more information regarding the program (4%) and that the number of goods exchange events should be increased (4%).



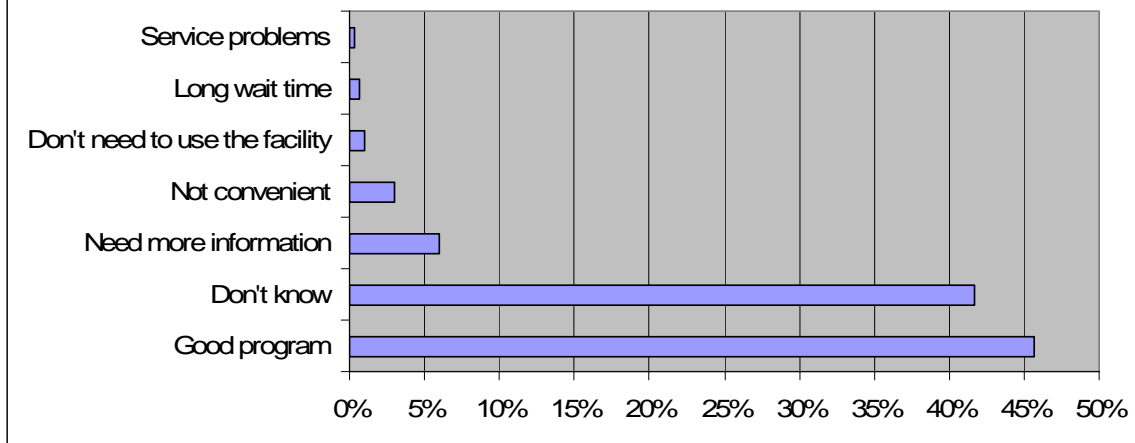
3.8 Transfer Station

Almost 6 in 10 people use the transfer station to dispose of their garbage and recycling. Approximately 1/3 of respondents who use the facility do so once a month while just less than that (30%) use it only 1 to 2 times a year.



When the public was asked to comment on their experience using the transfer station, most (46%) said that it was a good program. A minority of people said that they required more information regarding the service (6%) and that the service was not convenient (3%).

Figure 12: Public Comments Regarding Use of the Transfer Station



3.9 Household Hazardous Waste Program

Slightly more than half of City residents (53%) use the household hazardous waste program and 75% of those people have used it 1 to 2 times in the past 2 years. When asked to comment on the program, people generally said that it was a great program (62%); they would like more information regarding the service (10%); the frequency of events should be increased (3%); the service is not convenient (1%); or that they forget about the events (1%).

Figure 13: HHW Program - Frequency of Use Over Past 2 Years

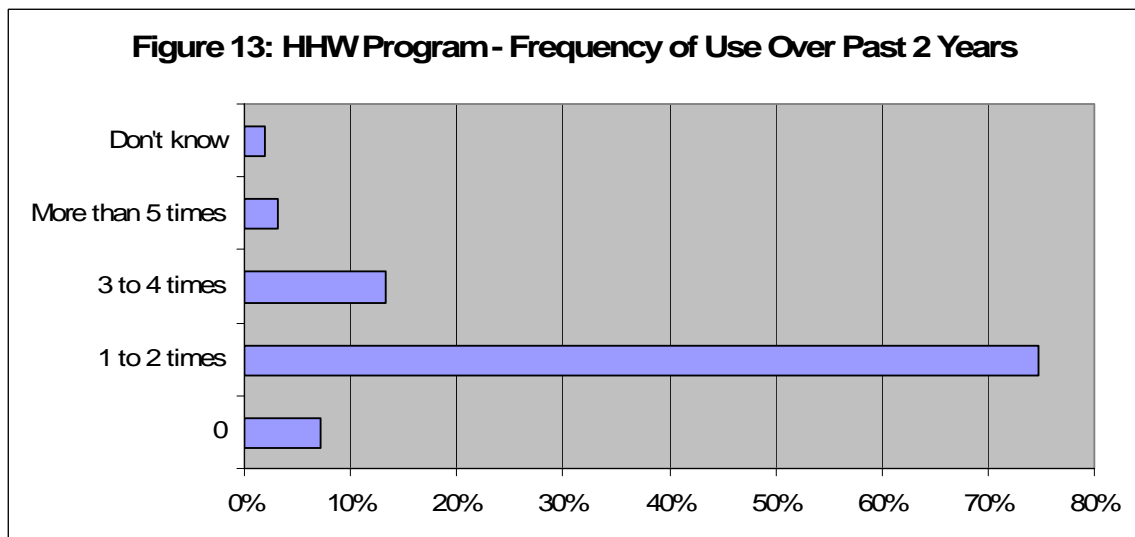
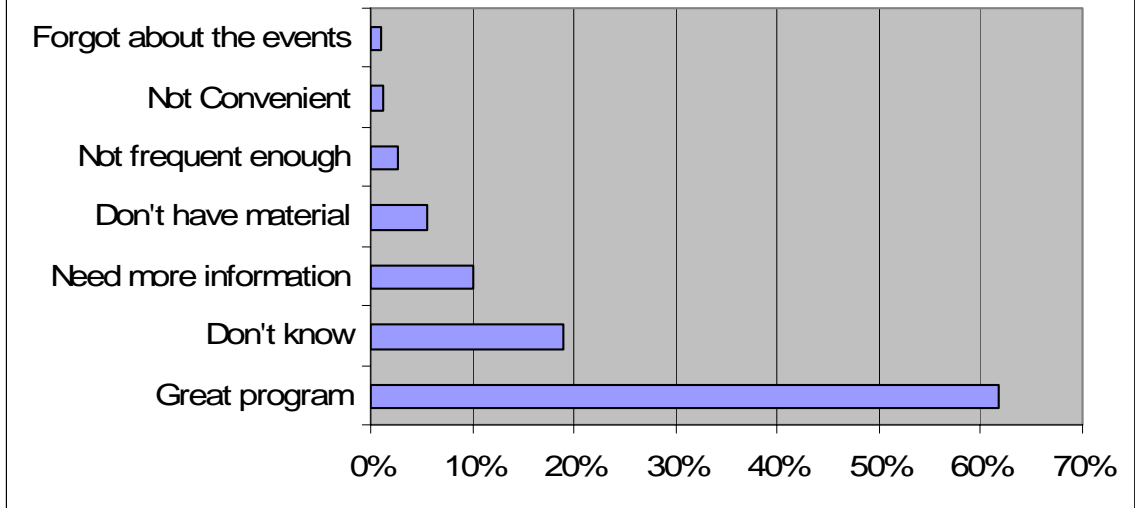


Figure 14: Public Comments Regarding the City's HHW Program

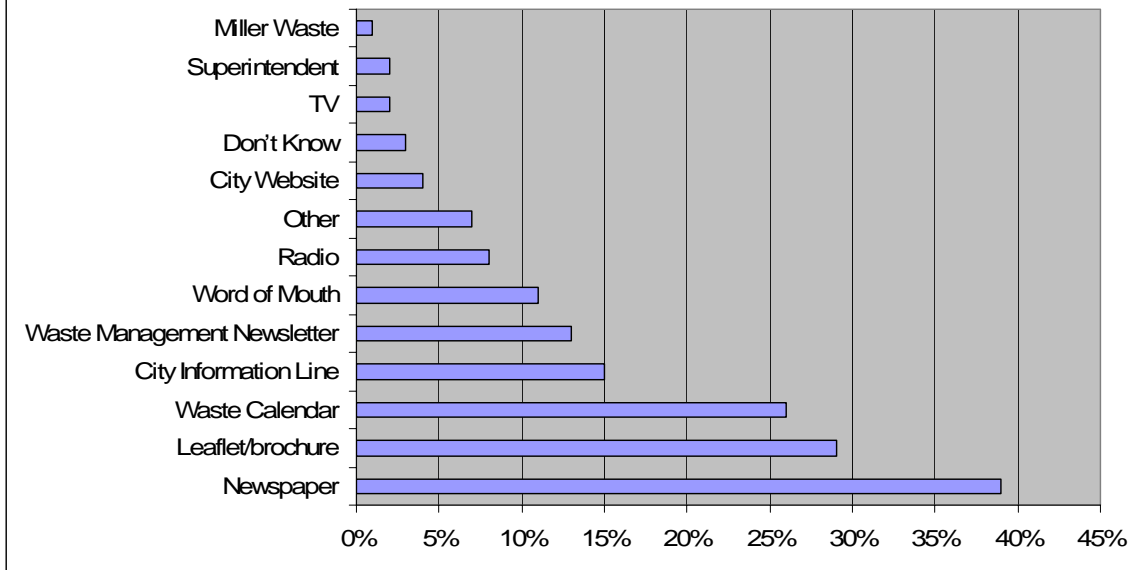


3.10 Promotion and Education

The majority of the public indicated they have a sufficient amount of information (87%) regarding the City's waste management programs. When asked what additional information they would like to have, the majority of people (95%) said more information on City facilities and events including hours of operation, locations, cost and types of materials accepted. A minority of people (3%) said they would like more information on recyclable materials collected through the blue box; or that they didn't know what additional information they required (2%).

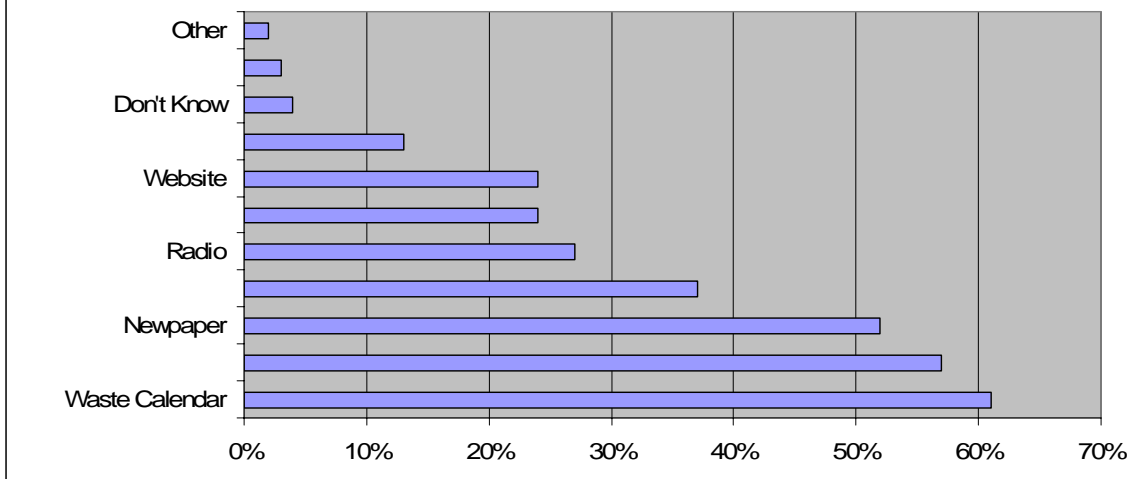
People indicated that they currently receive most of their information regarding City waste management programs from the newspaper (39%); leaflets and brochures (29%); and the waste management calendar (26%). Slightly fewer people indicated they receive waste management information from the City's telephone information line (15%); a waste management newsletter (13%); and by word of mouth (11%).

Figure 15: How Residents Obtain Waste Management Information



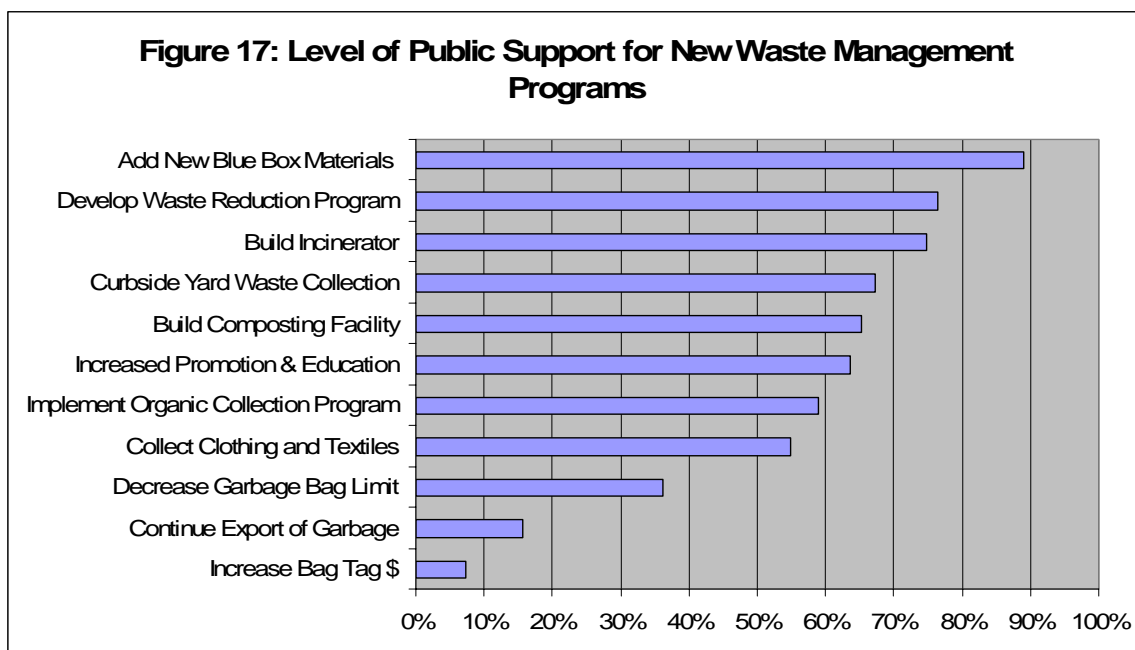
When people were asked how they would prefer to receive waste management information, almost 2/3 of the public would like to get most of their information through the City's waste management calendar. Almost as many people (57%) said they would prefer to receive information through leaflets and brochures while 52% preferred to find information about waste management programs in the newspaper. Fewer people indicated that they would prefer to receive waste management program information by means of a waste management newsletter (37%); radio (27%); the City's telephone information line (24%); the City's website (24%); and television (13%).

Figure 16: Preferred Method to Recieve Waste Management Information

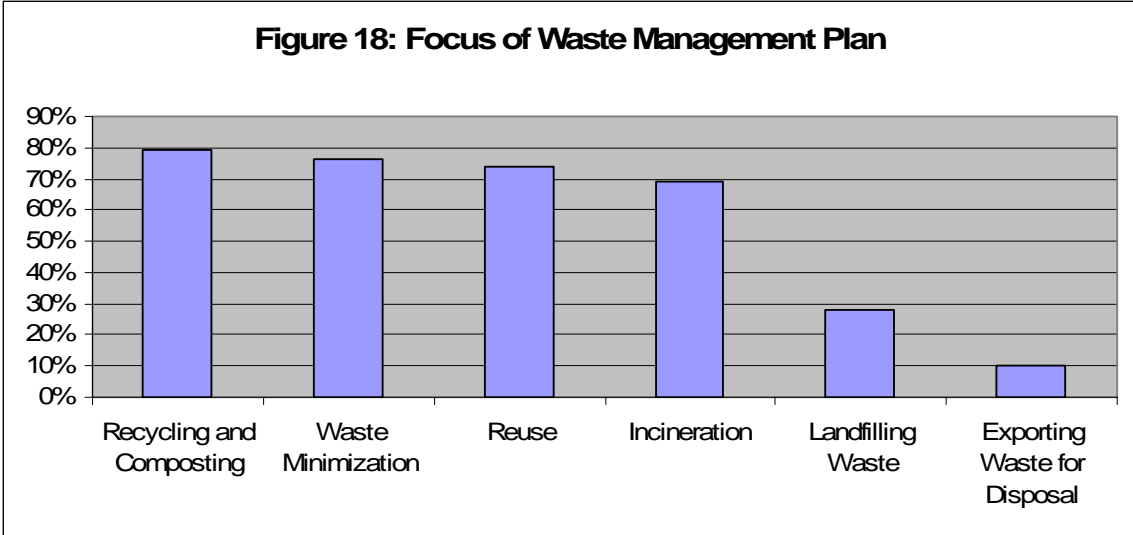


3.11 Long Term Waste Management Planning

People were asked for their opinion regarding the development of a long term waste management plan to manage the City's waste. People said they would support programs that would add new materials to the Blue Box (89%); reduce the amount of waste produced (76%); build an incinerator within the City for waste disposal (75%); and collect yard waste at the curb (67%). Fewer people indicated that they would support building a composting facility within the City to manage food and yard waste (65%); enhancing waste management program promotion and education initiatives (64%); developing a program to collect food waste (59%); and to collect textiles such as clothing (55%). A smaller number of people said they would support a decrease in the bag limit for garbage (36%); the continued export of the City's garbage; and an increase in the cost of garbage bag tags (7%).



People also stated that the waste management plan should focus on recycling and composting (79%); waste minimization (76%); reuse (74%); and incineration (69%). Only 33% of people would be willing to pay more to support the implementation of a long term waste management solution while 35% said they would not. Furthermore, 25% of the people stated that they might be willing to pay more if they knew how much the increase would be and what the increase would pay for. 6% of people didn't know if they would or would not pay more.



Appendix A

Owen Sound Questionnaire

OWEN SOUND LONG TERM WASTE MANAGEMENT PLAN

Telephone Survey

Hello, my name is _____. I am conducting a survey of residents on behalf of the City of Owen Sound. We are calling today because the City is developing a long term plan to manage its waste and we would like to ask you a few questions about the City's garbage and recycling programs. This will take about 5 to 10 minutes to complete.

Please be assured we simply want to ask your opinions. Your identity and everything you say will be kept strictly confidential.

Qualifying

1. Which of the following best describes your home? (Read responses)

(Select only one.)

- A single-family dwelling
- Townhouse or duplex
- Apartment building
- Other (Please specify)
- Don't know (**End survey**)
- No answer (**End survey**)

2. Do you work for, or are affiliated with one of the following? (Read responses)

(Select only one.)

- City of Owen Sound Waste Management Department (**End survey**)
- Miller Waste Systems (**End survey**)
- City of Owen Sound Council (**End survey**)

General

3. What waste management services and programs provided by the City are you aware of? (Do not read)

(Select all that apply.)

- Curbside garbage collection
- Blue Box recycling
- Goods exchange days
- Leaf/yard waste depot
- Household hazardous waste events

- Transfer station for recycling, garbage, yard waste drop off
- Backyard composting
- Electronics recycling
- Waste disposal/landfills

Attitudes

4. Do you use the blue box recycling program?

- Yes
- No (**go to Q. 6**)
- Sometimes
- DK/NA

5. What materials do you recycle in the blue box? (Do not read)

(Select all that apply.)

- Paper
- Cardboard
- Glass jars and bottles
- Plastic bottles
- Cans
- Plastic bags
- Aluminum foil
- Drinking boxes
- Other (specify)

6. Do you have any comments regarding the blue box program?

(Select only one.)

- Not convenient
- Service problems
- Need more information
- Don't believe in the program
- Waste of time
- Waste of money
- Blue box not big enough
- Great program
- Other (specify)
- DK/NA

7. Do you compost in your backyard?

(Select only one.)

- Yes (**Skip to Q. 9**)
- No
- Sometimes
- Not Applicable
- DK/NA

8. Why don't you backyard compost?

(Select all that apply.)

- Not convenient
- Service problems
- Need more information
- Don't believe in the program
- Waste of time
- Waste of money
- Too messy
- Other (specify)
- DK/NA

9. Do you use the City's electronic waste recycling program?

(Select only one.)

- Yes
- No
- Sometimes
- Not Applicable
- DK/NA

10. Do you have any comments regarding the City's electronic waste program?

(Select all that apply.)

- Not convenient
- Service problems
- Need more information
- Don't believe in the program
- Waste of time
- Waste of money
- Haven't had to dispose of electronics
- Great program
- Other (specify)
- DK/NA

11. Do you take yard waste to the City's composting site?

(Select only one.)

- Yes
- No (**Skip to Q. 13**)
- Sometimes
- DK/NA (**Skip to Q. 13**)

12. In one year, how often do you take materials to the composting site?

(Select only one.)

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12 or more
- DK/NA

13. Do you have any comments regarding the City's composting site?

(Select only one.)

- Not convenient
- Service problems
- Don't know location
- Need more information
- Don't believe in the program
- Waste of time
- Waste of money
- Haven't had to dispose of yard waste
- Disposal of improper material
- Great program
- Other (specify)
- DK/NA

14. Are you satisfied with the City's garbage collection service?

(Select only one.)

- Yes (Skip to Q. 16)
- No
- Somewhat satisfied
- Somewhat dissatisfied
- DK/NA (Skip to Q. 16)

15. Why are you not satisfied with the garbage collection service?

(Select only one.)

- Too many restrictions on number of bags/materials collected
- Bag tags are too expensive
- Obtaining bag tags is difficult/not convenient
- Collection crew leaves a mess

- Collection too early/late
- Collection people are rude
- Garbage missed
- Garbage left behind
- Trucks are too loud
- Restrictions on weight or container size
- Other (specify)
- DK/NA

16. Do you participate in the goods exchange days?

(Select only one.)

- Yes
- No
- DK/NA

17. Do you have any comments regarding the goods exchange program?

(Select all that apply.)

- Not convenient
- General service problems
- Need more information about the program
- Don't have materials to exchange
- Don't like the program
- Insufficient frequency
- Great program
- Other (specify)
- DK/NA

18. Do you use the City's transfer station (garbage/recycling depot)?

(Select only one.)

- Yes
- No (Skip to Q. 20)
- Sometimes
- DK/NA (Skip to Q. 20)

19. How often do you use the transfer station?

(Select only one.)

- More than once/week
- Once/week
- Once/two weeks
- Once/month
- Other (specify)

20. Do you have any comments regarding the use of the transfer station?

(Select only one.)

- Not convenient

- Service problems
- Need more information about what is accepted
- Long wait time
- Don't know where they are located
- Don't know operating hours
- Cost is too high
- Accessibility
- Safety
- Other (specify)
- DK/NA

21. Do you use the City's Household Hazardous Waste special events to drop off oil, pesticides, car batteries, etc.?

(Select only one.)

- Yes
- No (skip to Q. 23)
- Sometimes
- DK/NA (skip to Q. 23)

22. Over the last 2 years, how many times have you used the Household Hazardous Waste facility?

(Select only one.)

- 0
- 1-2
- 3-4
- >5
- DN

23. Do you have any comments regarding the HHW special waste events?

(Select all that apply.)

- Not convenient
- Poor location
- Not frequent enough
- Need more information about what is accepted
- Long wait time
- Don't know where they are located
- Don't know when they are held
- Forget about them
- Great program
- Other (specify)
- DK/NA

24. Do you feel you have enough information regarding the City's waste management services and programs?

(Select only one.)

- Yes (Skip to Q. 26)
- No
- DK/NA

25. What additional information do you feel you need?

- Specify
- DN

26. How do you obtain information regarding the City's waste management services? (DO NOT READ)

(Select all that apply.)

- Newspaper
- Waste Management Calendar
- Leaflet/brochure
- City's telephone information line
- Waste Management newsletter
- City's website
- Television
- Radio
- Other (specify)
- DN/NA

27. How would you prefer to receive information about the City's waste management services and programs? (Read responses)

(Select all that apply.)

- Newspaper
- Waste Management Calendar
- Leaflet/brochure
- City's telephone information line
- Waste Management newsletter
- City's website
- Television
- Radio
- Other (specify)
- DN/NA

Long Term Waste Management Planning

The City is currently developing a long term plan to manage future diversion and disposal of the community's waste.

28. Would you support and/or participate in following waste diversion programs if implemented? (Read responses)

(read all)

- A curbside program to collect food waste
- A program to reduce the amount of waste people create
- New materials added to the blue box
- Curbside collection of yard waste
- Decrease the number of garbage bags to 2 or less
- An increase in the cost of garbage bag tags
- An enhanced promotion and education program
- A program to divert clothes and other textiles
- Building a facility in Owen Sound to compost residential food and yard waste
- Continue to export garbage to other jurisdictions
- Building a facility in Owen Sound area to incinerate garbage
- Other _____

29. From the following list, which elements of a long term waste management plan do you think are the most important to focus on? (Read List)

(check all that apply)

- Minimizing the amount of waste we produce
- Reusing waste materials
- Diverting waste from disposal through recycling and composting programs
- Exporting waste for disposal
- Landfilling waste
- Incineration of waste
- Other (specify)

30. Would you be willing to pay more to support the implementation of a long term sustainable waste management solution?

(read all)

- Yes
- No
- DK
- Other (specify)

Demographics

To finish, we would like to ask you a few questions to help us understand the demographics of the survey results. If you would rather not answer a particular question, please feel free to say so.

31. How many people live in your household?

(Select only one.)

- 1
- 2
- 3
- 4
- 5
- 6 or more

32. (DO NOT ASK) Record Gender

- Male
- Female
- DK

City/Town _____

End

33. Thank you very much for your time.



Long Term Waste Management Planning
Process

APPENDIX D: Waste Characterization





Owen Sound

Waste Characterization

December 2006



This report provides an estimate of the amount of waste that is generated in Owen Sound, based on the available weighed data and data from studies that have been conducted in other Canadian jurisdictions. The estimates are made for both the residential and commercial sectors. It also makes projections on residential growth and waste generation, based on Owen Sound planning data.

Background

In order to develop a waste management plan for the City of Owen Sound it is necessary to develop a characterization of the waste stream. The characterization can then be used to estimate volumes and weights of materials available, and in turn the size and capacity of collection vehicles and processing facilities.

Source Data

For the purpose of this study, data has been categorized in 3 groups: ***weighed, calculated, and estimated.***

- ***Weighed*** data is a result of weighing the material on scales, recording it and aggregating it over a period of time.
- ***Calculated*** data is a result of taking some sort of estimate and multiplying it by a known figure. For instance, if it is estimated that there are 100 cubic yards of a material that is known to weigh, on average, 1 tonne per cubic yard, then the calculated weight of the material is 100 tonnes. Calculated data is less accurate than weighed data.
- ***Estimated*** data is simply that, an estimate. For instance, in its data call the Waste Diversion Organization allows municipalities an estimated value for grasscycling. This figure is simply an estimate of how much grass is being left on the ground and not collected for processing, and is not based on any measurement or estimation of the amount of grass available in the community. Estimates are the least accurate of the three types of data.

The City does weigh most of its waste as part of its normal operations. For instance, good weight data exist for the elements of the blue box program and the waste that is collected and sent for disposal as refuse. Other materials that are weighed include Electronic Waste, and Tires.

Other diverted materials are calculated. For instance, yard waste is measured by applying an estimated weight against an estimate of the volume of the yard waste collected annually.



The City does not estimate data itself. However, for the purpose of this study, it has been necessary for the consultants to make estimates of the materials that are available in the waste stream. These are educated estimates, as they are based upon characterization figures from other jurisdictions or studies. For instance, published waste characterization data for all of Ontario and for all of Canada have been used as guidance to determine estimates of quantities of materials in the Owen Sound waste stream, as well as to adjust calculated figures where it is felt necessary.

Assumptions and Notes

Certain assumptions have been made in determining the characterization of Owen Sound's waste stream. These follow:

1. The measured data is accurate and has not to been changed;
2. The calculated data is based on best estimates and can be adjusted if a significant anomaly is found.
3. The Owen Sound Waste stream is not significantly different than published amounts for Ontario;
4. Because the waste from Georgian Bluffs and the Town of Meaford are processed through the transfer station in Owen Sound it is considered to be handled by the City and has, for the purposes of this study, been grouped with the Industrial, Commercial and Institutional Sector data, since this sector is not within the municipal jurisdiction.
5. The refuse collected from the Industrial, Commercial and Institutional Sector is mixed with the residential refuse from apartments and other multi-unit dwellings when collected by a collection contractor; and,
6. Yard waste, stumps, wood waste, electronics and Household Hazardous Wastes all included a mix of wastes from residential and non-residential sources.

Residential

The Owen Sound Residential Waste Characterization Data is based on weighed data, calculated data, and final estimated data based on adjustments to reflect the best estimates of the waste generated. Adjustments have been made where the weighed and calculated data was significantly different than other jurisdictions in Canada (as provided for reference purposes in the left portion of the table). The results of the adjustments are reflected in the estimated data column, which represents the best estimation of the City's waste based on all available data.

Data for Calgary and the Town of Cochrane in Alberta were included because the comprehensive waste characterization study conducted in 2005 is very recent, and demonstrates the difference between the rural and urban area. Comparable recent, comprehensive data was not available for Ontario. The Town of Markham and City of London data was included for guidance although it is incomplete as the methodology did not analyze the total waste stream.

Implications of the table

The following observations have been made about the calculated waste stream for Owen Sound, which is represented by the two right-most columns in Figure 2.

1. It appears that the City could capture significantly more paper waste than the 58% it is currently achieving through the blue box collection program.
2. Although in the weighed data the portion of the paper collected is only 14% of the total waste stream, it is expected that the actual proportion is higher. That is because the estimate of the yard waste material appears to be higher than it should be, partially because of a large presence of stumps and material from grubbing operations, which is not a normal part of the residential waste stream.
3. Glass recovery in the Blue Box program appears to be significant, in the order of 74%.
4. Only 20% of available plastic is being recovered.

**Residential Waste Characterization Data for Owen Sound
With a Sample of Representative Data from other Canadian Jurisdictions**

Figure 1 – Based on 2005 Owen Sound Data

	Ontario (%)	Canada (%)	Calgary Alta (%)	Cochrane Alta (%)	Markham (%)	London (%)	Owen Sound (tonnes)	Owen Sound (%)	Owen Sound Calculated (tonnes)	Owen Sound Calculated (%)	Owen Sound Estimated (tonnes)
Paper	24%	26%	22%	21%	38%	33%	1393	14%	2384	24%	2384
Organic		40%		23%		29%					
- Food & HHLD, if broken out	25%		21%		37%				2484	25%	2484
- Yard, if broken out	13%		31%		1%		2774	28%	1292	13%	1500
Glass	5%	3%	2%	2%	6%	7%	371	4%	497	5%	497
Ferrous	2%	4%	3%	4%	2%	3%	228	2%	199	2%	228
- Aluminum, if broken out	1%								99	1%	
Plastic	4%	9%	8%	8%	2%	10%	81	1%	397	4%	397
Other	26%	18%	11%	9%	15%	16%			2583	26%	
- HHW, if broken out			2%			1%	71	1%			71
- Electronics, if broken out							53	1%			53
- Tires, if broken out							20	0%			20
- Wood and Soil, if broken out				19%							
- C&D, if broken out				14%							
- Refuse, if broken out							4944	50%			2301
Total	100%	100%	100%	100%	101%	99%	9935	100%	9935	100%	9935

Notes:

1. Ontario data is from *Ontario's 60% Waste Diversion Goal – A Discussion Paper*, Ontario Ministry of the Environment, June 10, 2004
2. Canada data is from *Human Activity and the Environment Annual Statistics 2005 Feature Article Solid Waste in Canada*, Statistics Canada, 2004
3. Calgary and Cochrane, Alberta data is from *Provincial Waste Characterization Framework*, Alberta Environment, Government of Canada, Action Plan 2000 on Climate Change (Enhanced Recycling Program) and the Recycling Council of Alberta, 2005
4. Markham data is from *Markham's Mission Green Program Waste Audit Results Fall 2004*, RIS International, 2004

5. London data is from a 2006 study conducted by the City and available on the *Stewardship Ontario* website.
6. Owen Sound data is from the WDO Datacall 2005, landfill annual reports and other data as provided by the City of Owen Sound
7. Some residential data includes material from IC&I sources, particularly in the case of drop-off materials
8. Data from Markham and London does not include Leaf and Yard Waste
9. Some totals do not add up to 100% because of rounding errors

Industrial, Commercial and Institutional and other Municipalities

There is no data available on the amount of waste that is diverted from disposal by the IC&I sector in Owen Sound. Nor is there any data on the characterization of the IC&I waste in Owen Sound.

The figures for the IC&I sector have been calculated based on the published Ontario IC&I characterization data. Because the Meaford and Georgian Bluffs residential and IC&I waste is also routed through the transfer station in Owen Sound, that data has been included in the following table.

Owen Sound IC&I Waste Characterization Data*Figure 2*

Items	Ontario	Owen Sound (tonnes)	Owen Sound %	Meaford (tonnes)	Meaford %	Georgian Bluffs (tonnes)	Georgian Bluffs %	Total Meaford and GB
Paper	23%	2015	23%	322	23%	224	23%	546
Glass	5%	438	5%	70	5%	49	5%	119
Metal	11%	964	11%	154	11%	107	11%	261
Plastic	3%	263	3%	42	3%	29	3%	71
Wood	21%	1840	21%	294	21%	204	21%	499
Organic	11%	964	11%	154	11%	107	11%	261
Other	26%	2278	26%	365	26%	253	26%	618
Total	100%	8760	100%	1402	100%	973	100%	2375

Notes:

1. Ontario data is from *Ontario's 60% Waste Diversion Goal – A Discussion Paper*, Ontario Ministry of the Environment, June 10, 2004
2. Owen Sound, Meaford and Georgian Bluffs data provided by the City of Owen Sound
3. Because of the rural nature of the area, there may be more compostable organic material than the provincial average, due to the presence of a local agricultural industry

Projections

The generation of waste for the next 25 years has been forecast using data from two reports: City of Owen Sound Official Plan Background Study – Biglieri Group, 2003, and Development Charges Background Study – County of Grey – Hensom Consulting Limited, 2005.

According to Biglieri, an optimistic average growth rate for Owen Sound, based on economic renewal, is just under 1% per year. The growth rate could be lower if the economic growth does not materialize, but this plan is based on this potential for growth.

According to the Hensom report, from 2001 to 2004 Georgian Bluffs grew 11%, and the Town of Meaford grew 2%. This average annual growth was calculated and applied to the overall generation of waste from each of the municipalities.

The following table forecasts the waste generation for the next 25 years based on the planning forecast. It is important to note that the waste generation forecast assumes no changes in the content of the waste stream and no changes to per capita generation.

Waste Generated and Number of Households

Figure 3

	Waste Generated (tonnes)				Permanent Households				Household Generation Rate (tonnes/yr)
	Owen Sound	Georgian Bluffs	Meaford	Total	Owen Sound	Georgian Bluffs	Meaford	Total	
<i>Growth</i>	0.95%	2.75%	0.50%		0.95%	2.75%	0.50%		
2005	18695	973	1402	21070	9532	3970	5000	18502	1.14
2006	18873	1000	1409	21281	9736	4027	5193	18956	1.12
2007	19052	1027	1416	21495	9828	4138	5219	19185	1.12
2008	19233	1056	1423	21712	9922	4252	5245	19418	1.12
2009	19416	1085	1430	21930	10016	4368	5271	19656	1.12
2010	19600	1114	1437	22152	10111	4489	5298	19897	1.11
2011	19786	1145	1445	22376	10207	4612	5324	20143	1.11
2012	19974	1176	1452	22603	10304	4739	5351	20394	1.11
2013	20164	1209	1459	22832	10402	4869	5378	20649	1.11
2014	20356	1242	1466	23064	10501	5003	5404	20908	1.10
2015	20549	1276	1474	23299	10601	5141	5431	21173	1.10
2016	20744	1311	1481	23537	10701	5282	5459	21442	1.10
2017	20941	1347	1488	23777	10803	5427	5486	21716	1.09
2018	21140	1384	1496	24020	10906	5577	5513	21996	1.09
2019	21341	1423	1503	24267	11009	5730	5541	22280	1.09
2020	21544	1462	1511	24516	11114	5887	5569	22570	1.09
2021	21748	1502	1518	24769	11220	6049	5596	22865	1.08
2022	21955	1543	1526	25024	11326	6216	5624	23166	1.08
2023	22164	1586	1534	25283	11434	6387	5653	23473	1.08
2024	22374	1629	1541	25545	11542	6562	5681	23785	1.07
2025	22587	1674	1549	25810	11652	6743	5709	24104	1.07
2026	22801	1720	1557	26078	11763	6928	5738	24429	1.07
2027	23018	1767	1565	26350	11874	7119	5766	24760	1.06
2028	23237	1816	1572	26625	11987	7314	5795	25097	1.06
2029	23457	1866	1580	26903	12101	7516	5824	25441	1.06
2030	23680	1917	1588	27185	12216	7722	5853	25792	1.05

Notes:

1. Number of households is from Statistics Canada, 2006, extrapolated based on planning data from *City of Owen Sound Official Plan Background Study – Biglieri Group, 2003*, and *Development Charges Background Study – County of Grey – Hensom Consulting Limited, 2005*.
2. Waste tonnage is total of residential and IC&I from Figures 1 and 2.

Sewage Sludge

Sewage sludge, the dewatered material from sewage collection systems, is organic and can be composted, digested, lagooned, disposed in landfill, incinerated, or applied to land as a fertilizer (if it meets the Ministry of the Environment “Guidelines for the utilization of biosolids and other wastes on agricultural land.”)

Sewage sludge is not normally considered part of the municipal solid waste (MSW) stream. In this study the data is kept separate from the MSW characterization in order not to impact the proportions of the traditional stream. Nonetheless, as sewage sludge must be managed and is a candidate for composting with MSW, sewage sludge is being considered in this study, particularly for composting and disposal options. The data for the sludge in Owen Sound can be found in Appendix 1.

Currently, the City is applying liquid sludge to land for disposal, and is undertaking a study to investigate upgrading the current primary sewage treatment plant to secondary treatment. The financial costs for a sludge dewatering and composting facility are being estimated as well as an estimate of the expected capacity.

Until the study has been completed, a factor of four has been applied to the 2004 and 2005 figures to represent an estimate of the amount of sludge available from an upgraded facility operating at maximum capacity (the facility currently operates at approximately 55% capacity).

Accordingly, with an average in 2004/5 of 7,500 m³ it is expected that available sludge would be 15,000 m³ at current capacity and 30,000 m³ at full capacity.

The sludge could be considered for composting with source-separated organics and Leaf and Yard Waste, as is done in some municipalities. The compost product could be used for agricultural purposes, gardening or landfill purposes, depending on the quality of it after processing.

Conclusions

This characterization of the waste stream in Owen Sound is an estimate based on the weighed and estimated amounts from the City's operations, comparisons to waste audits conducted in other jurisdictions, and published data from the Ontario Ministry of the Environment and Statistics Canada.

As much as there is confidence in this estimate, it cannot be as accurate as a waste audit. During a waste audit, a statistically representative and random sample of waste is taken out of the waste stream, sorted and weighed to determine the actual components of the waste stream. Waste audits provide significantly more accurate representation of the waste stream.

Accepted protocols exist to conduct municipal waste audits. There is funding available from Stewardship Ontario for waste audits, although the program for 2007 is now full. Generally, Stewardship Ontario will pay 50% of the cost of conducting a waste audit.

It is strongly recommended that Owen Sound conduct its own waste audit to more accurately understand the components of its waste stream. More accurate information can lead to better planning and decision-making, and provide opportunities to ensure programs and facilities are cost-effective and sized appropriately.

Appendix 1 - Owen Sound Sludge Data - 2005

ANNUAL SUMMARY FOR 2005

SLUDGE HAULAGE

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Average	Maximum
Sludge Haulage	m3				1118.20	786.53	790.89	259.09	559.09	1718.15	818.16	300.00		6,350.1	-	1,718.2
Total Solids	%						3.90	3.23	3.18	6.28	5.50	3.50		-	4.27	6.28

Nutrients

TKN	mg/L	1120	965	1330	1480		2021.5	1390	1351	2015.5	2180	1708	1590		1559.18	2180
Ammonia	mg/L	222	480	578	668		845	878	716.5	1275.5	954	548.5	731		717.86	1,275.50
Phosphorus	mg/L	220	1990	830	1100		1705	1100	935	1585	2100	1500	850		1,265.00	2,100.00
Nitrate	mg/L	0.3	0.3	0.3	0.03		0.3	0.3	0.3	0.3	0.3	0.3	0.3		0.28	0.30
Ammonia + Nitrate	mg/L	222.3	480.3	578.3	668.03		845.3	878.3	716.8	1275.8	954.3	548.8	731.3		718.14	1,275.80
TS	mg/L	8410	62200	26000	31900		50750	33400	21150	40450	68100	47250	26900		37,864.55	68,100.00

Metal Concentrations

Copper	mg/L	3.2	25	12	16		24.5	16	15.5	24.5	33.5	22.5	12		18.61	33.50
Nickel	mg/L	0.13	0.96	0.43	0.57		0.835	0.58	0.55	0.85	1.15	1.1	0.5		0.70	1.15
Lead	mg/L	0.42	3.2	1.4	1.8		2.6	1.7	1.75	2.55	3.45	1.95	1.2		2.00	3.45
Zinc	mg/L	3.5	32	14	18		26.5	17	18	26	35	24	15		20.82	35.00
Arsenic	mg/L	0.15	0.93	0.14	0.17		0.255	0.17	0.3	0.3	0.35	0.3	0.3		0.31	0.93
Cadmium	mg/L	0.08	0.19	0.01	0.014		0.0145	0.013	0.03	0.045	0.06	0.03	0.03		0.05	0.19
Cobalt	mg/L	0.05	0.36	0.15	0.17		0.22	0.15	0.185	0.18	0.22	0.195	0.1		0.18	0.36
Chromium	mg/L	0.79	6.2	3.1	4.1		6.6	4.3	5.75	7.3	9.2	6.05	3.4		5.16	9.20
Mercury	mg/L	0.044	0.058	0.03	0.046		0.0675	0.041	0.0425	0.0825	0.1385	0.0745	0.021		0.06	0.14
Molybdenum	mg/L	0.05	0.34	0.19	0.3		0.485	0.33	0.35	0.65	0.7	0.6	0.3		0.39	0.70
Selenium	mg/L	0.2	1.2	0.13	0.16		0.255	0.17	0.3	0.3	0.3	0.3	0.3		0.33	1.20

Ammonia/Metal Ratios

Copper	(Min 10)	69.47	19.21	48.19	41.75		34.50	54.89	46.25	52.07	28.49	24.39	60.94		43.65	69.5
Nickel	(Min 40)	1710.00	500.31	1344.88	1171.98		1012.34	1514.31	1303.27	1500.94	829.83	498.91	1462.60		1,168.12	1,710.0
Lead	(Min 15)	529.29	150.09	413.07	371.13		325.12	516.65	409.60	500.31	276.61	281.44	609.42		398.43	609.4
Zinc	(Min 4)	63.51	15.01	41.31	37.11		31.90	51.66	39.82	49.07	27.27	22.87	48.75		38.93	63.5
Arsenic	(Min 100)	1482.00	516.45	4130.71	3929.59		3314.90	5166.47	2389.33	4252.67	2726.57	1829.33	2437.67		2,925.06	5,166.5
Cadmium	(Min 500)	2778.75	2527.89	57830.00	47716.43		58296.55	67561.54	23893.33	28351.11	15905.00	18293.33	24376.67		31,593.69	67,561.5
Cobalt	(Min 50)	4446.00	1334.17	3855.33	3929.59		3842.27	5855.33	3874.59	7087.78	4337.73	2814.36	7313.00		4,426.38	7,313.0
Chromium	(Min 6)	281.39	77.47	186.55	162.93		128.08	204.26	124.66	174.77	103.73	90.71	215.09		159.06	281.4
Mercury	(Min 1500)	5052.27	8281.03	19276.67	14522.39		12522.96	21421.95	16865.88	15464.24	6890.25	7366.44	34823.81		14,771.63	34,823.8
Molybdenum	(Min 180)	4446.00	1412.65	3043.68	2226.77		1742.89	2661.52	2048.00	1962.77	1363.29	914.67	2437.67		2,205.44	4,446.0
Selenium	(Min 500)	1111.50	400.25	4448.46	4175.19		3314.90	5166.47	2389.33	4252.67	3181.00	1829.33	2437.67		2,973.34	5,166.5

Owen Sound Sludge Data – 2004

Figure 4

ANNUAL SUMMARY FOR 2004

SLUDGE HAULAGE

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	Average	Maximum
Sludge Haulage	m3				409.20	721.07	1650.45	1237.61	981.90	1186.68	1643.62	900.24		8,730.8	-	1,650.5
Total Solids	%				5.16	5.40	4.98	6.06	4.94	2.95	4.51	5.32		4.92	-	6.06

Nutrients

TKN	mg/L															
Ammonia	mg/L	540			534.667	573	772	1017.8	895.3	901.9	847.3	878.6			773.40	1,017.80
Phosphorus	mg/L	1100			1566.67	1450	1550	2100	1850	1330	1800	1800			1,616.30	2,100.00
Nitrate	mg/L	0.3			0.243	0.3	0.3	0.3	0.3	0.4	0.3	0.3			0.30	0.40
Ammonia + Nitrate	mg/L	540.3			534.913	573.3	772.3	1018.1	895.6	902.3	847.6	878.9				
TS	mg/L	38200			51633	54000	49800	60600	49300	29534	45100	53267			47,937.11	60,600.00

Metal Concentrations

Copper	mg/L	16			21	32	20.5	28	28.5	20.5	23	25			23.83	32.00
Nickel	mg/L	0.49			0.67	1.1	0.785	1	0.985	0.75	0.88	0.87			0.84	1.10
Lead	mg/L	3.4			3.233	6.7	4.05	5	3.9	2.85	3.5	3.6			4.03	6.70
Zinc	mg/L	15			22.667	34	22	29.5	29	23	26	28			25.46	34.00
Arsenic	mg/L	0.57			0.773	0.81	0.75	0.9	0.73	0.595	0.68	0.8			0.73	0.90
Cadmium	mg/L	0.08			0.55	0.13	0.045	0.18	0.045	0.035	0.04	0.05			0.13	0.55
Cobalt	mg/L	0.17			0.207	0.27	0.215	0.2	0.21	0.145	0.14	0.17			0.19	0.27
Chromium	mg/L	5			6.9	11.45	6.95	8.8	8.75	6.2	6.8	7.3			7.57	11.45
Mercury	mg/L	0.04			0.049	0.04	0.069	0.084	0.023	0.037	0.04	0.07			0.05	0.08
Molybdenum	mg/L	0.21			0.3	0.515	0.365	0.42	13.775	0.365	0.36	0.49			1.87	13.78
Selenium	mg/L	1.1			1	1.075	1	1.22	1.01	0.8	0.9	1.06			1.02	1.22

Ammonia/Metal Ratios

Copper	(Min 10)	33.77			25.47	17.92	37.67	36.36	31.42	44.01	36.85	35.16			33.18	44.0
Nickel	(Min 40)	1102.65			798.37	521.18	983.82	1018.10	909.24	1203.07	963.18	1010.23			945.54	1,203.1
Lead	(Min 15)	158.91			165.45	85.57	190.69	203.62	229.64	316.60	242.17	244.14			204.09	316.6
Zinc	(Min 4)	36.02			23.60	16.86	35.10	34.51	30.88	39.23	32.60	31.39			31.13	39.2
Arsenic	(Min 100)	947.89			691.99	707.78	1029.73	1131.22	1226.85	1516.47	1246.47	1098.63			1,066.34	1,516.5
Cadmium	(Min 500)	6753.75			972.56	4410.00	17162.22	5656.11	19902.22	25780.00	21190.00	17578.00			13,267.21	25,780.0
Cobalt	(Min 50)	3178.24			2584.11	2123.33	3592.09	5090.50	4264.76	6222.76	6054.29	5170.00			4,253.34	6,222.8
Chromium	(Min 6)	108.06			77.52	50.07	111.12	115.69	102.35	145.53	124.65	120.40			106.16	145.5
Mercury	(Min 1500)	13507.50			10916.53	14332.50	11192.75	12120.24	38939.13	24386.49	21190.00	12555.71			17,682.32	38,939.1
Molybdenum	(Min 180)	2572.86			1783.03	1113.20	2115.89	2424.05	65.02	2472.05	2354.44	1793.67			1,854.91	2,572.9
Selenium	(Min 500)	491.18			534.91	533.30	772.30	834.51	886.73	1127.88	941.78	829.15			772.42	1,127.9



Long Term Waste Management Planning
Process

APPENDIX E: SSO Composting Options



REPORT ON

SSO Composting Options

The City of Owen Sound

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and



Distribution of Report:

2 Copies - Lura Consulting

2 Copies - 2cg Inc.

2 Copies - Golder Associates, Whitby

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1.0 INTRODUCTION

The City of Owen Sound retained Lura Consulting and Trow in association with 2cg Inc and Golder Associates Ltd. to complete a solid waste management master plan. The tasks to be completed as part of the study included:

- Review of existing City Waste Diversion & Disposal Programs and Contracts
- Review of potential Source Separated Organics (SSO) collection and processing options including:
 - Curbside Pick-up:
 - City of Owen Sound Collection - Capital & Operating Costs
 - Contracted Collection - Net Operating Costs
 - Compost Processing Facilities:
 - City owned - Capital, Operating Costs, Revenue, Siting
 - Local Private Contractor - Net Operating Costs
 - Export to Distant Private Composting Facility:
 - Potential Locations
 - Cost per tonne
 - Transfer & Transportation requirements
- Review of potential waste disposal options including:
 - Survey of current and emerging disposal options for waste generated in Ontario;
 - Refinement of potential disposal options for municipal and IC&I waste generated in the City of Owen Sound following the completion of the export contract; and
 - Summary of disposal options should the Michigan border close to Ontario waste prior to the completion of the export contract.

This report outlines the findings related to the Source Separated Organics (SSO) component of the study and was completed by 2cg Inc. and Golder Associates Ltd.

1.1 Background

The City of Owen Sound presently composts leaf and yard waste at a windrow composting facility. The facility is located on the southwest corner of the intersection of 28th Avenue East and 26th Street East. In 2005 the City reported that 1,774 tonnes of leaf and yard waste was delivered to the site plus 1,000 tonnes bulky material.

The City also has an active backyard composting program which results in the self management of SSO and leaf and yard wastes. Approximately 1,400 backyard composters have been distributed since 1999. To increase the capture and composting of SSO the City would need to develop or access appropriate composting infrastructure.

The following sections present an estimate of SSO residential and IC&I quantities; describe different collection options, describe the different types of composting technologies; describe different compost facility options; describe export options and present a general overview of the costs to implement and SSO program.

Finally the report provides recommendations on the organics components that should be considered for further evaluation by the City.

2.0 QUANTITIES OF ORGANIC WASTE

Based on waste generation data generated by Lura Consulting, it was estimated that the City generates approximately 2,500 tonnes/yr of residential SSO and about 1,200 tonnes/yr of IC&I organic waste, including SSO. If a residential SSO program was initiated it is reasonable to assume that 60% of the material generated could be captured. The IC&I may participate in an SSO program if the overall costs to divert these wastes are less than the cost to dispose of them. A rough estimate of the IC&I capture rate would be 20%.

Table 2.1 depicts the amount of SSO from the residential, IC&I and sectors that would be available for composting as generated by the City.

Table 2.1 Estimate of SSO that Could be Captured for Composting

Waste Type	Tonnes/Year
SSO-Residential	1,500
SSO-IC&I	250
Total	1,750

Less than 2,000 tonnes of SSO would be captured annually in the City. It should be noted that up to 2,000 tonnes of carbonaceous materials (e.g. leaves, wood chips) is required to mix in with the SSO prior to composting. The City received 2,700 tonnes of leaf and yard waste in 2005 so this should be adequate to supply the carbonaceous material for the SSO.

The amount of leaf and yard waste captured in 2005 is much higher than what is typically available in the residential waste stream. Using typically Ontario leaf and yard waste generation numbers the City would generate 1,400 tonnes a year. These leaf and yard waste tonnages gave the City a high diversion rate of 55% in 2005. Municipalities in Ontario with similar waste diversion programs typically have diversion rates of 35 to 40%. Some of the reported tonnage could have been from the IC&I sector in the form of leaf and wood waste or may be from outside sources.

It is anticipated that additional leaf and yard waste is available in the urban area of Owen Sound. This may amount to 1,000 to 1,200 tonnes a year.

Another feedstock that could be considered for composting in the City is the sewage sludge generated at the Sewage Treatment Facility. Currently the material is land applied. The City is undertaking a study looking at upgrading the facility from primary to secondary treatment. As part of that study the costs of dewatering the sewage sludge and composting the resulting cake is being undertaken. The plant currently produces approximately 7,500 m³ of sewage sludge at 4% solids (approximately 1,500 tonnes at 20% solids).

Based on the above the City has the following organic waste streams available for composting:

- Leaf and yard waste;
- IC&I leaf and wood waste;
- Residential SSO; and
- Municipal Sewage sludge.

3.0 ORGANICS COLLECTION OPTIONS

With the implementation of an SSO program decisions on the types of containers to be used by residents is required. In addition, a decision on the use of plastic bags, biodegradable bags or no bags in the collection containers must be made.

3.1 Collection Containers

There are a number of methods to collect SSO from the households. First generation organics programs (e.g. City of St. Thomas, Ottawa Valley) use larger 240 litre carts. Carts are often fitted with ventilation designed to facilitate some aeration of the organic waste in the cart. Typically in these programs SSO and leaf and yard wastes are combined in the same container. Collection frequency tends to be bi-weekly. Second generation organics programs (e.g. City of Toronto, Region of York, Region of Peel, Region of Durham etc.) have gone to smaller 40-50 litre containers. Typically only SSO are included, although in some cases residents are allowed to “top-up” these containers with leaf and yard waste. Collection frequency tends to be weekly.

It is possible to collect organic wastes in plastic bags. Programs such as the City of Guelph Wet-Dry program and Westmorland-St Albert (Moncton, New Brunswick) use plastic bags as a collection receptacle. Programs like the City of Toronto and Region of York allow plastic bags as liners. A quality compost product can be made if plastic bags are allowed, although a price is paid for plastic removal and disposal.

It is also possible to collect organic wastes in kraft paper bags or certified compostable plastic bags. Up to this point the trend has been to use these bags to complement an existing SSO program. For instance some municipalities have allowed residents to line the kitchen container in which they first place SSO with these bags (Region of Durham). There has been limited use of these bags as curbside receptacles for SSO. There has been considerable use of kraft paper bags in leaf and yard waste programs across the Province.

Table 3.1 presents an overview of rigid plastic carts used in SSO programs. Table 3.2 presents an overview of bags that are currently used in composting programs. Bags are typically used as liners of kitchen containers and to a lesser extent rigid plastic carts, as opposed to receptacles.

Table 3.1 Collection Containers

Manufacturer	Container Type	Size (litres)	Municipalities Using (examples)
Master Cart by IPL	Bio Cart	240, 360	Montreal, Victoriaville, Region Chertsey
	Kitchen container	7	
Norseman	The Green Bin &	46.5	Toronto, Peel, Markham, Barrie, Pickering/Durham, Niagara Region, Hamilton, Simcoe
	Kitchen container	7	
Rehrig Pacific Company	Organic Waste Cart	40	Halton Region, Hamilton, Region of Waterloo, Olds, AB, Victoria, BC, Windsor, N.S.
	Organicart	240	
	Kitchen container	7	
SSI Schaeffer	Compostainer	120, 140, 240	St. Thomas, Lunenburg, NS, Halifax, NS
	Kitchen container	7	

Table 3.2 Compostable Bags used that could be used in Food Waste Programs

Manufacturer	Container Type	Municipalities Using (examples)
Bag to Earth Inc.	Cellulose-lined kraft paper bag	Ottawa (pilot) Many allow small food waste bags as kitchen container liners
	Large food waste bags (curbside receptacle)	(Note: many municipalities allow for leaf and yard waste)
	Small food waste bags (for kitchen)	
W. Ralston Inc. (Biosak)	Certified Compostable plastic bags used as liners	Region of Durham Region of Halton (pilot) Prince Edward Island
	Large (240l) liners	Bags are allowed for use as liners
	Large (40l) liners	
	Small (7l) liners	
Biobag Inc.	Large (240l) liners	Region of Durham, Peterborough, Halifax, Prince Edward Island
	Small	
		Bags are allowed for use as liners

The City of Owen Sound and outlying areas has approximately 22,000 people and 9,300 households. Of these households 80% are single family households and the balance are multi-family households. Each single family household would require a kitchen container and rigid plastic food cart for an SSO program.

The approximate unit costs are noted below:

- Kitchen containers 7 L \$ 5/unit
- Small rigid cart 40 L \$20/unit
- Large rigid cart 240 L \$65-\$75/unit

If all households received a kitchen container and small rigid cart the approximate capital cost would be \$190,000 plus delivery charges. If households were given a kitchen container and large

rigid container (for SSO and leaf and yard wastes) then the capital cost would be approximately \$520,000 plus delivery charges.

The retail cost of kraft paper bags is approximately \$0.40-0.90/bag and the retail cost of the biodegradable bags can range from \$0.10-0.30/bag. In some cases bag manufacturers sell directly to municipalities for lower unit costs.

Table 3.3 provides an overview of the different collection containers and the advantages and disadvantages of each from a municipal perspective.

Table 3.3 Advantages and Disadvantages of Various Collection Containers in SSO Programs

Collection Method	Advantages	Disadvantages
Loose inside a Re-usable Container (cart, bin, etc.)	<ul style="list-style-type: none"> • Has no impact on quality of the finished compost. • Easier for collection staff because they don't need to determine if resident used proper plastic bags or what's inside the bag. • No contamination or processing issues at composting facilities. • No cost to resident. 	<ul style="list-style-type: none"> • Inconvenient for residents (e.g. bin dirtiness, etc.) • Odour issues, especially during the summer months • Maggots, fruit flies, etc. inside bottom of container.
Non-compostable Plastic Bag (opaque grocery or yard waste bags, green bags, etc.)	<ul style="list-style-type: none"> • Convenient for residents (e.g. bin cleanliness, etc.) • Odourless • Low-cost option (grocery bags) 	<ul style="list-style-type: none"> • Difficult for collection staff to determine if resident used the proper plastic bag. • Difficult to tell what is inside bag. • Contamination issues at composting facilities because bag won't breakdown. This could have impact on quality of finished compost. • Potential processing issues at composting facilities that can't deal with any plastics. This may result in an increased cost to process the organics. • Confusion in the marketplace.
Compostable Plastic Bag	<ul style="list-style-type: none"> • Convenient for residents (e.g. bin cleanliness, etc.) • Odourless • Has no impact on quality of the finished compost, once it's fully broken down. 	<ul style="list-style-type: none"> • Bags may disintegrate or leak. • Cost per unit is high. • Difficult for collection staff to determine if resident used the proper plastic bag. • Difficult to tell what is inside bag. • Potential processing issues at composting facilities that can't deal with any plastics. This may result in an increased cost to process the organics. • Past performance of compostable bags has been poor. • Confusion in the marketplace.
Paper Bags	<ul style="list-style-type: none"> • Convenient for residents (e.g. bin cleanliness, etc.) • Easier for collection staff because they don't need to determine if resident used the proper plastic bag. • Has no impact on quality of the finished compost, once it's fully broken down. 	<ul style="list-style-type: none"> • Cost per unit is high. • Odour issues, especially during the summer months, which may lead to a decreased participation rate. • Difficult for collection staff to determine if there is any contamination inside bag. • Confusion in the marketplace.

A number of options are available for the collection of SSO from residents with the smaller carts currently being preferred by a number of municipalities. The types of carts used have a direct influence on the type of trucks that would be required for the collection of organics.

Decision on the collection method to be utilized will be required before an SSO program can be implemented.

For the smaller carts leaf and yard waste are typically put in kraft bags and wood waste tied into bundles. If the larger containers are used they can take a certain amount of leaf and yard waste with kraft bags used when there is overflow.

3.2 Curbside Collection of Organics

Collection of waste in Owen Sound is currently undertaken by municipal forces.

Organics are often collected in split trucks with 30 to 40 % of the trucks capacity being dedicated to the organic fraction. Either waste or recyclables are collected at the same time and occupy the remaining 60 to 70% of the truck. This is done to reduce costs by collecting the different waste streams. Although organics by weight make up a large percentage of the waste stream by volume they take up less capacity in the truck. Currently the City operates two rear load packers to collect waste.

Leaf and yard waste can typically be picked up in a rear loading packer.

It is difficult to select a truck until a decision on the type of collection containers is made. The larger rigid containers would require the use of a mechanical arm for collection while the smaller containers can be tipped into the truck by hand. A bag system would also require a slightly different set up on the truck.

In general each truck would cost between \$230,000 and \$290,000.

Before definitive capital costs for organics collection can be made a number of decisions have to be made:

- Collection container type; and
- Truck type.

In general organics collection is estimated to cost 10 to 20% more than typical garbage collection. The final cost for organic collection will be dependant on the preferred waste management system that is selected by the City.

3.3 Summary Collection Options

In summary two decisions have to be made with regards to collection:

- Types of containers to be provided to the residents; and
- How the organics will be collected from the curb (municipal or private forces).

In general the City will be looking at a capital cost for containers ranging from \$190,000 to \$520,000. The capital costs for new truck would range from \$230,000 to \$290,000. If done by municipal forces two trucks are anticipated at a capital cost of \$460,000 to \$580,000.

The 2005 waste collection costs for the City equaled approximately \$80 tonne. This cost is anticipated to increase to \$85 to \$95 tonne if organics collection is implemented.

4.0 ORGANIC COMPOSTING PROCESSING OPTIONS

There is a number of composting technologies that could be used to compost SSO, leaf and yard waste and biosolids feedstocks.

Composting typically includes three major components:

- pre-processing;
- composting; and
- post-processing.

Their function is described briefly below.

4.1 Pre-Processing

Pre-processing involves turning the feedstocks into a suitable, refined feedstock, ready for introduction to the composting process. Pre-processing operations can include the following activities:

- debugging;
- manual inspection;
- manual and/or mechanical removal of recyclables and/or wastes;
- particle size reduction;
- screening ;
- addition of amendments (e.g. bulking agents such as wood chips); and
- mixing.

SSO and leaf and yard waste typically requires pre-processing. The composting of SSO and biosolids will also require the addition of some type of amendments.

The extent of pre-processing is a function of the feedstock and the composting technology used. It should be noted that one of the challenges in designing an SSO organics diversion system is to decide whether the advantages of collection systems that result in a higher capture rate but produce a more-contaminated waste stream are worth the much higher pre-processing cost of removing those contaminants at the facility.

4.2 Composting

Once the pre-processing stage is complete, the organic waste is ready to be composted. There are many composting technologies and vendors available, all of which can work in a range of applications and scales. All systems are designed to accomplish the same thing: provide an environment that optimizes aerobic microbiological decomposition. The outputs will depend on

the feedstock inputs and may include a high quality compost or lower quality products. There are two main classes and four main types of centralized composting technologies.

4.2.1 Non-Reactor Composting Technologies

These are technologies where composting takes place in the open or outdoors. Non-reactor systems tend to utilize public-domain technology, albeit sometimes with the aid of specialized equipment provided by various vendors.

Windrow

Outdoor, turned-windrow composting is by far the most widely-used system for centralized composting in North America. Windrow composting can deal with a wide variety of organic wastes at almost any operating scale. Windrow composting has been successfully operated in the range of 5 tonnes/day to 100 tonnes/day (1,000 tonnes/yr to 25,000 tonnes/yr); while large mechanized windrow operations may go up to 100,000 tonnes/yr.

In a residential context windrow composting sites are typically used to process leaf and yard wastes. They can also be used to process materials collected by SSO programs, although this practice is less common and requires an experienced operator to avoid odour problems.

The term windrow refers to a pile of material that is characterized by a generally-triangular cross-section and a length that may vary significantly depending on available space. Commonly, windrows are between two and four metres in height and three to six metres in width. Windrow composting generally takes place outdoors on a paved (e.g. concrete, asphalt) or unpaved surface such as a compacted clay pad.

Windrows are moved or 'turned', usually by some type of mobile heavy equipment such as a pay loader or specialized windrow turner. This is done to aerate the material, to reduce particle size, to blend it, and often to gradually move it through a processing area. The frequency of turning may range from several times daily to once per month, depending on a wide range of factors (such as type of organic material). Most regulatory regimes require that the material be fully turned at least five times during the process, but much higher numbers of turns are not uncommon.

Equipment capacities and sizes must be co-ordinated with feedstock volume and the range of pile dimensions. Regular turning of the material can result in a finished, stable (fully degraded) product in about 3 months, though some facilities choose to take much longer, and save operating costs as a result.

Process monitoring tends to focus on the collection of temperature data. In some cases oxygen and other process data is collected. Depending on the facility size process monitoring takes place daily to weekly. Often simple and rugged hand-held instruments are used.

A properly managed turned windrow composting facility does not produce a greater odour impact than more capital-intensive, enclosed facilities. The solution to odour problems is to ensure that experienced facility design and management expertise are used, and that on-site staff are well trained in the biochemistry of composting and trouble-shooting solutions when problems arise. When properly managed, these systems work very well. However, there have been a number of cases in Canada where windrow facilities have failed due to poor or inconsistent management.

Placing piles out-of-doors exposes them to precipitation, which can result in runoff management problems. Any runoff created must be collected and treated, or added to a batch of incoming feedstock to increase its moisture content. To avoid problems with runoff, piles can be placed under a roof, although this adds to the capital costs of the facility, and can make it more difficult to move material around the facility.

Given their low demand for capital equipment, and low operating costs, windrow systems are widely recognized as the lowest-cost composting approach available. Windrow composting has larger land requirements. Windrow composting is a non-proprietary technology which is most viable in rural sites or areas with large buffer zones.

The greatest advantage of turned-windrow composting is its flexibility. Many facilities are able to dramatically vary windrow size, turning frequency and how space at the site is used, to accommodate wide fluctuations in incoming waste tonnages and composition. A related characteristic is that wastes can be added part-way through the process when needed. For instance, if an unusual surge of one type of waste arrives at a windrow composting facility, the excess can be added to existing windrows already in process while the balance of the new material can be used to form new windrows. Food wastes, for instance, are commonly added to a windrow.

Windrow composting is not common for the composting of SSO in Canada but could be a system that in particular could be used by smaller communities.

Aerated Static Pile

Aerated static-pile composting appears in many ways to be similar to windrow composting. The only important difference is that by definition, the windrows or piles are not turned, but remain stationary for most of the composting process. Instead of aerating the piles by physically turning them, fresh air is either allowed to passively migrate into the pile, or is forced in (or out) with

fans. For both systems, windrows are built on pads or platforms. Routinely, the piles are monitored for temperature and oxygen.

In an actively-aerated system, a fan (or air supply blower) either forces air into the pile or draws air out of it. The air is circulated through the pile through a diffuser (a pipe with holes to allow distribution of air). The fans are controlled by a timer or a temperature feedback system similar to a home thermostat. Air circulation in the compost piles provides the needed oxygen for the composting microbes and also prevents excessive heat build-up in the pile. Removing excess heat and water vapour cools the pile to maintain optimum temperatures for microbial activity. A controlled air supply enables construction of large piles, which decreases the need for land as compost stays in one place and does not need to be moved around the site.

When the composting process is nearly complete, the piles are broken up for the first time since their construction. The compost is then taken through a series of post-processing steps, possibly including turned-windrow composting for further stabilization of the product. Aerated static pile composting systems have been used successfully for SSO, leaf and yard waste, biosolids, and industrial composting.

Advantages of aerated static-pile composting compared to turned-windrow composting include the management of odorous materials in an undisturbed mass, until such time as they have stabilized. This is one reason that it has been popular in the processing of sewage biosolids (in the US, and Canada). The infrastructure necessary to provide for forced aeration requires higher capital costs although staffing needs are lower as the compost piles do not need turning. Unlike turned-windrow composting, the fact that the compost mass is never disturbed after being formed into a pile means that the mix and ratio of waste feedstocks must be correct right from the start, a feature that prevents this approach from readily coping with fluctuations in waste composition.

The capital costs can be lower than for windrow composting if no supplemental aeration is provided. The operating costs are relatively low.

Aerated static pile composting is less common than windrow composting of SSO. It may have some potential for smaller communities.

4.2.2 Reactor Composting Technologies

These encompass enclosed channel and tunnel/container systems. They are commonly referred to as “in-vessel” systems. Reactor systems tend to be available only from vendors of proprietary technologies.

Common elements of Reactor Composting Technologies include:

- Some type of building(s) to house elements which may include: feedstock preparation (i.e. segregation, shredding/grinding, mixing), composting and curing);
- Composting takes place indoors or in fully sealed vessels;
- Residence times of organic waste varies from 3-28 days;
- Some level of automated data collection for temperature (e.g. thermocouples, programmable logic controller, desk-top computer) and in some cases other parameters such as oxygen, relative humidity etc.;
- Air handling system to force air through composting waste and remove off-gases for treatment;
- Treatment of off-gases typically occurs in a biofilter although other scrubbing methods are also sometimes used; and
- After residence time has been completed composting material must be taken to a curing area for further processing. This curing area can be indoors or outdoors.

The most common technology is the container/tunnel style. Specific technologies include a rotating drum which on a continuous flow basis facilitates composting and additional debagging (over and above pre-processing). Container systems also appear to be quite common.

Enclosed Channel

Channels are partially sealed vessels. Enclosed channel composting takes place in a horizontal silo like channel consisting of two long parallel concrete walls generally, 1-2 m in height, 3-5m in width and 30m+ long. A facility can have a number of channels. A variant of this type of composting is wide-bed composting, where the width of the channel is close to the width of a building.

Each channel has a distinct input and output end and functions as a continuous flow system rather than a batch system. Material is placed in the input end by a piece of mobile equipment. Mixing of organic waste is provided with a specialized automated turner that typically straddles the concrete walled channels on rails or wheels. It starts its processing at the output end, discharging compost, and moves towards and completes its cycle at the input end of the channel. As the turner makes repeated passes down the channel over time, it gradually moves the mass of waste from the input end to the output end of the channel. Additional aeration is provided via a mechanical aeration system. A typical retention time is 7-28 days.

These systems typically employ automated temperature gathering equipment (e.g. thermocouples, programmable logic controller, and desk-top computer).

These systems typically include a mechanical off-gas removal system and odour abatement infrastructure (e.g. biofilter).

The system is designed such that the primary composting process is largely completed by the time that the waste is discharged from the end of the channel.

After discharge from the channel compost is cured in a separate area, often employing a windrow type technology. The length of curing time is a function of compost end-use.

A finished product can typically be produced in 2-6 months.

Channel composting systems are currently in operation in Canada accepting a wide range of annual tonnage. Since wastes can only be added once (i.e. at input end) it is important to develop a good recipe.

Although costs vary among different technologies, enclosed channel systems are generally less costly than container/tunnel systems.

Channel composting systems have been used to compost SSO with a reasonable success level. It may be a good solution for medium to large communities.

Container/Tunnel

Container/tunnel composting systems are fully sealed vessels in which the composting environment is tightly controlled and so should be able to process compost at the shortest amount of time possible.

Container systems are mobile and resemble closed top roll-off containers. They are typically made from metal with the interior made from corrosion resistant metals. There are generally a number of containers at a facility. They are modular and additional containers can be added relatively easily.

Tunnel systems are fixed in place and contained in a building. They are typically made from concrete or corrosion resistant metals. They in some cases originated and share features of composting tunnels used by the mushroom growing industry. There are generally a number of tunnels at a facility. They are modular and additional tunnels can be added relatively easily.

A subset of tunnels includes long, cylindrical, rotating drums often called digesters. Waste moves in a continuous flow fashion from an input to an output end.

A combination of mobile equipment and other mechanisms (e.g. conveyors) are used to feed raw waste into the container/tunnel and remove uncured compost from the container/tunnel.

There is usually no mechanical agitation of material while it is in the container or tunnel. A few container/tunnel technologies operate in a continuous flow system as described above (e.g. digester). Agitation is provided through the rotating of a drum. Some other systems include an agitation step mid-way through the process.

As there is often no or very little mechanical agitation all systems feature a relatively sophisticated air handling system to inject air into the composting mass and remove composting off gases for treatment. Some systems have the ability to add supplemental moisture into the container or tunnel.

These systems typically employ sophisticated automated temperature gathering equipment (e.g. thermocouples, programmable logic controller, and desk-top computer). All systems will include a monitoring system for temperature and in some cases oxygen.

Odours are more easily managed in these systems, since primary composting occurs in a sealed container or tunnel. These systems typically include a superior mechanical off-gas removal system. Exhaust air is removed from the container or tunnel and typically passes through a biofilter and/or other odour scrubbers.

The typical residence time in a container or tunnel is from 3-28 days. At the end of the primary composting process, the container is disconnected from the air and monitoring systems, emptied, and then made available for another cycle.

Compost is cured using either a windrow or aerated static pile system. The length of curing time is a function of the compost end use.

One critical advantage is that all operations are totally enclosed, limiting contact with the organic material, thus minimizing occupational health and safety concerns.

This tends to be the most capital-intensive of the approach available. A critical advantage of these systems is that they take up less space and may be viable where others are not. They also tend to be the most expensive system.

Container/tunnel composting systems have been used to compost SSO with a reasonable success level. It may be a good solution for medium to large communities.

4.3 Post-Processing

Post-processing activities involves preparing the end-product from the composting operation for market. Post-processing activities may include:

- manual and/or mechanical removal of recyclables and/or wastes
- screening
- blending
- bagging

Post-processing requirements will depend on end-market requirements, and the degree to which contaminants are still present after pre-processing. Most post-processing operations include screening the compost to homogenize it and remove oversize materials.

4.4 Composting Technology Summary

In summary the following technologies are available to compost the feedstocks in Owen Sound:

- open windrow;
- aerated static pile;
- enclosed channel; and
- container systems.

Each can compost the feedstocks available in Owen Sound.

4.5 Composting Technology Costs

A survey was conducted of Canadian and American composting facilities. The intent was to focus on facilities that composted SSO and leaf and yard waste as well as obtaining information from all technology types. The research was completed by contacting 33 facilities and obtaining information from 28 sites. The capital and operating cost data obtained in the survey was used to assist in the development of capital and operating costs estimates.

It should be noted that it is challenging to obtain comprehensive and comparable cost data from different facilities. The values used are indicative rather than absolute.

4.5.1 Capital Costs

Based on the data collected and assuming a 20 year amortization of capital, the range of capital costs for each technology is as follows:

- open windrow \$10 - \$20 tonne
- aerated static pile \$20 - \$30 tonne
- enclosed channel \$40 - \$50 tonne
- container systems \$70 - \$80 tonne

4.5.2 Operating Costs

Based on the data collected the range of operating costs for each technology is as follows:

- open windrow \$30 - \$40 tonne
- aerated static pile \$25 - \$35 tonne
- enclosed channel \$40 - \$50 tonne
- container systems \$50 - \$60 tonne

4.6 Total Costs

Based on the above the estimated total costs for each type of technology are as follows:

- open windrow \$40 - \$60 tonne
- aerated static pile \$45 - \$65 tonne
- enclosed channel \$80 - \$100 tonne
- container systems \$110 - \$130 tonne

It is possible to generate revenue from the sale of compost. Depending on the markets developed the revenue that could be generated from the sale of compost could range from \$10 to \$20 tonne.

5.0 COMPOSTING FACILITY OPTIONS

The City has a relatively small quantity of SSO that would be captured annually (i.e. less than 2,000 tonnes). Also there is approximately 1,000 to 1,200 tonnes of leaf and yard waste available in the urban centre of Owen Sound. A portion of the leaf and yard waste collected at the curb would be self hauled by residents to the existing facility although the exact number can not be calculated. As mentioned previously 2,700 tonnes of leaf, yard and wood waste was dropped of at the current leaf and yard waste facility in 2005. In addition approximately 1,500 tonnes of biosolids are available.

There are a number of processing options available to composting the additional organic waste streams in the City and include:

- Expansion of current leaf and yard waste facility;
- Development of a new facility;
- Export; and
- Development of a regional facility.

Each is discussed in more detail below.

5.1 Leaf and Yard Waste in Urban Centre

The City could implement bi-weekly collection of leaf and yard during the growing season (May to November) to collect this material. It is anticipated that anywhere from 1,000 to 1,200 tonnes would be collected. The existing rear loading vehicles owned by the City could be used to collect the material. The existing leaf and yard waste facility could easily accommodate this material. No new approvals would be required at the existing facility. Before this is undertaken the City should undertake an audit to determine the actual amount of material that may be available in the existing waste stream.

The capital and operating costs to process 1,200 tonnes of material would range from \$48,000 to \$72,000 for processing and \$100,000 and \$115,000 for collection.

5.2 Expand Current Leaf and Yard Waste Composting Facility

It may also be possible to integrate SSO composting at this operation. Efficiencies could be gained because SSO requires leaf and yard waste to facilitate composting. It is estimated that less than 2,000 tonnes of SSO would be received at the facility annually in addition to the 2,700 tonnes currently composted. A facility with the ability to compost 5,000+ tonnes of material would be required.

This option would require a feasibility study to ensure that the current site is appropriate. If it was deemed appropriate a Certificate of Approval would be required from the Ministry of the Environment (MOE) to allow the composting of SSO.

The anticipated additional costs to add 2,000 tonnes of processing capacity would range from \$80,000 to \$120,000 and \$125,000 to \$145, 000 for collection. The capital costs for the containers to collect the SSO also have to be considered.

5.3 Develop New SSO Composting Facility

The City could develop a new facility to compost SSO. It is estimated that less than 2,000 tonnes of SSO would be received at the facility annually. An additional 2,000 tonnes of carbonaceous material would also be required.

A site selection and technology selection exercises would have to be undertaken. An application for a Certificate of Approval would have to be submitted to the MOE. It would make sense to add the sewage treatment sludges as an acceptable feedstock in the application. This would add up to an additional 1,500 tonnes of biosolids and 1,500 tonnes of carbonaceous material to the facility.

The costs of the new facility will be dependant on the technology selected but assuming that 4,000 tonnes of material (SSO and amendment) is composted the low end windrow cost would be \$160,000 with the high end container facility at \$520,000. The capital costs for the containers to collect the SSO also have to be considered.

5.4 Develop New Regional SSO Composting Facility

It is well know in Ontario that there is currently a lack of composting processing capacity. The City could work with Regional partners to develop new infrastructure to compost leaf and yard waste, SSO and sewage sludge. Obviously this would involve larger quantities of feedstocks and likely require an enclosed channel or container/tunnel technology be considered. In addition it would require the involvement of a number of municipalities in the area.

A site selection and a technology selection exercise would have to be undertaken and a Certificate of Approval would be required from the MOE.

The estimated costs to Owen Sound cannot be determined until the type of facility and partners are defined.

5.5 Export Options for Organics

A survey was undertaken to identify composting facilities that accept SSO in southern Ontario. A majority of the SSO facilities in Southern Ontario are greater than 150 km from Owen Sound. The closest facility is the All Treat Farms Facility, in Arthur. The All Treat Farms facility is currently accepting material from Meaford. The County of Dufferin is also considering the development of a regional composting facility which could possibly accept the City's SSO. The Region of Peel composting facility in Brampton and the Halton Recycling Ltd. composting facility in Newmarket are both about 150km away.

Based on cost information collected from composting facilities standard per tonne waste transfer costs were estimated. Transport costs were estimated based on current costs of hauling SSO. Tipping fees costs were estimated based on a range of current tipping fees for SSO.

The following estimated costs would be incurred to export SSO:

- Transfer costs \$5/tonne
- Transport costs \$15-30/tonne
- Tipping fees \$65-\$120/tonne

Overall the range of costs is estimated to be between \$85 and \$155/tonne to manage SSO through export. This is also contingent on site capacity. In general SSO processing capacity is limited in Ontario although some new capacity came on-line in 2006.

If 2,000 tonnes was transferred the estimated costs would be between \$170,000-\$310,000/year to transfer, transport and tip the 2,000 tonnes of SSO/year.

6.0 CONCLUSIONS

Based on the analysis in this report the following conclusions are provided:

- It is estimated that less than 2,000 tonnes of SSO could be captured from the residential and IC&I sectors in Owen Sound if a program was in place;
- There are a number of container options available for the collection of the SSO material from the residents;
- There are a number of options available for the processing of SSO;
- The existing leaf and yard waste facility should be considered as a potential site for the processing the City's SSO.
- The City should evaluate the feasibility of composting biosolids;
- The 35-40% of SSO waste and leaf and yard wastes, represents waste that the City can control itself. Given the present waste export climate this may be advantageous.

There are a number of potential funding options that the City could explore relating to the implementation of a source separated organics program.

The Federation of Canadian Municipalities would consider an application for up to 50% of the feasibility study and capital cost of such an operation. The Province is considering a proposed carbon credit trading system, as part of their Climate Change program. Carbon credits would be available through organics programs, as they avoid the production of methane in landfill sites. Until the program is released, and the parameters for trading define, it is difficult to place a value on the potential credits.

7.0 RECOMMENDATIONS

The following recommendations are provided:

- The City should consider every other week collection of leaf and yard waste during the growing season as a potential waste management system component following the completion of an audit to determine available quantities; and
- The City should consider SSO collection and processing as a potential waste management system component.

Costing information for the different ways to process SSO has been included in the report and should be used in the evaluation of components and systems.

If leaf and yard waste and SSO collection becomes part of the preferred waste management system for Owen Sound further evaluation of a number of factors is required and includes:

- Types of collection containers to be used;
- Combining the collection of leaf and yard waste with SSO;
- Type of processing facility to be developed.

2cg INC.

GOLDER ASSOCIATES LTD.

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Long Term Waste Management Planning
Process

APPENDIX F: Project Charter



Owen Sound

Development of a Sustainable Waste Management System

Project Charter

October 2006



About the Project Charter

The Project Charter lays out the framework for the development of a Sustainable Waste Management Plan for Owen Sound. It reflects the work plan agreed upon between the City of Owen Sound and the project consultants.

First, it sets out the background to the planning process. Next, it describes the current situation and the need and rationale for the waste management planning process. Third, it details the steps to be followed, technical studies and community consultations that are being undertaken as part of the planning process. Lastly, it details a timetable for completion of the work.

Members of the community and stakeholders are invited to participate in the development of this plan.

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1.0 Introduction

The City of Owen Sound is located on the southwestern shore of Georgian Bay, on the Niagara Escarpment. With a population of 22,000 and 10,000 more people just outside the City's boundaries, the City was named one of 5 Cultural Capitals of Canada in 2004. A picturesque harbour city, Owen Sound is the hub of Grey County and the Bruce Peninsula, and has deep cultural and historical roots.

Over the past decade, the City and neighbouring municipalities in Grey County have attempted to develop a collaborative waste disposal system to manage their wastes locally, but this did not lead to success.

Under the *Municipal Act, 2001*, the City of Owen Sound has the responsibility to plan for and manage municipally-generated solid waste within its boundaries. With the lack of access to neighbouring disposal sites, Owen Sound is currently exporting its residual wastes to a landfill site in Michigan, under a 10-year contract with Miller Waste Systems (2005-2015). Relying on exporting Owen Sound's waste as a disposal solution has its challenges as the existence of viable disposal options are subject to external political and regulatory factors outside of the control of the City. Establishing local landfill disposal facilities can be contentious, and can take more than a decade to achieve approvals.

City Council has decided that much more emphasis needs to be put on reducing and diverting wastes from disposal. Based on best practices in other communities in Canada and elsewhere, upwards of 60% of the total municipal wastes generated within City boundaries can be diverted from disposal, through improving the capture rate of both recyclable and compostable materials. Recently, Council directed that a comprehensive waste management planning process, involving community participation and technical studies, be undertaken to assess the potential feasibility of this approach.

2.0 Current Waste Management Programs

The following discussion generally outlines the waste management programs available in the City today. The final Plan will describe these programs in more detail, and explore the capacity for expanding waste diversion programs, thus limiting the amount of wastes requiring disposal.

2.1 Domestic Waste Programs

The City's waste management program comprises a waste reduction approach, numerous diversion schemes, and waste collection and transfer to a disposal facility in Michigan.

The diversion programs currently divert about 55% of material that otherwise would have gone to disposal.

Waste Reduction

The City employs a number of financial and regulatory instruments in order to reduce waste. These include a user pay system and material disposal bans that encourage and mandate waste diversion.

Recycling

Owen Sound collects recyclable material from residential dwellings, apartments, industry, business and institutional organizations. The City's domestic recycling program collects over 30 types of material, making it one of the most comprehensive programs in Ontario. Bottles and cans are sorted in a blue box, paper sorted in a plastic bag, and cartons, paperboard and kraft paper are sorted in a third stream. The material is collected every other week.

Recyclables are collected from the curbside, processed and marketed under contract to Miller Waste Systems.

Residents in apartment buildings have access to an extensive recycling program operated by the City, with material sorted into wheeled containers.

In addition, all residents can take recyclable materials to the transfer station, where they can also take polystyrene and end-of-life electronics, white goods, tires and other materials for recycling.

Industry, businesses and institutions are required, by by-law 2006-001, to recycle in Owen Sound.

Household Hazardous Wastes

On seven Special Household Hazardous Waste days per year residents can take Hazardous and Special Wastes to the public works building for safe disposal. These materials include:

- Pharmaceuticals
- Paint
- Aerosols
- Pesticides
- Oxidizers
- Acidic materials
- Caustic materials
- Automotive/Recreational Vehicle Fluids
- Miscellaneous Organic
- Batteries

The program is well used and popular with residents. The City also allows residents from neighbouring municipalities to participate in the HHW events.

Leaf and Yard Waste Composting

The City provides a central leaf and yard waste composting facility, open daily that accepts grass, leaves, branches, weeds and many other yard waste materials. Residents take compostible material to the facility. This program is also well used and popular with residents.

Backyard Composting

The City provides educational guidance and backyard composter subsidies to encourage backyard composting.

Domestic Garbage Collection and Waste Transfer

Curbside garbage collection is provided weekly. The City implemented a user pay program in July 1999 for the collection of garbage. Residents can set out up to 3 bags of garbage for collection and they must affix a \$2.00 bag tag to each bag/container to be collected. Garbage is taken to a central transfer station, owned and operated by Miller Waste Systems. Miller Waste Systems exports domestic garbage to the United States for disposal. Approximately 3,000 tonnes of residential waste are disposed in landfill each year.

Industrial, Commercial and Institutional Garbage Collection and Transfer

While the focus of the waste management planning process is on Owen Sound's jurisdictional responsibility for domestic waste management, it is prudent to consider opportunities to integrate the IC & I sector into the waste management system planning process where appropriate.

Communications and Education Programs

Communications and education is an important component of Owen Sound's Diversion Programs. Current initiatives include web-based information, a waste management calendar delivered free-of-charge to households annually, and a series of informative print materials.

In order to assist the IC&I sector, the City provides waste audit materials, signage and advice.

3.0 Approach to Developing a Waste Management Plan

The City's Waste Management Committee, together with a team of consultants (the Project Team), have designed an approach to developing the waste management plan for Owen Sound. The steps to be followed are described below. Generally, they include:

- Understanding and Assessing the Current Waste Management System
- Developing a Vision and Goals for Future Waste Management In Owen Sound
- Understanding and Assessing the Options

- Selecting Waste Management System Components
- Preparing the Plan

3.1 Assessment of Current Waste Management System

The first step in the development of the waste management plan is to assess the current situation. This will be done by:

1. Surveying the residents of the community;
2. Analyzing the characteristics of the waste stream;
3. Reviewing the existing programs and services; and,
4. Benchmarking the existing programs and services with those provided by other municipalities.

Survey of Residents

In order to review a program's strengths and performance, and make recommendations on opportunities for improvements, it is necessary to contact the users of the program and gain input from them. This provides a qualitative approach to assessing the current program, and will identify the public's perspectives and potential willingness to participate in a variety of additional programs in the future. Additionally, the survey will provide insight on community values relating to waste management and disposal – in particular, relating to the economics, environmental and social sustainability of a potential new system.

A statistically valid survey on waste management programs will be conducted with City residents. The objective of the survey will be to assess the public's awareness and perception of current waste management programs and future waste diversion and disposal options. Attention will be paid to the development of a community participation baseline against which progress in program improvement can be measured.

A survey report will be included with the final Waste Management Plan.

Understanding the types of waste generated within Owen Sound

The selection of a sustainable waste management system is best made based on the sources and types of wastes generated within the management area. For example, the quantities of recyclable and compostable materials need to be generally understood before new facility types and processing capacity can be selected.

While specific local waste characterization data is not currently available, there is enough information about waste characterization in Ontario to make approximations on the character of waste being generated in Owen Sound.

In this task the project team will apply existing waste characterization data collected by Waste Diversion Ontario (a province-wide organization whose mandate is to promote waste diversion across Ontario) to the current and projected population and demographics of the City of Owen

Sound. The next step will be to develop a waste system performance model capable of projecting the quantity and types of waste to be generated to the year 2030.

Review of Program Components

The project team will review each component of the current waste diversion program and evaluate the following:

- Cost
- Diversion Results
- Estimated capture rate
- Participation/Awareness
- Barriers to participation
- Public Support
- Opportunities to reduce or eliminate barriers
- Gaps in service, performance
- Opportunities for improvement in diversion through increased participation or collection of additional/different materials
- Opportunities for cost reduction
- Opportunities for program expansion
- Opportunities to reduce contamination
- Collection and processing contracts, where applicable.

The result of this task will be a comprehensive understanding of the potential for system optimization, enhancement, improvement and/or expansion.

Benchmarking

Performance and cost data of Owen Sound's current system will be bench-marked and measured against other municipalities in Ontario. The programs will be evaluated to determine where improvements can be made and to allow the City to examine its performance against similar programs.

3.2 Vision and Goals for a Sustainable Waste Management System

Through review of provincial and City objectives and goals, and discussions with stakeholders and members of the public, a Vision and Goals for the future will be developed. The final plan will address how the community's vision and goals will be met.

Provincial Directives

The Waste Diversion Ontario (WDO) was created under the Waste Diversion Act (WDA) and is an arms-length, Provincial Corporation. WDO was established to develop, implement, and operate waste diversion programs for a wide range of materials. On June 10, 2004 the Ministry of the Environment released a discussion paper which advocated a waste diversion rate of 60%

by 2008 from the residential, industrial, commercial, institutional, construction and demolition sectors. The paper is currently under consultation.

To date the Minister of the Environment has designated recyclable materials to include used tires, used oils, waste electronic and electrical equipment and household hazardous waste. Potential future designations include fast food and convenience food packaging, food waste, pharmaceuticals and fluorescent tubes. Once the Minister designates a material through a regulation under the WDA, the Minister requests WDO to work cooperatively with industries that produce and distribute products that result in designated materials to establish diversion programs for these materials. The Project Team will review the provincial directives, and apply current and future potential directives to Owen Sound's Waste Management Plan.

City Objectives

The City of Owen Sound wishes to meet or exceed the 60% diversion target, reducing their dependence on waste haulage and disposal and processing more of its waste within its own boundaries. The City wishes to extract as much value out of the waste stream as it can, in an economically viable and socially acceptable manner.

Public Perspectives

Through payment of city taxes, the public is entitled to an efficient waste collection system, one that achieves maximum diversion that is economically achievable. The public has demonstrated willingness to reduce and recycle waste materials and to make use the compost site and transfer station to recycle special wastes and electronics.

3.3 Identifying and Evaluating Alternative Solutions

The Project Team will identify and evaluate a number of opportunities to maximize diversion opportunities throughout the system. These include:

- Increasing composting through curbside collection of separated compostables (source-separated organics)
- Improving recycling capture rates and materials;
- Considering waste reduction programs at source, including improvements to backyard home composting; and,
- Considering waste disposal options.

Source Separated Organics (SSO)

Review Potential SSO Collection Options

In this task SSO collection options will be examined. Using the waste quantities and household information collected in Task 1 an assessment of potential collection opportunities will be undertaken. Both City and contracted collection services will be assessed.

For City collection the costs of infrastructure (trucks and bins) will be determined. In addition the costs of labour, insurance, fuel, etc., will have to be determined. Both the capital and operating expenses will be examined.

For contracted collection an examination of recent contract prices for organics collection around the Province will be collected (e.g. Barrie, Durham Region, Hamilton, Ottawa Valley, Muskoka, etc.)

Review of Organics Processing Facility Options

Members of the Project Team have recently completed a data collection exercise of composting facility capital and operating costs across Canada and the U.S. They are currently collecting additional information on these costs and operating design requirements for both public and private sector facilities. This information will be used to arrive at estimated costs for both a City owned and contractor owned facility.

Review Export of Organics

An evaluation of the costs to export organics to another facility in Ontario will be undertaken and include:

- Identification of potential locations;
- Feedstock requirements for each location;
- Processing cost per tonne;
- Approvals;
- Transfer Station requirements and cost; and ,
- Hauling costs to the facilities.

Improving Capture Rates and Materials for Recycling

Based on the program review conducted in Task one, the Project Team will assess the viability and options for improving both the capture rate (amount of material set out for recycling) and types of materials.

Disposal

Assessment of Current and Emerging Disposal Options

A number of options exist for waste disposal, which could be categorized into two groups; namely:

1. Disposal without processing; or,
2. Disposal with processing.

Disposal without processing includes municipal waste landfills, private waste disposal sites and waste exporting within Grey County or beyond.

Disposal with processing includes commercially viable processes to reduce volume (i.e., anaerobic digestion), reduce mass (i.e., energy from waste), or reduce waste characteristics (i.e., mixed waste composting). The processes may or may not create additional waste streams (i.e., ash and flue gas from energy from waste).

Waste disposal options within these two categories will be assessed and screened to include:

- Options that can viably operate with the waste quantity generated in Owen Sound; and,
- Options that operate at greater tonnages, where Owen Sound would participate with other municipalities or the private sector.

Waste disposal options available to Owen Sound will be summarized within the categories of Disposal without Processing or Disposal with Processing. The types of waste accepted will be noted, the quantity of waste required, the life expectancy/availability of the option and related costs. Preferred options will be selected for possible consideration.

Assessment of Immediate Options

Currently, waste from the City of Owen Sound is exported to a landfill in Michigan. This will limit the options for the City of Owen Sound when municipalities that ship their waste to landfill sites in Michigan will no longer be allowed to do so by the end of 2010. The Project Team will assess currently available options.

Environmental, Financial and Community Considerations

All of the elements of the waste management program have environmental, financial and community implications.

The study will consider the environmental benefits and costs to all elements of the program. As well, cost projections for each element will also be considered.

In order to engage the public in the process, share knowledge and obtain advice about community priorities, the public will be consulted through a process which will include two public workshops/meetings and a public opinion survey. In addition, the public will be informed about the study and the options being considered through publicity and information distribution. Throughout the study, members of the public can contribute their advice and ideas through the project web site www.e-owensound.com.

Input from the public will be integrated into the draft and final Waste Management Plan reports. The public will have the opportunity to review and comment on the draft and final reports.

3.4 The Path Forward

Sustainable Waste Management Solutions for Owen Sound

From the findings, recommendations will be made for a sustainable waste management program for Owen Sound that expands on the current program, includes source-separated organics processing, and envisions a long-term waste disposal solution.

Recommendations for the waste management system will be made and will include financial and operational implications, expected benefits, and recommended timelines. Furthermore, funding opportunities will be identified that could reduce the net cost of implementing future programs.

4.0 Timetable

Deliverable/Task	Technical Component	Committee/ Public/Stakeholder Consultation and Communications	Deliverable and timeline
Project Charter		Consultation and Communications Plan	September 29
		Notice of Commencement/ad for forum	October 4
		Promotion of forum Website	October 4-13
Assessment of Current Situation/Vision and Goals for Sustainable Waste Management Plan	Waste Characterization Review of Program Components (Waste Recycling; SSO; Disposal) Benchmarking	Newspaper article	
		Survey of Residents	October 13-18
		WM Committee/ Stakeholder Forum #1 Vision/Goals/Options (all components)	November 6
Identifying and Evaluating Alternative Solutions	Identify Options (Policy, waste recycling, SSO, disposal)	Promote Forum #2	Late November
		Stakeholder Forum #2 (Review/Select Options)	Early December
The Path Forward	Draft Integrated Report (Policy/WR/SSO/Disposal)	Draft Report	December 30
		Council Presentation	Mid-January
		Public Review	January-End February
		Finalize Report Notice of Completion	February 28 th



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APPENDIX G: Disposal Options





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Environment

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Residual Waste Management Options

The City of Owen Sound

March 2007

www.trow.com



Owen Sound Residual Waste Management Options

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Residual Waste Management Options

Current Practice

This report addresses management options for residual wastes or garbage. Options addressed include waste stabilization, thermal processing and disposal. Residual wastes exclude materials that are collected separately from at-source waste diversion programs, or dropped off for recycling, composting or HSW. Residual waste can also include residual wastes resulting from processing in recycling and composting operations.

In 2005, the City of Owen Sound contracted Miller Waste Systems (Miller) to dispose of their residual waste. This contract expires in 2015. Miller currently hauls Owen Sound's residual waste 300km from the Miller Waste transfer station in Owen Sound, to Pine Tree Acres Landfill near New Haven, Michigan, USA, for disposal. The option of transporting waste across the border to the US will be eliminated by the end of 2010 (please refer to letter from MOE to Mayor Ruth Lovell, dated September 11, 2006). The Ontario government is planning to reduce the flow of waste to the USA by 20% starting the end of 2007. Owen Sound has been targeted to stop sending waste to the USA before 2010. Miller Waste has committed to dispose of Owen Sound's wastes at other facilities should the border close. (Please refer to the Waste Management Contract for further details).

Residual Waste Processing

Residual waste processing is defined as physical, thermal or biological processes that can be used to reduce the amount of residual waste requiring landfill disposal. Physical processes such as a screening, manual sorting or shredding are generally used as a precursor to thermal or biological residual waste processes.

As a result, two groups of residual waste processing options are available, namely Waste Stabilization (by composting), and Thermal Processes.

Residual waste processing may be price competitive with landfill disposal at higher tonnages. To take advantage of these lower processing costs, Owen Sound would have to send their waste to a facility that processes waste for other municipalities or the private sector. Stand-alone residual waste processing options for the quantity of waste generated in Owen Sound could be in the range of \$150 to \$450 per tonne.

Each Residual Waste Option as well as current operations has been assessed using the Evaluation Criteria.

Residual Waste Quantities

Residual waste processing options may be applicable to all of these streams or only the waste not collected or dropped for diversion. Generally the limiting factor is the proximity of each of the processing facilities to one another. In Owen Sound Miller

Waste manages recyclables. Owen Sound’s future SSO composting operation has not been sited, but the Public Works Yard, adjacent to the Miller Transfer Station, will be considered. Processing of Owen Sound’s residual waste will most likely be located outside Owen Sound in order to take advantage of economies of scale.

Owen Sound required residual waste disposal of 4944 tonnes of municipal waste in 2005. In addition 8760 tonnes of IC&I waste is generated and/or received in Owen Sound (2005).

With forecast increases in waste diversion, the quantity for disposal will decline significantly over the next several years. The disposal requirement could be reduced by diversion to 2300 tonnes of municipal waste, based on Owen Sound’s current waste characterization. Diversion of IC&I waste and/or reduced service offering to the IC&I sector could also reduce the quantity of waste requiring disposal.

The residual waste processing options for Owen Sound are restricted due to the quantity of waste generated by Owen Sound. Residual waste processing of 5000 – 13,000 tonnes per year is not considered economic for most stand-alone processes. With this quantity of waste, Owen Sound could partner with other municipalities to agglomerate their waste at a facility designed for a higher waste quantity. A range of technologies available at increasing tonnages is provided below.

Typical Process Annual Tonnages

Process	Typical Process Tonnage Required
<i>Waste Stabilization:</i>	
Residual Composting	Minimum 20,000 tonnes per year
<i>Thermal Processes:</i>	
Gasification, Syngas Production, Thermal Cracking etc.	Suppliers have noted minimum ranges from 7000 to 35,000 tonnes per year depending on technology (technical and financial data is limited)
Energy from Waste (Incineration with energy recovery)	>100,000 tonnes per year

Residual Waste Processing Options

Residual Waste Stabilization

Composting can stabilize residual waste. This process would be separate from SSO composting. Composting residual waste can reduce residual waste disposal requirements by a further 20-40% of the input waste, by reducing the moisture content and organic matter content of the waste. Composting residual waste would produce a stabilized non-putrescible waste for disposal. Stabilized residual waste cannot be sold as a compost product, but it can be used as a landfill cover material, or could be landfilled directly. In

addition to reducing the amount of residual waste, stabilizing the residual waste would reduce the future generation of landfill gas and leachate.

Residual waste stabilization is a publicly preferred process in many communities as this process virtually eliminates biodegradable waste from being disposed in a landfill. This is characterized by reductions in potential environmental effects from the disposal of the residual waste stream.

A good example of residual waste composting is in Halifax, Nova Scotia. Since 1999 Halifax has employed a Mechanical, Biological Treatment facility known as the Otter Lake facility. This facility was envisioned primarily to reduce the amount of moisture and readily degradable organic matter before the waste was sent to landfill. The facility contributes an approximate addition of 9% to the total waste diversion in Halifax.

Thermal Processes

Thermal processing includes a group of processes such as incineration with energy recovery, gasification, pyrolysis, thermal cracking, and pelletization to produce a refuse-derived fuel. Thermal processes could reduce residual waste landfill requirements by 75% or more.

A number of thermal processes are being brought forward by suppliers as potential solutions to waste disposal for municipalities in Ontario. Technical details and actual cost per tonne data cannot be confirmed at this time.

Energy from Waste (EFW) incineration is the most recognizable and proven thermal technology. Current technology allows EFW facilities to meet all regulatory requirements for atmospheric emissions when operated correctly.

Residual waste streams from Energy from Waste would include bottom ash and fly ash. Fly ash (approximately 3 - 4% of total input) typically requires management and disposal as a hazardous waste. Energy by-products may include heat, electricity and/or steam.

EFW has for a long time divided people's opinions. Proponents look at the energy recovery and reduced waste disposal requirements. Opponents counter that emissions, even if they meet regulatory requirements may still discharge hazardous materials into the atmosphere.

Emerging Residual Waste Processing Options for Owen Sound

Owen Sound has an opportunity to piggyback on one of several emerging residual waste management solutions being developed in South-Central Ontario.

Dongara Developments

In 2004 the Region of York released an RFP for waste disposal. Dongara Developments was the successful proponent in the Region of York's RFP for disposal of 70,000 tonnes/year (tpy) of waste. Dongara's proposal is to pelletize solid non-hazardous waste

in conjunction with high BTU plastic film to produce a fuel pellet. In conjunction with the production of pellets, Dongara is working with Arbour Power. Arbour Power proposes to develop a co-generation plant for electricity and steam to be located in downtown Ajax, Ontario. The best case operating date for the pelletizing plant is in the first Quarter of 2009.

In order to meet the fuel demands of Arbour Power, Dongara's total plant capacity is proposed to be 190,000 tonnes per year of MSW for the Region of York and "Others". Owen sound could be one of several "Other" municipalities.

Durham/York Residual Waste Study

Region of Durham/Region of York Residual Waste Study began in 2005. The Study is appears to be concluding with Energy from Waste solution. Energy from Waste facility operators typically seek additional waste to operate at the maximum throughput capacity. The Residual Waste Study being conducted is looking at a 25 year planning horizon. It is realistic to suggest that capacity will be available as the facility is expanded in a stepwise manner to accommodate growth over the next 25 years. The likely timeline for implementation is 2010 at the earliest.

OE Gasification

OE Gasification has a modular scaleable gasification system with capacities in the same order of magnitude as needed by Owen Sound. Each OE module has a nominal capacity of 7000 tonnes per year based on 80% availability. Each module produces approximately 5000lb/hr of saturated steam. Three or more modules can be tied together to generate electricity.

At the present time OE is interested in pursuing residual and IC&I waste from Owen Sound and the surrounding area. OE is currently developing a 6-module system in Kincardine Ontario based on an agreement to provide steam to an industry adjacent to the Bruce Nuclear Plant. OE is seeking the waste from Owen Sound as part of the 45,000 tonnes per year required for the Kincardine plant.

OE anticipates the Kincardine facility will be operations in approximately 24 months. The target gate fee FOB Bruce is \$85.00 per tonne.

OE would also be interested in developing a stand-alone facility specifically for Owen Sound.

Laflèche Environmental

Laflèche Environmental has stated interest in developing a waste management site (inclusive of composting, C&D recycling, soil remediation, sludge dewatering and waste transfer) within the Owen Sound area.

KMS Peel Incinerator

The KMS Peel Incinerator is the only incinerator in Ontario licensed to incinerate municipal solid waste. The incinerator currently processes some 160,000 tonnes per year of waste from the Region of Peel. The current contract with the Region of Peel concludes in 2012. KMS is interested in discussing future waste disposal requirements with municipalities for the post 2012 timeframe. The Region of Peel currently pays approximately \$76 per tonne for disposal plus the cost of disposing of hazardous fly ash. The total cost is in the range of \$100 per tonne, excluding transfer costs.

Final Landfill Disposal Options

Regardless of the chosen waste diversion or residual waste processing options, there will always be some quantity of waste requiring landfilling. The quantity of waste generated in Owen Sound requiring landfilling is currently approximately 13,000 tonnes (2005). As noted, this quantity may be substantially reduced through increased waste diversion or residual waste processing.

Owen Sound currently requires all commercial, industrial, institutional and restaurant premises in the City of Owen Sound to recycle. Materials are to be dropped off at City Recycling Drop-off Centre or curbside collected. The IC&I sector may use Miller waste services or other private sector waste management companies to manage their waste disposal requirements.

Without a local landfill, waste generated in Owen Sound is exported for final disposal. The options for export currently include the business as usual option of exporting to the U.S.A., until the border closes, or exporting to a landfill in Canada. As the Miller Waste Management Contract expires in 2015, the City of Owen Sound does have a contracted means of waste disposal until that time.

Disposal of Owen Sound waste in the U.S.A is in jeopardy as early as 2008. A number of Public Sector and Private Sector landfill sites are in Ontario. In 2004, 16 public sector and 65 private sector landfills were permitted in Ontario¹. The majority of public sector and private sector sites are restricted by service area for receiving municipal waste. The majority of private sector sites are able to receive IC&I waste from across the province and/or out of province. Some landfills may be in a position to accept waste from Owen Sound, and/or amend their conditional C of A's to accept waste from Owen Sound.

While Miller Waste has committed to handling Owen Sound's wastes after the border closes, to minimize the risk to Owen Sound a number of other options have been reviewed.

¹ RIS, Private Sector IS&I Waste Management System in Ontario, December 2004

Private Sector Landfills

There are a number of potentially available private sector landfills that may be available for Owen Sound's wastes.

- Laflèche Landfill, projected closing 2020 (expansion under application) – Able to receive province wide Municipal and IC&I Solid Non-Hazardous Waste. The tipping fee at Laflèche Landfill in Moose Creek, Ontario would be in the range of \$50.00 per tonne, FOB Moose Creek (35km north of Cornwall). Waste transfer and transportation should be in the range of \$30.00 - \$40.00 per tonne.
- Ridge Landfill, projected closing 2020 – Able to receive province wide solid non-hazardous waste from the IC&I sector, owner BFI Canada.
- Warwick Landfill, in Lambton County, received approval for expansion in early 2007. It is approved to accept 750,000 tonnes of solid waste per annum (increased from 50,000 tonnes). Owned by Waste Management, it is intended that the landfill will accept waste from Ontario municipalities.

Local/Regional Disposal Solutions

Owen Sound also has the option of developing a local landfill site within the City of Owen Sound, the surrounding County or in partnership with another municipality. The hydrogeology of the local area and local public opinion are likely to be the determining factors in developing a local landfill within or outside the City of Owen Sound.

Another option, that was not discussed at the public workshops, is the mining of closed landfills. This approach has the potential to recover space for land filling within previously utilized areas. Landfill mining has been used successfully to gain landfill capacity in both North America and Europe. Mining generally entails excavating the site, screening to separate cover material from waste material, and some limited recovery of recyclable material like metal. New landfill capacity can be gained within the same footprint by more efficient placement and compaction of remaining waste and more effective and controlled use of landfill cover.

Exploring the feasibility of mining closed landfills in the vicinity of Owen Sound was outside of the scope of this project, and the approach would have to be analyzed for feasibility, cost-effectiveness and community acceptance before being actioned.

Final Disposal – Next Steps

In the short term Owen Sound should develop a contingency plan for waste disposal with a private sector company. Such a company could solicit capacity at market rates. Owen Sound may never need to use this contingency; however, creating this fall back position may be advantageous to the City.

The transfer of risk to the private sector is not without downside risk to Owen Sound, as any private sector company may default its contract if it has no operational alternative. The contingency plan need not be used; however, it would provide additional security for Owen Sound.

Owen Sound needs to solidify its options to capture long-term waste disposal capacity. The options include a new local/Regional landfill, exporting to the KMS Incinerator (or other facility that may be operational in 2015), or exporting to a landfill site in Canada.

In the medium term Owen Sound should negotiate with municipalities and/or private sector operators to secure long term management and disposal capacity and/or include final disposal requirements in any future residual waste processing contracts.

Evaluation of Residual Disposal Options

		Evaluation Criteria							
		Cost/ Affordability	Environmental Effects	Social Impact and Acceptability	Proven Technology	Ease of Implementation	Efficiencies	Extent of Local Control	Scalability
Disposal Options	Current Practice – Disposal in USA	Benchmark waste disposal cost for comparison to options	Licensed Landfill in MI, USA, 300km travel distance	Opposition to Canadian Waste entering the USA – Border closing begins in 2008	Licensed Landfill is well proven technology	Current program, waste stream already exists without additional sorting	Economies of scale based on the size of the landfill	Contracted to external facility	Not scalable – site capacity and fill rate has been approved
	Waste Stabilization (composting) Local	High cost – based on available tonnage (between 4944 and 2300 tonnes per year)	Positive – production of CO ₂ versus CH ₄ in landfill	Positive – reduced environmental impact from landfill	In-vessel (compost box) technology available at low tonnage.	Waste stream already exists no additional sorting	Economies of scale at higher throughput capacity	Can be managed by Owen Sound directly	Very scalable – in-vessel units
	Waste Stabilization (composting) Export	Lower cost per tonne if partnered with other municipalities	Positive – production of CO ₂ versus CH ₄ in landfill	Positive – reduced environmental impact from landfill	Many in-vessel technologies at higher capacity	Waste stream already exists no additional sorting	Economies of scale at higher throughput capacity	Contracted to external facility	Scalability depends on chosen technology and size of site, generally good scalability

Gasification/ Thermal Cracking etc.	Cost per tonne from supplier appears low (no direct comparable operations available)	Said to meet regulatory requirements – no Ontario data available	Mixed/ positive – becoming more socially accepted	Facilities in Europe, Asia and California	Waste stream already exists no additional sorting	Lower throughput can be used for steam generation. Higher throughput allows for electrical generation	Insufficient amount of waste locally. Would need to partner to increase tonnage	Very scalable – units are modular
EFW Export	KMS Incinerator cost approximately \$100-120/tonne plus shipping to Brampton, ON	Meets all environmental regulations	Existing facility is accepted locally	Existing facilities globally	Waste stream already exists no additional sorting	Higher efficiency at higher capacity	Contracted to external facility	No – designed for specific capacity
Landfill Export	Approximately \$90-\$110 per tonne depending on transportation cost to Moose Creek ON	Fully regulated landfill in Ontario. Distance to landfill ~600km	Existing Landfill – long distance to landfill	Existing Landfill	Waste stream already exists	Large Capacity landfill, very good operational efficiency	Contracted service – through waste collection contract or separate disposal contract	Large capacity site – not scalable
Local Landfill	High capital and approvals cost to implement	Approved landfill must meet specific requirements of the MOE	Will be subject to much public scrutiny	Landfill technology is well understood	Waste stream already exists	Approvals cost are not related to the size of the site – larger site reduces cost per tonne	Could be owned and operated by Owen Sound	Capacity not scalable once approved – expansion is site specific