1. **Committee Membership**

   Councillor Stephen Chase, Chair
   Councillor Eric Price, Vice-Chair
   Councillor Kevin Darrah, Member
   Councillor Greg Ericson, Member
   Councillor Steven Hicks, Member
   Councillor John MacDermid, Member
   Councillor Eric Megarity, Member

2. **Agenda**

   2.1 **Garbage & Recycling Program Consultant Services**

   PowerPoint Presentation by:
   - Stephen Hartley, Development Engineer

   2.2 **Garbage & Recycling Program Review**

   PowerPoint Presentation by:
   - Andrew Philopoulos, Consultant with GHS Limited
PUBLIC SAFETY & ENVIRONMENT COMMITTEE

Garbage & Recycling Program Consultant Services

GHD Limited

Tuesday March 14, 2017
Agenda

1. Introductions and format of meeting
2. City’s current garbage & recycling programs
3. GHD – Preliminary report & recommendations
4. Questions & Discussion
5. Next Steps
City of Fredericton Programs for Waste & Recycling

What We Do

• Weekly curbside collection of residential garbage & recyclables
• Recycle depot program for residents of certain condominium buildings and for apartment buildings over 4 units
• Curbside collection of yard waste: Spring Yard Program and Fall Leaf Collection

We are a collection agency
City of Fredericton Programs for Waste & Recycling

What We Do Not Do

• Collection of sorted styrofoam or glass for recycling (*FRSW*)
• Collection of kitchen waste for composting (*FRSW*)
• Collection of curbside garbage or recyclables at apartment buildings with more than 4 units
• Collection of garbage or recyclables at the Institutional, Commercial, Industrial (ICI) Sector
• Have enforcement processes
City of Fredericton Programs for Waste & Recycling

• In NB, solid waste management and recycling is done on a regional basis.
• Any waste and recycling processing solutions require the involvement of Fredericton Region Solid Waste & surrounding communities.
Partners

• Fredericton Region Solid Waste (Regional Service Commission 11)  
  Operate landfill and recycling facilities

• Fero Waste & Recycling Inc.  
  Collect curbside garbage, recyclables and yard waste & leaves

• GFL Environmental  
  Collect material from recycle depot sites

• City Compost Facility  
  Receives and processes yard waste & leaves
P16-05 GARBAGE AND RECYCLING PROGRAM CONSULTANT SERVICES

• A complete review of the current collection programs;
• Comparison of the programs and costs with similar programs in Canada;
• Explore options for possible operation of a residential compost program;
• Provide recommendations on changes to the collection programs.
Public Safety & Environment Committee
Garbage and Recycling Program Review
The City of Fredericton
March 14, 2017

Andrew Philopoulos P.Eng., M.Sc. | Associate, GHD
Robert Turner, P.Geo., MASc.   | Associate, GHD
Blair Shoniker, MA., RPP       | Senior Waste Planner, GHD
Brian Dermody, P.Eng.          | Solid Waste Engineer, GHD
Agenda

1. Current State of Solid Waste Management
2. Residential Waste Management Survey
3. Diversion
4. Automated Collection
5. Multi-Unit Residential Recycling
6. Residential Composting Program Review
7. Glass Recycling
8. Recommendations
Current State of Solid Waste Management

• City of Fredericton has:
  - Administered a curbside recycling collection program for the last 16 years
  - Managed leaf & yard waste collection and processing for last 25 years
  - Recognized the importance of continually adapting waste management programs

• City residents noted that current recycling program was well regarded
Current State of Solid Waste Management

- Key Challenges:
  - Low diversion from landfill disposal
  - Limited services in place to address diversion from multi-unit residential buildings
  - No organics (e.g., kitchen waste) management plan
  - Limited funds/financial resources
  - No solid waste management strategy
Current State of Solid Waste Management

- Objective of study was to review the City’s collection programs to identify opportunities for improvements related to efficiency, cost, and diversion.

- Key Questions:
  - What changes do residents want to see?
  - Can we improve diversion?
  - Should we implement automated curbside collection?
  - How much does composting cost?
  - Why is glass not being recycled?
Residential Waste Management Survey

• Survey objective to gauge residents' views on solid waste management services and potential diversion initiatives

• Survey was deployed online from October 3 to October 31, 2016

• GHD and City staff also administered the survey in-person at Reagent Mall, Grant Harvey Arena, and Northside Market from October 14 to 15, 2016

• A total of 844 responses were received

• The survey has a confidence level of 95% +/- 3.35%.
Survey Results

• 60% of respondents said that the City’s current recycling program was well regarded (“very good” or “somewhat good”)

• 62% of respondents said that the City’s current recycling program did not keep enough material out of the landfill

• 96% indicated diversion was important (“very important” or “somewhat important”)
What are your expectations for the City’s diversion rate?

- Modest Improvements (20 - 30%): 25%
- Significant Improvements (30 - 40%): 32%
- Status Quo (<20%): 5%
- Unsure / No opinion: 4%
- No Response Provided: 13%
- Major Improvements (40 - 50%): 21%

- No Response Provided: 13%
- Modest Improvements (20 - 30%): 25%
- Significant Improvements (30 - 40%): 32%
- Status Quo (<20%): 5%
- Unsure / No opinion: 4%

GHD
Fredericton
Rank the top three waste programs you think the City should consider

<table>
<thead>
<tr>
<th>Program</th>
<th>Average Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curbside food waste collection</td>
<td>3.05</td>
</tr>
<tr>
<td>Eliminate depot system</td>
<td>3.16</td>
</tr>
<tr>
<td>Promote backyard composting program</td>
<td>3.52</td>
</tr>
<tr>
<td>Increase promotion and education</td>
<td>3.54</td>
</tr>
<tr>
<td>Implement automated curbside collection using wheeled carts</td>
<td>3.90</td>
</tr>
<tr>
<td>Reduce garbage collection frequency</td>
<td>5.12</td>
</tr>
<tr>
<td>No Change</td>
<td>5.68</td>
</tr>
</tbody>
</table>

Ranked Highest

**Ranked Highest**

- Curbside food waste collection
- Eliminate depot system
- Promote backyard composting program
- Increase promotion and education
- Implement automated curbside collection using wheeled carts
- Reduce garbage collection frequency

No Change
Survey Results

• High willingness to pay (34%) for additional diversion programs or through shifting priorities (27%)

• Residents divided on imposing garbage limits (44% - yes; 42% - no)

• Some support for decreasing garbage collection frequency (51% - yes; 36% - No)

• 125 comments that specifically requested a glass recycling program
Survey Findings

• Recycling highly valued by residents

• High interest from residents to see improvements to City’s program

• Residents interested in:
  
  o Diverting organics and glass from landfill disposal
  
  o Eliminating depot system for multi-unit residential

• Support from residents to pay more or shift priorities to support solid waste programs
Diversion

- Diversion rate was calculated to be 19% based on City’s program
- No standard method for calculating diversion across Canada
- Diversion rate low as compared to other Canadian jurisdictions
Diversion

- The amount of materials that are currently “captured” by City’s recycling programs was estimated at 43%.
- Modest increase in diversion can be achieved through greater participation in existing program (e.g., multi-residential) and through promotion and education (P&E).
- More significant improvements can be made through expanding curbside program to include a source separated organics (i.e., kitchen waste) program.
Diversion – Promotion & Education (P&E) Plan

• The P&E plan should develop specific objectives, what are we conveying to the public and why?

• Mechanisms:
  - Brochures and newsletters
  - Posters
  - Interactive displays for community events and schools
  - Social media and website
  - Development of policies to support solid waste programs
Automated Collection Review

- Trend in North America to move towards automated cart and arm collection systems
- Standard carts are provided to residents
- Benefits
  - Reduced time in motion
  - Reduced health and safety claims
  - Increased diversion
Automated Collection
## Curbside Collection Evaluation Model

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Current Manual System (Baseline Scenario 1)</th>
<th>Automated Garbage Only (Scenario 2)</th>
<th>Automated Garbage and Recycling (Scenario 3)</th>
<th>Automated Garbage, Recycling, and Organics (Scenario 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Collection Method</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td>Semi-Aut.</td>
<td>Automated</td>
<td>Automated</td>
<td>Automated</td>
</tr>
<tr>
<td>Source-Separated Organics</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>Automated</td>
</tr>
<tr>
<td><strong>Collection Frequency (service weeks per year)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garbage</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>26</td>
</tr>
<tr>
<td>Recycling</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>SSO</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>52</td>
</tr>
</tbody>
</table>
## Model Results - City Program Costs

<table>
<thead>
<tr>
<th>Parameter</th>
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<th>Automated Garbage, Recycling, and Organics (Scenario 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Cost ($2017)</td>
<td>$0</td>
<td>$890,000</td>
<td>$2,620,000</td>
<td>$3,650,000</td>
</tr>
<tr>
<td>Annual Operating Cost</td>
<td>$14,000</td>
<td>$56,000</td>
<td>$159,000</td>
<td>$220,000</td>
</tr>
</tbody>
</table>
# Model Results - Collection Costs

<table>
<thead>
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<th>Automated Garbage, Recycling, and Organics (Scenario 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Annual per Tonne Cost ($2017)</td>
<td>$108/tonne</td>
<td>$106/tonne</td>
<td>$105/tonne</td>
<td>$101/tonne</td>
</tr>
<tr>
<td>Equivalent Annual Cost ($2017)</td>
<td>$1,710,000</td>
<td>$1,680,000</td>
<td>$1,660,000</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>Model Estimated Savings over Current Contract</td>
<td>---</td>
<td>1.7%</td>
<td>2.5%</td>
<td>6.4%</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>$30,000</td>
<td>$50,000</td>
<td>$110,000</td>
</tr>
</tbody>
</table>
Other Potential Curbside Changes

- Objective to divert more materials to recyclable streams
- Policies include:
  - Limiting the number of garbage bags or carts
  - “Pay as You Throw” (e.g., fee per bag or cart)
  - Decreasing garbage collection frequency
Multi-Unit Residential Recycling

• Currently curbside program not extended to multi-unit residential dwellings with 5 or more units

• Three recycling depots setup for multi-unit residents to drop off recyclable materials:
  o Not convenient/not effective at capturing recyclables
  o Issues related to improper sorting, contamination, access, and litter
Multi-Unit Residential Recycling

- No “one size fits all” solution

- The City should consider implementing a bylaw with goal of ensuring all residents have access to the City’s recycling program

- Considerations:
  - Convenience
  - Relationship with property managers/landlords
  - Adequate storage
Residential Compost Program Review

- Currently no source separated organics (SSO) program
- Fredericton Region Solid Waste has no plans to implement SSO program
- Current practice is to place organics in landfill and capture landfill gas to generate electricity
- Limited potential to materially increase overall carbon offset as compared to current practice
Residential Compost Program Review

- Key considerations
  - Feedstocks
  - Collection Infrastructure
  - Processing
  - End Markets
  - Costs
Cost Considerations

• An order of magnitude cost estimate was prepared to develop a composting facility

• Assumed 5,000 – 15,000 TPY facilities including co-processing biosolids and leaf and yard waste

• Assumed in-vessel technology due to facility likely being developed in close proximity to residents

• Order of magnitude cost based on known facility costs and are conservative
## Composting Technology Costs

<table>
<thead>
<tr>
<th>Processing Technology</th>
<th>Estimate Cost (Operating and Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Windrow</td>
<td>$50-70 per tonne</td>
</tr>
<tr>
<td>Covered Aerated Static Pile (e.g. Gore System)</td>
<td>$70-120 per tonne</td>
</tr>
<tr>
<td>Aerated Static Pile (Enclosed in building)</td>
<td>$80-150 per tonne</td>
</tr>
<tr>
<td>In-Vessel System (Enclosed in building)</td>
<td>$130-200 per tonne</td>
</tr>
</tbody>
</table>
## Composting Facility Order of Magnitude Costs

<table>
<thead>
<tr>
<th>Item</th>
<th>5,000 to 15,000 TPY Composting Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Processing Costs (Assumes In-Vessel Technology)</strong></td>
<td></td>
</tr>
<tr>
<td>Capital Cost</td>
<td>$6-15 million</td>
</tr>
<tr>
<td>Equivalent Annual Cost Per Tonne (20 years at 5% Discount Rate)</td>
<td>$176-$197</td>
</tr>
<tr>
<td><strong>Net Equivalent Annual Cost</strong></td>
<td>$575,000-1.73 million</td>
</tr>
<tr>
<td><strong>Program Costs</strong></td>
<td></td>
</tr>
<tr>
<td>New Carts and Kitchen Catchers</td>
<td>$1.03 million</td>
</tr>
<tr>
<td>Annual Operating Costs</td>
<td>$61,000</td>
</tr>
</tbody>
</table>
Glass Recycling

- Glass containers (e.g., jars, bottles, etc.) not included in blue box program
- Bottle refund program available for beer and liquor containers
- City likely generating approximately 300 tonnes (~1.3%) of glass that is landfilled annually
Glass Recycling – Why are regions in NB not recycling glass?

- Contacted FRSW, Fundy Region Solid Waste, and Southeast Regional Service Commission
- Generally cited reasons:
  - Limited quantities and impact on diversion
  - High cost to recycle and limited end markets
  - Potentially contaminate other recyclable materials
  - Health and safety considerations
Glass Recycling – End Market/Use Examples

- PEI uses both bottle refund and curbside materials to produce clear stone and fill materials used for local municipal projects.

- HRM curbside materials are used to produce septic field drainage media for local projects.

- A large portion of glass collected from bottle refund and curbside materials in Atlantic Canada appear to be sent to one facility in Moncton, NB.

- End uses for glass cullet include the production of new glass, glass abrasives, and insulation.
Recommendations

1. Build on study and develop an overall strategy with regards to solid waste management

2. Undertake a residential waste audit

3. Develop a Promotion and Education (P&E) Plan

4. Phase out the drop off depots and replace with a curbside recycling program at multi-unit residential buildings
5. Implement automated curbside collection of garbage

6. Adopt a "pay as you throw" system for new garbage carts that are rolled out as part of an automated curbside collection program

7. Further evaluate other aspects of the collection program with respect to automated collection:
   - Automated Collection of Curbside Recyclables
   - Multi-Unit Residential
Recommendations

8. If the City proceeds with automated collection of garbage, some consideration will need to be given to the collection of leaf and yard waste (e.g., collection period, public drop off at City’s composting facility, grasscycling). These measures will also help improve diversion.

9. If the City would like to further consider the implementation of a SSO program, it should engage FRSW as a stakeholder in the region's solid waste program. The next step would involve completing a Business Case Analysis.

10. Re kick start working with Greener Village to promote backyard composting
What Are Your Thoughts?