2017 Excellence Award Entry

Recycling System Award

Niagara Region

Recycling Centre Improvements

Population: 431,346
Households: 184,160
Total Cost for Improvements: CDN $3.1 million
Cost per Household (After funding Grant): CDN $10.32

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Executive Summary (150 words)

Niagara Region is located in southern Ontario, Canada and is comprised of 12 municipalities. Niagara Region is responsible for the delivery of all waste management programs to over 190,000 households and various industrial, commercial and institutional properties.

Niagara Region operates a two-stream (containers and fibres) recycling program. With one of the most cost-effective facilities in Ontario and with a low residue rate, Niagara is proud of its MRF operations and its unique partnership with its processor, Niagara Recycling.

Recognizing the need to meet stricter market specifications, increase operation efficiencies and revenues, Niagara Region applied, and was successful in receiving $1.2 million dollars in funding to undertake recent MRF upgrades.

Since the upgrades, Niagara Region has increased its revenue by approximately $1 million annually, with a payback period for all four projects ranges from 0.375 to 2.8 years. Additionally, an annual cost avoidance of over $300,000 was also recognized.
Recycling System Excellence Award: Recycling Centre Improvements

1) Design and Planning of Recycling System

- What considerations were included in the planning process? How did you decide on the system design? What considerations were included in the planning process? How did you decide on the system design?

Niagara Region is continually researching opportunities to enhance its recycling program, and processing operations and to show innovation and leadership in the recycling industry. In 2013/14, the Region was successful in receiving $1.2 million dollars in funding from the Continuous Improvement Fund (CIF), a program developed through a partnership among Waste Diversion Ontario (WDO), the Association of Municipalities of Ontario (AMO), the City of Toronto and Stewardship Ontario. Its mandate is to improve the effectiveness and efficiency of Ontario’s municipal blue box program. This funding was used to purchase and install four new pieces of equipment: a glass clean-up system (GCS), an eddy current separator (ECSS), a polystyrene densifier system (PDS) and a fibre optical sorting system (FOSS) in its MRF to increase operation efficiencies, produce higher revenues and to secure sustainable end markets.

Glass Clean-up System (GCS)

The purpose of this project was to address the Region’s issues with processing mixed broken glass (MBG) internally within its Ecoglass manufacturing process. The Ecoglass manufacturing process recycles glass into fine particles that are used for sandblasting abrasives. Due to deteriorating quality of MBG, proposing MBG through the existing Ecoglass processing system was becoming a challenge. To overcome this issue, Niagara Region and its processing operator, Niagara Recycling, investigated glass clean-up systems that would allow it to process its MBG and produce an acceptable end product.

The GCS enabled Niagara Region to avoid costly disposal costs for MBG at other facilities and permitted the Region to process the MBG through the Ecoglass manufacturing process. As well, the GCS will eventually provide Niagara Region with an opportunity to process MBG from other municipalities. The GCS was installed and commissioned in April 2014.

Niagara Recycling, Niagara Region’s processing contractor, researched and developed the original design for the Ecoglass manufacturing process in 2005. Through various research efforts including MRF tours, attending equipment vendor fairs and discussing our objective with various vendors, Niagara Recycling decided to work with Kice Industries, an equipment manufacturer in the United States. During the research phase, samples of the dirtiest feedstock were shipped to Kice Industries, for analysis in their test laboratory. Results from the analysis positively showed that their equipment was able to efficiently clean-up the dirty feedstock by removing the majority of contaminants. Once installed the process was further refined through on-going discussions with the equipment manufacturer. Niagara Recycling worked collaboratively with Kice Industries to custom design retrofits for the Ecoglass manufacturing process.
Javelin Eddy Current Separator System (ECSS)
The purpose of this project was to increase the recovery of used beverage containers (UBC) from the material stream and to increase the quality of UBC shipped to end market. At the time, Niagara Region was shipping its processed UBC’s to a secondary end market, at a substantially discounted price, due to contamination levels of approximately 8%. In 2014, a Request For Quotations was issued for the manufacturing and installation of an eddy current separator for the purposes of decreasing contamination and increasing the collection efficiency of non-ferrous metals from the UBC stream. The equipment performance was to guarantee a minimum of 98% UBC purity and 98% UBC recovery. Prior to installing the ECSS, field testing was conducted at the Javelin facility in Fort Wayne, Indiana to verify that the equipment would achieve the performance targets. In addition, staff toured a facility where a similar piece of equipment was installed to view the performance of the equipment in action. The new ECSS was anticipated to improve the recovery of UBC’s by approximately 10% over current levels. The Javelin ECSS was installed and commissioned in December 2014 with enhanced throwing capabilities to increase recovery of UBC’s and to minimize cross contamination in the ejected stream.

GreenMax EPS Densifier (PDS)
The purpose of this project was to manage expanded polystyrene (EPS) independently from mixed plastics in order to produce higher revenues from curbside-collected mixed plastic material produced by the MRF. At the time, the Region was blending its EPS with its 2 to 7 mixed plastics stream (excluding #2 HDPE bottles) and selling this material at a discounted price to an Ontario based mixed plastics processor. Staff worked with consultants from the Canadian Plastics Industry Association (CPIA), a not-for-profit association dedicated to the growth of the plastics industry, to find an efficient and cost effective solution for removing EPS from the mixed plastics stream. As part of the research, a tour was conducted at a commercial facility in Hamilton, Ontario to view the performance of GreenMax EPS densifier. CPIA consultants reviewed and provided input on the layout and design of the system which included two (2) new conveyors and sort platform. The GreenMax EPS Densifier (PDS) was installed and commissioned in February 2016 to produce densified blocks of EPS that met the specifications of the end market.

Fibre Optical Sorting System (FOSS)
The purpose of this project was in to increase the recovery of old corrugated cardboard (OCC) and boxboard (OBB) from the newsprint stream. Extensive research was conducted. This included discussions with leading industry consultants and touring facilities with existing fibre optical equipment installed in Pittsburgh and Chicago. After a detailed cost benefit analysis was completed by Niagara Region’s finance department, and approved by Niagara Region Council, a Request for Proposal (RFP) was developed and issued in 2015 for procurement and installation of the equipment in which minimum specifications were outlined (i.e. scan light intensity ≤ 180 watts per metre to minimize electrical consumption). The RFP document was developed in-house and peer reviewed by a leading industry expert. Following the competitive RFP process, VanDyk Recycling Systems was selected as the preferred manufacturer. The FOSS was installed and commissioned in December 2015.

What factors did you consider to be most important?
The most important factors during the planning process, were gaining additional efficiencies, improving quality of the material stream and increasing revenues with payback period of less than five years. The new equipment improvements were seamlessly integrated into existing operations and design of the MRF, as seen below in Figure 1, and the MRF operations experienced zero downtime throughout
the installation and commissioning of all four pieces of equipment. A majority of the construction and installation work was completed during off hours to reduce the impact on processing.

![Figure 1: Engineering drawing of the MRF with new equipment added](image)

- **Describe the equipment used at the facility, including its efficiency and effectiveness.**

**Glass Clean-up System (GCS)**

The GCS increases operation efficiencies and produce higher revenues from curbside-collected mixed broken glass material produced by the MRF. In addition to producing an end product this GCS provides the Region with an opportunity to process mixed broken glass from other municipalities with the purpose of cleaning their glass to current market specifications. The new GCS will result in a savings of approximately $101,310 annually.

The GCS is comprised of three main system components: a trommel screen, a bucket elevator and an aspirator. The Ecoglass process includes eight steps to remove residue from the glass stream. The trommel and aspirator perform two of these eight steps, removing 21% of the total input residue stream. The magnet separators screens and other air separation systems
remove the remaining 79%. Combined, the eight steps remove 1,130 kilograms per hour of residue from the system. The average processing rate for the Ecoglass system is 3.48 tonnes per hour.

Across recycling programs in Ontario, one of the greatest challenges is the collection and processing of glass. The processing of recycled curbside collected glass usually results in higher maintenance costs, higher residue rates, higher sorting costs and reduced revenue for municipal recycling facilities. Furthermore, because much of the glass collected is broken during collection, compaction or processing, the small pieces of broken glass get missed in traditional sorting practices and end up in landfill or used in aggregate applications at a significant cost to municipalities. This is not the case in Niagara Region, thanks to the innovative Ecoglass process of cleaning, grinding, drying, screening and packaging. The Ecoglass system has an 8,000 tonnes / year processing capacity. Rather than costing Niagara Region to process glass, the Region is provided with revenue while diverting tonnes of broken glass from the Region’s landfills. Ecoglass is processed into three different sizes and sold in 1,360 kg super sacs and 22.7 kg sealed plastic bags. Ecoglass is used most commonly for sandblasting in applications such as auto body and auto parts, construction equipment, light fabricated metal, wood and other sensitive surfaces, and industrial applications.

The benefits of Ecoglass, compared to similar abrasive products include: no detectable “crystalline silica”, no heavy metals, free of chloride and other salts, environmentally friendly and an angular shape that makes the glass very effective for sandblasting at lower pressures.

**Eddy Current Separator System (ECSS)**

The ECSS increases separation efficiencies and produce higher revenues from curbside collected aluminum beverage containers material produced by the MRF. Specifically, the ECSS enables the Region to increase the recovery and resale value of its aluminum beverage containers. Between recovery and resale value, the ECSS is generating over $220,000 per year in additional aluminum beverage container revenue.

The process is as follows:

- After plastics have been sorted on the container line, the remaining material move along to a magnetic separator, where a magnet lifts the steel containers from the glass, plastic, aluminum and polycoat materials.
- The high conductivity of the aluminum beverage containers allows for the greatest effectiveness of the technology. The gauss (Magnetic Field Strength) on top of the belt is maximized to consistently read over 4,200 MgO; this translates into longer throws of the material, which provides a more pure product for end market.
- In addition to this, deepening the catch field and widening the ECSS from 30” to 48” provided a higher recovery, allowing even burdened material to be captured. The eccentric set of the rotor in the shell allows the adjustment to be made as close as possible to the inside of the shell, in turn maximizing the outside field strength.

**Fibre Optical Sorting System (FOSS)**
Implementation timeline once equipment arrived on site in early November was about five weeks. System started operating December 7, 2015. Niagara Region received a grant of just over $1 million from CIF for a net cost to the Region of approximately $1.5 million. The return on investment is based on higher revenues for newsprint and increased recovery of cardboard and boxboard which has a higher market value than newsprint. The FOSS equipment and installation was completed by Van Dyk Recycling Solutions.

The fibre optical sorting system uses near infrared technology to efficiently detect and separate different types of recyclable materials. The process is as follows:

- Mixed fibre including Old Corrugated Cardboard (OCC), Old Boxboard Blend (OBB) and Old newsprint (ONP), as well as plastic film, polycoat cartons, containers and residue are split into two equal streams and conveyed to a vibratory feeder. The feeder spreads the material evenly across the 9 foot width.
- Material cascades onto an accelerator conveyor that is 9 feet wide and moving at a speed of about 500 feet per minute. This conveyor thinly distributes material to the optical sorters.
- The two twin Titech optical sorters are programmed to recognize and eject OCC, OBB, polycoat cartons and plastics utilizing infrared technology. These high resolution scanning units sort by size, colour, weight and shape.
- The ejected material consisting primarily of OCC and OBB is transferred to an existing sorting line for further processing and baling. The baled OCC/OBB is shipped to mills in Trenton and Brantford, Ontario and Niagara Falls, NY.
- The pass through material consisting of newspaper, magazines and office paper is transferred to existing sort lines for final sorting. The clean paper is then loaded and transported to Resolute Forest Products in Thorold.

The FOSS increases separation efficiencies and produces higher revenues from curbside collected mixed fibres produced by the MRF. Specifically, the FOSS will enable the Region to increase the resale value of its newsprint and the volume of hardpack (Old Corrugated Cardboard/Old Boxboard blend) that is marketed to end markets. It is projected that the net benefit of the FOSS will be over $699,066 annually, before capital amortization costs.

Polystyrene Densifier System (PDS)

Installation in January 2016, the project was completed in about 6 weeks. The process is as follows:
- Contaminants are manually removed from the polystyrene on a conveyor,
- PS is pre-shredded to smaller sizes, Shredded PS is blown into a storage silo,
- From the silo, PS is fed into the compactor unit where material is compressed into large cubes measuring 18 inches wide by 18 inches tall by 48 inches long and weighing approximately 100 lbs. Compression ratio is 50:1.
The new PDS manages the polystyrene independently from mixed plastics thus producing higher revenues from the Region’s mixed plastic stream. Specifically, the PDS will enable the Region to increase its revenue stream from the sale of mixed plastics. The new PDS will generates over $72,000 per year in additional revenue for the Region from the sale of mixed plastics, after factoring in PDS net processing costs. In addition, the new PDS will ensure that the Region has multiple sustainable markets for these two plastic grades for the future

- **Discuss the overall merits and impact of the recycling program.**

Through the equipment upgrades, Niagara Region is able to work towards achieving a diversion target of 65% by 2020 by increasing the recovery of marketed materials and by decreasing the amount residue being sent to the landfill. Niagara Region has an average residue rate of 4.12%; one of the lowest residue rates in Ontario. The sale of recyclable materials generates annual revenues of over $9 million. Revenues are used to off-set the costs of Waste Management services to local taxpayers. In addition, through Niagara Region’s partnership with our non-profit processing contractor, Niagara Recycling, money is donated back to the community to support developmentally challenged adults.

Niagara Region’s Recycling Centre is a leader in the highly competitive recycling industry. The upgrades resulted in increased operational efficiencies, which resulted in the production of high quality marketable material. Increased quality results in increased revenue and allows the Region to secure long term sustainable end markets. As an industry leader, the Region is able to pave the way for other recycling programs through knowledge transfer with other recycling facilities that may be looking to install similar pieces of equipment to improve their operational performance.

- **What is unique about this system that takes it to the ‘excellence’ level? Demonstrate how the equipment is ‘state of the art’ and how it contributes to minimizing impact on human health, resource conservation and the environment.**

There are several factors that make the system in Niagara Region unique:

- **GCS -** Niagara Region is the only MRF in Ontario that use MBG produced in the MRF to manufacture a product for retail and industrial markets. The GCS enables Niagara Region to process the MRF’s mixed broken glass to produce Ecoglass for use in the sandblasting industry, as an alternative to silica sand and avoid the purchase of more expensive pre-cleaned residential mixed broken glass.

- **PDS -** Niagara Region is the only MRF in Canada that has a fully integrated PDS system in its MRF. This system compresses larger volumes of PS into highly dense blocks, which can be turned into new products such as pictures frames, decorative moulding and office supplies; for every densified load, 35 to 40 trucks of loose PS is taken off the road.

- **FOSS -** Niagara Region is the first MRF in Canada to use optical sorting technology to eject browns, polycrjat, plastic film and mixed plastics in a single eject optical sorter from a mixed fibre stream. This system improves the quality of recycled newsprint, and greater recovery of cardboard and boxboard resulting in higher revenues.

Niagara Region’s MRF is able to remain competitive within the market industry through the installation of state of the art equipment and improve the quality of the material being shipped to end markets.
2) Use of Equipment/Systems and Technologies

- Explain the facility’s waste screening procedure?

The initial waste screening process starts at the curb with an aggressive compliance program, where residential material is tagged if it does not meet set out requirements. The tagged notice notifies residents of why their material was left behind in order to educate them on acceptable materials in order to achieve a low contamination rate at the MRF. Niagara Region stipulates in its collection contract that contaminate levels cannot exceed 2% by volume per load. Random audits are conducted to ensure this condition is met.

The final design, with the incorporated upgrades, ensures a seamless connection to existing equipment and effectively utilizes building space. This allows for an uninterrupted flow of material through the MRF.

Detailed material flow through MRF upgrades is as follows:

When the materials reach the MRF, the loader operator conducts an initial screening when moving recyclables from the tip floor to the pre-sort lines.

Pre-Sort Line – Grey Box materials

As materials are sorted, they are directed to chutes which lead to large bunkers (storage areas) located below the sorting lines. Each sorted material has its own bunker.

1. Sorting staff remove any contaminants (items that do not belong on the sorting line). For example, items such as wrapping paper, organic waste and food wrappers that were incorrectly placed in the Grey Box, as well as recyclable materials that should have been placed in the Blue Box. The Blue Box materials that are removed are transferred to the container sorting line. It is important for residents to place items in the correct recycling box to ensure an efficient sorting process.

2. The plastic bags, film and outer-wrap are removed from the sorting line. Collecting plastic bags, film and outer-wrap with paper and cardboard allows this material to remain cleaner and to be more easily sorted from other recyclables. When plastic bags, film and outer-wrap are collected with container recyclables, they can become contaminated with pieces of glass, liquid and food residues and are difficult to sort from the other materials.

3. Bags of shredded paper are removed, opened and placed down a chute. Shredded office paper is a valuable recyclable material.

4. Remaining cardboard, boxboard and paper materials continue to a screening system with large steel discs that separates the newspaper, magazines and smaller cardboard and boxboard from the larger cardboard and boxboard. The separated fibre material is then sent to the new optical sorter and secondary Grey Box processing lines.

Optical and Secondary Processing Lines

1. The larger cardboard and boxboard, that was screened, is sent to a conveyor where sorting staff remove any contaminants such as plastic bags and newspaper. The clean cardboard and boxboard is transferred to an automatic baler that compacts this material into 635 kg bales.
2. The smaller cardboard, boxboard, newspaper and magazines that fell through the screen discs are sent to the new optical sorting process. The material is separated evenly into two parallel processing lines. The material is conveyed to a vibratory feeder, then onto an accelerator conveyor which moves at approximately 150 metres per minute and spreads out the material evenly. The material then passes under an optical sorter that scans the material using near infrared technology and visual spectrometry to identify cardboard and boxboard and any plastic materials. A signal is sent to a valve block where compressed air ejects the identified items away from the newspaper and magazines, at a very high rate of speed.

3. The ejected material (which is mostly cardboard and boxboard) is transferred to a manual sorting line for final clean-up and then to the baler. The material that is not ejected is transferred to two twin sorting lines where sorting staff remove any remaining cardboard and boxboard and other contaminants such as plastics, metal and residue from the newspapers and magazines.

4. The newspaper and magazines fall off the end of the two lines into a storage bunker where the front end loader loads the clean material into large trucks for delivery to the paper mill.

**Pre-Sort Line – Blue Box materials**

1. Sorting staff must remove any contaminants. This can include non-recyclable items such as small appliances, organic waste and food wrappers that were incorrectly placed in the Blue Box. In addition, materials that should have been placed in the Grey Box must be removed. The recyclable Grey Box material is transferred to the Grey Box line for processing.

2. Plastic bags that were incorrectly placed in the Blue Box are removed. Large empty plastic bags that were used as containers for collection are also removed and captured for recycling.

3. Larger mixed plastics (i.e. plastic pails, flower pots and trays, typically larger plastic containers and packaging numbered 3 through 7), are manually sorted off the line

4. High density polyethylene (HDPE or #2) plastic containers such as detergent, shampoo and windshield washer bottles are sorted manually

5. Polystyrene plastic (i.e. Styrofoam containers, cups, and packaging) is manually sorted and transferred by conveyor to the new polystyrene densifier system. The polystyrene densifier pre-shreds the polystyrene into smaller sizes and blows the material into a storage silo. From the silo, polystyrene is fed into the compactor unit where material is compressed into large cubes weighing approximately 43 kg at a compaction ratio of 50:1.

6. The remaining material moves along to the new magnetic eddy current separator system where a magnet lifts the steel containers from the glass, plastic, aluminum and polycoat materials

7. Once the steel has been removed, the remaining material passes over a glass breaker screen that breaks the glass into pieces less than 2 inches in size. The broken glass is stored in a bunker and used to make Niagara Ecoglass.

8. After the glass has been removed, the remaining plastic, aluminum and polycoat cartons (milk cartons/ juice boxes) pass through a perforator which flattens the material and then they move along to the secondary sorting process.

**Secondary Sorting Lines**

1. As the remaining material move along the conveyor, sorting staff manually remove aluminum foil while the remaining plastic, polycoat cartons and aluminum cans head towards the optical sorter
2. The optical sorter uses near infrared light technology and compressed air to automatically separate the materials into three categories: water and pop bottles (Polyethylene terephthalate bottles and containers), mixed plastics and aluminum cans and polycoat cartons.

3. After the optical sorter, sorting staff manually remove the polycoat cartons, while an eddy current automatically removes the aluminum cans.

**Glass Recycling Process**

The glass from the container line that is stored in concrete bunkers is picked up by the front-end loader and placed into a hopper. The glass passes under a magnetic separator to remove any steel and then the glass continues onto an eddy current separator, where aluminum is removed.

The metal free glass falls on a sort conveyor where a sorter manually removes any large plastics or other contaminants. The glass is then fed into the primary grinder where it is ground to ¾ inch size. The ground glass is discharged onto a ¾ inch screen which removes large contaminants such as corks, plastics and large labels. This residue is sent to landfill. The packaged products will be loaded into transport trailers and sold to end markets.

3) Regulatory Compliance

- **Explain how the site complies with environmental laws and regulations, particularly those that are unique to your state or community**

An Environmental Compliance Approval (ECA) is required to operate a MRF in the province of Ontario. ECAs, which stipulate operating terms and conditions, are issued by the Ontario Ministry of Environment and Climate Change (MOECC). Currently, two ECAs govern how the MRF is operated and requires annual reporting to the MOECC on all operations. Daily and weekly inspections are required and results are captured in the annual reports submitted to the MOECC.

- **Describe and include supporting documentation (awards, letters of support or facility inspection data) that provide third-party verification of your facility’s regulatory record.**

Through the partnership between Niagara Region and Niagara Recycling, Niagara Recycling continues to offer financial support to non-profit agencies involved in providing opportunities and support for developmentally challenged adults through the management fee paid for the operations for the MRF.

Below are only a few examples of feedback, and gratitude received from some of these agencies, as well as links to media coverage for system upgrades: Niagara Recycling gives Styrofoam new life, Niagara Region has become first municipality in Ontario to install a polystyrene foam densifier, New recycling technology launched in Niagara | St. Catharines Standard, Densifier to cut Canadian Traffic
On behalf of our choir, our team and Board of Directors, thank you for your generous gift and the opportunity to continue our mission in improving the lives of musicians with disabilities. We believe in an inclusive society, where the gifts of unique artists can be professionally nurtured and given the opportunity to share their passion for music and performance.

Figure 2: Momentum Choir

“Through our long standing partnership with the Niagara Region, Niagara Recycling is proud to have supported the Autism Spectrum Disorder Summer Movement Camps at Brock University for nearly all of its 20-year history,” says Niagara Recycling Chief Executive Officer Norman Kraft.

Since 1997, Niagara Recycling has donated more than $317,000 in financial commitments to disability programming at Brock University with more than $137,000 going to the ASD Summer Movement Camp. Their support also contributes to Brock University’s Special Needs Activity Program (SNAP), Saturday SNAP and the Confident Healthy Active Role Models (CHARM) Initiative.

The generous gift of $180,000 from Niagara Recycling in 2014 enabled the creation of the Experiential Education Coordinator, Inclusive & Adaptive Physical Activity position at Brock University. This position manages disability programming for the Special Needs Activity Program (SNAP), Saturday SNAP, Confident Healthy Active Role Models (CHARM) and Autism Camps. This programming is vital to the Niagara community and to the education of our students, and the impact of these programs is significant for all involved. We thank Niagara Recycling for this tremendous support that has created far reaching impact for our program participants.

Figure 3: Media Release - Brock University, Communications & Public Affairs & Dean of Faculty of Applied Health Sciences at Brock University

• Describe any regulatory citations received and how problems were corrected.

Niagara Region has not received any regulatory citations since commissioning the MRF in 2004.

4) Worker Health & Safety

• Describe employee training frequency and topics. What safety procedures do you use and how do you enforce them?

Safety procedures are detailed in health and safety policies. Enforcement is by Supervision through daily inspections and interactions with plant staff. Equipment maintenance manuals and safety procedures are also used to ensure equipment is repaired safely.

Depending on the safety topic, frequency varies as follows:

<table>
<thead>
<tr>
<th>Annually</th>
<th>Every 3 years</th>
</tr>
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<tbody>
<tr>
<td>WHMIS</td>
<td>Confined Space</td>
</tr>
<tr>
<td>Lockout</td>
<td>Fall Protection</td>
</tr>
<tr>
<td>Slips, Trips and Falls</td>
<td>Accident Investigation</td>
</tr>
<tr>
<td>Musculoskeletal Injury Prevention</td>
<td>Lift Truck</td>
</tr>
<tr>
<td>Drug and Alcohol Awareness</td>
<td>Snorkel Lift</td>
</tr>
<tr>
<td>Violence &amp; Harassment</td>
<td>Front End Loader and Skid Steer</td>
</tr>
<tr>
<td>Driver training</td>
<td>Electrical Safety Awareness</td>
</tr>
</tbody>
</table>

During MRF upgrades a significant amount of work was completed during off hours to ensure no disruption with the processing of recyclables. This resulted in little interferences with construction and MRF operations. This limited the potential for any health and safety issues throughout the project.

• Include injury rates and what methods have been used to reduce injuries.
No injuries related to the new equipment. Injuries are reduced through worker education including monthly plant safety meetings, Joint Health and Safety Committee monthly meetings, monthly Safety and Environmental Plant Inspection, safety bulletin boards and daily safety messaging on large screen television located in employee lunch room.

5) **Performance, Economics & Cost-Effectiveness**

Niagara Region measures success of its recycling program by diverting more materials from landfill, improving final material quality, lowering operational and maintenance costs, increasing recyclable sales revenues, and reducing downtime. Each project’s goals, objectives, results and outcomes are outlined below:

**Glass Clean-up System**

Niagara Region applied to the CIF in April 2013 for funding to purchase and install a GCS in its MRF to increase operation efficiencies and to produce higher revenues from curbside collected MBG. Specifically, the GCS will enable the Region to avoid costly disposal costs for MBG to other facilities and permit the processing of the Region’s MBG through the Ecoglass manufacturing facility. As well, the GCS may provide the Region with an opportunity to process MBG from other municipalities with the purpose of cleaning their glass to current market specifications. Below are the project’s goals, objectives, results and outcomes:

<table>
<thead>
<tr>
<th>Goals and Objectives</th>
<th>Results and Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase operation efficiencies.</td>
<td>Discontinued stockpiling of MBG.</td>
</tr>
<tr>
<td>Produce higher revenues from curbside MBG.</td>
<td>Process the previously stockpiled MBG.</td>
</tr>
<tr>
<td>Avoid costly disposal or storage costs.</td>
<td>Stop the purchase of the cleaned glass for use in the EcoGlass system.</td>
</tr>
<tr>
<td>Permit processing of EcoGlass on site.</td>
<td>Estimated $101,310 in net savings, in addition to avoided costs from the potential purchase of cleaned glass</td>
</tr>
</tbody>
</table>

**Eddy Current Separator System**

The ECSS was installed in the MRF to increase separation efficiencies and produce higher revenues from curbside-collected, Used Aluminum Beverage Container (UBC’s) material produced by the MRF. Specifically, the ECSS will enable Niagara Region to increase the recovery and resale value of UBC’s. Below are the project’s goals, objectives, results and outcomes:

<table>
<thead>
<tr>
<th>Goals and Objectives</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Increase separation efficiencies.</td>
<td>Amount of UBCs in residue stream decrease by an average of 4.4% which equates to a 28% increase in recovered UBC from the residue stream when comparing pre and post installation data.</td>
</tr>
<tr>
<td>Produce higher revenues from curbside UBCs.</td>
<td>Amount of UBCs recovered from residue</td>
</tr>
</tbody>
</table>
Recycling Centre Facility Improvements

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<table>
<thead>
<tr>
<th>Goals and Objectives</th>
<th>Results and Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase recovery and resale of UBCs.</td>
<td>Niagara Region realized an increase in revenue of approximately $220,000 by implementing the ECSS.</td>
</tr>
<tr>
<td>ECSS projected to generate $185,000 in additional revenue per year</td>
<td></td>
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**FOSS**

The FOSS was installed in the MRF to increase the recovery of old corrugated cardboard (OCC) and boxboard (OBB) from the newsprint stream and to reduce the level of contamination in the newsprint stream. Specifically, the FOSS will enable Niagara Region to increase the resale value of newsprint. Below are the project’s goals, objectives, results and outcomes:

<table>
<thead>
<tr>
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<th>Results and Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase recovery of OCC and OBB from the newsprint stream.</td>
<td></td>
</tr>
<tr>
<td>Reduce overall contamination in the newsprint stream.</td>
<td></td>
</tr>
<tr>
<td>Increase newsprint sales.</td>
<td></td>
</tr>
<tr>
<td>Reduce newsprint contamination levels to 9%.</td>
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</tbody>
</table>

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**PDS**

The PDS was installed in the MRF to manage expanded polystyrene (EPS) independently from mixed plastics, to produce higher revenues from curbside-collected mixed plastic material produced by the MRF. Specifically, the PDS will enable Niagara Region (the Region) to increase its revenue stream from the sale of mixed plastics. Below are the project’s goals, objectives, results and outcomes:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Manage EPS independently from mixed plastics.</td>
<td>EPS decreased from roughly 3% to less than 0.25% by weight when comparing pre and post audit data in the mixed plastic stream. As a result, the Region increased its quality of the mixed plastics revenue stream by over 80%.</td>
</tr>
<tr>
<td>Produce higher revenues from curbside-collected</td>
<td>The tonnage of mixed plastic increased by</td>
</tr>
</tbody>
</table>
Increase revenue from the sale of mixed plastics. Projected $55,000/year in additional mixed plastics revenue, after factoring in PDS net processing costs.

9% and sales increase by 55%. Sales increase is primarily due to increased quality of mixed plastics being sold.

- How much downtime does the system have, how long is each instance on average and what measures have you taken to reduce downtime?

There has been no system downtime since the commissioning of the MRF upgrades.

- How does your organization foster customer service? How do you determine whether you are doing a good job in responding to customers?

Niagara Region’s Council has established strategic priorities under advancing organizational excellence by building a strong internal foundation to enable a more prosperous Niagara – through integrated customer service model that addresses the multiple ways customers access Niagara Region services, including Waste Management.

Niagara Region’s waste management website is available to its residents 24/7 – to help them find where various household items go, locations for disposal, purchasing Blue/Grey Boxes and Green Bins, historical presentations, or to connect with the Region for any enquiries or complaints. In 2016, the waste management landing page received 52,557 page views.

Niagara Region’s Waste Info-Line is operated year-round by three full-time, trained customer service representatives. Residents are able to call in Monday to Friday 8:00 a.m. – 4:30 p.m. with any questions, comments, concerns or complaints about their waste, recycling and organics collection services. To ensure customer satisfaction, all calls are retuned within one day, and missed collection must be collected no later than the following day by noon in accordance with the curbside collection contract. In 2016, the Waste-Info Line received 27,612 calls. 82% of calls were answered within 30 seconds by a customer service representative. The average talk time per call is 1 minute, 29 seconds. By 2018, the Region has set an internal target is to answer 90% of the calls within 30 seconds, aligning with best practices in customer service.

Niagara Region also has an internal standard for all staff to ensure that any communication they receive is provided with a response within 24 hours; this has been a standard that has been successfully carried over the years. Staff receive frequent training and communication on customer service standards, with the ultimate goal of exceeding the customer’s expectations, with every interaction.

- Explain whether the system operation within its budget and whether costs are appropriate. Describe how long it has taken, or will take, for the organization to recoup costs for the facility or program. Explain how return on investment funds, if any, are applied to enhancing programs, doing educational outreach, or being applied to other community endeavours.

A total capital investment of $3,158,576 was made between the four major projects outlined in this submission. Niagara Region submitted an application and received funding grants for all four projects discussed in this submission. Each project’s total cost, granted CIF funding and estimated payback period are listed in Table 1. The payback period for each investment was calculated by taking into the capital investments, operational expenses and savings, sales
revenues, avoided disposal costs, and overall funding granted. The return on investment funds are applied to enhancing programs and service levels by helping to reduce the cost of waste management services to the tax payer, and providing Niagara Recycling with funds to continue making donations to organizations within the community.

Table 1: Project Budgets, Investments, Funding and Payback Periods

<table>
<thead>
<tr>
<th>Project</th>
<th>Budgeted Funds</th>
<th>Actual Investment</th>
<th>CIF Funding</th>
<th>% CIF Funded</th>
<th>Estimated Payback Period After Commissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECSS</td>
<td>$138,187</td>
<td>$117,994</td>
<td>$41,022</td>
<td>35%</td>
<td>0.375 Years</td>
</tr>
<tr>
<td>GCS</td>
<td>$225,000</td>
<td>$252,607</td>
<td>$116,440</td>
<td>46%</td>
<td>1.4 Years</td>
</tr>
<tr>
<td>PDS</td>
<td>$96,073</td>
<td>$227,002*</td>
<td>$40,812**</td>
<td>18%</td>
<td>2.5 Years</td>
</tr>
<tr>
<td>FOSS</td>
<td>$2,508,329</td>
<td>$2,560,973</td>
<td>$1,017,600</td>
<td>40%</td>
<td>2.8 Years</td>
</tr>
</tbody>
</table>

* At the time of budget development, system integration was not part of the system design. The final design integrated the system into the existing system at the Region’s MRF by adding two new conveyors and a sorting platform. The total cost to integrate the system was $129,112.

** CPIA also provided funding in the amount of $17,000 towards the purchase and installation of the PDS.

6) Public Acceptance, Appearance and Aesthetics

- **Provide evidence that the facility is a good neighbor in the community.** Describe your public relations program and the types of public education you do to help your community understand what your facility does

Niagara Region partners with Niagara Recycling to operate the Recycling Centre facility. Niagara Recycling is a non-profit social enterprise that delivers funds generated from managing the recycling process operations back into the community.

Since 1996, Niagara Recycling has donated over $2 million to support non-profit agencies that are involved in providing opportunities, programming, and support for developmentally challenged adults. They work closely with Niagara Training & Employment Agency providing funding to their facilities, programs and employment opportunities for adults in the Recycling Centre. Niagara Recycling also partners with Brock University, Red Roof Retreat, and Momentum Choir, providing programs to support individuals with developmental disabilities; including movement and recreational programs and nurturing their musical talent.
In addition to the external support to the greater community, Niagara Region and Niagara Recycling also facilitates tours of the Recycling Centre to community groups and elementary, high school and post-secondary institutions to educate the public on the recycling process. Educational videos have also been developed by Niagara Region for comprehensive outreach, allowing large groups of students and community groups to take a ‘virtual tour’ during our presentations about Niagara Region’s recycling programs. Our recycling mascots, Benji the Blue Box and Greycie the Grey Box often join staff at community events, camps and during community and school presentations to help promote the importance of recycling. With the addition of the new equipment and upgrades, updates are required to ensure the public is receiving information about the entire recycling process and understand the diversion efforts of the Niagara Region. To further educate residents, educational materials are developed to inform residents of the recycling process.

Phone calls from residents are tracked through our reporting software, and since the partnership with Niagara Recycling in operation of the site, Niagara Region has only received two minor complaints since the opening of the MRF in 2004.

- **How do you ensure that the facility and vehicles are clean and aesthetically pleasing?**

As part of the ECA, staff conduct daily litter clean ups around the site, and each inspection is documented and signed off by staff and management. The loader operator ensures trucks do not leave facility with material outside of vehicles. Drivers are also required to undertake a thorough inspection of their vehicles before exiting the site. To date, Niagara Region has not received any litter complaints.