City of Cold Lake

Residential Solid Waste Management Study

FINAL REPORT

February 2016

Advanced Enviro Engineering Ltd.

Providing Solutions for Business and Environment Since 1992

Advanced Enviro Engineering Ltd.
Providing Solutions for Business and Environment Since 1992

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February 11, 2016

Azam Khan
General Manager
Infrastructure Services
City of Cold Lake
5513-48 Ave
Cold Lake, T9M 1A1

Dear Mr. Kahn,

Enclosed is the final report of the Integrated Waste Management Study completed by Advanced Enviro Engineering Ltd. and its consultants for the City of Cold Lake.

If you have any questions or require further information, please contact our office at 780-488-7926.

Sincerely yours,
Advanced Enviro Engineering Ltd.
APEGA Permit to Practice Number P10783

Kirstin Castro-Wunsch, P. Eng.
CEO

EXECUTIVE SUMMARY

Advanced Enviro Engineering Ltd. (AE) conducted an Integrated Waste Management Study for the City of Cold Lake. The study included a review of the current waste management system, a waste sort, a survey of Cold Lake residents to measure interest in a range of solid waste options, interviews with City staff, Councilors and other municipalities, and an analysis of feasible collection and diversion options.

Based on results of this work, Advanced Enviro made recommendations for a comprehensive solid waste management system that is environmentally responsible and meets the needs of its citizens in a cost effective manner.

REVIEW OF CURRENT SYSTEM

The City of Cold Lake has the foundations for an effective solid waste management plan. The City provides a fair level of service for recyclables and organics at a relatively high cost but is not achieving its potential for diversion. The program's current services (based on 2014 data) which include garbage collection, organics and recycling divert 17% of the residential waste stream. Approximately 2,614 tonnes of residential waste is sent to landfill each year.

The City of Cold Lake's existing waste management system that is covered in the monthly fee includes the following programs:

1. Waste Collection:
    - Weekly manual curbside residential garbage collection for 4,002 households and weekly automated curbside garbage collection (240L black cart) for 1,000 households.
    - Drop off at the Cold Lake Transfer Station

2. Recycling:
    - Every two weeks (alternating with organics in the summer), manual curbside recyclables collection (blue bags, paper and cardboard)
    - Recycling drop off and processed at the Cold Lake Recycling Centre (CLRC).

3. Composting and Organics Recycling (including food waste);

- Every two week manual organics collection in the summer, alternating with recyclables.
- Drop off at the City's Compost Compound.

4. Cold Lake Transfer Station (CLTS) available for residents drop off of household waste (garbage, recyclables), large items and e-waste.

5. CLRC located at 3609-50th Street available for residents and businesses to drop off recyclables and E-waste.

6. Cold Lake Class III landfill available for residents and businesses for the disposal of inert, non-hazardous wastes.

7. Seasonal Christmas tree collection

8. Roundup event (household hazardous waste and e-waste)

9. Communications Program and Other Tools:
   - Website
   - Seasonal information to the residents regarding collection services (Recycling roundup, Christmas trees, etc.) are mailed out with the utility bills.
   - Other means of communication include the City's website, facebook, radio and open house

10. Fee Structure

Residents in Cold Lake currently pay $5-27.50/month for waste management services. Table below provides a general breakdown of the program component costs.

Cold Lake Fee Structure

Waste Service	Utility Fee (/month/household)	Utility Fee (/month/household)
	Single dwellings, duplex, fourplex	Apartments, condos, townhomes > 4 units
Waste Collection & Disposal	$19.00	
Curbside Recycling	$8.50	$ 5
Total	**$27.50**	**$ 5**

Based on the current diversion rate and on services provided by the City, the opportunity exists for the City of Cold Lake to significantly increase diversion within a relatively short time frame.

SURVEY RESULTS

The survey results provided direction in the following areas:

1. 95% of the respondents indicated that waste diversion and reduction is important to them, while 5% of the respondents do not think it is important.

2. 79% of the respondents think that the City should divert more than 40% of waste from landfill in the next five years. Only four percent (4%) indicated that the City should not divert waste**.**

3. 86% of the respondents generate only 1-2 bags of garbage per week. Since less than 3% of the population generate 5 or more bags per week, bi-weekly (every two weeks) garbage collection with a 240L cart or a limit of 4 bags is possible.

4. 83% of the survey respondents want weekly garbage collection. This is an indication that the status quo is perceived as satisfactory and that the cost implications of a weekly service has not been communicated to the residents. Other possible reasons why respondents would like to keep the current collection frequency could be force of habit and/or fear of change.

5. 61% of the survey respondents recycle 1 blue bag, 57% recycle 1 bag with paper and 56% recycle 1 cardboard bundle per week. However, if the City increases its waste limits (i.e. reduces garbage collection frequency) to increase infrastructure

use and increases the education program, then the City should expect an increase of recyclables diversion over the next several years.

6. 60% of the respondents want every two weeks recyclables collection.

7. Out of all the survey respondents, 43% do not compost organic waste at all, 32% compost in their backyard, 16% take organic material to the Cold Lake compost compound, and 36% use the curbside organics collection. As the organic component of waste represents over 50% of the total waste generated by residents, a 50% diversion goal for the City of Cold Lake in the next five years cannot be achieved without an organics program.

8. 53% of the respondents set out yard waste, 21% set out food waste and 12% set out organics including pet waste, soiled paper, etc. for the curbside organics collection. City should educate residents to use the existing curbside organics collection for all types of organics.

9. 56% of the respondents want every two weeks organics collection.

10. 75% of all the survey respondents are willing to use carts for garbage and 68% are willing to use carts for organics curbside collection. Only 1/5th of the respondents are not willing to use carts for either garbage or organics. This shows that a smooth transition to carts for garbage and organics curbside collection is possible.

11. 72% of the survey respondents support a garbage limit while 24% don't. 58% of the respondents support fees based on the amount of garbage. This shows that there is a strong support towards garbage reduction. Implementing a limit of four bags of garbage every two weeks with 'tag a bag' system for extra bags (or a 240L black cart for garbage every two weeks) incorporated with education is feasible. (the city already implemented carts city wide.

12. In general respondents do not use the CLTS frequently. Transfer Station use should be encouraged and the potential to provide further services there exists. Usage could be increased through providing residents education about services provided at the transfer station.

13. Public support for a material ban at the CLTS is fairly evenly distributed. If the City chooses to implement a material ban, and phases it in overtime and with education, residents would support this.

14. 84% of the survey respondents support recyclables (plastic containers, cardboard, etc.) bans at the CLTS. 17% and 20% support garbage and organics ban respectively. This data combined with the waste sort carried out by Adavnced Enviro and observations at the Tranfer Station reinforces the recommendation for an immediate recyclables ban as it will increase the usage of the existing recycling infrastructure and reduce costs in the long term

15. The Class III Landfill in Cold Lake is reaching its life expectancy (2-3 years). 49% of the survey respondents want the City to build a new Class III Landfill for inert solid waste while 32% would like the City to focus on diversion.

16. 77% of the survey respondents would sort inert solid waste before they bring it the Class III Landfill; 82% percent would separate dry waste such as shingles, concrete, furniture, dry wall; and 83% would separate wood before they bring it the Class III Landfill. This shows that residents are willing to do what is required in order to extend the landfill's life expectancy City should evaluate options to divert most of the waste currently ending up at the Class III Landfill. Clean wood waste represents a high percentage of the inert solid waste and this stream could be diverted along with other material to increase landfill life expectancy and reduce costs

17. Based on the survey results the top waste program options that the City should consider implementing include:
    - keep program as is,
    - more education and information on how to reduce waste,
    - encourage backyard composting program / grasscycling (leaving mulch on lawn),
    - Ban cardboard and organics from landfill.

18. 51% of the survey respondents are willing to pay $27 - $30 per month, 8% are willing pay $31 or more per month (currently $27.5/hh/month). These responses indicate City residences are in favor of a Waste Reduction Strategy with an associated goal and they are willing to pay up to $30 per month for that strategy to be implemented.

19. Marjority (52%) of the residents indicated that they want educational initiatives to be communicated to them more often. This shows resident's interest to learn more about waste issues.

These survey results provide the City with strong direction. Often residential survey responses can be divided relatively evenly among the “yes” group and the “no” group so that responses are in the 45 to 55 per cent range. This division is not seen in the Cold Lake survey, instead there is a strong, “across the board” support for options as listed above. The City can therefore be confident that the recommended strategies are in line with residents.

WASTE SORT RESULTS

A waste sort for residential waste, organics and recyclables generated by the Cold Lake residents was performed in December 2014 at the Cold Lake Transfer Station.

1. Composition of Waste Sent to Landfill

During the waste sort, the following observations were noted:

- Organics was the largest component of garbage by weight (42%), followed by regular garbage (27%). Recyclables comprised twenty percent (20%) of the sorted garbage, transfer station/CLRC items comprised five percent (5%) and potential donation items comprised six percent (6%) of sorted garbage.

- Based on results of the garbage composition, 73% of the materials set out for garbage pickup could potentially be diverted through programs already offered by the City. 42% of the current garbage set out could be diverted through the curbside organics collection.

2. Composition of Recyclables

During the waste sort, the following observations were noted:

- Recyclables were largely composed of mixed paper, followed by cardboard and metal/glass. Plastics consisted mainly of food containers and plastic bags.

- A large percentage of recyclables (86%) is placed in the correct stream, whereas garbage (7%), potential donation items (4%) and organics (3%) were also put in recyclables. The largest component of the recyclables is mixed paper (41%) followed by cardboard (22%).

- Based on the waste composition results, the recyclables program has a contamination rate of 14%, of which 7% is garbage, 4% is potential donation items and 3% is organics.

3. Composition of Organic Waste

During the waste sort, the following observations were noted:

- Organic waste is comprised of yard waste.
- Based on the results obtained from the organic waste sort, contamination is insignificant (0.1%) and it shows that residents are using the green carts only for yard waste as food waste comprises only 0.2%.

4. Capture Rates of Recyclables and Organic waste

- Based on the 2014 annual waste generation data and data obtained from the waste sort; the recyclables program has a capture rate of 31% and the organics program has a capture rate of 18%.
- Corrugated cardboard has the highest capture rate followed by mixed paper and metal/glass within the blue bag program. While in the organics program, yard waste has the highest capture rate of 76%.

ACTION PLAN

Based on the review of the current system, the survey results, waste sort, application of solid waste management “best practices”, cost analysis and Advanced Enviro’s experience and knowledge of successful programs, Advanced Enviro recommends the following Solid Waste Management Strategy for the City of Cold Lake.

1. Adopt the following waste reduction goal

The City of Cold Lake currently has no formal goals for waste diversion and/or reduction. Based on the residential survey, seventy nine percent (79%) of the respondents think that the City should divert more than 40% of its waste from landfill in the next five years. This clearly indicates that the City should set a target for 50% diversion in the next five years.

City should set a goal for a diversion rate of 50% by 2020 and share the goal with the community. This represents an approximate 32% reduction in residential waste being sent to landfill.

Based on survey City residences are in favor of a Waste Reduction Strategy with an associated goal and they are willing to pay up to $30 per month for that strategy to be implemented in residential waste sent to landfill and moves the City towards the overall provincial target of 75-80% diversion rate.

2. Composting

Waste management strategies targeted to organics provide municipalities with the biggest “bang for your buck” because organics are the largest component of the waste stream and provide the greatest diversion potential. In order to achieve its goal, the City must enhance its current organics diversion program. Although programs are in place to address organics, the curbside collection program has an extremely low capture rate (18%) and 42% of garbage stream is comprised of organics (mainly food waste).

The City should implement year round Curbside Collection of Organics (every two weeks in the winter and every week in the summer) by April 2016. Year round organics collection will increase the rate of both kitchen waste capture as well as organics diversion.

3. Garbage Collection

The City of Cold Lake’s waste stream composition shows a high percentage of organics (42%) and recyclables (20%) in the sorted garbage. In addition, based on the residential survey carried out by Advanced Enviro in March 2015, 72% of the survey respondents support a garbage limit.

The current waste management system does not include a sufficient incentive to reduce waste (weekly garbage collection). A one cart limit every two weeks should be implemented at the same time as year round curbside collection of organics is

implemented. Bag/cart limits achieve approximately a 20% reduction in waste generation through behavioral changes as a result of an increased awareness of waste habits. Introducing a cart limit is an efficient method of reducing garbage generation, augmenting the City diversion rate and reducing costs.

4. Curbside Recycling Collection and Recycling processing

The City currently diverts just over 30% of the available recyclable waste stream. Based on the waste sort, recyclables comprise twenty percent (20%) of the sorted garbage.

The recommendation to implement a public education campaign, social marketing and a waste limit, is the most effective means to increase participation and capture rates for the curbside recyclables collection program. Increases achieved and other good news stories should be shared with residents.

The current high cost for recyclables collection at CLRC ($159/tonne) and the lack of competitive MRFs in the area suggest that alternative suitable options need to be evaluated by the City:

- Review Recyclables Processing Contract.
- Evaluate the feasibility for a new City-owned facility for processing recyclables and go out with a request for EOI (expression of interest) to find a suitable long term option (response can be from public, City itself or private).

5. Class III Landfill

Based on the waste characterization, carried out by Advanced Enviro in December 2014, wood waste is the largest component of waste (60%) by weight, accepted at the landfill, followed by C&D (30%) then recyclables (7%). By diverting the materials delivered to the Class III landfill the City could reduce landfill costs, increase diversion and increase life expectancy for the landfill.

City should divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill in accordance with the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see “Class III Landfill Feasibility Study”).

6. Adopt a strong Public Education Program and Enhanced Social Marketing

The survey, waste sort results, and interviews with council members and City staff reinforced the need and desire for public education programs. All successful waste management strategies necessitate a strong public education campaign. Relatively low capture rates for the recycling program indicate the need for increased education to increase participation and capture rates.

The Education Program should:

1. Identify a key staff member responsible for education program delivery.
2. Provide social marketing training to the education program coordinator
3. Inform the public of the City's Waste Management Strategy (Recommendation 1) and Goals (Recommendation 2)
4. Provide information on Cold Lake's waste stream and waste generation rates (information provided in Section 1)
5. Inform the public of the associated benefits and costs of alternative waste management strategies
6. Incorporate social marketing techniques to market the social good of participating in existing and new diversion programs
7. Create environmental education programs for schools that target students from grade one to six; as this is when recycling behaviour is largely formed for life and they are extremely influential in teaching their families how to minimize waste and follow program rules
8. Integrate all solid waste management programs under the City's solid waste management strategy
9. City should educate residents first before implementing program changes
10. Identify a theme that is used for all diversion programs that reinforces an integrated approach to solid waste diversion (i.e. Whistler's "Towards a Sustainable Future, Stony Plain's "Paint Your World Green", etc.)

7. ICI Diversion

The City should consider goals and associated bylaws for the ICI (Industrial, Commercial and Institutional) sector as well as material bans (i.e. recyclable and wood). This will increase commercial waste diversion.

The City should conduct a waste diversion study, similar to this project, which addresses diversion options for the commercial sector, as this comprises most of the municipal solid waste stream.

A summary of recommendations is provided below.

Recommendation	Description
Recommendation 1	Set a goal for the diversion rate and share it with the community. Increase the residential diversion rate to 50% by 2020.
Recommendation 2	Develop and Document a Solid Waste Management Strategy.
Recommendation 3	Consider components of the successful diversion programs chart when developing Solid Waste Strategy (Section 3.1-Action Plan).
Recommendation 4	Implement an ongoing public education program that incorporates social marketing and integrates all collection and diversion programs under one theme and strategy.
Recommendation 5	Implement year round Curbside Collection of Organics (every two weeks in the winter and every week in the summer) by April 2016.
Recommendation 6	Implement Automated Garbage Collection throughout the City in 2015.
Recommendation 7	Reduce the garbage collection frequency from weekly to every two weeks. Implement a Cart waste limit (1- 240L cart every 2 weeks).
Recommendation 8	Share the achievements of diversion programs with residents.
Recommendation 9	In two years' time evaluate implementation of weekly curbside collection of recyclables.
Recommendation 10	Review Recyclables Processing Contract (Cold Lake Recycling Centre).
Recommendation 11	Evaluate the feasibility for a more suitable private or City-owned facility for processing recyclables. Engage the ICI sector to assess the quantities of recyclables available and to measure barriers to, support of and commitment to

	participate in this project. Put it out for EOI. (City and Private Contractors can respond).
Recommendation 12	Implement an agreement with CLRC to weigh the quantities of recyclables processed.
Recommendation 13	Provide drop off service for recyclables at the Transfer Station.
Recommendation 14	Implement a recyclables ban at the Class III landfill and use existing programs to divert recyclables from the landfill.
Recommendation 15	Divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill in accordance with the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see "Class III Landfill Feasibility Study").
Recommendation 16	Evaluate a plastic bags ban in Cold Lake

STRATEGY TIMELINE

The following table shows the recommended timeline for implementing the solid waste management strategy.

ACTION/STRATEGY	TIMING
2015	
Finalize Waste Management Strategy and goals: • Increase the diversion rate to 50% by 2020	2nd Half, 2015
Implement Automated Garbage Collection throughout the City.	2nd Half, 2015
Develop and implement public communication program using social marketing strategies.	Start 2nd Half, 2015 Continue every year
2016	
Continue Public Education Program focusing on review of initial results of Waste Management strategy and informing public of next stages.	1st Half, 2016
Implement year round Curbside Collection of	1st Half, 2016

ACTION/STRATEGY	TIMING
Organics (every two weeks in the winter and every week in the summer).	
Provide a drop off service for recyclables at the Transfer Station.	1st Half, 2016
Reduce garbage collection from weekly to every two weeks. Implement a Cart waste limit (1- 250L cart every 2 weeks).	2nd Half, 2016
Implement a recyclables ban at the Class III landfill and use existing programs to divert recyclables from the landfill.	2nd Half, 2016
Divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill following the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see "Class III Landfill Feasibility Study").	2nd Half, 2016
Put out an EOI for suitable options (private or public) for an expanded recyclables processing facility and engage the ICI sector to assess the quantities of recyclables available and measure barriers to, support of and commitment to participate in the project.	2nd half, 2015
2017/18	
Measure data against baseline and share results as part of education campaign.	
Waste audit to measure contamination and capture rate.	
Review of the Waste Management Strategy, with new goals set for reductions in waste generation by 2022.	
Continue public education program sharing diversion results.	
Evaluate implementation of a weekly curbside collection for recyclables.	
2019/20	
Measure data against baseline and share results as part of education campaign.	

ACTION/STRATEGY	TIMING
Continue the public education program sharing the diversion results.	

Extending organics collection year round will increase the organics capture rate especially when combined with the implementation of a garbage limit (collection every two weeks). This would increase the capture rate for recyclables as well.

Garbage collected every 2 weeks, recyclables every 2 weeks, organics every week in summer and every 2 weeks winter would allow the City to increase diversion from 17% (current) to 50% in 2-3 years at no cost increase ($29.76/hh/month).

This implementation plan achieves significant diversion results within a two year time frame. Advanced Enviro feels that this is feasible for the City of Cold Lake. However, if desired, the City can continue to refer to the Action Plan and work towards implementing the recommendations along a timeline it feels comfortable with.

City of Cold Lake
Integrated Waste Management Study

Section 1: Current System
&
Other Municipalities Review

Advanced Enviro Engineering Ltd.
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FIGURES AND TABLES

1.0 INTRODUCTION

Advanced Enviro Engineering Ltd. (AE) is conducting an Integrated Waste Management Study for the City of Cold Lake. The goal of this study is to make recommendations to the City of Cold Lake on a comprehensive solid waste management system that is environmentally responsible and meets the needs of its citizens in a cost effective manner.

The project is divided into the following sectors

- Local Research / Current Waste Management System
- Other Municipal Systems Review
- Curbside Waste Sort
- Survey
- Diversion Option Analysis
- Action Plan/Implementation Report

This Section 1 presents the local research (current waste management system) and the review of other municipalities waste management systems as outlined in our proposal.

1.1 Work Conducted

Local research involved the review of the City of Cold Lake's existing waste management systems and identification of available options and/or specific "issues/desires" of those involved with the activities.

The following work was conducted:

1. Project start up meeting

2. Interviewed City of Cold Lake personnel associated with waste management activities:

    - Craig Copeland, Mayor
    - Duane Lay, City Councilor
    - Vicky Lefebvre, City Councilor
    - Kelvin Plain, City Councilor
    - Azam Khan, City of Cold Lake, General Manager of Infrastructure Services

- George Urlacher, City of Cold Lake, Operations Manager
- Mark Lowe, City of Cold Lake, Waste Management Foreman
- City of Cold Lake, waste collection operators

3. Conducted site visits of existing waste management components and interviewed City and private service providers:

   - Cold Lake Recycling Centre (CLRC) and interviewed the owner, Hussien Elkadri
   - Cold Lake Regional Transfer Station/Class III landfill and interviewed the waste management foreman, Mark Lowe
   - Observed both waste and recyclables collections

4. Reviewed existing reports, documentation and information related to waste management and demographics, including:

   - Waste Management Strategy – Regional Waste Management Study – July 2014 by Stantec Consulting Ltd.
   - The waste management bylaw (519-UT-14)
   - 2011 Census Report
   - City of Cold Lake – Annual Report – 2013-2014
   - City website

5. Reviewed other Municipal Systems:

   - St. Albert
   - Strathcona County
   - Leduc
   - Windsor, Nova Scotia
   - Leaf Rapids, Manitoba
   - Boulder, Colorado

2.0 CURRENT WASTE MANAGEMENT SYSTEM

Section 2 provides a brief summary of the current waste management system, an analysis of current waste data and a review of each of the components of the current system.

2.1 Existing System

The City of Cold Lake's existing waste management system that is covered in the monthly fee ($27.5 per single dwelling) includes the following programs:

1. Garbage Collection:
    - Weekly manual curbside residential garbage collection for approximately 4,002 households (garbage collected weekly by the City using a semi-automated side loader trucks).
    - City of Cold Lake is currently carrying out an automated collection pilot project (since 2014) for approximately 1,000 households (garbage collected weekly by the City using a fully automated side loader truck)
    - Garbage collection in not provided to appartments, condos and six plex.

2. Recycling:
    - Bi-weekly (every two weeks alternating with organics collection) manual curbside collection (blue bags, paper and cardboards) of recyclables for approximately 5,002 households
    - Recycling drop off at the Cold Lake Recycling Centre
    - Recyclables collection in not provided to appartments, condos and six plex, but a fee of $5/month/household is charged.

3. Composting
    - Bi-weekly (every two weeks alternating with blue bag collection) manual residential curbside organics collection for approximately 5,002 households from April 1st to November 15th
    - Organics drop off at the Composting Compound at the Cold Lake Transfer Station

4. Cold Lake Transfer Station/Class III Landfill and Cold Lake Recycle Centre available for residents to dropping off all household waste, household hazardous waste, e-waste, and white goods (see sections 2.4.5 and 2.4.7).

5. Seasonal Christmas tree collection at curbside

6. Annual Toxic Round Up once a year at the transfer station

7. Communications Program and Other Tools:
    - Website

- Information regarding collection services (Christmas trees, Toxic Round Up, etc.) is mailed out with utility bills periodically.

2.2 Solid Waste and Diversion Data Review

Solid waste and diversion data for 2011 to 2014 was reviewed and analyzed to establish solid waste generation and diversion rates and a baseline for measurement of future progress.

Records from the City of Cold Lake and Cold Recycle Centre were reviewed.

2.2.1 Garbage to Landfill

The average annual amount of residential curbside garbage sent to landfill based on 2011 to 2014 data is approximately 2,614 tonnes. Using 2014 data as the baseline, 2,901 tonnes of residential garbage, or 184 kg/capita is sent to landfill per year; compared to the provincial residential garbage disposal average of 272 kg/capita[1].

The annual tonnes of residential solid garbage landfilled (per capita and per household) for the years 2011 to 2014 is provided in Table 1 and illustrated in Figure 1 and Figure 2. Using 2011 as a baseline, there was a 15% increase in the per-household garbage to landfill rate for 2014.

Table 1. Waste Sent to Landfill: 2011 – 2014

Year	Total residential garbage to landfill (Tonnes)	Population	Number of households	Per capita (kg)	Per household (kg)
2011	2,306	13,839	5007	167	461
2012	2,520	14,400	5041	175	500
2013	2,727	14,976*	5280	182	516
2014	2,901	15,736	5469	184	530

*Assumes a 4% population increase from the 2012

[1] Based on 2010 Statistics Canada residential waste disposal data and Statistics Canada 2010 Population data

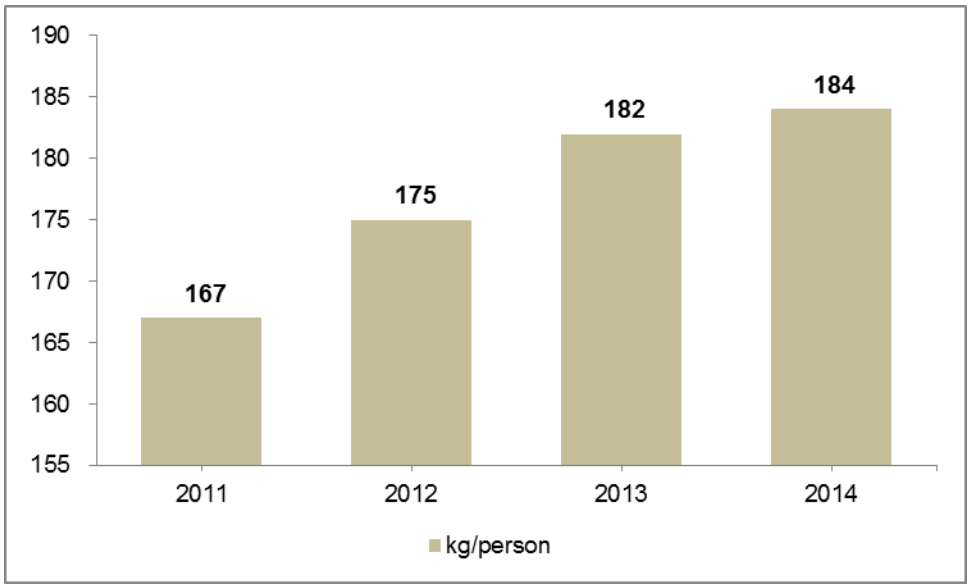

Figure 1. Garbage Sent to Landfill per person: 2011 - 2014

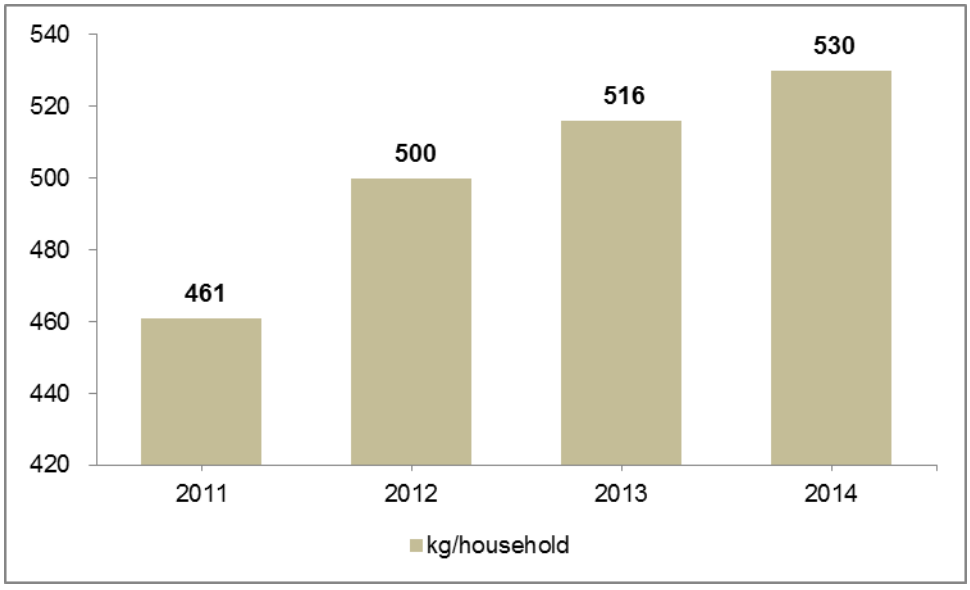

Figure 2. Garbage Sent to Landfill per household: 2011 - 2014

2.2.2 Waste Diversion Rate

Diversion rate is the quantity of waste diverted divided by total waste generated.
Table 2 shows the residential waste diversion rates for the City of Cold Lake. Diversion was achieved through curbside collection of recyclables and organics (data for recyclables is available for 2014 only).
Data regarding recyclables diverted by the residents is based on the curbside collection data only, as no data was available for recyclables dropped-off at the Cold Lake Recycling Centre by the residents.

Table 2. Residential curbside Waste Generation and Diversion Rates: 2011 – 2014

Year	Total residential waste generated (Tonnes)	Landfilled	Blue Bag Recycling	Organics	Diversion Rate
2011	2,551	2,306		245	10%
2012	2,767	2,520		247	9%
2013	2,951	2,727		224	8%
2014	3,481	2,901	304	276	17%

The City of Cold Lake's current curbside residential waste diversion rate (2014) is **17%.** The percentage of waste that was recycled in 2014 compared to the percentage that was landfilled is illustrated in Figure 3.

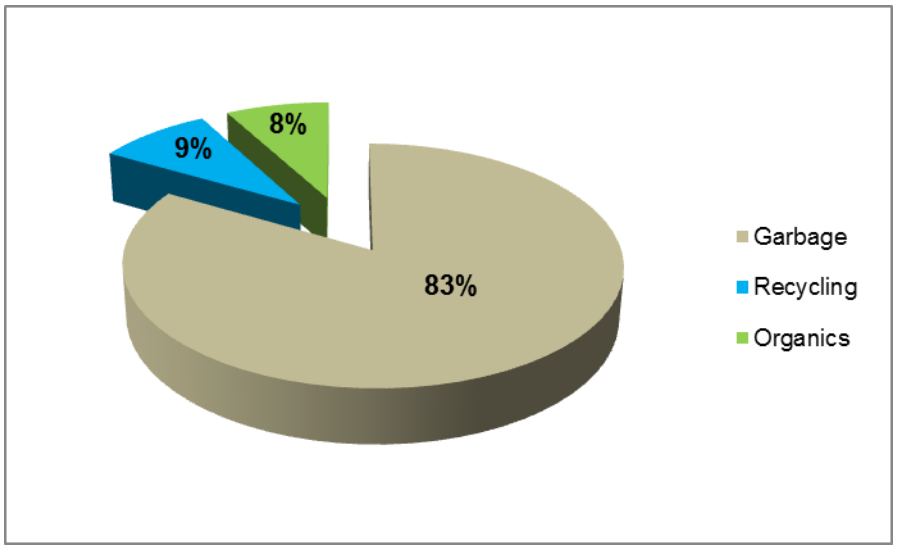

Figure 3. Landfilled and Recycled Residential Waste (2014)

2.3 Capture Rates

2.3.1 Residential Capture Rates

Figure 4 provides an estimate of the components of typical residential waste in Alberta.

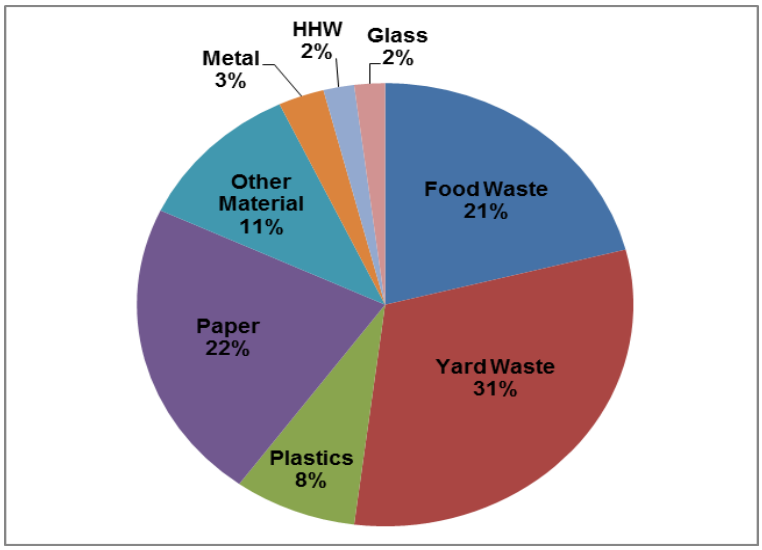

Figure 4. Residential Waste Composition, Alberta (Urban)
Source: Provincial Waste Characterization Framework, AENV, GoC. RCA,2005

More than half of the residential waste stream is comprised of compostable organics (food and yard waste). Table 3 illustrates the capture rate for curbside collection or the percentage of the available waste stream that is being captured by the current curbside programs.

Table 3. Residential Waste Capture Rates (2014)

Waste Stream	% Of Typical Residential Waste	% Of Waste Stream Diverted	Capture Rate*
Organic Waste	52%	8%	15%
Recyclables	35%	9%	26%

* Assumes City of Cold Lake residential waste composition is similar to Alberta's waste composition.

This means that the City of Cold Lake captures slightly less than one fifth of the main waste stream (organics) and 26% of the available recyclable stream. The percentage of each waste stream that is actually diverted compared to what could be diverted is illustrated in Figure 5.

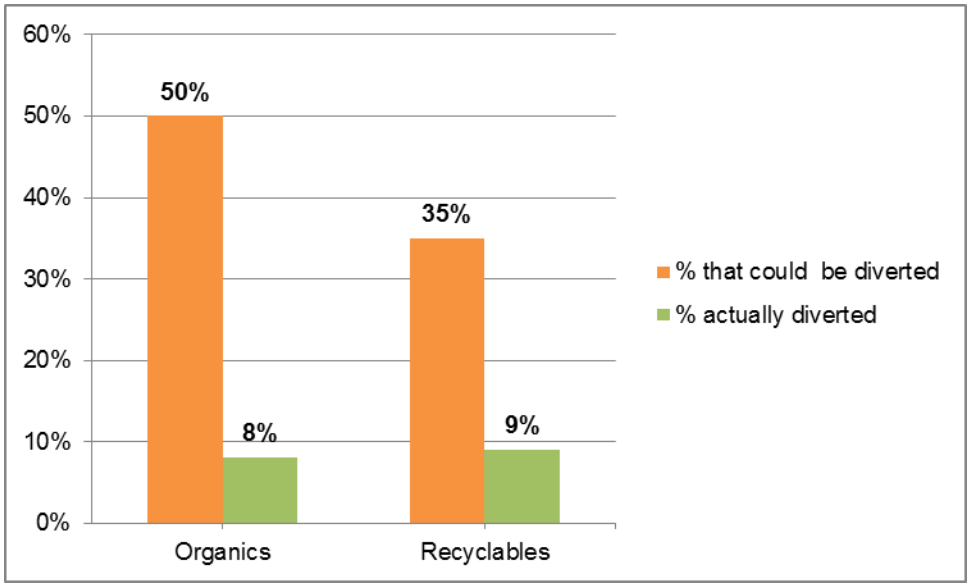

Figure 5. Comparison of Actually Diverted with Potentially Diverted

2.4 Review of Current Waste Management Programs

2.4.1 Solid Waste Management Plans and Goals

The City of Cold Lake is part of the Beaver River Regional Waste Management Commission (BRRWMC), which was formed in 2003 and represents the Municipal District of Bonnyville (including the summer villages of Pelican Narrows and Bonnyville Beach), the Town of Bonnyville and City of Cold Lake. The BRRWMC started operations on April 1, 2009 and implemented a transfer station based approach to manage waste in the region.

Currently the Region runs seven Class III landfills and nine transfer stations namely Ardmore, Bonnyville, Cold Lake, Goodridge, Hilda Lake, LaCorey, Therien. Muriel Lake and Fort Kent have transfer stations only. Cold Lake Transfer Station and Bonnyville Transfer Station are the main transfer stations used in the Region. There is currently no formal operating contract between the Commission and the City of Cold Lake, however there was a verbal agreement at one point to establish payment and fees. All the waste that come to these Transfer Stations is taken either to Ryley Class II landfill or one of the Class III landfills in the Region for final disposal, composted at the Cold Lake Composting compound or taken to one of the privately owned and operated recycling/recovering centers for processing.

Currently, the City of Cold Lake has one waste management bylaw in effect:

Bylaw No. 519-Ut-14

Regulation, Control And Management Of Municipal Solid Waste

- Came into effect on August 12, 2014
- Replaced bylaws No. 277-UT-07, No. No. 356-UT-09 and No. 418-UT-11
- Outlines Cold Lake facility fee structure, prohibitions and penalties associated with disposal at the Cold Lake Class III landfill and transfer station

At present, the City of Cold Lake does not have a set waste diversion goal to work towards.

Findings:

- City of Cold Lake currently has no goals for waste diversion and/or reduction.
- City of Cold Lake wouldl benefit from a Solid Waste Management Strategy that identifies goals and strategies to achieve specified goals.
- Goals should be measurable against baseline data specific to Cold Lake.
- City of Cold Lake has a young demographic which reflects an increased demand for education and higher diversion rate goals (see Table 4).
- Data on recycling collection at privately owned recycling centre might be collected to have accurate baseline.

Table 4. City of Cold Lake age composition based on the "2014 Municipal Census"

	City of Cold Lake	%
Total population	15,736	
<15	2,974	19%
15 - 24	1,963	12%
25 - 34	3,203	20%
35 - 44	1,996	13%
45 - 54	1,962	12%
55 - 64	1,020	6%
65+	665	4%
No response -Age	1,953	12%

- Strategies to achieve goals should reflect desire to be environmentally responsible, should be cost-effective and program users should be aware of the true cost of these programs

- Multifamily, ICI and C&D sectors could be included in the City's overall waste management program

2.4.2 Weekly Residential Garbage Collection

Weekly manual curbside residential garbage collection for approximately 4,002 households and weekly automated curbside garbage collection (240L black cart) for approximately 1,000 households are collected by the City of Cold Lake. The City owns and uses one (1) side loader semi-automated trucks (for manual collection) and two (2) side loader fully automated truck (for automated collection- Labrie side loader) for garbage collection. In 2015, the City hopes to buy one more fully automated truck (Lebrie side loader) and go city wide with the black garbage carts system. Currently, the garbage collected is taken to the Cold Lake Regional Transfer Station for compaction and then transported to Ryley Landfill, 260km away from the City of Cold Lake, for final disposal.
The current costs and services are as follows:

- Manual or automated garbage collection: $19/month/household
- Tipping rate at the Transfer Stations/Class III Landfills for commission members is $141 per tonne ($0.14/kg) and for non-commission members is $185 per tonne.
- City pays $50/tonne tipping fee to the Commission for disposal at the Ryley landfill plus transportation cost to private haulers.
- Garbage collected at the curbside includes empty aerosol cans, double bagged animal waste, cold and double bagged ashes, wrapped broken glass, carbon paper, cd's, ceramics and clay items, chip bags, coffee cups, decorations, dog and cat food bags, bagged diapers, floor sweepings, frozen juice containers, garden hose, hardcover books, kitchen utensils, dishes and drinking glasses, latex gloves, microwave popcorn bags, non-recyclable packaging (cookie bags, string, wrapping, toothpaste tubes), pots and pans, styrofoam, textiles (shoes, clothing, linen), vacuum cleaner bags.
- Garbage container are constructed of sturdy, water-tight material and have a maximum volume of no more than 100 litres, garbage bags should be less than twenty (20) kilograms (45lbs) including contents and a maximum volume of 100 liters.
- Each dwelling unit is allowed to place a maximum of three (3) waste containers or waste bags on collection day.

- Excess of three (3) waste containers or waste bags require the Bag Tags. Bag Tags are only available to areas that are not eligible for automated collection or for a premise that automated collection has not yet been established. Tags for extra bags of garbage are available through the City at a cost of $2.50 per bag.
- Residents can drop off their excess garbage at the Cold Lake Regional Transfer Station/Class III Landfill (east of Highway 28 at the South edge of the City) free of charge (under 100kg).
- Multi-family dwellings including duplex, some four plex with street or road frontage are provided with curbside garbage collection.

Findings:

- The City has a limit of 3 bags per week per household but the black cart (240L) currently used in some parts of the city and maybe used city wide soon holds approximately 4-5 bags which might interfere with the garbage limit and waste reduction.
- The City currently pays a very high rate for the management of residential garbage as it is hauled to the Ryley landfill (approximately 260Km).
- Apartments and condos over four units, ICI and C&D sectors are currently not included in the City garbage collection system.

2.4.3 Every two weeks Collection of Recyclables

Curbside recyclables collection program started in October 2006. Recyclables are collected manually bi-weekly (every two weeks) alternating with organics. The City collects recyclables using a truck that has three compartments for blue bags, paper, and cardboards and hence residents are obliged to separate their recyclables in these three categories and include:

- In a clear or transparent blue bag - aluminum cans, beverage containers, glass bottles and containers, Plastic # 1-7 (plastic bottles and containers, plastic tubes and lids, plastic retail/grocery bags, tin cans).
- In a separate plastic grocery bag – clean/dry paper, cards, catalogues, envelopes, flyers, junk mail, magazines, newspapers, non-foil gift wrap, paper egg cartons and drink trays, paperback books, phonebooks, shredded paper.

- Cardboard flattened, bundled and securely tied (2ft x 3ft x 8in) – appliances boxes, pizza boxes, cereal boxes, shoe boxes, cookie and cracker boxes, paper towel rolls, tissue boxes, detergent boxes.

The current recycling costs and services are described as follows:

- Manual recycling collection - $8.50/month/household for residential single dwelling units and $5.00/month/unit for apartments and condos over 4 units.
- No limits to the amount of recyclables collected at the curb.
- Beverage containers can be taken to the Cold Lake Bottle Depot for refund.
- Recyclables collected at the curbside are taken to Cold Lake Recycling Centre without being weighed for processing.

Findings:

- There is no limit on the quantities of recyclables residents can set out at curbside.
- Recyclables can be dropped off at the CLRC for free as well but no data is available for these quantities.
- The amount of recyclables collected at the curbside is not known as recyclables are not weighed when taken to the CLRC which under estimates the calculation of the City's diversion rate.
- City pays for ICI recyclables waste processed at the CLRC.
- The City currently provides a high service level in the area of recycling. A strong education and social marketing program is required to increase participation and capture rates. (Current curbside recycling program achieves 9% diversion rate and generally it is expected to achieve 20% diversion).
- Apartments and condos over four units, ICI and C&D sectors are currently not included in the City recyclable collection system.

2.4.4 Organics

The City collects residential organics bi-weekly in summer months (every two weeks alternating with recyclables) manually at the curbside using a side-loader truck.

The organics collected are currently taken to the Compost Compound at the Cold Lake Regional Transfer Station for composting.

The current costs and the service are described as follows:

- Organics collection is currently not charged to the residents.
- Organics are collected for 16 weeks from April 1st to November 15th each year and during the winter season resident can put organics in their garbage cans or bring it to the Cold Lake Composting Compound.
- Compostable materials include kitchen food waste (fruit and vegetable peelings, bread, rice, pasta, sauces, coffee grounds and filters, tea bags, egg shells, meat, fish and dairy products), yard waste (grass clippings, plants, weeds, leaves, straw, branches and brush) and soiled paper (soiled boxboard and paper, cereal boxes, shoe and cracker boxes, paper towel rolls, tissue boxes).
- Organics at the curbside should be placed either in a heavy paper, approved compostable bags (meet the ASTM d6400-99 Standards to Specification for Compostable Plastics) or a can be affixed with an organics label available at the City Hall for free.
- Limit of ten (10) bags or containers and five (5) bundles of branches of brush per two weeks per household.
- Bags, containers or bundles should not exceed 1.2 m (4 ft.) in length and 25 kg (55 lbs.) in weight.
- Multi-family dwellings including duplex and four plex with street or road frontage are provided with curbside organics collection.
- Apartments, condos and six plex, ICI and C&D sectors are currently not included in the City organics collection system.

Findings:

- Although programs are in place to address yard waste and food waste (50% of waste stream), a significant portion is not being captured (currently 8%).
- The City is currently not pushing the residents to use the program for food waste. This is because the current compost pad may attract birds that may go into flight path of military base. Organics can be dropped off at the Cold Lake Compost Compound as well.
- A strong education and social marketing program is required to increase participation, capture rates and the use of the Compost Compound at the Cold Lake Regional Transfer Station.

2.4.5 Cold Lake Regional Transfer Station/Class III Landfill

The Cold Lake Regional Transfer Station/Class III landfill is located east of Highway 28 at the South edge of the City (SW26-62-02-W4M). It is open Tuesday to Saturday from 8:00am to 5:00pm during winter, Tuesday to Saturday 9:00am to 6:00pm during summer and Sundays 2:00pm to 6:00pm from June to September.

2.4.5.1 Cold Lake Transfer Station

A tipping fee of $141/ton applies for commission members for mixed loads and ICI (Industrial, Commercial and Institutional) waste and a fee of $185/ton for non-commission members including residential waste as set by the Beaver River Regional Waste Commission (BRRWC). There is no charge for commission members residential waste.

Materials accepted, restricted and prohibited at the Cold Lake Transfer Station include:

Accepted waste:

Municipal solid waste:

- Residential garbage (landfilled at the Ryley Landfill)
- Garbage containing recyclables (landfilled at the Ryley Landfill)
- Commercial waste (landfilled at the Ryley Landfill)

Non-hazardous industrial solid waste:

- Waste deemed to be non-hazardous as defined by AEPEA (Alberta Environmental Protection and Enhancement Act) and the Waste Control Regulation (Alberta Regulation 192/1996).

Special waste:

- Batteries (Vehicle only) are collected and recycled by Interstate Battery
- Concrete is currently stored at the transfer station until the City arranges for a processor to crush at a future date
- Compact fluorescent lights and fluorescent tubes are collected and processed by the City of Cold Lake. DBS Environmental provides for proper disposal

- Household appliances: air conditioners, fridges, stoves (a fee of $25 applies if CFC not removed). All Freon is removed by KK Recycling and then placed into scrap metal pile that is baled and ship out to metal recyclers
- Mixed metals are ship out to metal recyclers
- Paint and paint containers, aerosol paints and sprays are collected by DBS Environmental for disposal or recycling
- Used tires (rims removed) are collected and recycled by Cutting Edge
- Waste oil, oil containers and filters are collected by Little Dipper for recycling
- Propane containers are collected by DBS Environmental

Prohibited waste (not accepted):

- Waste defined as hazardous by AEPEA and the Waste Control Regulation
- Biomedial waste
- Radioactive waste
- Explosives
- Bulk liquids, including sump wastes
- Specified Risk Materials (SRM)
- Ashes and burn barrel waste
- Asbestos
- Inert waste that can be accepted at the Class III landfill
- Waste mixed with wet waste

Figure 6. Cold Lake Transfer Station

2.4.5.2 Cold Lake Class III Landfill

On July 21, 1971, Refuse Disposal Permit No. RD 114 was issued by the Provincial Board of Health to the City of Cold Lake to establish and operate a sanitary landfill. On March 15, 2009, Registration n. 156468 was issued to the City of Cold Lake to convert the sanitary landfill in a Class III landfill, which permits the disposal of inert, non-hazardous wastes.

Table 5 presents the tipping fees charged at the Cold Lake Class III landfill for members and non-members to dispose of waste. The non-member rate applies to those disposing of waste who reside outside of the Regional boundaries. The mixed load (loads containing a mix of residential, commercial, industrial or institutional waste) are sent to the transfer station and landfilled.

Table 5 Cold Lake Class III landfill tipping fees

Class III Landfill		
	Member Fee	**Non-Member Fee**
Demolition/Construction and Inert Materials (Residential)	$75.00 per tonne. Under 100kg — No charge	$150 per tonne Min charge $20.00 if below 100kg
Demolition/Construction and Inert Materials (Industrial, Commercial and Institutional)	$75.00 per tonne. Min charge $10.00 if below 100Kg	$150 per tonne. Min charge $40.00 if below 100kg
Asbestos	Not Accepted	Not Accepted
Clean Clay Fill	No Charge	No Charge

Materials accepted and prohibited at the Cold Lake Class III Landfill include:

Accepted waste:

- Inert solid waste (construction, renovation and demolition waste)
- Dry waste (shingles, concrete, furniture, dry wall, non-asbestos insulation, etc.)
- Wood (clean, not chemically treated)
- Clean clay fill. This is stored in a separate area and used for periodical coverage and/or saved for final coverage of the Class III ladfill

Prohibited waste:

- Municipal solid waste
- Grass and leaves yard waste
- Dead animals and SRM
- Chemically treated wood

Figure 7. A load of inert solid waste dropped off at the Cold Lake Class III Landfill

Findings:

- Landfill capacity is an issue. Landfill has a relatively short life expectancy (2 years).
- Composition of garbage dropped off at the transfer station by residents and businesses comprise a large percentage of recyclables items especially cardboards that could be diverted to other facilities (CLRC).
- At the Transfer station is not available a drop off service for recyclables (plastic, cardboards, paper, etc.) which are mixed with garbage and landfilled.
- Composition of inert solid waste dropped off at the Class III Landfill comprise a large percentage of recyclabels wood (over 60%) that could be diverted increasing the expectancy life for the landfill.
- Construction of a Class II landfill in the Region will reduce cost of transportation.
- A strong education and social marketing program is required to increase participation and use of the transfer station/class III landfill as well as the other facilities (CLRC, Compost Compound and Bottle Depot) described below.

Figure 8. Special waste (e-waste, tires, white goods) at the Transfer Facility

2.4.6 Cold Lake Composting Compound

Operated with Registration form N. 240095-00-00 of April 2007 as part of the Cold Lake Transfer Station/Class III Landfill area and located at located east of Highway 28 at the South edge of the City.

Accepted waste:

- Branches and brush
- Bread
- Coffee grounds and filters
- Dairy products
- Egg shells
- Fish
- Fruit and vegetable peelings
- Grass clippings
- Leaves
- Meat
- Paper towel rolls
- Pasta
- Plants
- Rice
- Sauces
- Soiled boxboard (cereal, cracker, shoe, tissue boxes)
- Soiled paper
- Straw
- Tea bags
- Weeds
-

Prohibited waste:

- Animal waste
- Ashes
- Corrugated cardboard
- Decorations
- Diapers
- Disposable coffee cups
- Glass
- Kitty Litter
- Newspapers & magazines
- Plastic (including plastic bags)
- Polystyrene
- Soil, dirt, rock, logs & tree stumps
- Wire Wreaths

2.4.7 Cold Lake Recycling Centre (CLRC)

The Cold Lake Recycling Centre Ltd. (CLRC) was established in 1996. It is located at 3609-50th Street and is open Monday to Friday, 8:00am to 5:00pm. There is also a drive-thru that is open 24 hours for residents to drop off limited recyclables. Currently the City has a five year contract with CLRC, and pays additional sort charge for the collected recyclables (residential and ICI) and shipping of materials to markets, and then shares 50% of the sales.

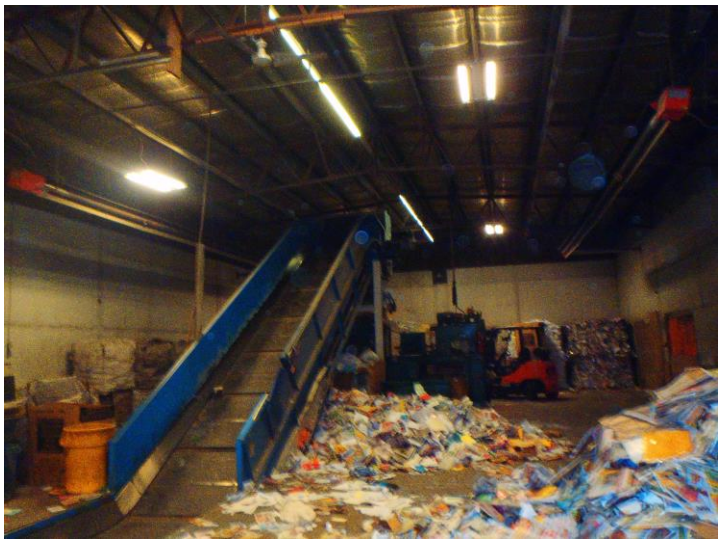

Figure 9. Cold Lake Recycle Centre (CLRC)

Materials accepted at the CLRC include:

Recyclables:

- Aluminum cans (clean)
- Aluminum foil and plates (clean)
- Boxboard (shoe, crackers and cookie boxes)
- Cards
- Clean/dry paper
- Corrugated cardboard (appliance boxes and pizza boxes)
- Deposit bearing containers (return for refund)
- Glass bottles and jars (rinsed)
- Magazines
- Mixed paper
- Newspapers
- Non-foil gift wrap
- Paper egg cartons and drink trays
- Paperback books
- Phone books
- Plastic # 1-7

Figure 10. Bins for Recyclables at the Cold Lake Recycle Centre

Special waste:

- E-waste – cell phones, cell phone batteries, computers, monitors, keyboards, mice, speakers, microwaves, TVs, stereo equipment
- Ink cartridges

Figure 11. Material bailed and ready to be transported at the CLRC

2.4.8 Cold Lake Bottle Depot

- Operated at part of the CLRC and located at 3609-50th Street
- Provides refunds ($0.10 for containers less than on litre in size and $0.25 for container greater that one litre in size) for residents who return beverage containers
- Open Monday to Friday 9:00am to 5:00pm and Saturday from 9:00am to 3:00pm

In addition to the services described above, the City of Cold Lake has partnership with different retailers in the Region to reduce, reuse and recycle waste such as outdated/unused pharmaceuticals, prescription eye glasses; good quality used clothing and toys, wet cell batteries, and ink cartridges.

2.4.9 Seasonal Christmas tree collection

The City of Cold Lake provides residents two weeks (one week for each collection area) in January for the collection of used Christmas trees.

2.4.10 Toxic Roundup event

The City of Cold Lake in collaboration with ARMA (Alberta Recycling Management Authority) holds an annual roundup event for residential household hazardous waste only at the Public Works Shop (1515-16th Street) on a Saturday in June or July.

Residents can bring unlimited amount of the residential household hazardous waste free of charge. At the end of the event, ARMA disposes the waste safely.

2.4.11 Communication/Education Program

The City currently has a $9,000 budget for communications or education programs for solid waste. Education and communication is limited to material written on the waste collection schedule. This includes material eligible in the three waste streams (garbage, recyclables and organics) with the appropriate size and weight, information on alternatives to landfill, and seasonal programs advertisement. Material is sent with utility bills periodically. Other means of communication include the City's website, facebook, radio and open house.

Findings:

- An effective communication program is necessary as majority of the residents live in Cold Lake for a short term.
- Education programs are limited due to the limited budget.
- Lack of public education program is reflected in low capture and low participation rates for current recycling programs.
- There are limited school education programs on local waste management. The only educational programs are related to the regular science lessons. In general this is seen as a gap and an opportunity.

2.4.12 Fee Structure

Residents currently pay $5-27.50/month for waste management services. Table 6 provides a general breakdown of the program component costs.

Table 6. Fee Structure.

Waste Service	Utility Fee (/month/household)	Utility Fee (/month/household)
	Single dwellings,four plex	Apartments, condos and townhomes > 4 units
Waste Collection & Disposal	$19.00	-
Curbside Recycling	$8.50	$5
Total	**$27.50**	**$5**

2.5 Interviews

Interviews associated with waste management activities were held with:

- Craig Copeland, Mayor, Cold Lake
- Duane Lay, City Councilor, Cold Lake
- Vicky Lefebvre, City Councilor, Cold Lake
- Kelvin Plain, City Councilor, Cold Lake
- Azam Khan, City of Cold Lake, General Manager of Infrastructure Services
- George Urlacher, City of Cold Lake, Operations Manager
- Mark Lowe, Waste Management Foreman
- City of Cold Lake, waste collection drivers

Findings:

- **Current collection system**

All the interviewed are very satisfied with the services offered by the city (recyclables, organics collections, Christmas trees, etc.) and they believe that the automated collection system instead of manual collection is going to be the future for the City. Most agree on having weekly recyclables collection but doubting about moving every two weeks garbage collection. Some of those interviewed felt that organics should be collected weekly within the organics collection period (summer).

- **Goal for the City**

Most of the people interviewed believe that a diversion rate between 60-80% is an achievable goal for the City, probably in the next 5-10 years, and that they should work in this direction. They believe that the goal can be reached step by step using a strong communication program. Some of the interviewees think that the implementation of a pay-as-you-throw system would lead to a good and fair result although currently the City is not ready and does not have the structure.

- **Communication programs**

The common feeling is that there is a lack of communication between the City and the residents. The community needs to be informed about the importance of recycling and how to recycle. It seems that most of the residents are not aware of the collection days and this result in miss collections. Some agree on educational programs at schools, on recycling, which is important for the kids who in return can teach their parents. City staff, Councilors and the mayor consider it is important to improve and enhance communication and education programs if it would lead to a higher diversion rate.

3.0 OTHER MUNICIPAL SYSTEMS REVIEW

Other Municipal Systems Review summarizes the findings from researches and interviews and with other municipalities. The following municipalities were reviewed:

1. St. Albert
2. Strathcona County
3. Leduc
4. Windsor, Nova Scotia
5. Leaf Rapids, Manitoba
6. Boulder, Colorado

3.1 Summary

Table 8 provides a summary of the solid waste management programs currently provided by selected municipalities in Alberta. Details on these programs are provided in the subsequent sections.

Municipality	Waste Collection		Recycling		Organics		Curbside Diversion Rate	Rates (/month/hh)
	Automated	Bag Limit	Curbside	Depot	Curbside	Depot		
Cold Lake	√	1 Cart or 3 bags	Blue Bag + paper + Cardboards	√	Food & Yard Waste		**18%**	**$27.50**
St. Albert	√	PAYT Subs.	Blue Bag	√	Food & Yard Waste	Yard waste	**65.9%**	**PAYT subs. ($18.81 to $27.02)**
Strathcona County	√	1 Cart	Blue Bag	√	Food & Yard Waste (Carts)	Yard waste	**61%**	**$25.50**
Leduc	√	1 Cart	Blue Bag	√	Food & Yard Waste		**52%**	**$21.50**

Table 7. Solid Waste Management Systems – Selected Municipalities

3.1.1 ST. ALBERT

Table 8. St. Albert Solid Waste Management Program Summary

Community	St. Albert
Contact	Christian Benson, Solid Waste Program Coordinator Ph: (780) 418 6699 E-mail: ebenson@st-albert.net
Demographics	Population: ~ 60,138 (2011) # of Households: 20,918
Waste Tonnages	Residential: 119 kg/person (2013)
Diversion Rate	66% (residential waste diversion - 2013)
Waste Collection	Automated every two weeks (in house collection) Pay as You Throw system with 3 bin size: 60 liter $1.06/month 120 liter $4.50/month 240 liter $9.27/month Extra Garbage Bag Tags (refuse stickers) if required: $2.25 Extra garbage is not picked up at the curb, if property tagged can be taken to the waste bin at the Recycling Depot.
Recycling	Blue Bag (no limits) weekly collection. $4.90/month.

Organics	Automated food and yard organic collection. Weekly in summer, biweekly in winter (May-November). Residents can choose between two sizes of organic card with no different fee structure: 120 litre $5.72/month 240 litre $5.72/month
Waste Bans	None
Commercial	Private hauler for collection

	Large Item Collection	• 'Take-it-or-leave-it' event once/year. Every June people drop off items and pick up items they want at Servus Place north parking lot from 8am to 1pm • Christmas trees pick up. • Large Junk Drop Off Event. Residents need to use garbage tags to dispose of their junk. Each item will require two (2) garbage tags ($2.18/each)
	HHW	• Recycling depot accepts household hazardous waste (paint, household cleaners and chemicals, used oil, oil filters, oil containers, scrap metal) effective October 1, 2011 • One-day Household Hazardous Waste Roundup.

Recycling	**Depot**	• Manned Recycling depot. Municipally run. • Currently depot accepts electronics, newsprint, flyers, clean waste paper, mixed paper, magazines, phone books, cereal and food boxes, corrugated cardboard, metal cans, brown, green or clear glass jars. • The depot does not accept some electronics (microwaves, DVD and VHS players, radios, cameras, cell phones, lamps, vacuum cleaners, telephones, stereo), plastics, styrofoam, and miscellaneous & contaminated items. • Unmanned Compost Depot for people to bring their yard waste (branches, leaves, hay, straw, grass clippings, flowers, shrubs, soil, wood chips, sod). • Compost Give Away twice a year; spring and fall – people bring their utility bill to Public Works yard to prove they are a resident then they get 2 free bags of compost. • Cost to operate compost depot: $ 179,500/yr., which includes staff costs, equipment and contracts.
Public Communication		• Website • Editorials in Newspaper • Utility Bills • Collection Schedule
Goals		• Reduce solid waste generation to 125 kilograms or less per person per year by 2020 • Increase diversion rate to 65% by 2020

3.1.2 STRATHCONA COUNTY

Table 9. Strathcona County Solid Waste Management Program Summary

Community	Strathcona County
Contact	Leah Seabrook, Coordinator Ph: (780) 416-6797 Email: Seabrook@strathcona.ab.ca
Demographics	Population: 87,998 (2011)

	# of Households: ~ 30,000 (single family & multi-family)
Waste Tonnages	Waste Tonnage (2011): 17,754 tonnes • Paper products: 3,960 tonnes • Container recyclables: 2,975 tonnes • Organic material: 10,635 tonnes • Enviro service hazardous waste: 184 tonnes
Diversion Rate	61% (2014) Diversion rate is net of the contamination rate in organic and recyclables
Waste Collection	Automated cart system – 1 cart limit (black in colour) Every two weeks collection. Extra waste and organics carts are available for an additional monthly fee.
Recycling	Manual Curbside Recycling – clear blue plastic bag. Weekly collection-no limits. Material collected and processed by Ever Green.
Organics	Automated cart system for food and yard waste (green carts) Extra organics carts are available for an additional monthly fee Weekly collection for 3 month and every two weeks for 9 month. Material processed at Henry Hill compost facility.
Waste Bans	Electronics, paint, oil, ties – Alberta Stewardship Program By-law that states what waste is and what organics are. Semi-permanent facility – Enviroservice program (open 6 months of the year) for materials like electronics, paint.
Commercial	Starting an ICI pilot project in 2010 – diversion of all materials where applicable. Would tailor to the specific waste streams generated in the business and will be targeting as much as they can

Program	
Fees	• Waste management services are rolled into one. Utility bill (recycling & waste collection are combined). The cost per household for 2014 was $25.50 per month. Extra waste and organics carts are available for an

Program		
		additional monthly fee.
Waste Collection	**Waste Limits**	• 1 cart limit each for garbage (carts must weigh less than 200 lbs) and organics. • No limit for recyclables.
	Large Item Collection	• Christmas trees are collected in January from curbside (cut into four-foot sections). • Large items (max 2 items) are picked up at curbside in spring and fall. • Items must be less than 6ft by 3ft and weigh less than 200lbs. (90kg) • Have to bring items to Enviroservice event (2X/month from May to October) or you are charged $6.00/item for curbside pickup which is only twice per year (spring & fall) and only two items allowed per household. • There are also re-use opportunities – Reuse Centre in Edmonton at 10004 – 103 A Avenue, Reuse Directory (where to take items) and Reuseit Network – free website to post descriptions & pictures of items to give away
	HHW	• Accepted at Streambank Avenue Recycling Centre during the Enviroservice event held every two weeks from May to October. • Electronics can also be taken to Staples Business Depot, ECO Station. • Extra waste can be taken to Enviroservice event for an extra fee. • Items such as commercial hazardous and biomedical waste, expired medication, explosives, radioactive waste, munitions, fireworks, and pressurized gases are not collected at Enviroservice events. • Accepted at Streambank Avenue Recycling Centre • Enviroservice event replaces the household hazardous waste roundup. • Only drop-off twice/month from May to October.

Program		
	Depot	• There are 4 recycle stations within Strathcona County which are municipally operated (Baseline Road Recycling Station, Ardrossan Recycling Station, South Cooking Lake Recycling Station and Streambank Avenue Recycling Station). • All recycling stations are open 24/7. • All stations except Streambank Avenue accept corrugated cardboard, glass jars, metal cans, mixed paper, newspaper, all kinds of plastics and Styrofoam. • Streambank Avenue Recycling Station accepts grass clippings, leaves and yard waste. • The recycle stations are not manned 24/7 but there is staff present and rotating between stations each day. • The depots allow people in apartments, condos and commercial businesses to recycle because the program is not set up for them. • It is open 24/7 and is not manned and thus sometimes there is a lot of contamination in the bins and outside lots of negligence.
Landfill		• Roseridge Regional Landfill – located out by Morinville, AB.

Program	

Public Communication	• Strathcona County Reduction of Abandoned Products Program (SCRAP):
	  ○ Flexible program to encourage residents to remove abandoned products on their own initiative
	  ○ Offers information on how to safely dispose of or recycle abandoned products
	  ○ Educates residents on wetlands environmental contamination problems
	  ○ Formalizes partnerships with industry and the County residents to sustain this education and awareness program
	• Green gardening workshops about plants that conserve water and how using compost can really green your garden on April 17, 2012 for $10 per person.
	• County sales Category A compost to the residents.
	• Run backyard composting workshops and sell composters in the spring at a subsidized rate for residents.
	Annual calendar containing all the information regarding collection schedule, special events, recycle station, etc.

Goals	• They would like to reduce waste, reduce transportation to far away landfill, increase environmental awareness and provide efficient and economical services

3.1.3 LEDUC

Table 10. Leduc Solid Waste Management Program Summary

Community	City of Leduc
Contact	Kerra Chomlak Ph: (780) 980-8442 Email: Seabrook@strathcona.ab.ca
Demographics	Population: 27,241 (2013) # of Households: ~ 9,789 (2011)
Diversion Rate	52% (2013) Diversion rate is net of the contamination rate in the

		organic (data provided monthly from the Compost facility)
Waste Collection		Automated cart system – 1 cart limit (65 gallons) Every two weeks collection Material disposed at the Leduc Landfill
Recycling		Manual Curbside Recycling – clear blue plastic bag. Weekly collection-no limits
Organics		Automated cart system – 1 cart limit (65 gallons) Weekly collection for 6 month and by-weekly for 6 month.
Fees		• Waste management services are rolled into one. Utility bill (recycling & waste collection are combined). The cost per household for 2014 was $21.50 per month.
Carts		Leduc owns the carts and provides the maintenance and new deliveries with internal staff. The initial delivery was provided by Ever Green in combination with the carts provider.
Waste Collection	**Waste Limits**	• 1 cart limit each for garbage and organics • At the Recycling center one bag of household waste is accepted free of charge and any additional bags are $2/bag. • No limit for recyclables
	Large Item Collection	• Christmas trees are collected in January from curbside • Large items are picked up at curbside for one week in May
	HHW	Accepted at the Recycling Centre all year round
	Depot	There is a manned recycle station in Leduc that accept blue bag recycling products, E-waste, household hazardous waste, old clothing and additional bags of waste year round.
Public Communication		• Web site • Annually calendar
Goals		• Increase diversion rate to 65% by 2021

3.1.4 WINDSOR, NOVA SCOTIA

Organics Ban at Landfill

In 1999 Nova Scotia's Environment Department implemented a ban on organics from landfills and required that 50 per cent of waste to landfills be diverted by 2000. In order to comply with this ban, Windsor, Nova Scotia a town of 3, 725, implemented an Organicarts program. Windsor has achieved waste diversion results of approximately 60% and has experienced success with both commercial and residential waste.

A key to the success of the Organicarts Program has been an extremely effective public communications program.

3.1.5 LEAF RAPIDS, MANITOBA

Plastic Bags Ban

In April of 2007, Leaf Rapids, Manitoba became the first community in North America to legislate a ban on single-use plastic shopping bags. With the support of various community members, business leaders and municipal councillors over 2 years a bylaw banning single use plastic bags was created. Under the bylaw (attached in Appendix A): " ***the Town of Leaf Rapids will be Single Use Plastic Shopping Bag free effective April 2, 2007 and retailers in the Town of Leaf Rapids will not be permitted to give away or sell plastic shopping bags that are intended for single use."*** Enforcement of the bylaw is based largely on complaints.

Before implementing the ban, the City distributed 5 free reusable bags to each household. Retailers were then required to charge $0.03/bag. After approximately one year, the ban was put in place. Education and public communication were keys to the success of the program.

3.1.6 BOULDER, COLORADO

Zero Waste Community

In 2006, the City of Boulder passed a resolution to pursuit Zero Waste as a long term goal. A copy of this resolution is provided in Appendix B.

The city's current solid waste management program includes the following programs:

1. Recycling Cart: comingled collection of recyclables with collection every other week. Costs for this program are covered by the base trash rate.
2. Organics Collection: food collection in a 32 gallon cart, yard waste in up to 3 bags – every other week.
3. Yard Waste Drop-Off Site.

The total budget for this program is $320,000/year which comes out of a "trash tax" paid by both the commercial and residential sectors (67% from the commercial trash tax and 33% from residential).

The current program also includes the following initiatives to encourage commercial waste diversion:

1. Free Recycling Coupon: The City provides a coupon for recycling collection for first three months of service if the business signs up for long term service.
2. Business Incentive: Businesses receive $2.50 per subscribed cubic yard of compost collection.
3. Wood Waste Drop off: 50% off standard disposal rate.
4. Yard Waste Drop off: 40% off standard disposal rate.

The typical cost per household/month is:

• Bag Service	$3.50/month
• Trash Bill	$10.50/month
• Cart Service	$11.50/month
• Trash Tax	$3.50/month
Total	$29.00/month

In its plan to achieve Zero Waste (the City has selected 85% diversion as a goal) the City has or is considering implementing the following programs:

1. Full organics curbside collection
2. Curbside recyclables collection
3. Recycling depot
4. Institute reporting requirements for recycling haulers
5. Develop Recycle Row project – a one stop-shop where Boulder residents and businesses can access facilities to meet all their waste reduction and recycling needs:

a. E-Recycling facility
b. ReSource – used building materials yard
c. Household hazardous waste and small business hazardous waste facility
d. Yard waste drop-off centre
e. Yard and food waste composting centre
f. County recycling drop-off centre
g. Education centre – where visitors can learn about green building techniques, alternative energy and energy conservation options

The goal is to create a market development zone for recycling-related business.

6. Implement and expand commercial assistance programs (i.e. Free Recycling Coupon)
7. Ban e-scrap
8. Coordinate a multi-family complex volunteer coordinator network – goal is to increase recycling in multi-family complexes
9. Construction and demolition recycling bond
10. Investigate more aggressive residential “pay as you throw” ordinance
11. Implement minimum multi-family unit recycling requirement
12. Legislate commercial recycling goal
13. Increase or rebate the Trash Tax for commercial business
14. Institute a commercial source-separation ordinance
15. Mixed Waste Construction and Demolition Debris Recycling Centre
16. Implement local producer “take back” laws

4.0 PRELIMINARY LIST OF PROGRAM ENHANCEMENTS

Based on the local research findings relating to the City of Cold Lake’s current waste management program, the following preliminary list of alternative solutions was developed. This is a “Laundry list” of options including suggestions from interviews with more defined options provided in Interim Report 4 reflecting the results of waste sort, survey and cost analysis.

4.1 Solid Waste Management Goals

- Set goals for both residential and commercial waste reduction.

- Gather data and compare annually to bench line data to measure progress towards goal.
- Continually review progress and set new goals once initial goals are met.
- Time implementation of diversion activities to manage budget. This allows diversion activities to increase as landfill costs go up in the future therefore having the net effect of keeping costs controlled.
- Time implementation of diversion option depending on percent diversion to help control program implementation costs.
- Update bylaws as required.

4.2 Weekly Residential Waste Collection

- Extend cart system at curbside to reduce collection costs through a reduction in workers compensation claims and reduction in collection time.
- Implement bag or cart limit to provide incentive to reduce waste and control collection costs.
- Implement plastic bags ban.
- Implement collection ban on certain materials i.e. OCC.
- Every two weeks garbage collection to reduce costs and increment recycling.
- Include all residents (multy-family) in the waste collection because currently a few buildings are excluded. The cities of Calgary and Edmonton are currently facing high costs to include multiresidential building in curbside collection in order to allow everyone to recycle. Cold Lake has the opportunity to do it now inexpensively.

4.3 Curbside Recycling and Cold Lake Recycling Centre

- The amount of recyclables collected at the curbside has to be weighed when taken to the CLRC. Currently quantity of recyclables collected is under estimates and its affect the calculation of the City's diversion rate. An agreement with CLRC to weigh recyclables has to be implemented.
- A drop off system for recyclables has to be implemented at the transfer station as a large amount of recyclables is mixed with garbage and not diverted. An agreement with CLRC has to be found to provide a drop off service for recyclables at the Transfer station.
- Mixed load of garbage and recyclables has to be regulated at the transfer station.
- Use signage at transfer station to promote recyclables diversion.

4.4 Organics

- Expand organics (food and yard waste) collection year round with carts.
- Implement organic weekly collection in summer (every two weeks or monthly in winter).
- Identify a suitable location for a new compost coumpound that overcome interferences with the military base (also in collaboration with nearby communities).
- Evaluate solutions to market the compost producted at the compost coumpound (give it away to residents or use it for City projects/Public works, etc.).
- Implement cart system for organics waste.
- Grass cycling.
- Offer rebate program for users of home composters similar.
- Implement communication and education programs for organic collection.
- Subsidize and provide education about backyard composters.
- Implement a give away compost for residents (possibly during a “Cold Lake weste reduction week”)

4.5 Transfer Station/Class III Landfill

- Composition of inert solid waste dropped off at the Class III Landfill comprise a large percentage of recyclabels wood (over 60%) that could be diverted increasing the expectancy life for the landfill.
- A drop off system for recyclables has to be implemented at the transfer station as a large amount of recyclables is mixed with garbage and not diverted. An agreement with CLRC has to be found to provide a drop off service for recyclables at the Transfer station.
- Improve signage at transfer station to better identify drop off areas and accepted items.
- Create a acceptance area for recyclable wood.
- Where possible beautify the site, make it more pleasing.

4.6 Communications

- Develop integrated education program that incorporates all solid waste management programs and associates programs with an overall diversion goal and theme.
- Develop theme that integrates all components of solid waste program.
- Include theme on all signage, advertising, website material, etc..
- Increase budget for public education programs and advertising.

- Share good news stories related to diversion.
- Systemize and expand education program so it runs consistently and reflects solid waste management plan.
- Focus education program on increasing capture and participation rates of current programs, expand program as more diversion strategies are implemented.
- Link communication mechanisms (school newsletter, Welcome Wagon, web site, newspaper, etc.) so information can be easily distributed.
- Provide more education on waste management truths and the good news stories.
- Indroduce a “Cold Lake reduction week” where severaly educational programs and activities are delivered and compost is given away to residents.

3.7 Summary

Cold Lake has the foundations of an effective solid waste management plan; programs are in place to address recyclables and yard waste, and there is an overall understanding that organics are key to achieving significant diversion. Broad areas of focus for options analysis based on the results from local research are:

- Maximizing efficiency of current diversion programs through waste limits
- Every two weeks garbage collection to reduce costs and increment recycling
- Expanding organics programs to significantly increase capture rate of organics
- Implementing communication and education programs

APPENDIX A

TOWN OF LEAF RAPIDS BY-LAW

Leaf Rapids Single Use Plastic Bag Bylaw

TOWN OF LEAF RAPIDS
By-Law No. 462

Being a By-Law of the Town of Leaf Rapids for the establishment of Single Use Plastic Shopping Bags.

WHEREAS Single Use Plastic Shopping Bags are a very visible component of litter throughout the Town of Leaf Rapids, lake side, trails, roadside and the nuisance grounds;

AND WHEREAS Single Use Plastic Shopping Bags have a negative impact on our wildlife habitat and are not environmentally friendly;

AND WHEREAS the Town of Leaf Rapids incurs a significant cost to clean up the Single Use Plastic Shopping Bags each year;

AND WHEREAS local businesses can reduce merchandise cost by not having to purchase Single Use Plastic Shopping Bags;

AND WHEREAS the Town of Leaf Rapids has provided education to shoppers and school children about the environmental advantages and reduced cost of using reusable shopping bags;

AND WHEREAS by using a multi-use shopping bag, residents are reminded of the positive impact of recycling;

NOW THEREFORE upon passing this By-Law, the Council of the Town of Leaf Rapids, enacts as follows:

1. *THAT the Town of Leaf Rapids will be Single Use Plastic Shopping Bag free effective April 2, 2007.*

2. *THAT retailers in the Town of Leaf Rapids will not be permitted to give away or sell plastic shopping bags that are intended for single use.*

3. *THAT a person who contravenes this By-Law of the Town of Leaf Rapids is guilty of an offence and is liable on summary conviction of a fine of not more than $1000.00.*

4. *THAT where a contravention continues for more than one day, the person is guilty of a separate offence for each day it continues.*

5. *THAT on passing of this By-Law, By-Law No. 457 is hereby rescinded.*

6. DONE AND PASSED as a By-Law of the Town of Leaf Rapids at the Townsite of Leaf Rapids, in the Province of Manitoba, this 22nd day of March, 2007, A.D.

EXEMPTIONS TO THE BY-LAW

Small plastic bags that are used to store non-packaged goods such as: a) Dairy products b) Fruit, vegetables or nuts c) Confectionery d) Cooked foods, hot or cold e) Ice f) Smaller bags for fresh meat, fish, candy and poultry g) Bags that cost more than $1.50

APPENDIX C

BOULDER – ZERO WASTE RESOLUTION

RESOLUTION NO. _____

A RESOLUTION DECLARING BOULDER A ZERO WASTE COMMUNITY.

WHEREAS, an estimated 156,773 tons of waste is generated in the city of Boulder each year by residents, businesses and institutions and approximately 70% of this amount is sent for landfill disposal;

WHEREAS, though the city of Boulder has reached an overall recycling rate of more than 30% percent, more can be done, especially in "closing the loop" by purchasing products made with recycled content;

WHEREAS, the placement of materials in waste disposal facilities, such as landfills and incinerators wastes natural resources, transfers liabilities to future generations and has the potential to cause damage to human health;

WHEREAS, avoiding the creation of waste or discards in the first place is the most economically efficient and environmentally sustainable resource management strategy;

WHEREAS, a resource recovery-based economy will create and sustain more productive and meaningful jobs than a disposal-based economy;

WHEREAS, with the appropriate economic incentives, manufacturers can and will produce and businesses will sell products that are durable and repairable and that can be safely recycled back into the marketplace or nature;

WHEREAS, government can be ultimately responsible for establishing criteria needed to eliminate waste, for creating the economic and regulatory environment in which to achieve it, and for leading by example, and

WHEREAS, the city of Boulder has positioned itself as an environmental leader among local governments by adopting environmental initiatives, programs and policies including the broad community vision contained in the Boulder Valley Comprehensive Plan, City Council's Environmental Sustainability Goal, city recycling and environmental purchasing policies, and the city Master Plan for Waste Reduction,

WHEREAS, the guiding principles of zero waste are: managing resources instead of waste, conserving natural resources through waste prevention and recycling, turning discarded resources into jobs and new products instead of trash, promoting products and materials that are durable and recyclable, and discouraging products and materials that can only become trash after their use.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BOULDER, COLORADO

The city of Boulder hereby encourages the pursuit of Zero Waste as a long-term goal in order to eliminate waste and pollution in the manufacture, use, storage, and recycling of materials. This goal must be addressed through the choices Council will make in the

context of the city's Business Plan and annual budget processes, by initiating action plans and measures that significantly reduce waste and pollution. These measures will include encouraging residents, businesses and agencies through incentives and legislation to judiciously use, reuse, and recycle materials, as well as to motivate businesses to manufacture and market less toxic and more durable, repairable, reusable, recycled, and recyclable products. In all cases, the guiding principles of the city's Master Plan for Waste Reduction will be followed. Mandatory programs will be employed only if the infrastructure exists and if convenient, voluntary programs prove not to be successful.

The city of Boulder will also review its own policies, contracts, and standard operating procedures to incorporate zero waste provisions and actions into all aspects of its organizational culture to encourage the use of materials and products that are durable, repairable, and reusable, have a minimum of packaging, toxic content or chemical hazard potential, are resource and energy efficient in their manufacture, use and disposal, and in their use or disposal minimize or eliminate the city's potential environmental liability.

ADOPTED this 2nd day of May, 2006

_____
Mark Ruzzin, Mayor

ATTEST:

_____
City Clerk on behalf of the
Director of Finance and Record

City of Cold Lake

Integrated Waste Management Study

Section 2: Waste Sort

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FIGURES AND TABLES

1.0 INTRODUCTION

Section two presents the results and findings of the waste sort conducted for the City of Cold Lake. This section summarizes the methodology and results arising from the waste sort.

2.0 WASTE SORT METHODOLOGY

2.1 Waste Sort Methodology

Residential garbage, organics and recyclables, from the two collection areas (Zone A and Zone B), were collected by the City of Cold Lake on Tuesday December 09th, Wednesday December 10th and Thursday December 11th of 2014 (regular collection days). The materials were transported to the City of Cold Lake Transfer Station located east of Highway 28 at the South edge of the City for sorting. The hauler unloaded materials in a designated area and provided waste and recyclables gross and truck tare weights (kg).

A team of three people sorted the waste at the City of Cold Lake Transfer Station, two from Advanced Enviro Engineering Ltd. (AE) and one from the City of Cold Lake.

Based on the Guidelines for Waste Characterization in the State of Washington report (Cascadia Consulting Group Inc., 2003a), Advanced Enviro Engineering Ltd. took residential garbage and recyclables samples from randomly selected trucks. Two garbage and two recyclables collection trucks were sampled. In addition two (2) loads of organics were segregated at the Cold Lake compost pad 4 weeks before the actual waste sort was conducted as organics collection was not available during the waste sort week. The organics sorted are considered representative of the winter organics collection. The whole organics loads were sorted.

The garbage and recyclables were spread into symmetrical or elongated piles at the designated area with a grid dividing each load into 8 sections. One grid (section) from each load was then randomly selected using a random number table. The approximate requisite amount of material (90 – 120 Kg) from the selected cell was then moved to the sorting area and sorted.

Figure 1. Garbage delivered December 11th, 2014 for waste sort.

Figure 2. Recyclables delivered December 11th, 2014 for waste sort.

Figure 3. Organics delivered November 11th and 12th, 2014 for waste sort.

Waste sort personnel collected, sorted and weighed garbage, organics and recyclables according to predetermined categories (Table 1). These categories were identified through consultant's experience, interviews, review of existing information (City website), reports, materials collected and processed by the City of Cold Lake. The categories list (Table 1) was approved by the City of Cold Lake.

Garbage, recyclables and organics were sorted into pre-weighed 76L (20 gallons) plastic storage totes/baskets and weighed using an ANYLOAD EC100 Counting Scale. The tare weight (tote) was subtracted from the gross weight (tote plus waste) to obtain net weight (waste).

Following the waste sort, garbage, recyclables and organics were piled separately and loaded back for disposal and recycling. Transfer Station items were taken to the Transfer Station.

Weights were recorded and analyzed using Microsoft Excel 2010.

Table 1. Waste sort categories and subcategories.

Cold Lake - Waste Sort (2014)			
Category	**Sub-category**	**Abb.**	**Description / Notes**
City Curbside Programs			
General Waste	General Waste	**GW**	Any item that does not fit in the Organics, Recycling, and Hazardours Category. **INCLUDES BUT NOT LIMITED TO** Ashes, Ceramics and clay, Diapers / Baby Wipes, Hygiene and Sanitation products, Broken glass, Soiled plastics, Soiled metal, Styrofoam, Fabric / Rags, Foil gift wrap, Frozen juice cans, Loose can lids, Plastic film and bubble wrap, Styrofoam cups & plates, etc., Toothpaste tubes, Window glass, **C & D (unless listed under Transfer Station)**
Organics	Food Waste	**Or-FW**	Fruit and vegetable peels and cores, Meat, Meat bones, Dairy, Egg shells, Breads, Cereals, Grains, Baking ingredients, Coffee grounds and filters, Tea leaves and bags, Table scraps and Spoiled food
	Household Waste	**Or-HW**	Dog droppings, Kitty litter, Wood or paper cage lining, Fur and feathers, Soiled paper (tissues, napkins, paper cups, paper plates, pizza boxes, etc.), Dirt and Dust
	Yard Waste	**Or-YW**	Flowers, Weeds, Grass, Leaves, Twigs, Small sticks
Recycling	Mixed paper	**R-MPa**	Printer and writing paper, newspaper, magazines, flyers, envelopes, cards, books, catalogues, cereal boxes, pasta boxes, tissue boxes, paper egg cartons and paper coffee cups (remove lids), shredded paper

	Metal / Glass	**R-MGl**	Steel cans (place lid inside and pinch shut), glass jars (all colors) (remove lids), aluminum foil, pie plates
	Plastics (#1-7)	**R-Pl**	Plastics #1 - 7; **look for the triangular symbo**l with a number in the middle, usually on container bottom, plastic bags
	Beverage /Deposit Containers	**R-Bev**	Milk cartons and jugs, pop and beer cans, wine, water, beer and juice bottles, Tetra Paks
	Corrugated cardboard	**R-Card**	Flatten and place under bagged items
Other Programs			
Transfer Station	Electronic Waste	**EW**	VCRs, stereos, microwaves, electronic toys, calculators, (Computer monitors and processors, televisions, DVD players, printers, laptops) etc.
	Household Hazardous Waste	**HHW**	Car and household batteries, propane bottles, oil, glycol, paints, pesticides, harsh cleaners, fluorescent bulbs, propane tanks, fire extinguishers
	Tires	**Tire**	Passenger tires
	Organic Waste	**Tree**	Tree branches, Christmas trees
	Construction	**C&D**	Construction waste, Gravel truck construction waste (wood, shingles), rocks, concrete
	Household Items	**LgIt**	Mattress, box spring, sofa, loveseat, chair, etc.
	White Goods	**Whi-Goo**	Fridge, stove, etc.
	Scrap Metal	**Met**	Scrap metal pieces
Potentials			
	Donation Programs	**P-Don**	e.g., Clothing (good condition)
CITY OF COLD LAKE - DEC 2014			

2.2 Waste Volume Methodology

A representative from Advanced Enviro Engineering Ltd. recorded waste volume data from randomly selected hundred (100) non-pilot households and seventy five (75) pilot program households at the curbside. The data included number of items (e.g. carts, blue bags, garbage bags or cans, etc.) set out and approximate volumes (e.g. ½ cart full, 2 full blue bags, ¾ full garbage bag). These data will help to understand the average volume of residential waste generated by the residents.

2.3 Assumptions and Limitations

- Randomly sampled waste is representative of the total waste generated by single family households in the City of Cold Lake.

- Randomly selected and volume data that was checked for households are representative of the total volume of waste generated by single-family residential households in the City.

- Due to the available budget and time constraints, the data analysis is not statistically valid as a small number of samples was sorted. However, data is representative of the Cold Lake waste generation and allows the consultant to better evaluate waste composition, capture rates and contamination rates for the different streams of waste generated in Cold Lake.

3.0 WASTE SORT RESULTS

3.1 Composition of garbage sent to landfill

During the waste sort, the following garbage (to landfill) characteristics were noted:

- Generally garbage was largely composed of diapers, clothing (ripped, torn), not recyclables plastic, snack bags, broken glasses, dirty papers, etc.

- Organic food waste was largely composed of leftovers, untouched food (eg. frozen products, full food containers), tissue, paper waste, etc.

- Recyclables were largely composed of mixed fiber (flyers/school notes/envelopes/newspapers), boxboard, cardboard, paper coffee cups and plastics. Plastics (types 1-2) consisted mainly of takeout food containers. Plastics (types 3-7) consisted mainly of yogurt containers, other food containers and plastic bags. Aluminum and beverage containers were infrequent.

- Potential donations items consisted mainly of articles of clothing all in good condition and books.

- One container (less than one litre) of household hazardous material was encountered during the waste sort.

A summary of garbage composition by weight is provided in Figure 4 and 5. As illustrated, **organics was the largest component of garbage by weight (42%),** followed by regular garbage (27%). Recyclables comprised twenty percent (20%) of the sorted garbage, transfer station/Cold Lake Recycling Centre (CLRC) items comprised five percent (5%) and potential donation items comprised six percent (6%) of sorted garbage.

Based on results of the garbage composition, 73% of the materials set out for garbage pickup could potentially be diverted through programs already offered by the City. Forty two percent (42%) of the current garbage set out could be diverted through the curbside organics collection.

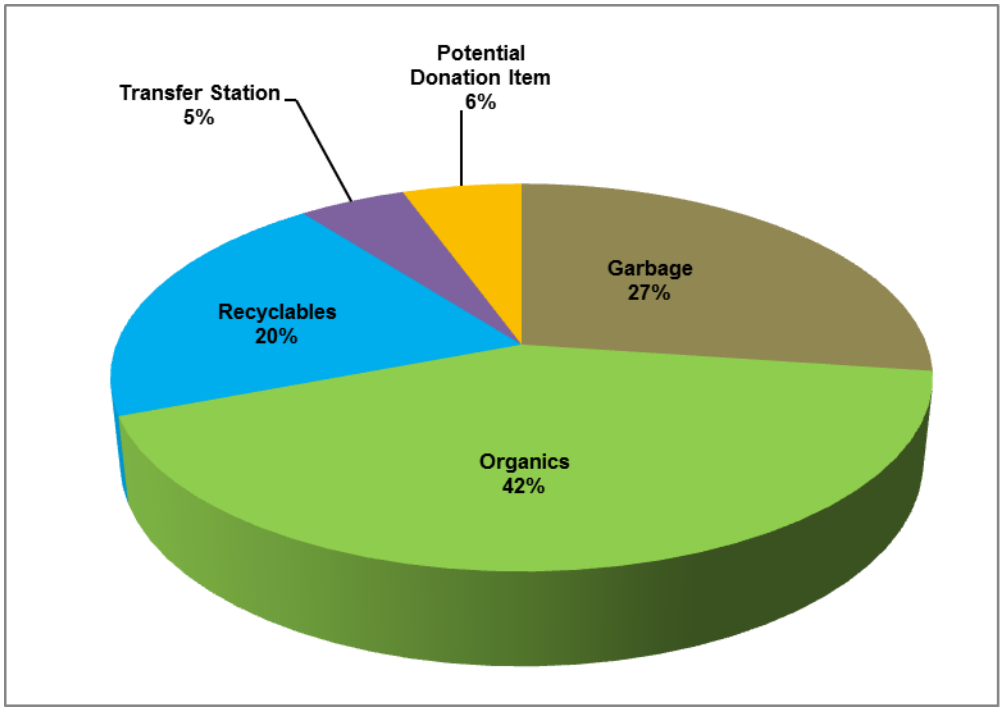

Figure 4. Composition of garbage to landfill by weight

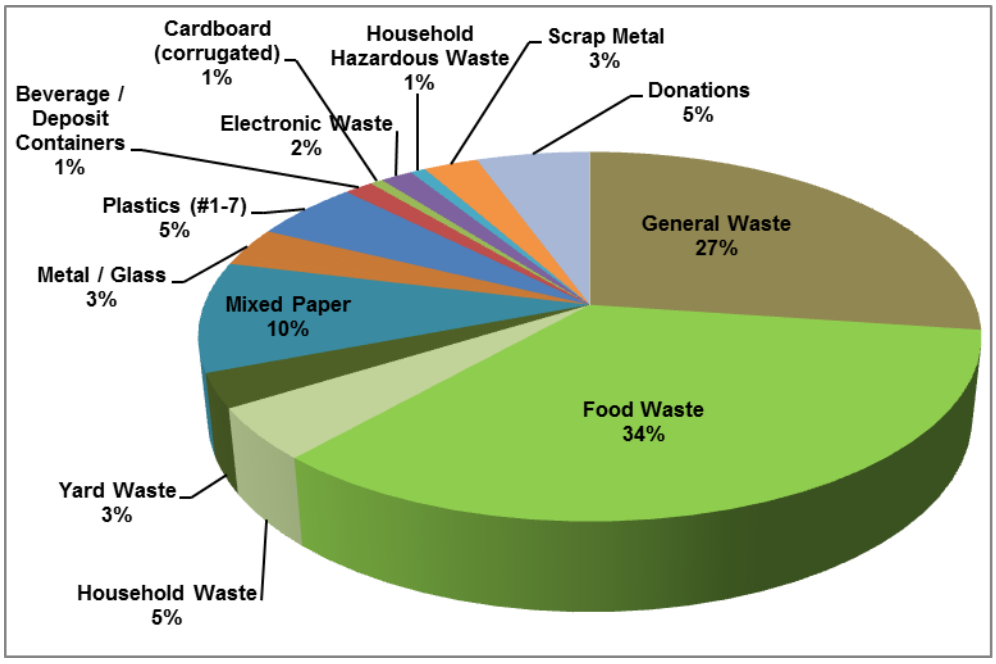

Figure 5. Composition of garbage to landfill by weight by category

As showin in Figure 5, thirty four percent (34%) of the organics found in the garbage is food waste. While mixed paper, metal/glass and plastics comprised eighteen percent (18%) of the recyclables in the garbage sent to landfill. Five percent (5%) of the garbage is comprised of electronic waste and scrap metal which can be taken to the Cold Lake Recycle Centre.

Observations of note include the following:

- High percentage of organics, mostly food waste is sent to landfill.
- A relatively high percentage of recyclables that could be recovered and used is included in the garbage.
- If waste are properly sorted at the source (household level), only a quarter of the gabage generated would have ended up in a landfill.

3.2 Composition of Recyclables

During the waste sort, the following recyclables (from current recycling programs) characteristics were noted:

- Recyclables were largely composed of mixed paper, followed by cardboards and metal/glass. Plastics consisted mainly of food containers and plastic bags.

A summary of recyclables composition by weight is provided in Figure 6 and 7. As illustrated in Figure 6, a large percentage of recyclables (86%) is placed in the correct stream, whereas garbage (7%), potential donation items (4%) and organics (3%) were also put in recyclables. Based on Figure 7, the largest component of the recyclables is mixed paper (41%) followed by cardboard (22%).

Based on the waste composition results, the blue bag program has a contamination rate of 14% of which 7% is garbage, 4% is potential donation items and 3% is organics.

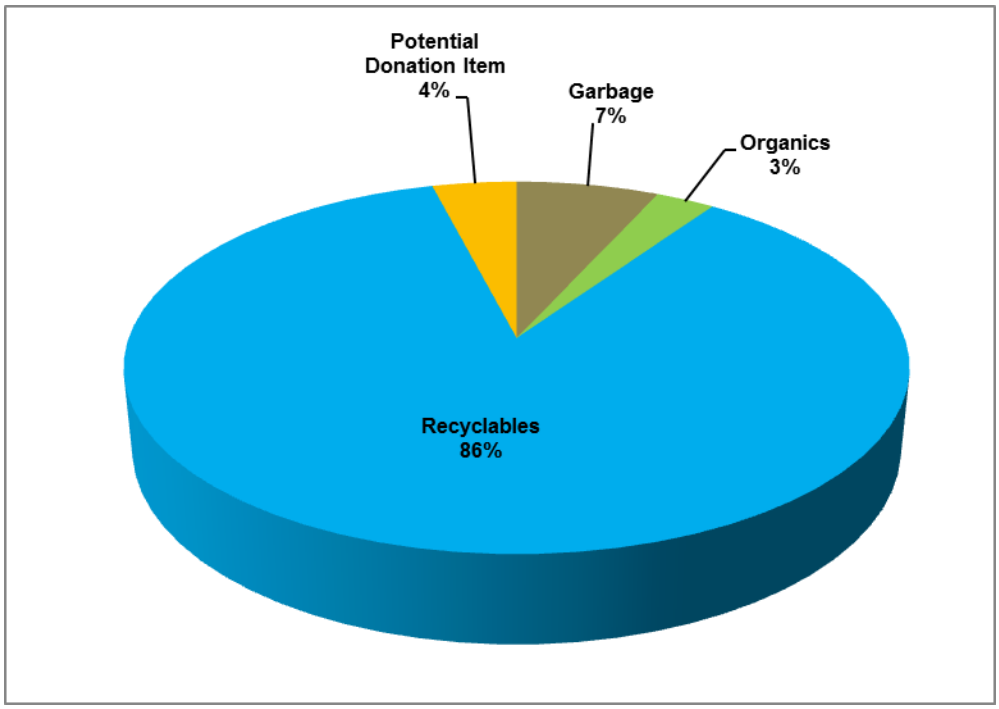

Figure 6. Composition of recyclables by weight

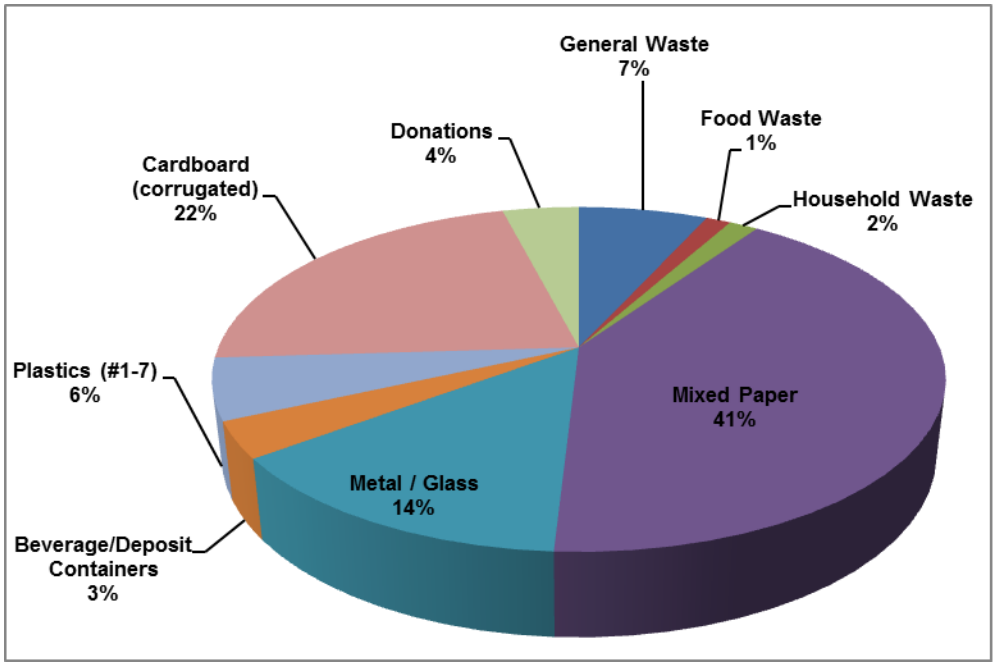

Figure 7. Composition of recyclables by weight by category

Observations of note include the following:

- A large percentage of recyclabes are recovered.
- Recyclables contamination is approximately 14%. This shows the need for eduation and “what goes where” information.

3.3 Composition of Organic Waste

During the waste sort, the following organic waste characteristics were noted:

- Organic waste is comprised of yard waste.

Based on the results obtained from the organic waste sort (Figure 8), contamination is insignificant (0.1%) and it shows that residents are using the green carts only for yard waste as food waste comprises only 0.2%.

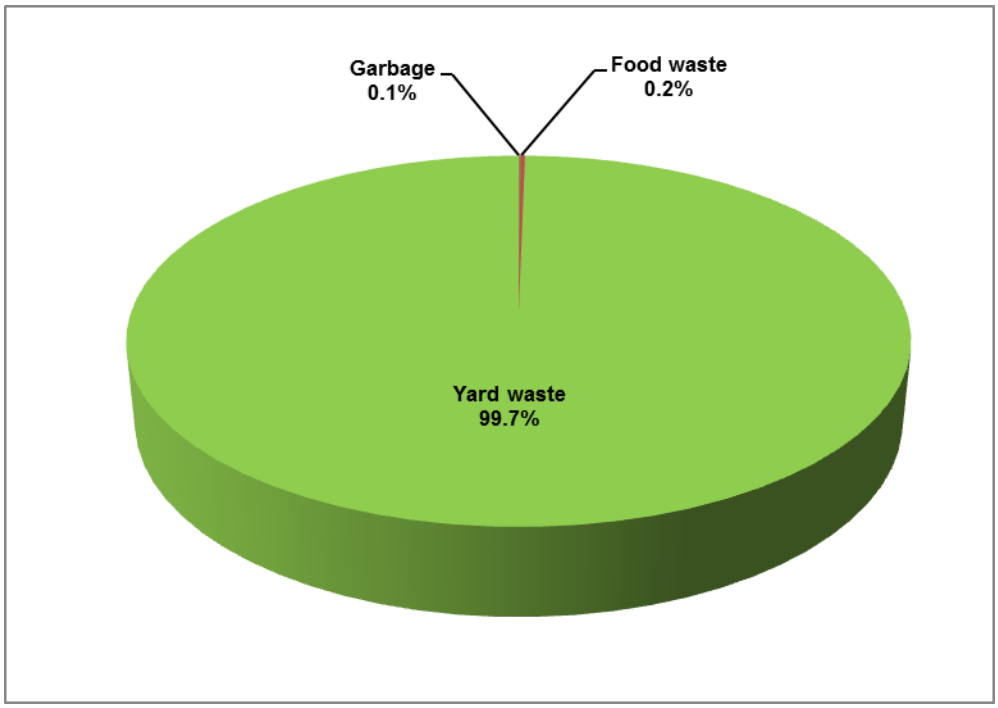

Figure 8. Composition of organic waste by weight by category

Observations of note include the following:

- Contamination is insignificant (0.1%)
- Almost all of the organic waste is yard waste (99.7%)

3.3 Capture Rates of Recyclable and Organic waste

The capture rate indicates the percentage of a particular waste stream that is being captured through a program aimed at diverting that waste stream.

Based on the 2014 annual waste generation data and data obtained from the waste sort; the blue bag program has a capture rate of 31% and the organics program has a capture rate of 18%. Corrugated cardboard has the highest capture rate followed by mixed paper and metal/glass within the blue bag program. While in the organics program, yard waste has the highest capture rate of 76%.

Figure 9 compares the percentage of the total curbside waste stream that could potentially be diverted and the percentage that is actually being diverted based on waste sort results.

Table 2. Capture Rates for Curbside Diversion Programs

Diversion Program	Material	Total Available in Waste Streams (tonnes/year)	Total Captured in Program (tonnes/year)	Capture Rate
Organics	Food Waste	1004	1	0.1%
	Household Waste	137	0	0%
	Yard Waste	362	275	76%
	Total Organics	**1503**	**276**	**18%**
Blue Bag	Mixed Paper	406	126	31%
	Metal / Glass	142	43	30%
	Plastics (#1-7)	169	18	11%
	Beverage / Deposit Containers	51	10	20%
	Cardboard (corrugated)	85	67	79%
	Total Blue Bag	**854**	**264**	**31%**

*Based on 2014 annual waste generated data

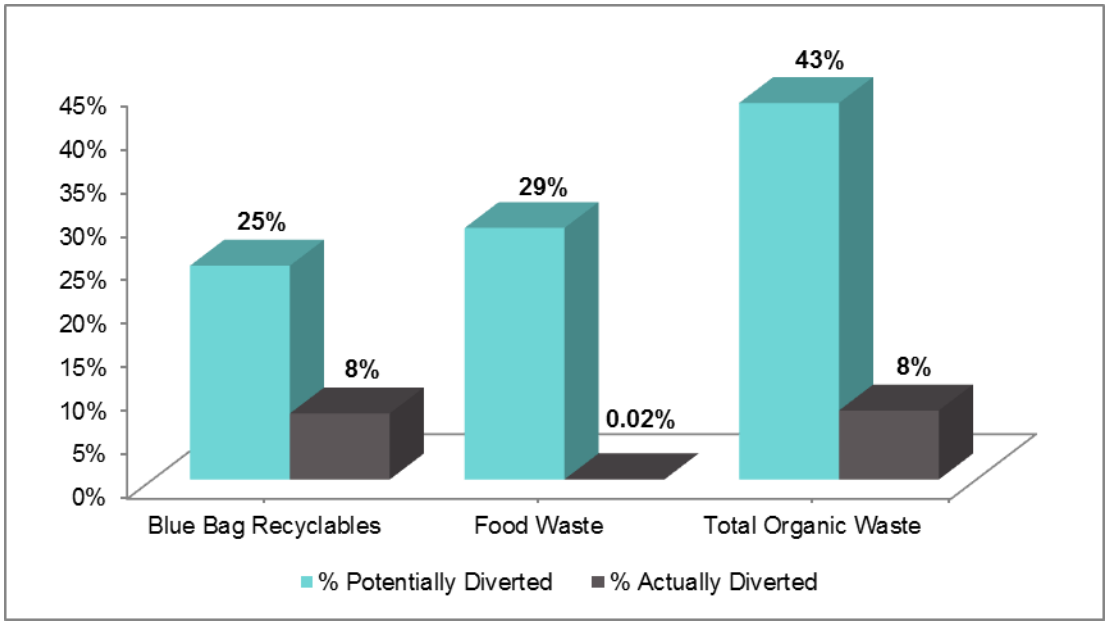

Figure 9. Comparison between diverted and divertible materials

Observations of note include the following:

- The curbside organics program has a capture rate of 18% while the blue bag program has a 31% capture rate.
- If all the available recyclables and organics are captured through the existing diversion programs, the City would reach at 68% diversion rate through the curbside collection.
- Considering also the waste that could be potentially captured through transfer station and donation programs the City could reach at 77% diversion rate
- Data regarding recyclables diverted by the residents is based on the curbside collection data only, as no data was available for recyclables dropped-off at the Cold Lake Recycling Centre by the residents.

3.4 Volume Evaluation of Total Waste (Garbage and Recyclables)

Approximate volume of garbage (black bags or cans) and recyclables (blue bags, cardboards and paper) set out from a total of sixty (60) randomly selected households in the non-pilot area, thirty (30) households in the Marina/Lake Shore area (Zone A) and thirty (30) households in the Brady Heights area (Zone B, garbage only), and a total of sixty (60) randomly selected households in the pilot areas, thirty (30) households in the Horseshow Bay area (Zone A) and thirty (30) households in Westlawn area (Zone B), were recorded on December 9th – 12th, 2014 with the assumption that one regular garbage bag equals 75l or one black garbage cart equals to 246l.

Ninety percent (90%) of the sample households in the pilot areas (Zone A) and sixty three percent (63%) of the sample households in the non-pilot areas (Zone A) did not set out recyclables for collection of the total 60 households observed during recyclables collection week. **Thirty seven percent (37%) of the sample households in the pilot areas (Zone A and B) and forty percent (40%) of the sample households in the non-pilot areas (Zone A and B) did not set out garbage for collection** of the total 60 households observed.

On average, in the pilot areas residents generate less than ½ black carts of garbage per household per week (Fig. 10) and less than half (1/2) bag of recyclables per household every two weeks. In non-pilot areas, on average residents generate approximately one (1) garbage bag per week and one (1) bag of recyclables per household every two weeks.

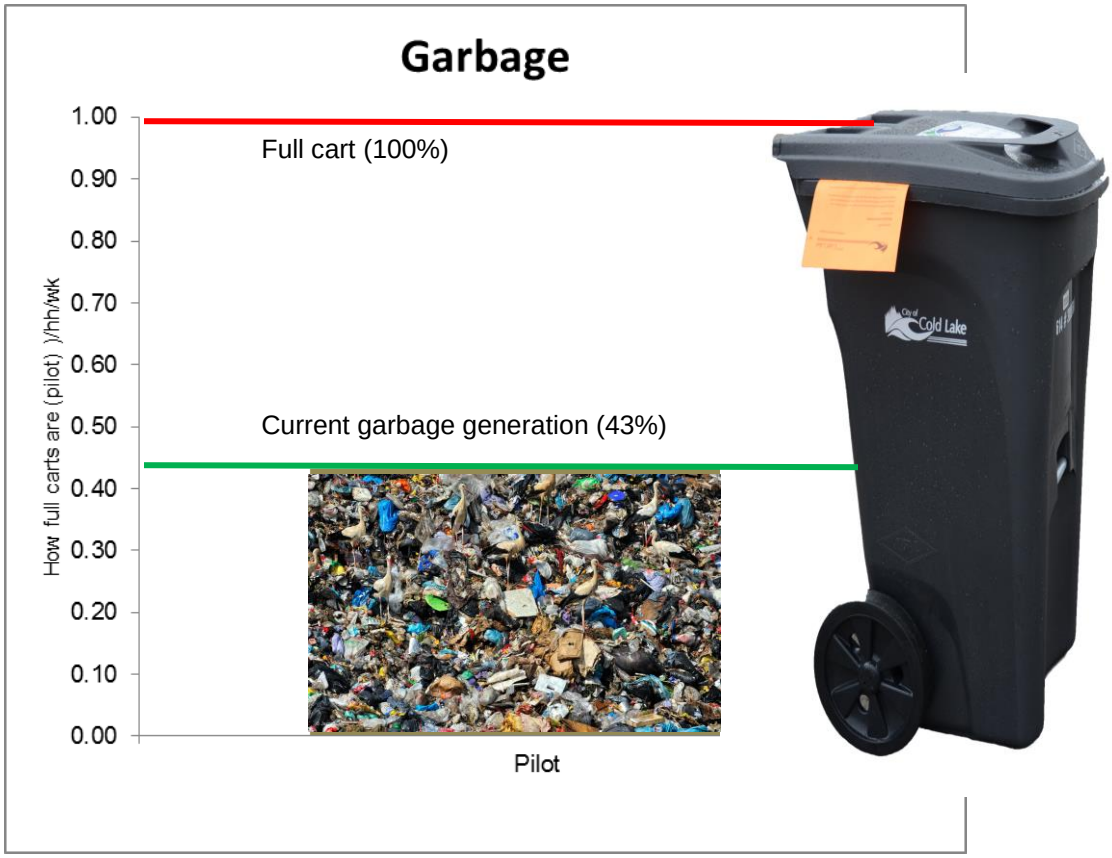

Figure 10. Approximate fullness of garbage in cart (pilot), per household per week (garbage)

Observations of note include the following:

- Black carts in the pilot areas are less than 1/2 full (approximately 2-3 bags) and in non-pilot areas on average residents generate approximately one (1) garbage bag per household per week.
- In pilot areas observed residents generate approximately less than half (1/2) bag of recyclables per household every two weeks and one (1) bag of recyclables per household every two weeks in the observed households in non-pilot areas.
- Pilot areas in Zone A generate higher volume of garbage than non-pilot areas in Zone A. On the contrary, non-pilot areas in Zone B generate higher volume of recyclables than pilot areas in Zone B.
- Residents generate less than one (1) bag of recyclables per household every two weeks
- Thirty seven percent (37%) of the sample households in the pilot areas (Zone A and B) and forty percent (40%) of the sample households in the non-pilot areas (Zone A and B) did not set out garbage for collection.

- Ninety percent (90%) of the sample households in the pilot areas (Zone A) and sixty three percent (63%) of the sample households in the non-pilot areas (Zone A) did not set out recyclables for collection
- It appears the City of Cold Lake could reduce frequency for garbage and recyclables collections based on volumes.

4.0 FINDINGS AND RECOMMENDATIONS

4.1 Findings

Composition of garbage sent to landfill

- High percentage of organics, mostly food waste is sent to landfill.
- A relatively high percentage of recyclables that could be recovered and used is included in the garbage.
- If waste is properly sorted at the source (household level), only a quarter of the gabage generated would have ended up in a landfill.

Composition of recyclables

- A large percentage of recyclabes is recovered.
- Recyclables contamination is approximately 14%. This shows the need for eduation and ‘what goes where’ information.

Composition of organics

- Contamination is insignificant (0.1%)
- Almost all of the organic waste is yard waste (99.7%)

Capture Rates of Recyclables and Organic waste

- The curbside organics program has a capture rate of 18% while the blue bag program has 31% capture rate.
- If all the available recyclables and organics are captured through the existing diversion programs, the City would reach 68% diversion rate through the curbside collection.
- Considering that the waste that could be potentially captured through the transfer station and donation programs the City could reach at 77% diversion rate
- Data regarding recyclables diverted by the residents is based on the curbside collection only as no data was available for recyclables dropped-off at the Cold Lake Recycling Centre by the residents.

Volume Evaluation of Total Waste

- Black carts in the pilot areas are less than 1/2 full (approximately 2-3 bags) and in non-pilot areas residents generate approximately one (1) garbage bag per household per week.
- In pilot areas observed residents generate approximately less than half (1/2) bag of recyclables per household every two weeks and one (1) bag of recyclables per household every two weeks in the observed households in non-pilot areas.
- Pilot areas in Zone A generate higher volume of garbage than non-pilot areas in Zone A. On the contrary, non-pilot areas in Zone B generate higher volume of recyclables than pilot areas in Zone B.
- Residents generate less than one (1) bag of recyclables per household every two weeks
- Thirty seven percent (37%) of the sample households in the pilot areas (Zone A and B) and forty percent (40%) of the sample households in the non-pilot areas (Zone A and B) did not set out garbage for collection.
- Ninety percent (90%) of the sample households in the pilot areas (Zone A) and sixty three percent (63%) of the sample households in the non-pilot areas (Zone A) did not set out recyclables for collection
- It appears the City of Cold Lake could reduce frequency for garbage and recyclables collections based on volumes.

4.0 PROJECT LIMITATIONS

This project was completed to the best of the consultants' abilities and in accordance with the APEGA Code of Ethics. The report is based on the information and data reviewed to the extent that the information was available and to the extent considered reasonable within the allocated project time frame and project budget. Advanced Enviro and the environmental consultants who prepared this report do not accept any liability for information that is not within the scope of the project and not identified in the final report.

The purpose of the report is to provide the client with further information in order to make a well-informed decision. This report is specifically for use by the client and for the purpose the consultant agreed to with the client. This report is a confidential document for the client and will only be distributed with the client's and the consultant's permission. One copy of the report will be maintained in the consultant's files as required by APEGA.

City of Cold Lake

Integrated Waste Management Study

Section 3: Solid Waste Management Survey

Advanced Enviro Engineering Ltd.

Providing Solutions for Business and Environment Since 1992

TABLE OF CONTENTS

FIGURES AND TABLES

1.0 INTRODUCTION

Section 3: Presents the results and findings of the solid waste management survey conducted for the City of Cold Lake. The recommendations based on the survey are bolded.

2.0 SURVEY FORMAT

The survey was designed in a questionnaire format to provide the City of Cold Lake residents with information regarding their current waste management system and some waste reduction alternatives. In turn this brings everyone to a similar education level about their current system.

Questions were based on the consultants' experience regarding suitable waste management alternatives and the input provided by the City staff and Councillors.

The survey was distributed by the City of Cold Lake to 5,469 households through a mail out. The survey was also put on Survey Monkey, survey software and questionnaire tool, and made available for the residents. The survey would appear as a pop-up when residents went to the City of Cold Lake home page. A sample of the survey form is in Appendix A.

Households were encouraged to either complete a hard copy or to complete the survey online. One hundred eighty one (181) online responses and eighty four (84) hardcopies were completed for a total of 265 from February 16rd to March 29th, 2015.

3.0 SURVEY RESULTS

3.1 Response Rates

The survey was mailed to each household with the utility bill to ensure all households had the opportunity to participate. To test for non-response bias; the responses by population category were compared to the actual population percentages. For example, the percentages of responses from respondents between the ages of 25 to 44 were

compared to the percentage of City of Cold Lake adult population between these same ages.

As illustrated in Figure 1, the response rate of residents between age 20 and 24 is lower than the actual percentage of population; while the response rate from the age categories 25 to 65+ is well represented. In general responses follow the approximate distribution of the population. There could be a slight bias towards the older range of the population (55 – 65+).

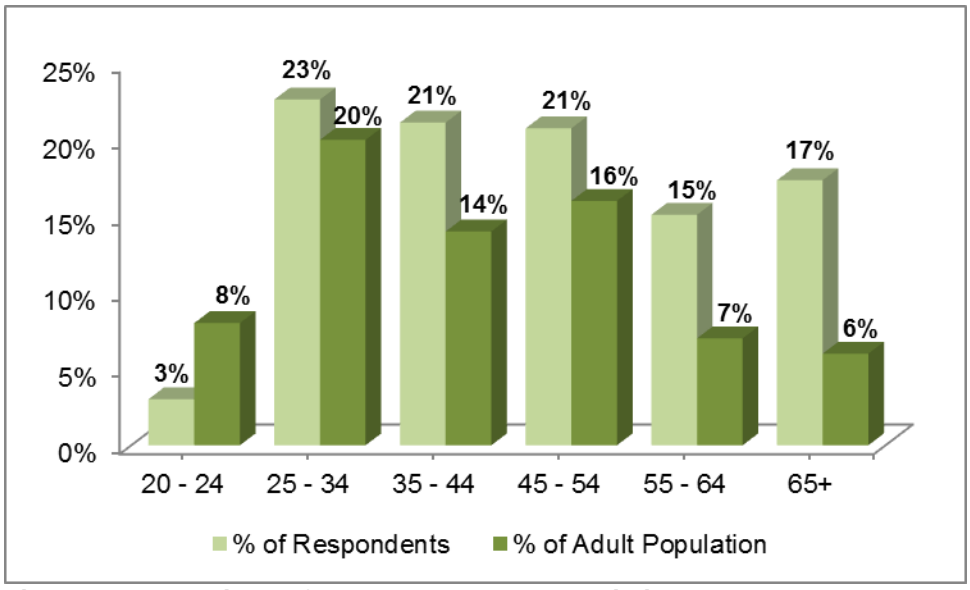

Figure 1. Comparison of response rates to population percentage

Table 1. Population percentage and response rate

	City of Cold Lake	%	Survey Total	%
Total population	13,830		265	
0 - 19	4,090	30%	0	0%
20 - 24	1,175	8%	8	3%
25 - 34	2,825	20%	60	23%
35 - 44	1,900	14%	56	21%
45 - 54	2,175	16%	55	21%
55 - 64	900	7%	40	15%
65+	765	6%	46	17%

Based on a population of 13,830 and assuming random sampling, responses provide a confidence interval of 6 with a confidence level of 95%. For example, if 85% of the respondents answer yes to a particular question then the City can be 95% sure that the actual population would respond yes between 79% and 91% of the time.

Responses for each survey question are provided below.

The purpose of Questions 1 and 2 is to gage the demographic that responded to the survey. Analysis of the population response was provided at the beginning of this section and was used to identify the potential for non-response bias.

Question 1: What is your age?

☐ Under 19	☐ 25 – 34	☐ 45 – 54	☐ 65+
☐ 20 – 24	☐ 35 – 44	☐ 55 – 64	

As shown in Figure 2, sixty five (65%) of City's survey respondents were in the 25-54 age categories, while thirty two (32%) were in the age group 55-65+. According to the City's 2014 Census Report about forty six (46%) and eleven (11%) of the City's population are within the age group of 25-54 and 55-65+ respectively. **This shows that the response rates are overall representative of the population.**

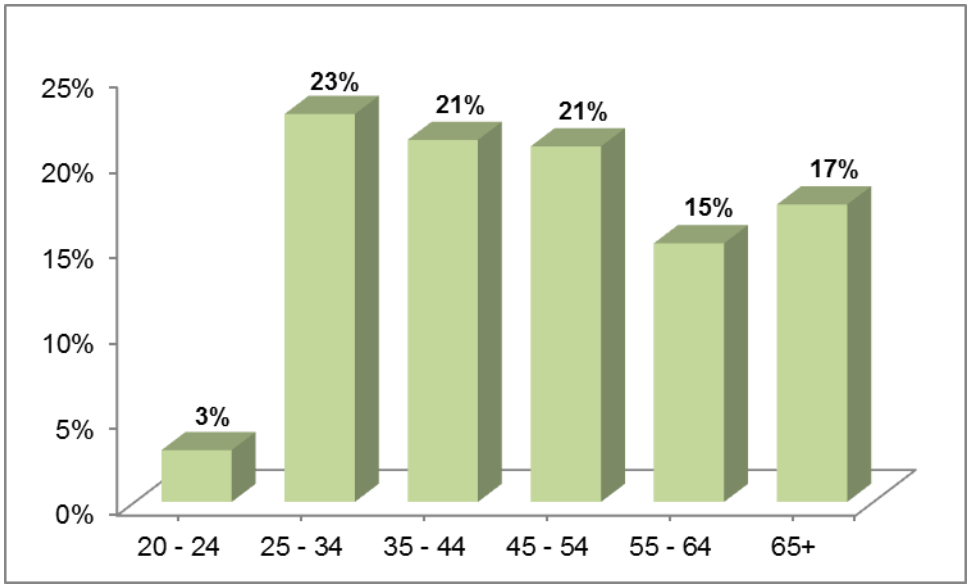

Figure 2. Age group responses

Question 2: What is your gender?

☐ Female ☐ Male

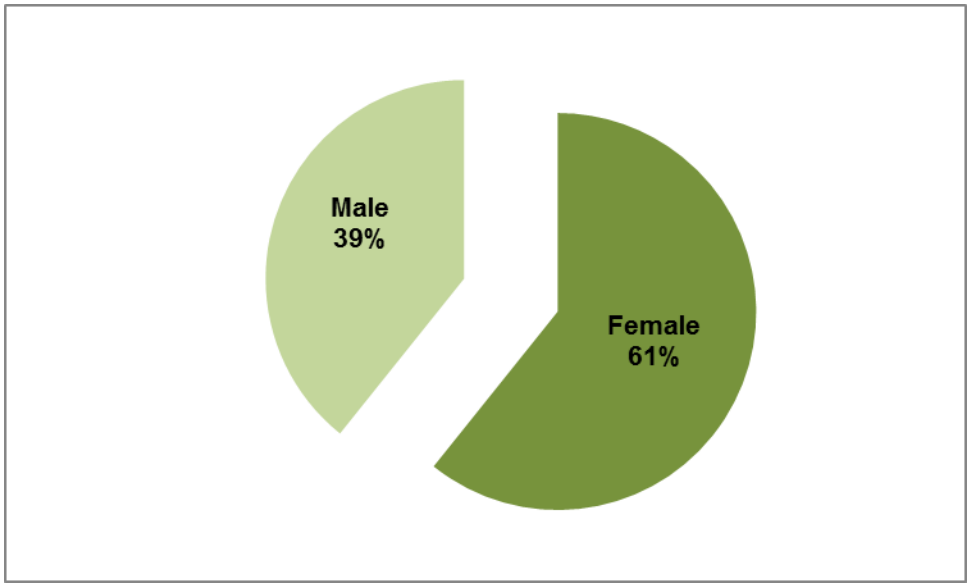

Figure 3. Male and female representation of survey respondents

Question 3: What type of dwelling do you live in?

☐ Condominium ☐ Duplex ☐ Townhouse ☐ Single Family ☐ Other _____

The purpose of question 3 is to confirm that the respondent is from a single family residence as the programs currently apply only partially to those living in multi-family residences.

As illustrated in Figure 4, ninety three percent (93%) of the respondents live in single family household and one percent (1%) live in townhouse.

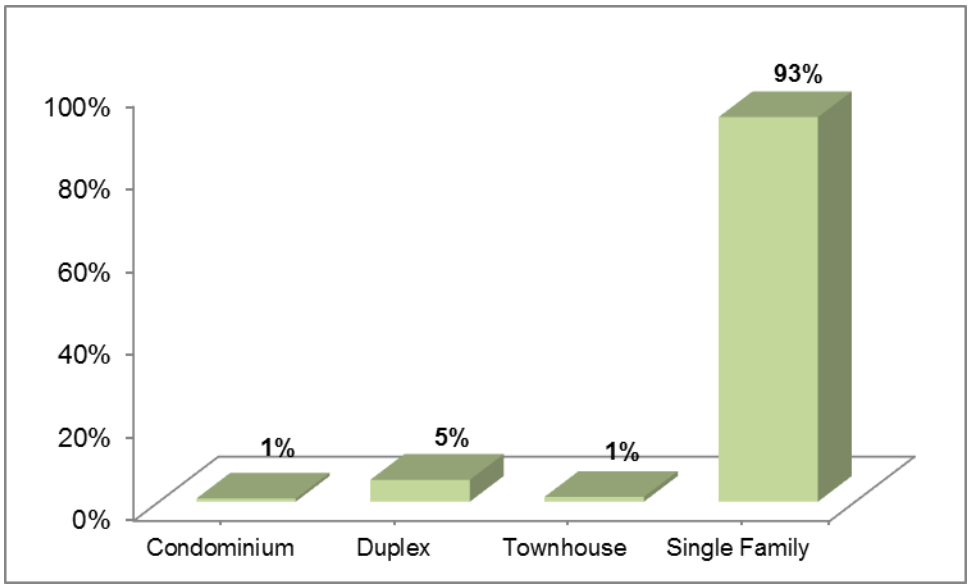

Figure 4. Type of dwelling

Question 4: Including yourself, how many people in each age group typically live in your household?

Age Group	Number of People
☐ Under 13	_____
☐ 13 – 17	_____
☐ 18 – 24	_____
☐ 25 – 34	_____
☐ 35 – 49	_____
☐ 50 – 64	_____
☐ 65 and Over	_____

The purpose of Question 4 is to see how many people and what age group are represented by one household.

According to Figure 5, twenty percent (20%) of households that participated in the survey are comprised of children under the age 13, thirteen percent (13%) are comprised between the age of 13 and 24, fifty six (56%) are comprised between the age of 25 and 64 and 11% are comprised of 65 years and above. Based on 2011 Census and 2014 Municipal Census, fifty six percent (56%) and fifty two percent (52%) of the City's population are within the age group of 25-64 and six percent (6%) and four

percent (4%) are 65 and above respectively. **This shows that the response rates between the ages 25-64 are representative of the population**.

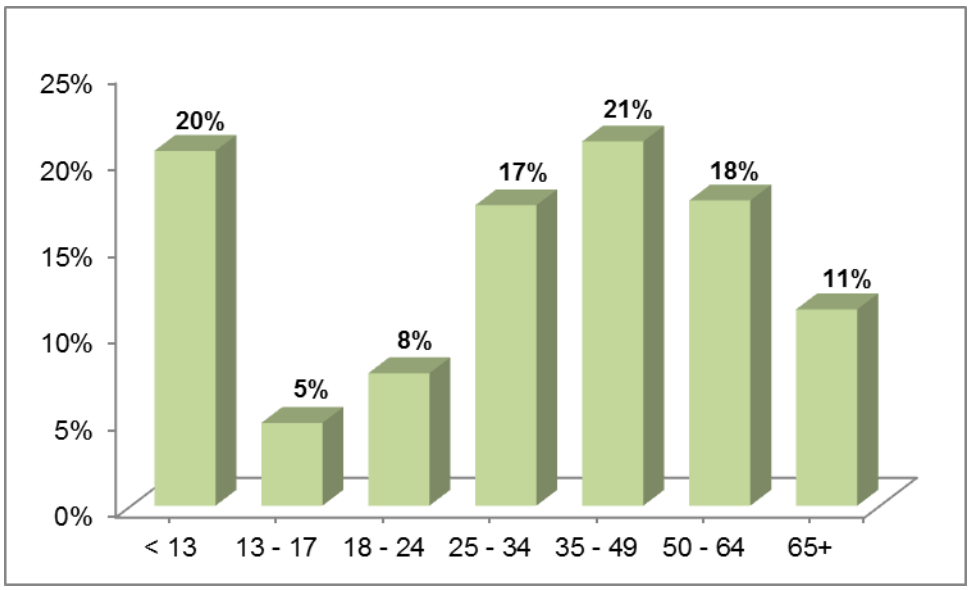

Figure 5. Age group responses

In addition, as shown in Figure 6, sixteen percent (16%) of the households that participated in the survey are comprised of 1 person, thirty seven percent (37%) are comprised of 2 people, and forty percent (40%) are comprised of 3 or 4 persons. Only 7% of the respondents have more than 4 people in a household.

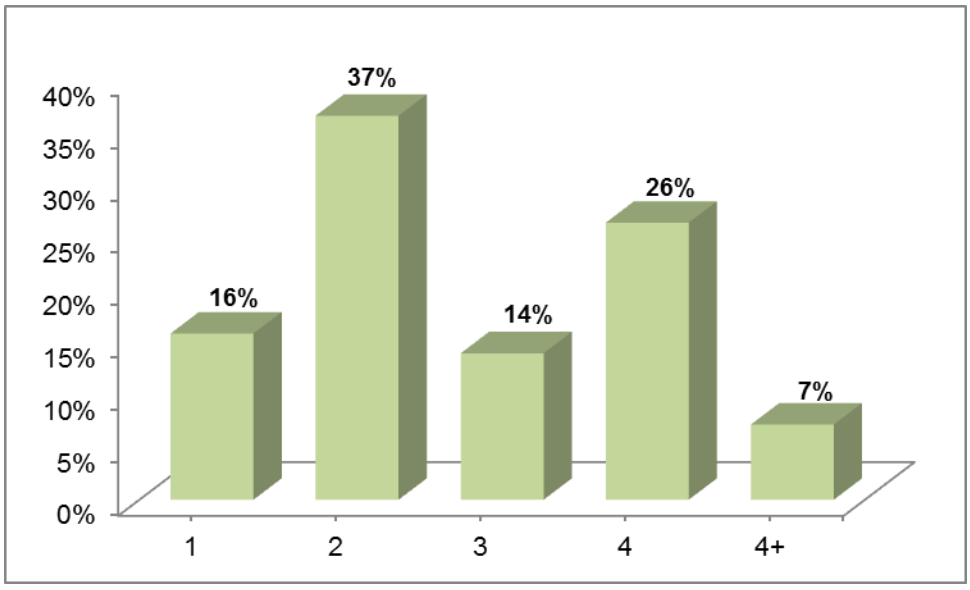

Figure 6. Number of people living in a survey respondent household

Question 5: How important is waste diversion and waste reduction to you?

- ☐ **Very important**
- ☐ **Somewhat important**
- ☐ **Not very important**
- ☐ **Not important at all**
- ☐ **Unsure**

The purpose of Question 5 is to measure the importance of waste diversion and waste reduction to the residents.

As illustrated in Figure 7, ninety five percent (95%) of the respondents indicated that waste diversion and reduction is important to them, while 5% of the respondents do not think it is important.

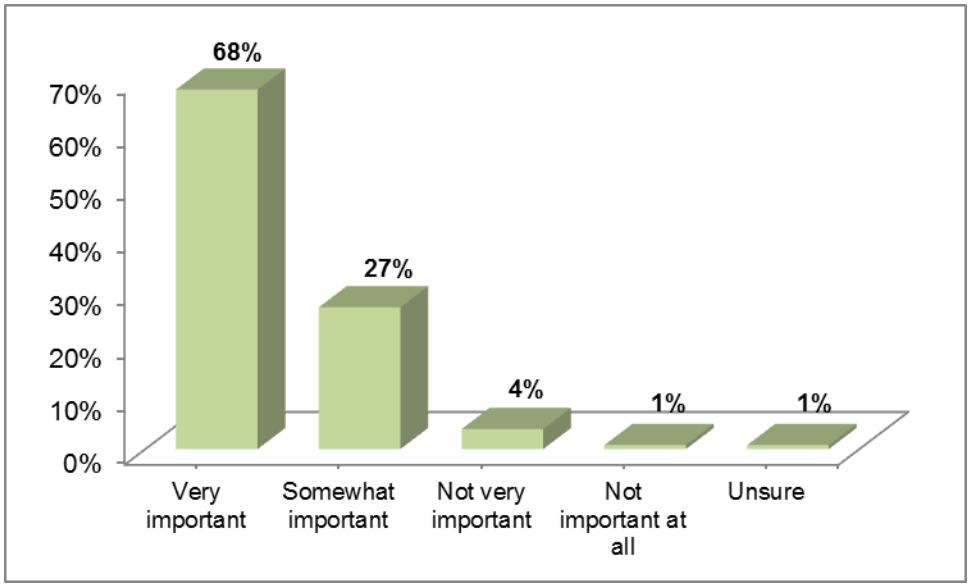

Figure 7. Measure of importance of waste diversion and reduction

Question 6: With this in mind how much waste do you think the City should attempt to divert from landfill in the next five years?

☐ None ☐ 20% ☐ 40% ☐ 50% ☐ 80%

The purpose of Question 6 is to determine the level of support of the residents to divert more and to assist the City to set an achievable goal. Goals provide a means to measure improvement and are therefore an integral part of any long term plan to reduce waste sent to landfill.

Figure 8 illustrates that about seventy nine percent (79%) of the respondents think that the City should divert more than 40% of waste from landfill in the next five years. Only four percent (4%) indicated that the City should not divert waste and two percent (2%) did not give response to this question. **This clearly indicates that the City could successfully set a target of 50% diversion rate in the next five years.**

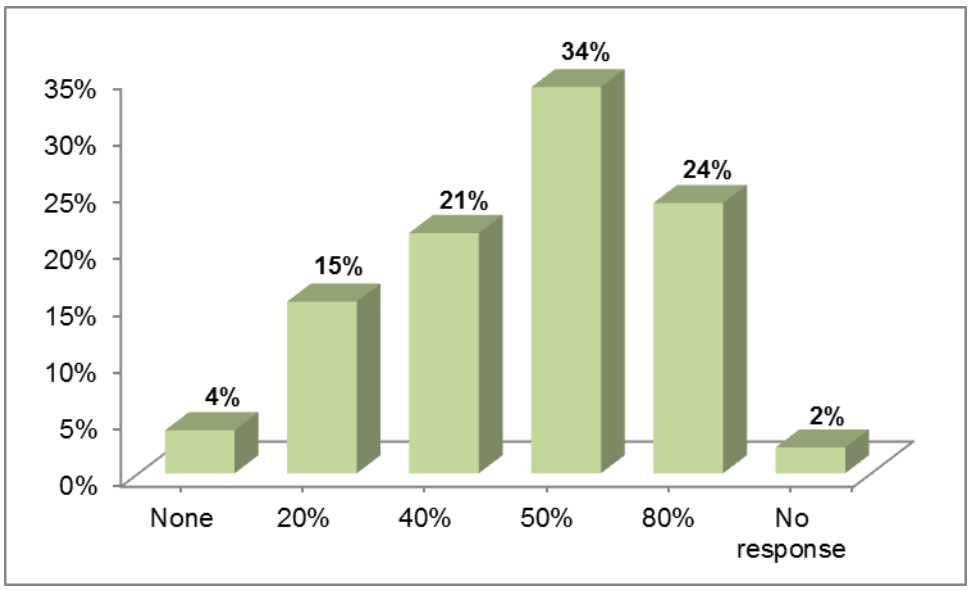

Figure 8. Diversion rate target goal

Question 7: How much garbage do you generate per week? (1 bag = 75L standard black garbage bag)

☐ 1 – 2 bags ☐ 3 – 4 bags ☐ 5 – 6 bags ☐ >6 bags

The purpose of Question 7 is to assist the City in sizing carts and collection frequency for garbage carts should the City decides to go city wide with the cart system or set a garbage limit.

As shown in the Figure 9, the majority of respondents, eighty six percent (86%) indicated that they generate only 1-2 bags of garbage per week, eleven percent (11%) generate 3-4 bags, and approximately two percent (2%) generate 5 or more bags per week.

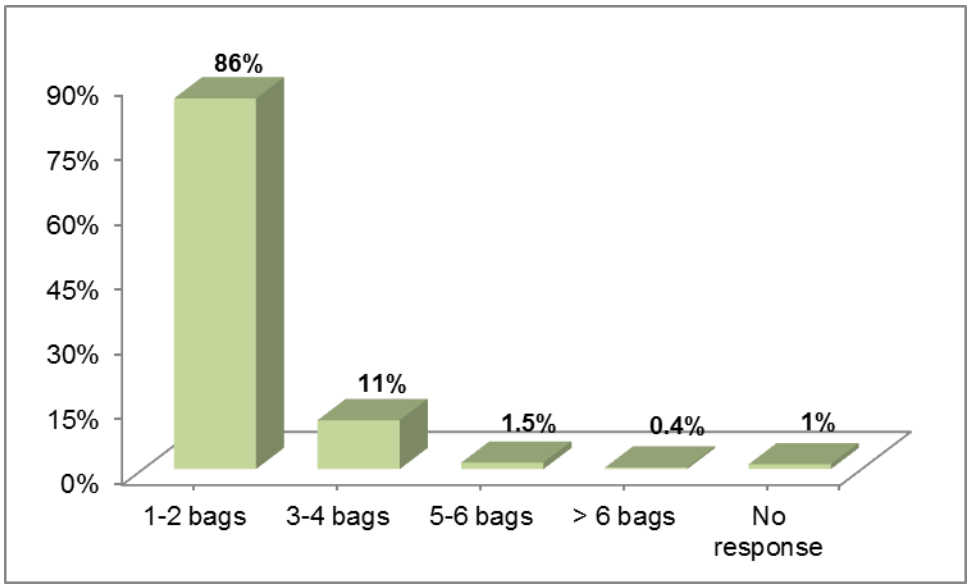

Figure 9. Amount of garbage generated per week

Since less than 3% of the population generate 5 or more bags per week, bi-weekly (every two weeks) garbage collection with a 240L cart or a limit of 4 bags is possible to implement. The survey confirms garbage volume evaluation data (Section 3.4 of the Waste Sort Report) carried out by Advanced Enviro Engineering. **It is recommended to have bi-weekly (every two weeks) garbage collection throughout the year as the carts currently used are generally capable of holding two weeks' worth garbage.**

Question 8: How much recyclables do you generate per week?

Blue bags _____ Bags with paper _____ Cardboard bundles _____

The purpose of Question 8 is to assist the City to make informed decisions on recyclables collection services.

Sixty one percent (61%) of the survey respondents recycle 1 blue bag, fifty seven percent (57%) recycle 1 bag with paper and fifty six percent (56%) recycle 1 cardboard bundle per week. Also twenty percent (20%) recycle 2 or more blue bags, fifteen percent (15%) recycle 2 or more bags with paper and twenty percent (20%) recycle 2 or more cardboard bundles per week. On the other hand, approximately eight to nine percent

(8% - 9%) do not recycle at all. Eleven to eighteen percent (11% - 18%) did not provide response to this question.

However**, if the City increases its waste limits (i.e. reduce garbage collection frequency) to increase infrastructure use and increases the education program, then the City should expect an increase of recyclables diversion over the next several years.**

Results are graphically represented in Figure 10.

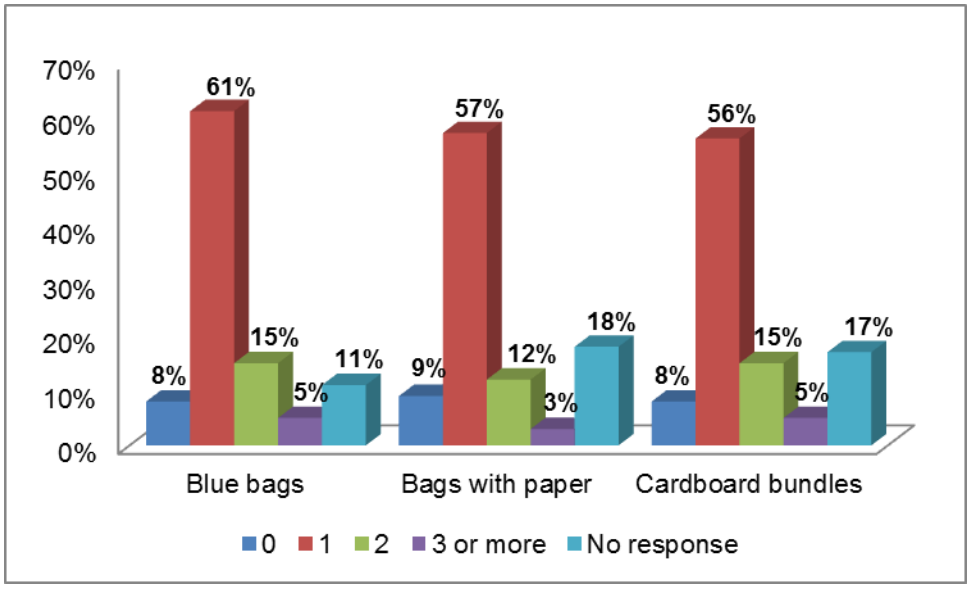

Figure 10. Amount of recyclables generated per week

Question 9: Do you compost? (Feel free to have multiple answers)

- ☐ **No**
- ☐ **I compost in my backyard**
- ☐ **I bring organic material to Cold Lake Transfer Station**
- ☐ **I use curbside organics collection**

The purpose of Question 9 is to find out what percentage of the residents compost organic waste and what method of composting they use.
Out of all the survey respondents, forty three percent (43%) do not compost organic waste at all, whereas thirty two percent (32%) compost in their backyard, sixteen percent

(16%) take organic material to the Cold Lake Transfer Station, and thirty six percent (36%) use the curbside organics collection.

Backyard composting should be encouraged as approximately 1/3 of the respondents are already doing it and also because it lowers the cost of organic diversion to the municipality.

As the organic component of waste represents over 50% of the total waste generated by residents, a 50% diversion goal for the City of Cold Lake in the next five years cannot be achieved without a year round organics program. (Recycling and the other suitable programs will not achieve this goal).

Results are graphically illustrated in Figure 11.

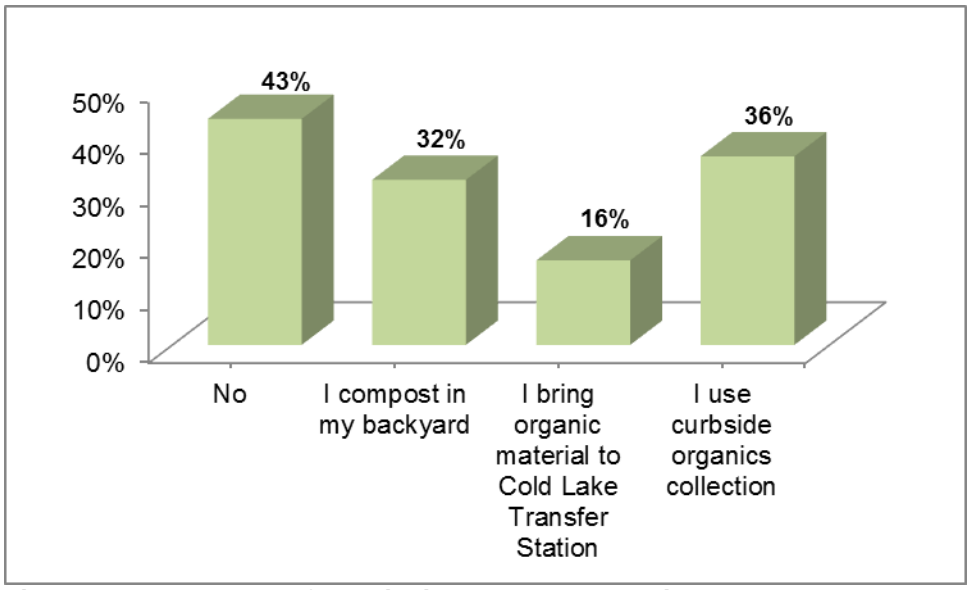

Figure 11. Percentage of people that compost organic waste

Question 10: What do you set out for the curbside organic collection? (Check all that apply)

- ☐ **Yard waste**
- ☐ **Food waste**
- ☐ **Organics incl. pet waste, soiled paper, etc.**
- ☐ **Other: _____**

The purpose of Question 10 is to see how residents are using the curbside organics collection program.

As illustrated in Figure 12, fifty three percent (53%) set out yard waste, twenty one percent (21%) set out food waste and twelve percent (12%) set out organics including pet waste, soiled paper, etc. for the curbside organics collection.

It is recommended to educate residents to use the existing curbside organics collection for all types of organics and the City considers organics collection every two weeks during the winter months. Year round collection increases the capture rate of food waste as spring through fall collection tends to reinforce yard waste collection only, in homeowner's minds.

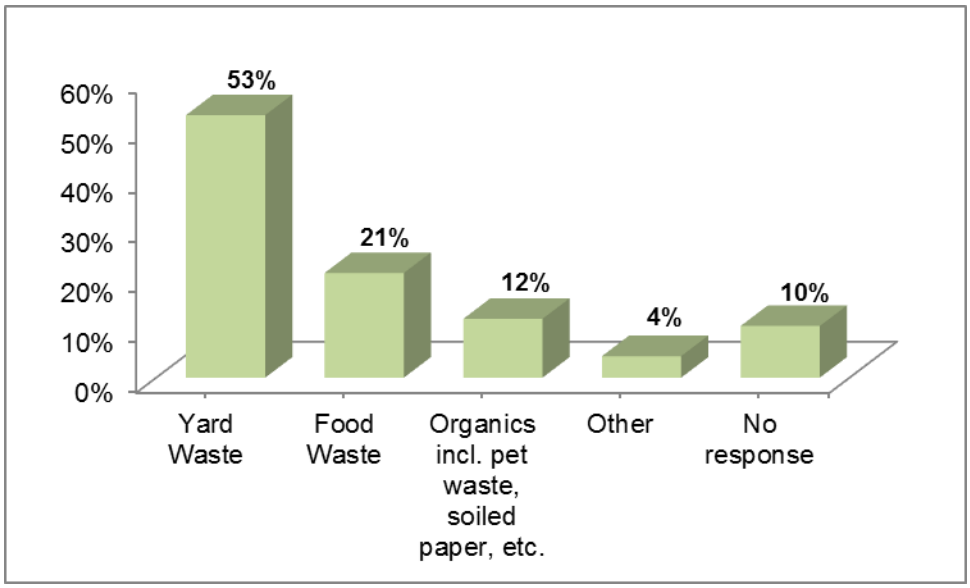

Figure 12. Types of organic waste set out at the curb

Question 11: How often should the City collect waste?

	Weekly	Every 2 weeks	Other
Garbage	☐	☐	_____
Recycling	☐	☐	_____
Organics	☐	☐	_____

Comments: _____

The purpose of Question 11 is to inform and remind residents of the waste service currently provided by the City (weekly garbage and every two weeks recyclables collection throughout the year, and every two weeks organics collection from April 1st to November 15th) and to measure residents' satisfaction with the current waste (garbage, recycling and organics) collection frequency. This will assist the City to determine how often waste should be collected.

As shown in Figure 13, eighty three percent (83%) of the survey respondents want weekly garbage collection, and sixty percent (60%) and fifty six percent (56%) want every two weeks recyclables and organics collection respectively.

These percentages might change if there is a year round organics collection as a majority of the respondents indicated that they set out yard waste for curbside organics collection.

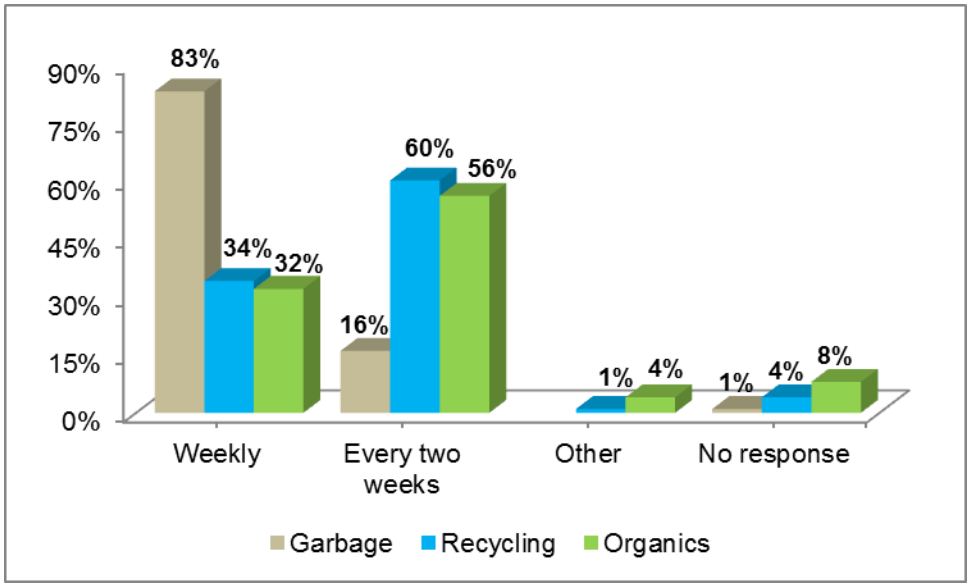

Figure 13. Frequency of garbage, recyclables and organics collection

Comments by survey respondents:

- Organics should be collected throughout the year, weekly in the summer months and every two weeks in the winter months.
- A few respondents had no idea organics collection is offered and a few think that organics collection is only for yard waste.
- Consider recyclables and organics collection for condos.
- Recyclables should be collected every week to encourage more recycling.
- Recycling could be collected once a month.
- More often toxic material collection.
- Strict guidelines to encourage more recycling and organics.
- Current system seems to work.

Implementation of organics collection throughout the year will reduce the amount of waste disposed of as garbage and allow every two weeks garbage collection then a revised schedule becomes acceptable, especially when residents have less waste left.

Despite the amount that residents would save if they switch to a lower garbage collection frequency, a high percentage of respondents (83%) selected that it should stay the same. **This is an indication that the status quo is perceived as satisfactory and that the cost implications of a weekly service has not been communicated to the**

residents. The consultant recommends a clear communication program to provide the residents this information.
Other possible reasons why respondents would like to keep the current collection frequency could be force of habit and/or fear of change.

Question 12: Would you agree to using carts instead of bags for curbside collection?

Garbage	☐ Yes	☐ No	☐ Other _____
Organics	☐ Yes	☐ No	☐ Other _____

The purpose of Question 12 is to help the City in decision making to switch to carts for curbside garbage and organics collection.

As illustrated in Figure 14, **seventy five percent (75%) are willing to use carts for garbage and sixty eight percent (68%) are willing to use carts for organics curbside collection. It is only 1/5th of the respondents that are not willing to use carts for either garbage or organics. This shows that smooth transition to carts for garbage and organics curbside collection is possible.**

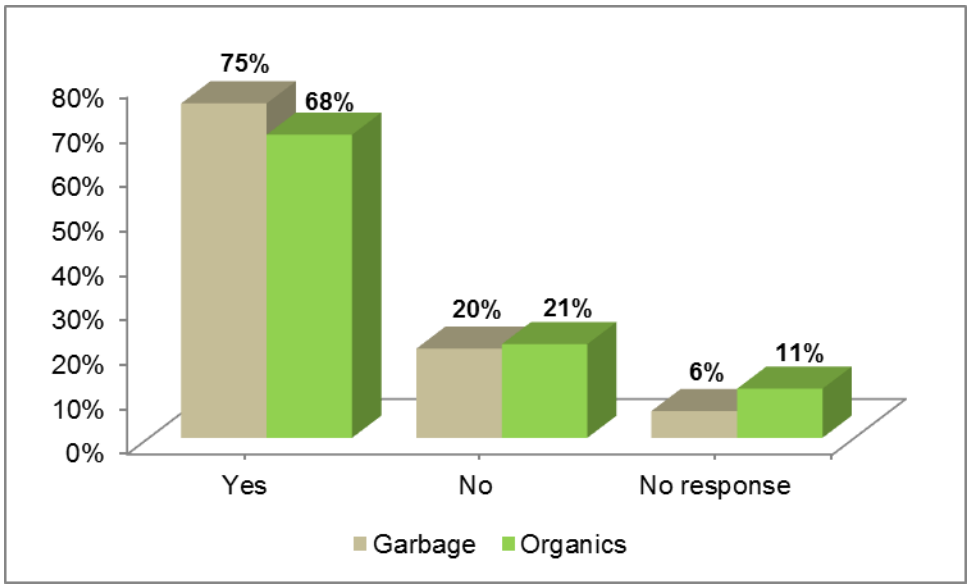

Figure 14. Willingness to use carts for garbage and organics

Comments by survey respondents:

- Would use carts if no extra cost is associated with them.
- Depends on how much they cost, how heavy they are and the amount they hold.
- So long as there is a bag in the carts.
- Organic carts only work with much education.
- Green carts for organics and clear bags for garbage. Reject garbage bags that contain recycling or organics.
- Due to our cold temperatures, everything would stick to the cart and would not be collected leading to a rotting pile in the cart.
- Would use carts for yard waste and recyclables.
- Different size containers for organics.
- Cart for recycling as well.
- We have to use bags and carts.
- The carts do not have enclosed bags? How about inside house?

It seems that a few residents are not clear with how carts are used and the cost benefits of carts. The City needs to educate residents well about usage of carts should the City decides to implement carts system for the whole city.

Question 13: Would you support…..

	Yes	No
Garbage limits	☐	☐
Fees based on amount of garbage	☐	☐
User fees for optional services	☐	☐

Comments: _____

According to Figure 15, seventy two percent (72%) of the survey respondents support garbage limit while twenty four percent (24%) don't. Fifty eight percent (58%) of the respondents support fees based on amount of garbage while thirty four percent (34%) don't. Fifty nine percent (59%) support user fees for optional services while twenty eight percent (28%) don't.

This shows that there is a strong support towards garbage reduction. Implementing a limit of four bags of garbage every two weeks with 'tag a bag' system for extra bags (or a 240L black cart for garbage every two weeks) incorporated with education is feasible.

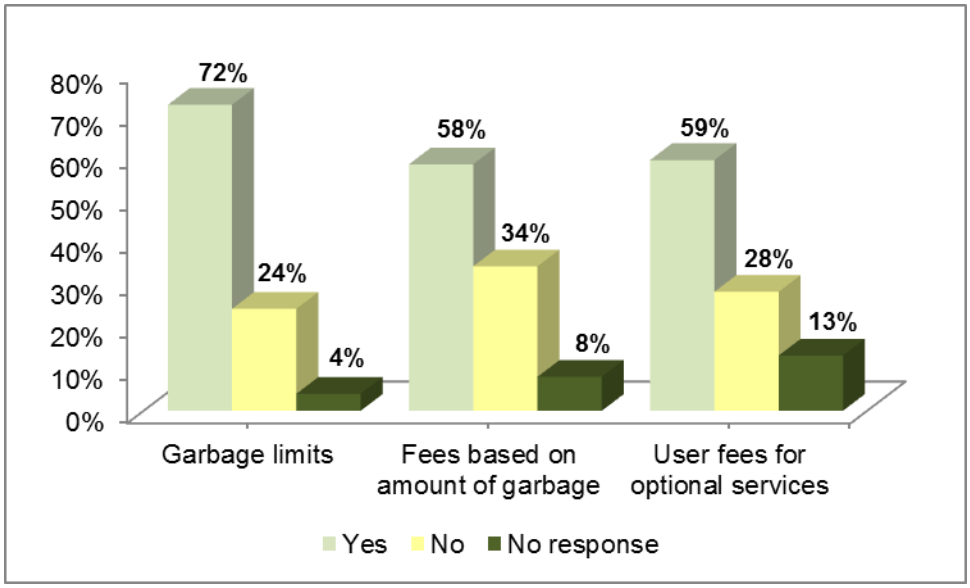

Figure 15. Support towards garbage reduction

Comments by survey respondents:

- No limit for recyclables and organics but a 2 bag limit for garbage.
- Additional fee for extra bags of garbage.
- Fees are high already.
- Garbage limits promotes illegal dumping elsewhere.
- Depends on what optional services are.
- Recycling and composting should not be optional services.
- Curbside recycling and organics should be free and simple.
- Fees based on amount of garbage depend on how much the system would cost to monitor and implement.
- Let residents have a choice of using the recycling service at the curb or take it to the Transfer Station themselves for free.
- Already pay taxes and utilities so only optional services should be charged.

Question 14: How often do you use the Cold Lake Transfer Station (east of Highway 28 at the south edge of the City)?

☐ Never ☐ Weekly ☐ Once a month ☐ Other _____

The purpose of Question 14 is to assess the frequency of the Cold Lake Transfer Station usage.

As shown in the figure below (Figure 16a), sixteen percent (16%) of the survey respondents do not use the Cold Lake Transfer Station while three percent (3%) use the Transfer Station weekly, twenty five percent (25%) use it once a month, and fifty six percent (56%) responded 'other'. The consultant has further categorized the 154 'other' responses. The results are illustrated in Figure 16b. Twenty nine percent (29%) of the respondents that selected 'other' use the Cold Lake Transfer Station once to three times a year, ten percent (10%) use it four to six times per year, twelve percent (12%) use it as needed, and five percent (5%) use it in the summer months only.

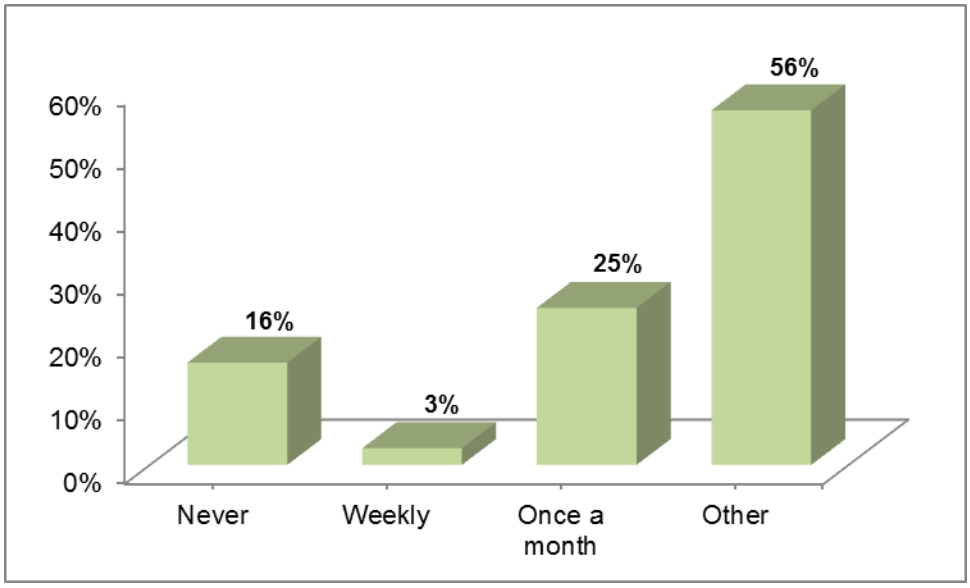

Figure 16a. Usage of the Cold Lake Transfer Station

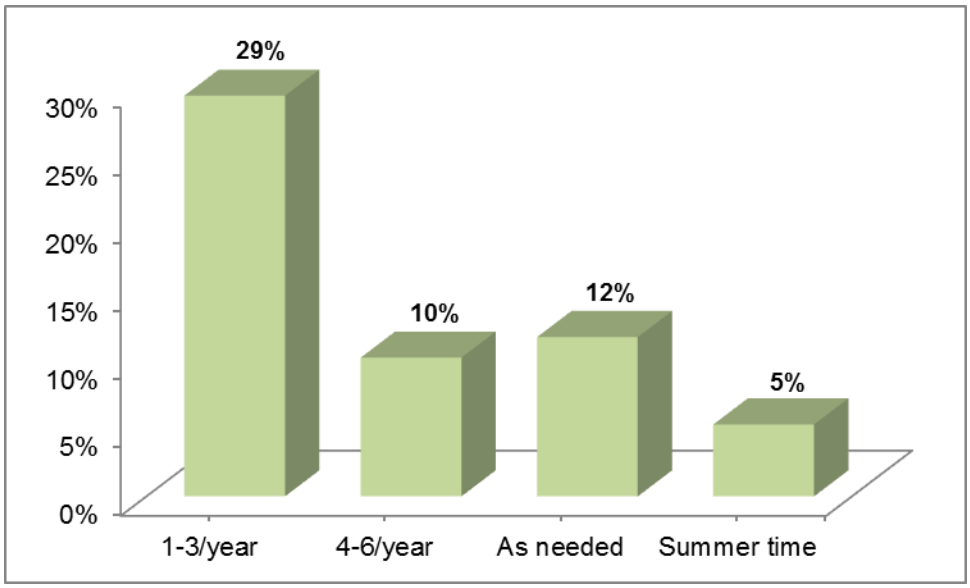

Figure 16b. Categories of respondents that selected 'other'

This shows that majority of the survey respondents (84%) use the Transfer Station as frequently as weekly to few times a year as needed. Transfer Station use should be encouraged and the potential to provide further services there exists. Usage could be increase through providing residents education on the services provided at the transfer station.

Question 15: What services do you use at Cold Lake Transfer Station?

- ☐ **Garbage drop-off**
- ☐ **Organics drop-off**
- ☐ **Batteries/Paint/Oil**
- ☐ **Household appliances (air conditioner, fridge, stoves)**
- ☐ **Tires**
- ☐ **Other** _____

The purpose of Question 15 is to inform the public of the current services provided at the Cold Lake Transfer Station and to identify services that are highly used and/or underutilized.

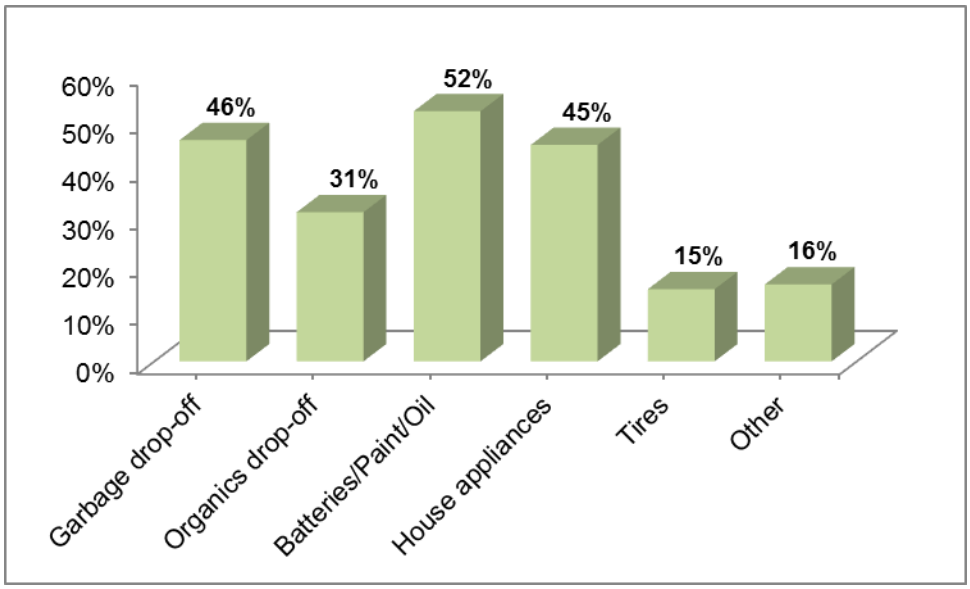

Figure 17a. Percentage of respondents using the services at the Cold Lake Transfer Station

As illustrated in figures 17a and 17b, forty six percent (46%) of the survey respondents use the Cold Lake Transfer Station for garbage drop-off, thirty one percent (31%) use the Transfer Station for organics drop-off, fifty two percent (52%) use it for batteries, paint and oil drop-off, forty five percent (45%) use it for household appliances such as air conditioners, fridge, stoves drop-off, fifteen percent use it to drop-off tires and sixteen percent (16%) selected 'other'. Out of the sixteen percent (16%) who selected 'other', five percent (5%) use it to drop-off construction waste and two percent or three percent (2% or 3%) use it to drop-off either metal, large items, wood or propane tanks. **This shows that residents use the different services offered at the Cold Lake Transfer Station. Educating the residents and advertising the Transfer Station could increase the usage.**

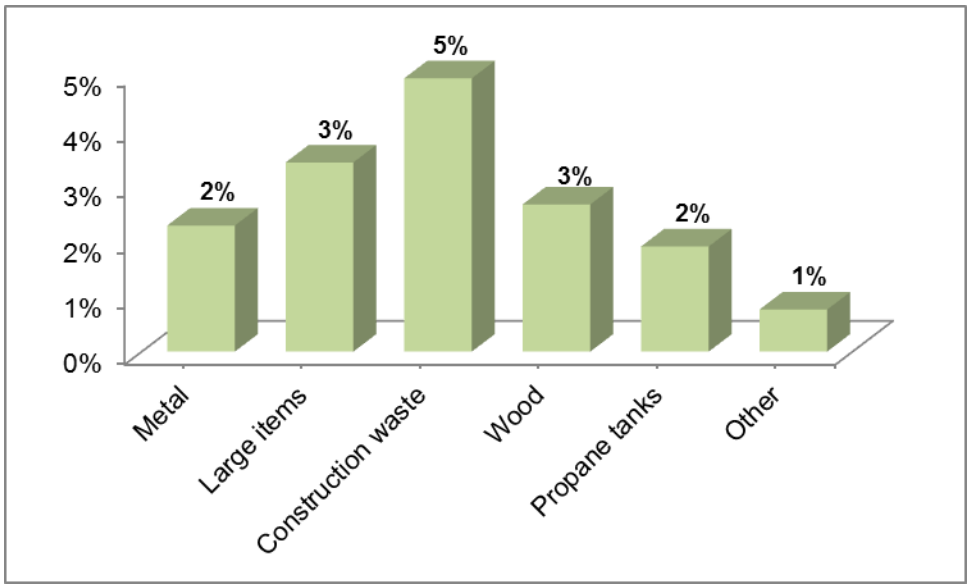

Figure 17b. Percentage of respondents using other services at the Cold Lake Transfer Station

Question 16: How often do you use the Cold Lake Recycling Centre (3609 – 50 Street)?

☐ Never ☐ Weekly ☐ Once a month ☐ Other _____

The purpose of Question 16 is to assess the frequency of the Cold Lake Recycling Centre usage.

As shown in the Figure 18a, eight percent (8%) of the survey respondents have never used the Cold Lake Recycling Centre whereas eleven percent (11%) use the Recycling Centre weekly, fifty two percent (52%) use it once a month, and twenty nine percent (29%) responded 'other'.

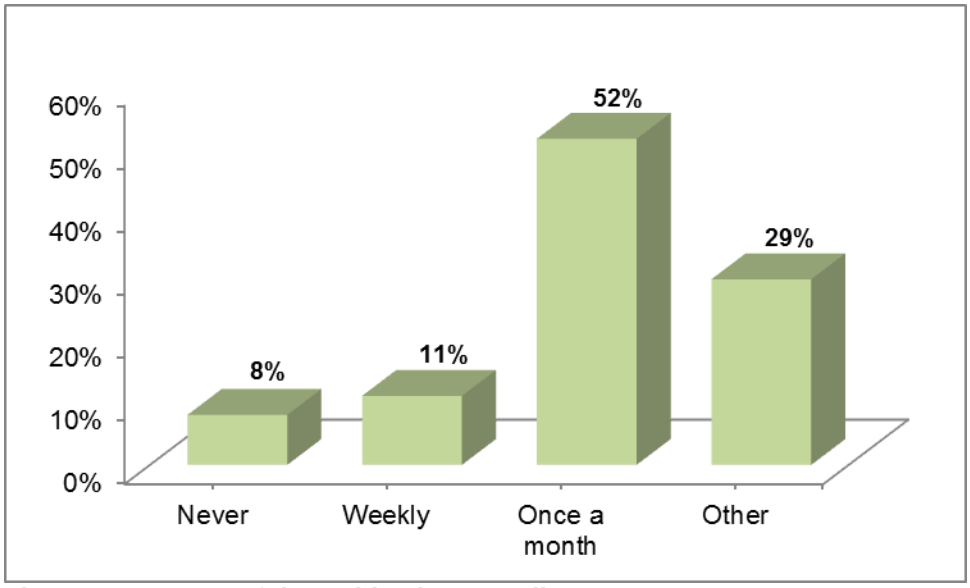

Figure 18a. Usage of the Cold Lake Recycling Centre

The consultant has further categorized the 78 'other' responses. The results are illustrated in Figure 18b below. Three percent (3%) use the Recycling Centre twice a month, six percent (6%) use it 1-3/year, ten percent (10%) use it 4 – 6 times a year, and ten percent (10%) use the Recycling Centre as needed.

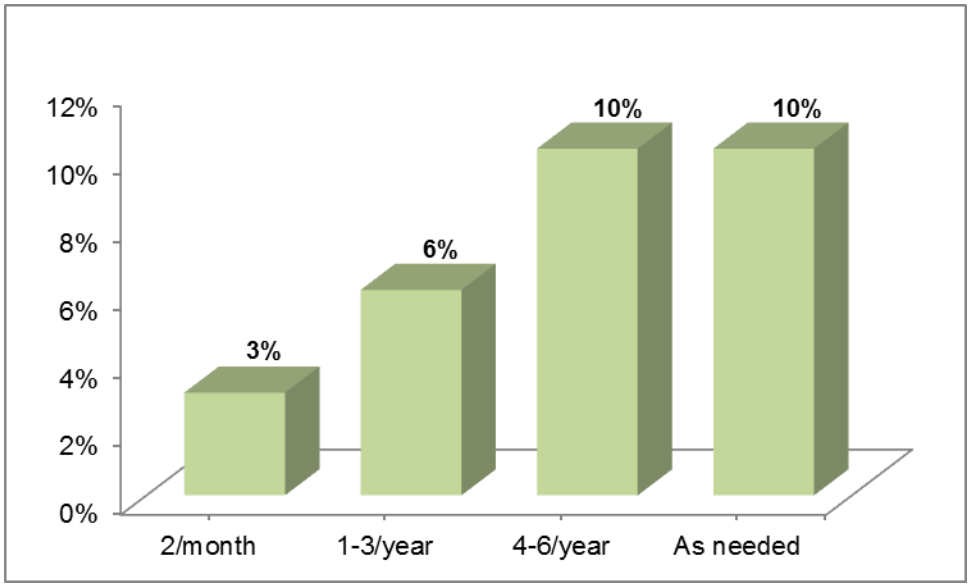

Figure 18b. Categories of respondents that selected other

Overall ninety two percent (92%) of the respondents use the Cold Lake Recycling Centre. A few respondents commented about the uncleanness of the Centre, the

long wait time and inconvenient operation hours. These are items the City could address in their contract with the center.

Question 17: What services do you use at Cold Lake Recycling Centre? (Feel free to have multiple answers)

- ☐ **Cardboard drop-off**
- ☐ **Mixed paper drop-off**
- ☐ **Plastic containers, bottles, bags, etc. drop-off**
- ☐ **Glass bottles and jars**
- ☐ **E-waste**
- ☐ **Ink cartridges**
- ☐ **Other** _____

The purpose of Question 17 is to inform the public of the current services provided at the Cold Lake Recycling Centre and to identify services that are highly used and/or underutilized.

As shown in Figure 19, sixty three percent (63%) of the survey respondents use the Cold Lake Recycling Centre for cardboard drop-off; forty nine percent (49%) use the Recycling Centre for mixed paper drop-off; sixty nine percent (69%) use it for plastic containers, bottles, bags, etc. drop-off; sixty percent (60%) use it for glass bottles and jars drop-off; thirty four percent (34%) use it to drop-off electronic waste; ten percent (10%) use it to drop-off ink cartridge and ten percent (10%) selected 'other'. Majority of the respondents who selected 'other' indicated that they use the Recycling Centre to drop-off refundable beverage containers and a few indicated that they drop-off metal, cans, microwave, concrete and dry cell batteries. **This shows that residents use the different services offered at the Cold Lake Recycling Centre and indicates that the location is convenient due to the frequent usage.**

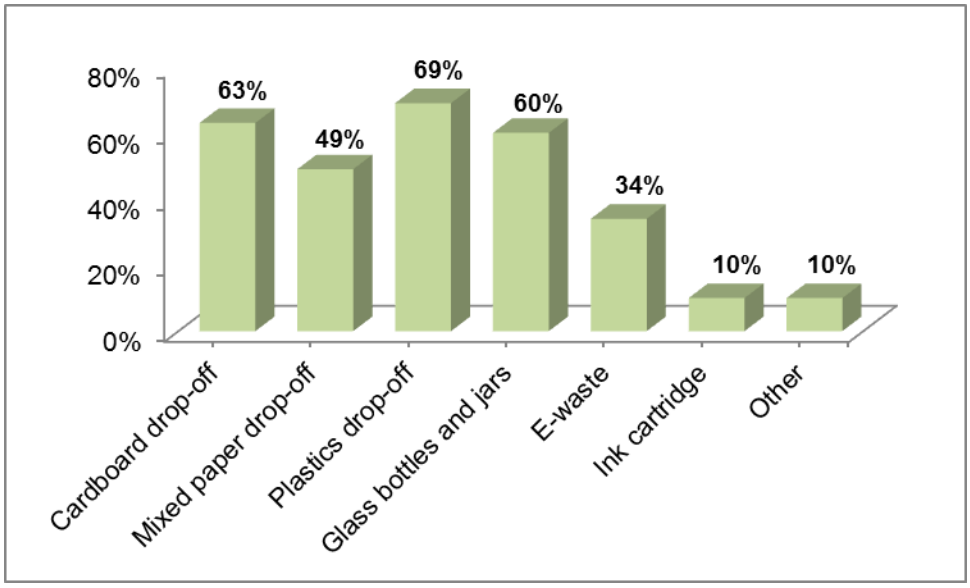

Figure 19. Percentage of respondents using the different services at the Cold Lake Recycling Centre

Question 18: Would you support a material ban at the Cold Lake Transfer Station?

☐ Yes ☐ No

The purpose of question 18 and 19 is to measure the public support for a material ban at the Cold Lake Transfer Station and the type of material.

As illustrated in Figure 20, fifty one percent (51%) do not support while forty five percent (45%) support a material ban at the Cold Lake Transfer Station. **If the City chooses to implement a material ban, and phases it in over time and with eduction, residents would not oppose.**

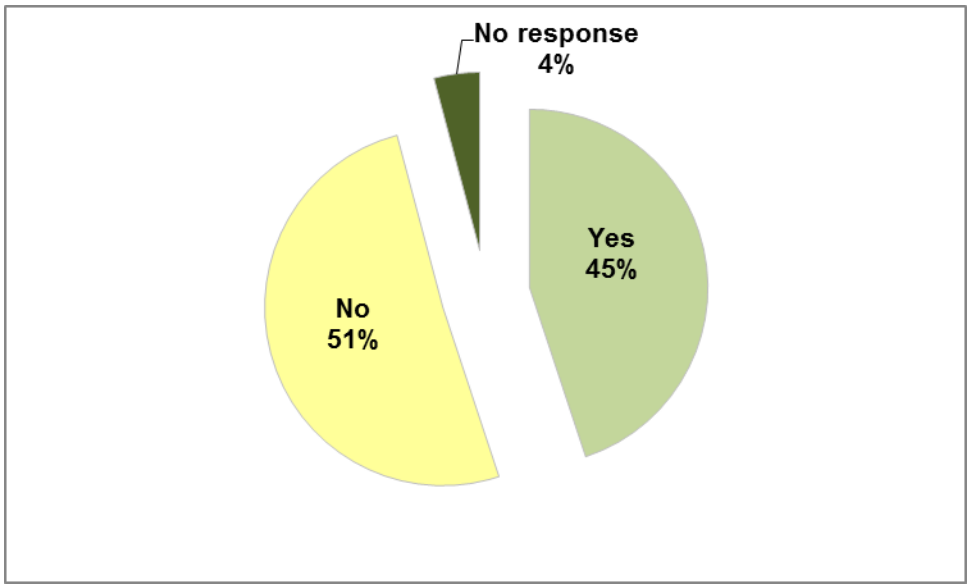

Figure 20. Percentage of respondents supporting material ban

Question 19: If yes, which item would you ban? Feel Free to have multiple answers.

☐ Garbage ban ☐ Recyclables ban (plastic containers, cardboard, etc.)

☐ Organics ban ☐ Other _____

As illustrated in Figure 21, majority (84%) of the survey respondents that support material ban at the Cold Lake Transfer Station (Question 18) support recyclables (plastic containers, cardboard, etc.) ban while seventeen percent (17%) and twenty percent (20%) support garbage and organics ban respectively.

The high support (84% of the 46% that support ban) for recyclables ban is likely due to the existence of a Recycling Centre as well as curbside blue bag collection service for recyclables. Material bans should include both residential and commercial sectors. This data combined with the waste sort carried out by Adavnced Enviro and observations at the Tranfer Station reinforces the reccomendation for an immidiate recyclables ban as it will increase the usage of the existing recycling infrastructure and reduce costs in the long term.

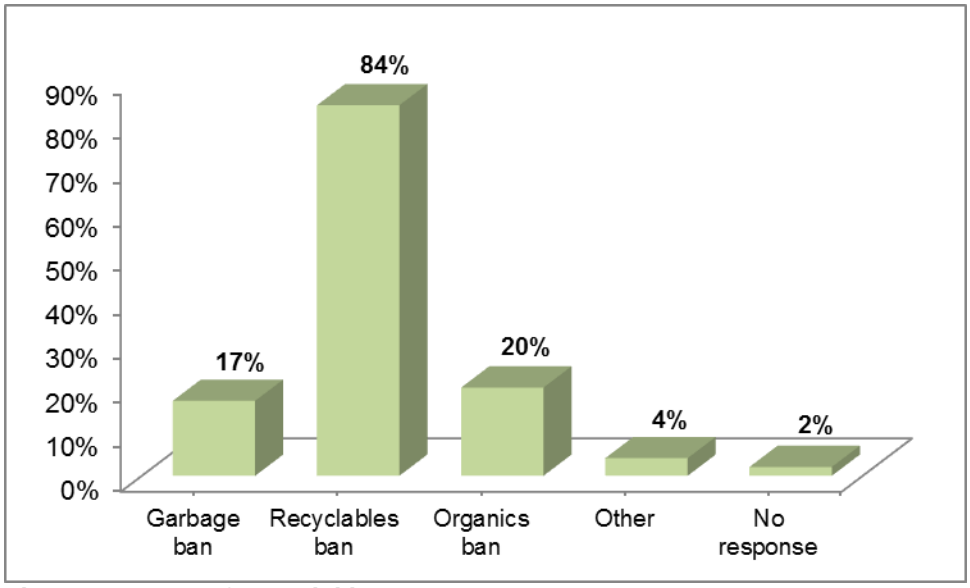

Figure 21. Type of material ban

Other materials to ban at the Cold Lake Transfer Station mentioned by survey respondents:

- Uninspected industrial waste generated by independent unmonitored contractors.
- Building scraps i.e. wood, metals, door frames etc.
- Anything other than what the Recycling Centre doesn't already take.
- Wood and all products that can be reused.
- Large items that can be recycled - wood, computers, etc.
- Hazardous materials.

Other comments made by the respondents:

- Organics should be processed locally and reused/sold.
- February 27, 2015, they were changing truck transfer containers so Transfer Station floor was full of garbage of which it appeared to be 50% cardboard.
- If anything banned those products will show up in construction dumpsters and be dumped by bad Samaritans on people's property out of town.
- Construction waste should be limited.
- People should make responsible choices because of the benefit not because it's against the law

Question 20: How often do you use the Cold Lake Class III Landfill? (Construction and Demolition aka C&D)

☐ Never ☐ Weekly ☐ Once a month ☐ Other _____

The purpose of Question 20 and 21 is to assess the frequency of the Cold Lake Class III Landfill usage and type of material residents dispose of.

Figure 22 shows that sixty percent (60%) of the survey respondents have never used the Cold Lake Class III Landfill, while six percent (6%) use it once a month, one percent (1%) use it weekly and thirty two percent (32%) selected 'other'.

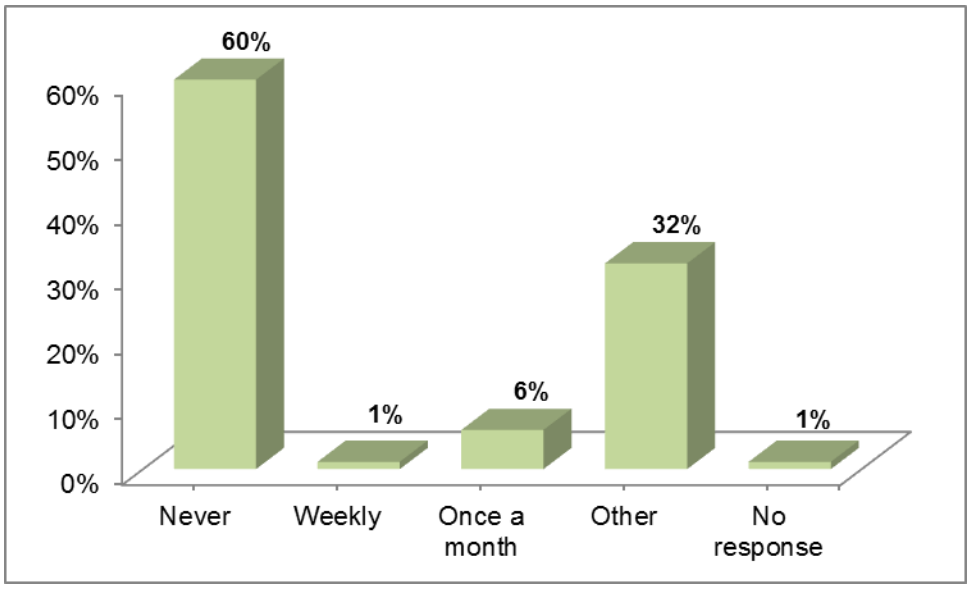

Figure 22. Usage of the Cold Lake Class III Landfill

Out of the thirty two percent (32%) that selected 'other' (Figure 23), seventeen percent (17%) use the Cold Lake Class III Landfill 1 – 3 times a year, three percent (3%) use it 4 – 6 times a year, nine percent (9%) use it as needed especially when they do home renovations, two percent (2%) use it in the summer time and one percent (1%) use it every two weeks.

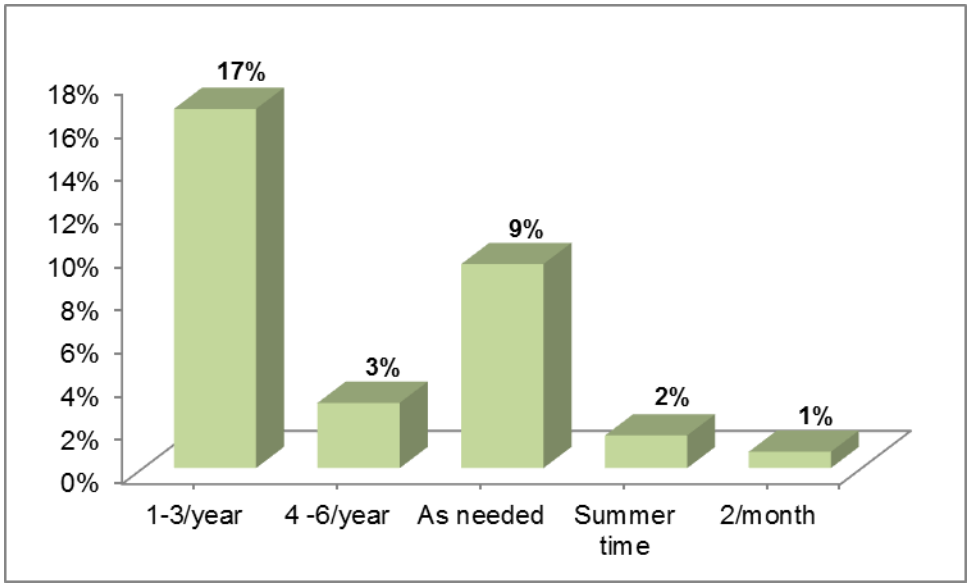

Figure 23. Categories of respondents that selected other

Question 21: What type of waste do you dispose of at the Cold Lake Class III Landfill?

- ☐ **Inert solid waste (construction, renovation and demolition waste)**
- ☐ **Dry waste (shingles, concrete, furniture, dry wall, non-asbestos insulation, etc.)**
- ☐ **Wood**
- ☐ **Other** _____

As illustrated in Figure 24, thirty six percent (36%) use the Cold Lake Class III Landfill to dispose of inert solid waste (construction, renovation and demolition waste); thirty two percent (32%) use it to dispose of dry waste such as shingles, concrete, furniture, dry wall, non-asbestos insulation, etc.; thirty percent (30%) use it to dispose of wood and two percent (2%) selected 'other' which includes bags of leaves, scrap metal, and used oil. The items mentioned by those who selected 'other' are not acceptable at the Cold Lake Transfer Station. Respondents might have confused the Cold Lake Transfer Station to the Cold Lake Class III Landfill which is located next to it. **The City should make clear to residents the distinction between the Transfer Station and the Class III Landfill and what materials are accepted where using more efficient information on website and collection calendar and better descriptive signage at the Transfer Station/Class III Landfill.**

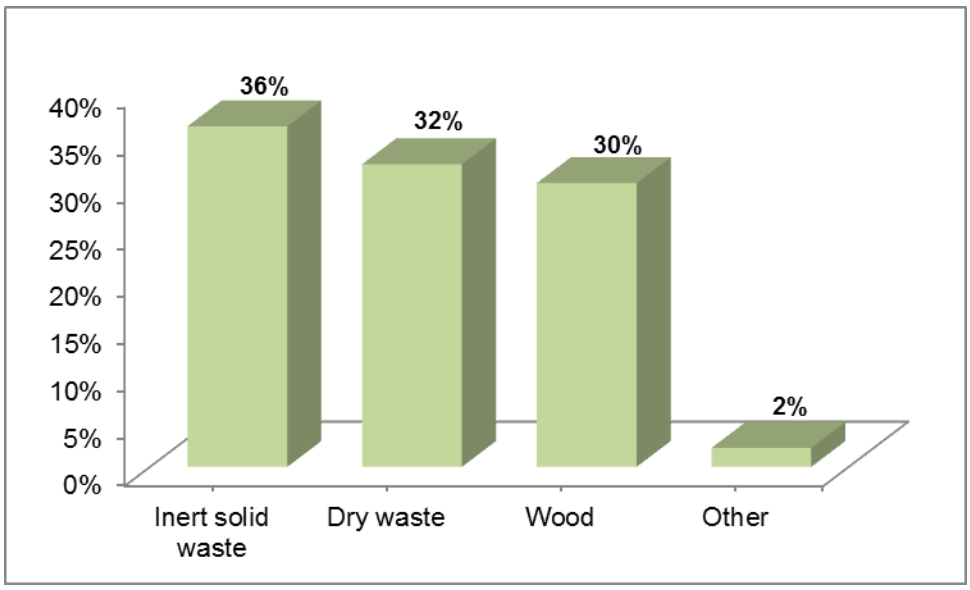

Figure 24. Percentage of materials respondents dispose of the Cold Lake Class III Landfill

Question 22: The Class III Landfill in Cold Lake is reaching its life expectancy (2-5 years). Would you like the City to build a new Class III Landfill for residents and businesses?

- ☐ **Yes**
- ☐ **No, bring to other communities' landfill**
- ☐ **No, focus on diversion**
- ☐ **Other** _____

The purpose of Question 22 is to gather resident's opinion regarding building a new Class III Landfill or increase diversion.

As shown in Figure 25, forty nine percent (49%) want the City to build a new Class III Landfill while thirty two percent (32%) would like the City to focus on diversion. Most of the respondents that selected 'other' have stated that they don't have enough information or don't know enough to make a decision.

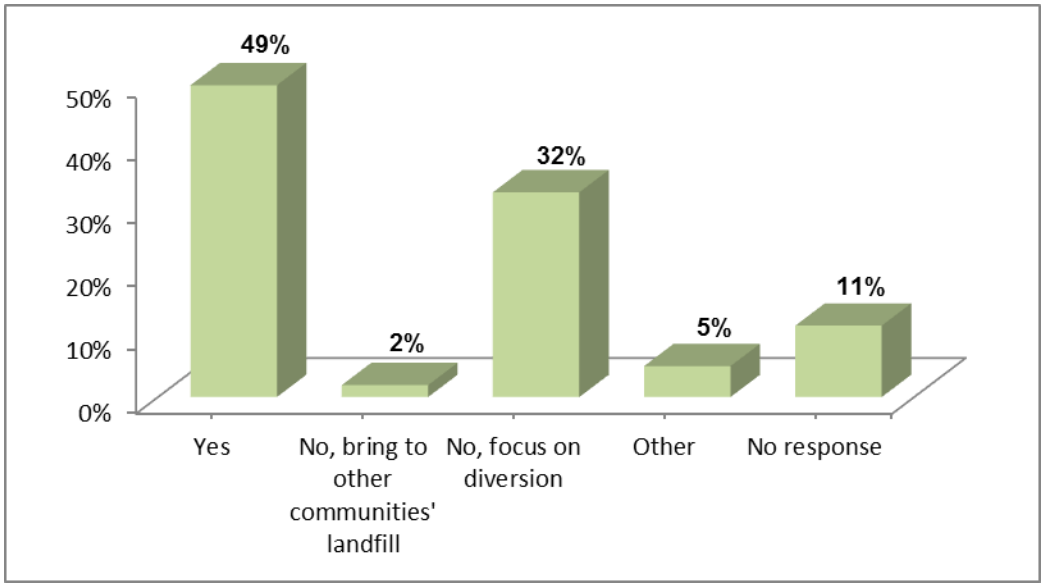

Figure 25. Respondent's opinion towards building a new Class III Landfill

Some of the comments made by the respondents:

- Let developers build it.
- With the amount of building and population growth, this is an asset.
- Why have another community take our garbage it is our garbage.
- If possible use the wood and other burnable materials to be used at campgrounds for firewood.
- Issue a sign in type of ID to record weight and frequency of use and implement a user fee for construction companies and hold accountable for separation of waste materials.
- Why burden another area with our waste?
- Focus on long term solution.
- Do what Fort McMurray did at their landfill.
- Construction waste disposal seems careless at this point, no incentive for contractors to pay attention to it.
- Too much good stuff are buried, authorized picking.
- If there is not a landfill close by, people would dump on the roadside or let it pile upon their properties.
- No more tax; keep down costs.
- Transfer payments recycle from landfill itself.
- Somewhere between Cold Lake and Grand Center.
- Up to the City to decide.
- More recycling bins.
- Better recycling i.e. wood chipping, chip board.

It is recommended that the City evaluates options to divert most of the waste currently ending up at the Class III Landfill. Clean wood waste represents a high percentage of the inert solid waste and this stream could be diverted along with other material to increase landfill life expectancy and reduce costs. This program would be highly supported by residents.

Question 23: Would you sort waste yourself before you get to the landfill to extend its life expectation?

- Inert solid waste (C&D waste)

  ☐ Yes ☐ No

- Dry waste (shingles, concrete, furniture, dry wall)

  ☐ Yes ☐ No

- Wood

  ☐ Yes ☐ No

The purpose of Question 23 is to measure the willingness of residents in extending the landfill's life expectation by separating the waste themselves.

The following figure (Figure 26) shows that seventy seven percent (77%) of the survey respondents would sort inert solid waste (C&D waste); eighty two percent would separate dry waste such as shingles, concrete, furniture, dry wall; and eighty three percent (83%) would separate wood before they bring it the Class III Landfill. **This shows that residents are willing to do what is required in order to extend the landfill's life expectancy.** On the other hand between 6% to 12% would not separate waste and 10% to 11% didn't provide response to this question.

It is recommended that the City evaluates options to divert most of the waste currently ending up at the Class III Landfill. Clean wood waste represents a high percentage of the inert solid waste and this stream could be diverted along with other material to increase landfill life expectancy and reduce costs. This program would be highly supported by residents.

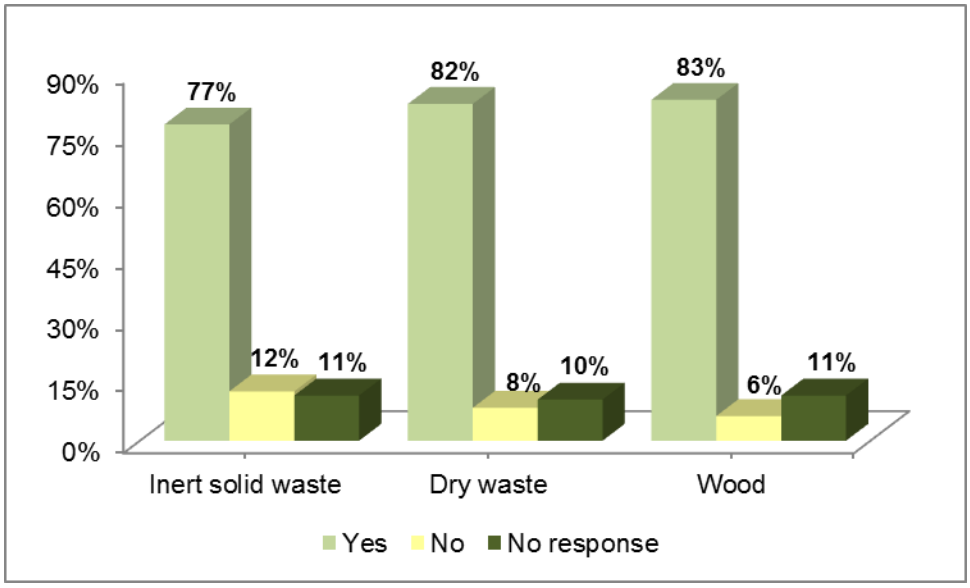

Figure 26. Wilingness of residents to separate the waste at the source

Question 24: Please rank the <u>top three</u> waste program options you think the City should consider implementing (1 being the most important):

- Encourage backyard composting program/grasscycling (leaving mulch on lawn)
- Reduce garbage collection frequency to encourage more composting and recycling
- Reduce collection frequencies to reduce overall costs
- More educational programs on how to reduce waste
- Ban cardboard and organics from landfill
- Keep current program as is

The purpose of Question 24 is to determine what residents see as the top three priorities for program enhancements based on limited knowledge. Respondents may not know the associated diversion rates, costs, etc. and typically choose the options they are familiar with. Some important wood diversion options were not included in the choices.

As illustrated in Figure 27, preferences were as follows:

Preference 1: Keep current program as is (26%)

Preference 2: Encourage backyard composting program / grasscycling (leaving mulch on lawn) (24%), and
More educational programs on how to reduce waste (24%)
Preference 3: Ban cardboard and organics from landfill (19%)

It is recommended to increase the budget for education programs that focus on waste reduction and to increase environmental awareness as residents are currently not highly aware of the benefits of waste reduction or of all the possible options.

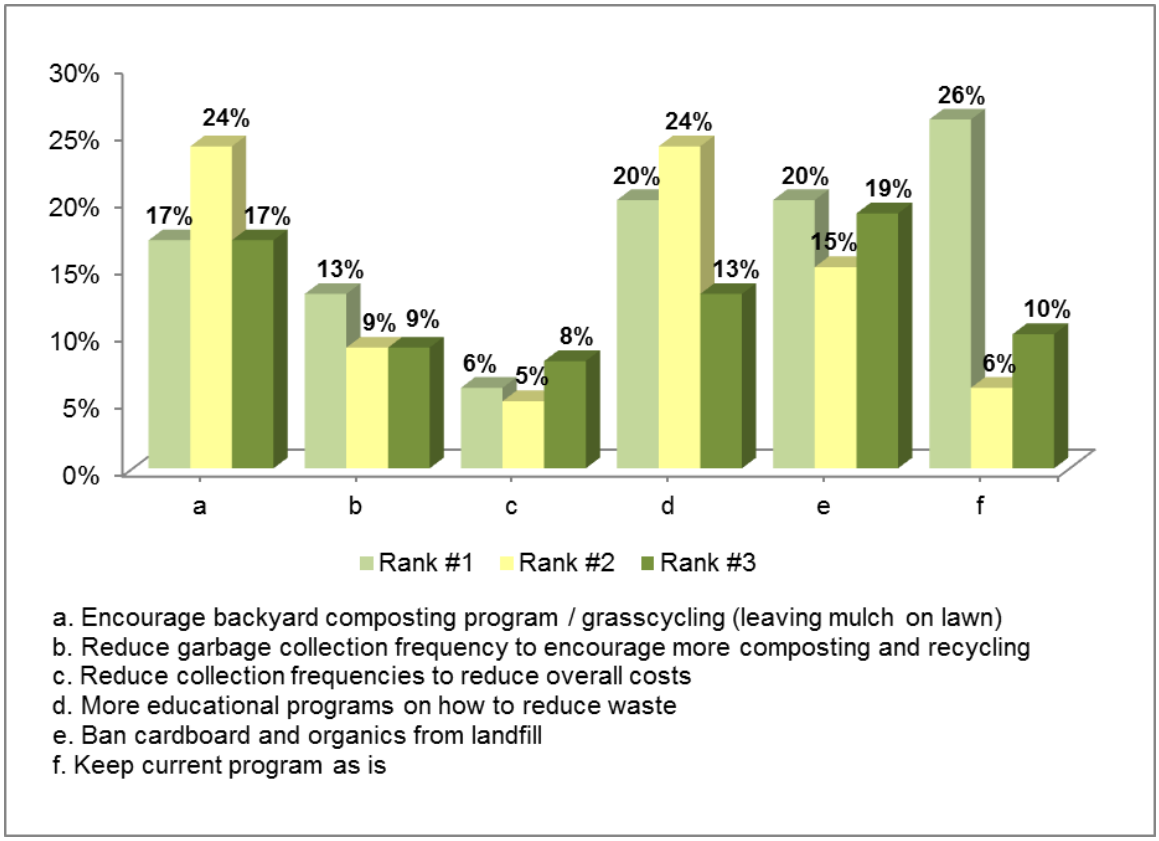

Figure 27. Top three waste program options for City to implement

Question 25: Residents in the Region pay approximately $20 - $35 per month for various levels of service for waste collection. Cold Lake residents pay $27.50. How much are you willing to pay per month for garbage, recycling and organics collection?

☐ $20 - $23 ☐ $24 - $26 ☐ $27 - $30 ☐ $31 or more

The purpose of Question 25 is to measure the willingness of the respondents to pay for curbside waste (garbage, recycling and organics) collection services and to inform them how much they are currently paying for the system.

Fifty one percent (51%) of the survey respondents are willing to pay $27 - $30 per month, eight percent are willing pay $31 or more per month but forty percent (40%) of the survey respondents want to pay less ($20 - $26) than what they currently are paying. **With some education, in the near future, residents may be willing to pay up to $2.50 more per month for the three waste streams collection at the curb as 51% indicated their willingness. In the meantime it is recommended that the City implement cost effective waste services. Ninety one percent (91%) of surveyed residents prefer costs less than $30 per household per month. This could be achieved through a reduction of collection frequencies, garbage limit, better use of infrastructure through waste reduction eduction, and allowing low cost options such as backyard composting and lawn mulching.**

Results are graphically illustrated in Figure 28.

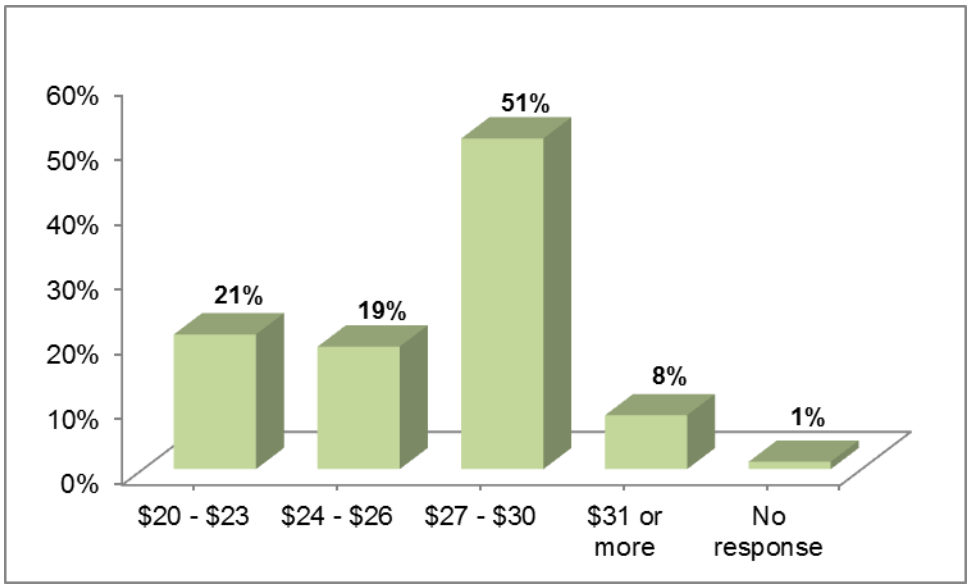

Figure 28. Amount residents willing to pay for curbside waste collection service per month

Question 26: When communicating with residents about educational initiatives, how often should we communicate with you about waste issues?

☐ About the same ☐ More often ☐ Less often

The purpose of Question 26 is to assist the City to evaluate the frequency of communication with the residents.

As illustrated in Figure 29, fifty two percent (52%) of the respondents would like the City to communicate with them more often while forty three percent (43%) are satisfied with the current communication frequency.

Marjority (52%) of the residents indicated that they want educational initiatives to be communicated to them more often. This shows resident's interest to learn more about waste issues.

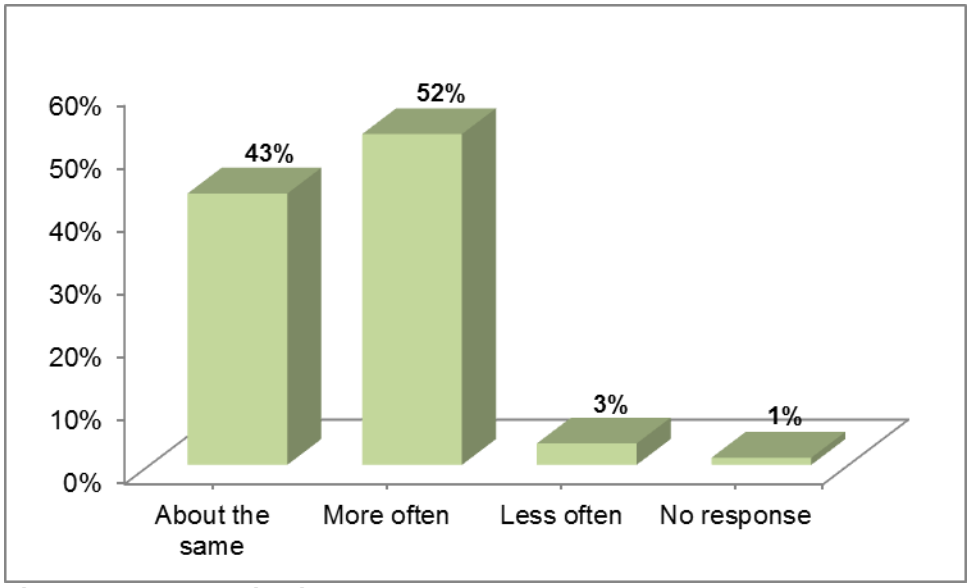

Figure 29. Communication Frequency

Question 27: What is the best way to communicate to you about waste reduction programs? (Rank your top 3)

- ☐ **In person**
- ☐ **Direct Mail**
- ☐ **Phone**
- ☐ **Brochures with utility bills**
- ☐ **Newspaper (specify) _____**
- ☐ **Info pack sent to door 1-2/year**
- ☐ **Radio announcements (Specify Channel) _____**
- ☐ **Education in schools**
- ☐ **Community bulletin boards**
- ☐ **Information on City Web Site**
- ☐ **Social media (Specify) _____**
- ☐ **Other _____**

The purpose of Question 27 is to ask residents to indicate the best communication methods. An excellent communication system is integral to the success of any waste management strategy.

Communication methods ranked #1:

- Brochures with utility bills (48%)
- Direct mail (23%)
- Newspaper (20%) – Cold Lake Sun, Advertisements, Recycle Initiatives

Communication methods ranked #2:

- Brochures with utility bills (17%)
- Direct mail (11%)
- Info pack sent to door 1-2/year (11%)
- Newspaper (9%) – Cold Lake Sun

Communication methods ranked #3:

- Information on City Web Site (15%)
- Info pack sent to door 1-2/year (12%)
- Social media (8%) – Facebook, Twitter, E-mail
- Education in schools (8%)

It is recommended that the City communicate with residents by:

1. **Brochures with utility bills**
2. **Direct mail**
3. **Cold Lake Sun newspaper in an advertisement form**
4. **Information on City website**
5. **Info pack sent to door 1-2/year**

Results are graphically illustrated in Figures 30a, 30b and 30c.

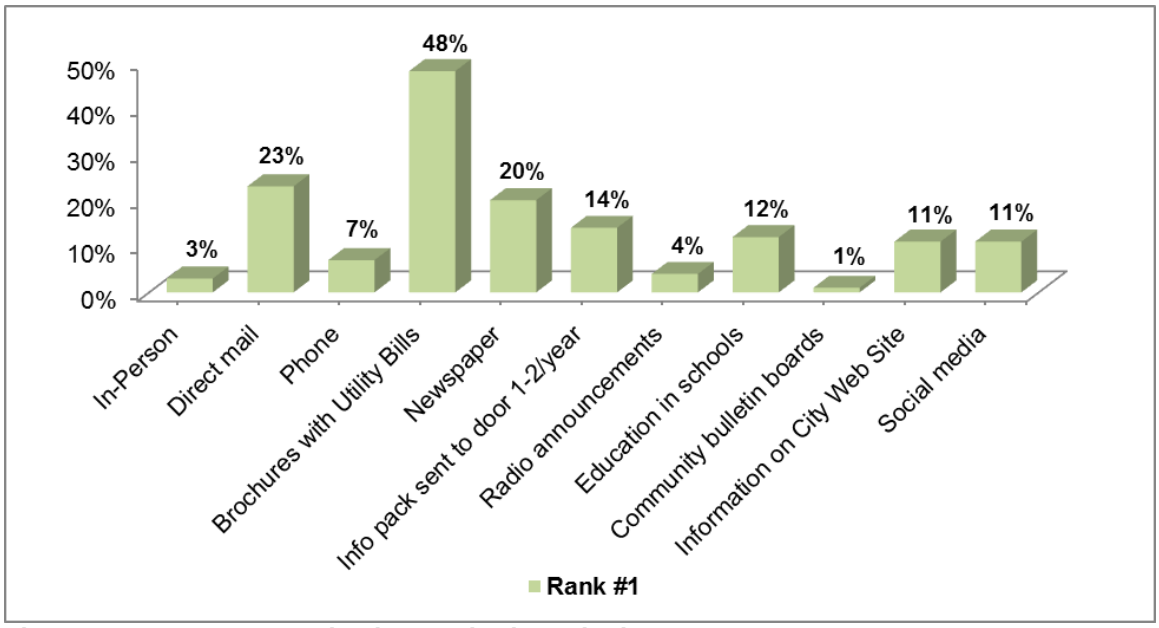

Figure 30a. Best communication methods ranked #1

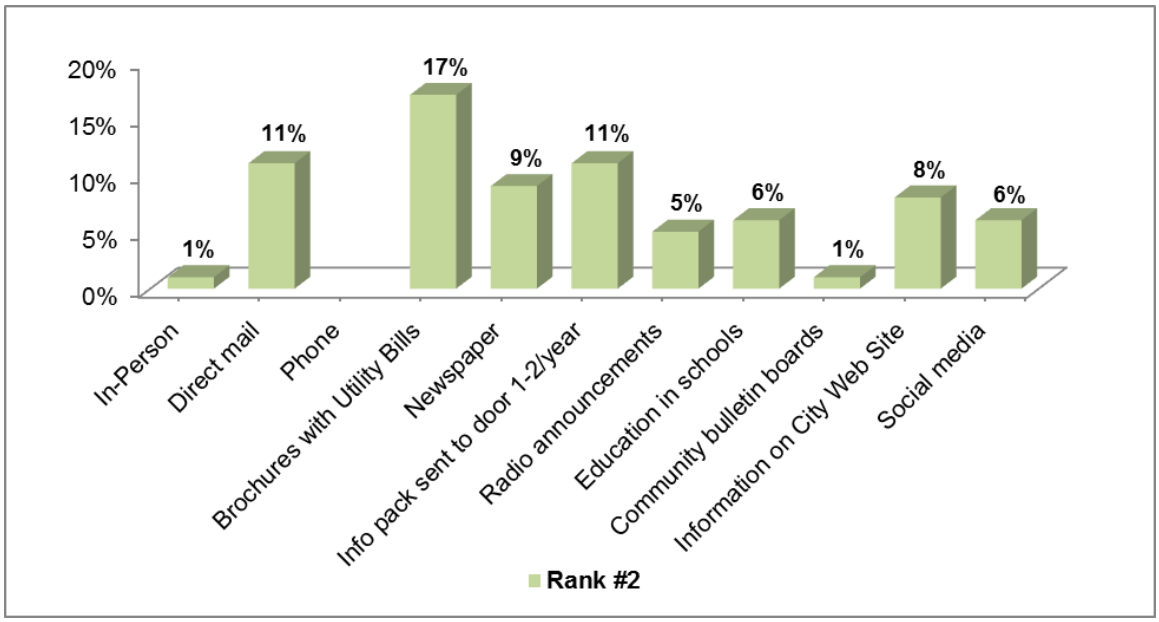

Figure 30b. Best communication methods ranked #2

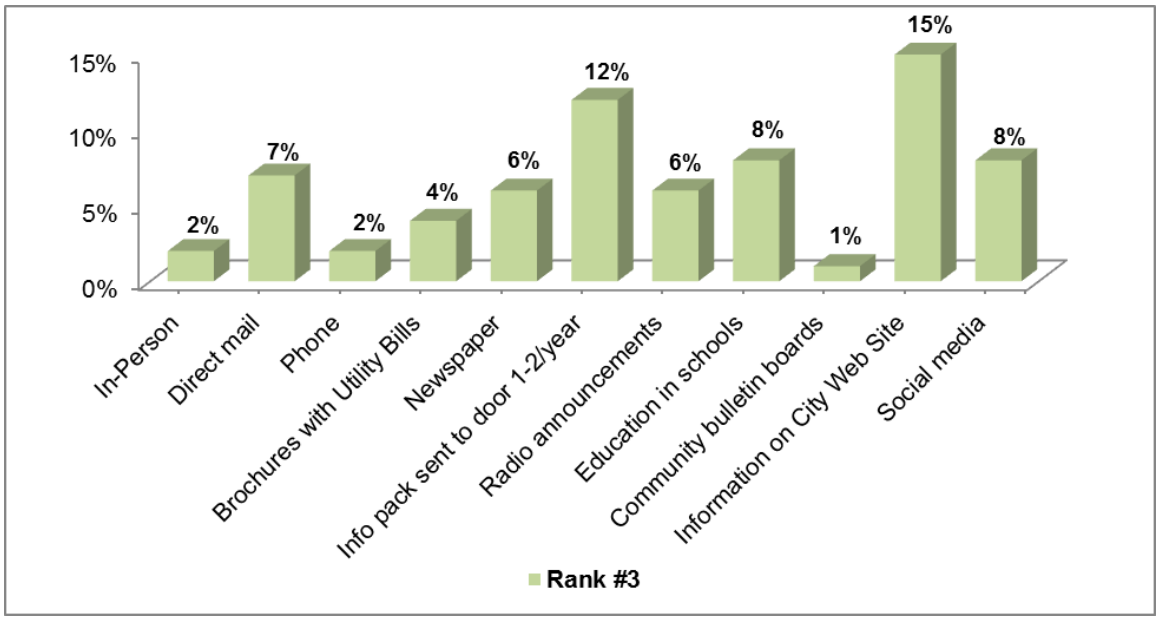

Figure 30c. Best communication methods ranked #3

Other Comments: _____
_____
_____
_____

Some comments are listed below. All comments are in Appendix B.

Appreciation

- Thank you City and keep up the good work.

Curbside collection

- Weekly curbside recyclables collection.
- Co-mingled recycling. It is easy and encourages recycling.
- Year round organics collection.
- Every two weeks garbage collection.
- Clear bags for garbage and if there is contamination, don't pick up.
- More frequent toxic waste pick up that once a year.
- Longer Christmas tree pick up.
- Start tag-a-bag system to be fair to everyone.

Carts

- Carts for garbage, recycling and organics.
- Provide carts with different sizes or number based on number of people in a household.
- Carts attract bears.
- Bigger carts than what is provided for the pilot program.
- People with over flowing garbage carts should be fined.

Education

- Education on the advantages of recycling and composting and what materials can be recycled and composted, etc.
- Advertise better the services available, e.g. services at the Transfer Station, organics pick-up services, etc.
- Teach the kids. Get them involved. Must develop a culture of reduce reuse recycle.

Landfill

- Longer hours at the landfill and open every day.
- Educate employees at landfill to compost so it can be sold or given to residents.
- Landfill should have better control; there is a lot recyclables that should not be there.
- Recycle some of what's in landfill now to extend life.
- City should have an incinerator (clean burning) and generate steam to heat city landfill buildings and this will extend landfill life.

Waste reduction

- Encourage retail to do less packaging.
- Eliminate plastic bag usage in all of City.

Bottle Depot

- Expand the bottle depot, minimize wait time or allow for more access.
- Machine to take refundable bottles (like Quebec).

Other

- Recycling station in Cold Lake North like before.
- Battery should be easy to recycle in town.

- Stop sending extra paper with bill; use social media.
- City provide bin for organics.
- Public but controlled burn system.
- Cover the garbage with tarp when hauling as stated in the by-law.
- Stop the application of salt and sand, the salt is killing the grass and it promotes weeds to grow.

APPENDIX A

SURVEY FORM

24. Please rank the <u>top three</u> waste program options you think the City should consider implementing (1 being the most important):

__ Encourage backyard composting program / grasscycling (leaving mulch on lawn)
__ Reduce garbage collection frequency to encourage more composting and recycling
__ Reduce collection frequencies to reduce overall costs
__ More educational programs on how to reduce waste
__ Ban cardboard and organics from landfill
__ Keep current programs as is.

25. Residents in the Region pay approximately $20 - $35 per month for various levels of service for waste collection. Cold Lake residents pay $27.50. How much are you willing to pay per month for garbage, recycling and organics collection?

☐ $20 - $23 ☐ $24 - $26
☐ $27 - $30 ☐ $31 and more

26. When communicating with residents about educational initiatives, how often should we communicate with you about waste issues?

☐ About the same ☐ More often ☐ Less often

27. What is the best way to communicate to you about waste reduction programs? (Rank your top 3)

☐ In-person
☐ Direct mail
☐ Phone
☐ Brochures with utility bills
☐ Newspaper (specify) _____
☐ Info pack sent to door 1-2/year
☐ Radio announcements (Specify Channel) _____
☐ Education in schools
☐ Community bulletin boards
☐ Information on City Web Site
☐ Social Media (Specify) _____
☐ Other _____

Other Comments: _____

_____

Thank you for participating!
All personal information provided will be kept strictly confidential.

Complete the Survey online at
www.coldlake.com
or Mail/Drop-off at:

City Hall
5513 - 48 Avenue
Cold Lake, Alberta
T9M 1A1

Fill out the survey online:

https://www.surveymonkey.com/s/coldlake

For more information on City of Cold Lake waste collection programs and initiatives go to:
http://www.coldlake.com/content/waste-management
or call 780 594 4494

Advanced Enviro Engineering Ltd.

City of Cold Lake

Please Return this Survey by March 15, 2015

City of Cold Lake

Waste Management Survey

The City goes forward

The City of Cold Lake is looking for cost effective options to reduce waste and to improve the current waste management system.

Current system:

- Weekly manual/automated garbage collection
- Recycling collection once every two weeks
- Organics collection once every two weeks (April 1st - November 15th)
- Seasonal Christmas Tree collection
- Annual Toxic Round Up
- Residents currently pay $27.50/month for these services.

Your feedback is important for the enhancement of current programs and to increase waste diversion from the landfill. All information provided is confidential.

Did you know?

In 2014, Cold Lake residents generated through the curbside collection about 3,481 Tonnes of waste, the equivalent of over 220kg per person.

Did you know?
In 2014 Cold Lake composted or recycled about 20% of all waste generated.

1. **What is your age?**
   - ☐ Under 19
   - ☐ 20 – 24
   - ☐ 25 – 34
   - ☐ 35 – 44
   - ☐ 45 – 54
   - ☐ 55 – 64
   - ☐ 65+

2. **What is your gender?**
   - ☐ Female
   - ☐ Male

3. **What type of dwelling do you live in?**
   - ☐ Condominium
   - ☐ Duplex
   - ☐ Townhouse
   - ☐ Single Family Household
   - ☐ Other _____

4. **Including yourself, how many people in each age group typically live in your household?**

Age Group:	**Number of People:**
Under 13	_____
13 – 17	_____
18 – 24	_____
25 – 34	_____
35 – 49	_____
50 – 64	_____
65 and Over	_____

5. **How important is waste diversion and waste reduction to you?**
   - ☐ Very important
   - ☐ Somewhat important
   - ☐ Not very important
   - ☐ Not important at all
   - ☐ Unsure

6. **With this in mind how much waste do you think the City should attempt to divert from landfill in the next five years?**
   - ☐ None
   - ☐ 20%
   - ☐ 40%
   - ☐ 50%
   - ☐ 80%

7. **How much garbage do you generate per week?**
   (1 bag = 75L standard black garbage bag).
   - ☐ 1 - 2 bags
   - ☐ 3 - 4 bags
   - ☐ 5 - 6 bags
   - ☐ more than 6

8. **How much recyclables do you generate per week?**

Material:	**Number:**
Blue bags	_____
Bags with paper	_____
Cardboards bundles	_____

Did you know?
About 50% of your waste could actually be composted?

9. **Do you compost? (Feel free to have multiple answers)**
   - ☐ No
   - ☐ I compost in my backyard.
   - ☐ I bring organic material to Cold Lake Transfer Station
   - ☐ I use curbside organics collection

10. **What do you set out for the curbside organic collection?** *(Check all that apply)*
    - ☐ Yard Waste
    - ☐ Food Waste
    - ☐ Organics incl. pet waste, soiled paper, etc.
    - ☐ Other: _____

11. **How often should the City collect waste?**

	Weekly	**Every two weeks**	**Other**
Garbage	☐	☐	_____
Recycling	☐	☐	_____
Organics	☐	☐	_____

Comments: _____

12. **Would you agree to using carts instead of bags for curbside collection?**
    Garbage ☐Yes ☐ No
    Organics ☐Yes ☐ No
    Other_____

13. **Would you support…**

Garbage limits	☐Yes	☐ No
Fees based on amount of garbage	☐Yes	☐ No
User fees for optional services	☐Yes	☐ No

Comments:_____
_____

14. **How often do you use the Cold Lake Transfer Station (east of Highway 28 at the South edge of the City)?**
    - ☐ Never
    - ☐ Weekly
    - ☐ Once a month
    - ☐ Other_____

15. **What services do you use at the Cold Lake Transfer Station?**
    - ☐ Garbage drop-off
    - ☐ Organics drop-off
    - ☐ Batteries/Paint/Oil
    - ☐ Household appliances (air conditioners, fridges, stoves)
    - ☐ Tires
    - ☐ Other_____

16. **How often do you use the Cold Lake Recycling Centre (3609 - 50 Street)?**
    - ☐ Never
    - ☐ Weekly
    - ☐ Once a month
    - ☐ Other_____

17. **What services do you use at the Cold Lake Recycling Centre? (Feel free to have multiple answers)**
    - ☐ Cardboards drop-off
    - ☐ Mixed paper drop-off
    - ☐ Plastic containers, bottles, bags, etc. drop-off
    - ☐ Glass bottles and jars
    - ☐ E-waste
    - ☐ Ink cartridges
    - ☐ Other_____

18. **Would you support a material ban at the Cold Lake Transfer Station?**
    - ☐ Yes
    - ☐ No

19. **If yes, which item would you ban? Feel free to have multiple answers.**
    - ☐Garbage Ban
    - ☐ Recyclables Ban (plastic containers, cardboards, etc.)
    - ☐ Organics Ban
    - ☐ Other _____

20. **How often do you use the Cold Lake Class III Landfill? (Construction & Demolition aka C&D)**
    - ☐ Never
    - ☐ Weekly
    - ☐ Once a month
    - ☐ Other_____

21. **What type of waste do you dispose of at the Cold Lake Class III Landfill?**
    - ☐ Inert solid waste (construction, renovation and demolition waste)
    - ☐ Dry waste (shingles, concrete, furniture, dry wall, non-asbestos insulation, etc.)
    - ☐ Wood
    - ☐ Other _____

22. **The Class III Landfill in Cold Lake is reaching its life expectancy (2-5 years). Would you like the City to build a new Class III Landfill for residents and businesses?**
    - ☐ Yes
    - ☐ No, bring to other communities' landfill
    - ☐ No, focus on diversion
    - ☐ Other _____

23. **Would you sort waste yourself before you get to the landfill to extend its life expectation?**
    - Inert solid waste (C&D waste) ☐Yes ☐ No
    - Dry waste (shingles, concrete, furniture, dry wall) ☐Yes ☐ No
    - Wood ☐Yes ☐ No

APPENDIX B

OTHER COMMENTS

1. I think that there should be recycling stations in Cold Lake North again like there used to be. By making it more convenient people will recycle more.
2. Please collect organics/compost all year through, cuts down on garbage we put at curbside.
3. Thank you for doing a great job for our city :)
4. I believe in the well-being of our community and seeing garbage on our highways or residential living area's is an accusation on our senses and brings us down, cleanliness is next to Godliness!! And yes, support our yearly spring clean-up, Guide's, Boy Scouts, and concerned groups. Good community consciousness and we all benefit!!!
5. Recycling pickup should be weekly.
6. Battery should be easier to recycle in town.
7. It's far more important to pick up hazardous/ toxic materials than organics. Once a year in the summer is NOT sufficient to stop these things from going into regular garbage.
8. We moved from Ottawa, ON area and they have an amazing program. Super easy to follow.
9. The cart system worked very well in Sherwood Park. Organics collection year round would divert waste from landfill.
10. Stop sending extra paper in the bills, start using social media.
11. We were given a garbage cart to use instead of bags. We were told the cart would hold the same amount of garbage that we were accustomed to putting out for pickup each week. However, we have found the cart only holds half of what we were putting out previously. Since we are thus being forced to take our own garbage to the landfill, then the landfill should be open every day of the week and with longer hours as well. Also, the garbage carts attract bears. When we used our own trash cans there was never an incident with bears.
12. The City of Cold Lake should follow the example of many BC Cities and ban organics and recyclables from garbage collection. However, the City should then be taking the proper steps to ensure every resident has the proper materials and bins to make this possible; providing green organics bins for households and larger curb side bins for both organics and recyclables (Blue and Green bags sitting on the side of the road is not acceptable).
13. I think that Cold Lake has one of the worst recycling programs that I have ever seen. It is so complicated! No one knows when to recycle/ get with the program and do it weekly, like every other City, simplify it! Have bins with labels so everyone knows what to recycle. Educate your community and more importantly YOURSELVES! Stop wasting paper on the schedule and don’t charge more for it because this should save money at the landfill. My words are harsh but without criticism you can never make change, so come City lets step up our game. The world is everyone’s to protect! Reduce Reuse Recycle.
14. Does the city have an Environmental Advisory Committee?
15. You guys do a great job!!! Can we do something to clean up the 4plexes on 50th... Disgusting.
16. Limiting garbage pick-up won't encourage more recycling. It will encourage illegal dumping and make our city dirtier.
17. I moved from Edmonton where they do not have all these rules when it comes to recycling. Throw it in a blue bag and that's it! Judging from what I see on curb

sides I think they have a much higher recycling rate because it's not such a hassle.

18. Number of carts should vary by the number of residence in the house. Our house should have two. Recycle for cardboard; papers etc. are not often enough to meet needs as we have no storage for them. Since we have carts we should look into closed recyclable cart as well so people do not have to try to store in houses. Not everyone has garages etc.
19. Look into implementation of a system like the md of Bonnyville has for Ardmore and Fort Kent. Initial costs would be slightly higher but actual collection fees would be reduced.
20. Transfer Station should ban non-residents of Cold Lake such as Riverhursts, Ardmore; outside communities bring their garbage to Cold Lake Transfer Station.
21. If recycling came every week and garbage biweekly it would encourage people to recycle more. Lots don't because of the amount of space recycling can take up in your home. People whose bins of garbage are overflowing each week should be charged as they are the same ones that have no recycling. Organic collection should be all year. I compost in the summer and the amount of trash I actually have is minimal.
22. I would not suggest to reduce waste collection frequency as this will become another problem for the city to tackle. Also, maybe change recycling program so that one doesn't need to separate all cans from bottles from plastic. It's silly, nowhere else I've ever lived required this. I can understand separating paper but all the cans/glass/plastic etc.? I have to create waste with extra bags and bins to put at the curb side in order to avoid waste. Oxymoron. Turns me off from recycling to be honest.
23. City provides bin for organic.
24. Educate the homes of residents that are not utilizing our curbside recycle and organics programs.
25. Use clear garbage bags and disallow pickup of the bag if it holds items that can go in recycling.
26. Do more composting and have a public, but controlled burn system.
27. Recycling is expensive and hard on the environment. It is contributing to global warming as it takes a tremendous amount of energy to process materials for re-use. The concept seems sound, but the implementation is flawed.
28. The current trial carts being used are about 30% smaller than similar carts I've seen in the area - if carts are implemented they should be larger than the trial ones.
29. Apparently there is a bylaw to have trailers, trucks etc. covered when hauling garbage to the dump or anywhere, that is not being enforced. All should be covered with a tarp. The amount of garbage that blows out of vehicles and trailers is ridiculous. I have had more plastic milk cartons and boxes blow towards me on the highway between Cold Lake North and South. The rules are there, please enforce them. Another problem is people over flowing their garbage bins. There should be a fine for this. They can certainly request another bin or buy one. This is a big mess for the neighbourhood and who picks it up but the rest of us.

30. High incomes lead to more waste. The corporate attitude in Cold Lake sucks, they just have no responsibility or even care about sorting or recycling and the only way to wake them up is thru fees, high fees.
31. It would be nice if people, who take their own recycling to the depot, didn't have to pay for it to be picked up (since it's not being used by those people).
32. Create a new resident package.....composting in backyards are hard for asthmatics.
33. As a parent I was very surprised how much recyclable material is put into the garbage at the Elementary schools level, they seem to only recycle the milk and juice boxes not the plastic and paper, cardboard it is just tossed into the garbage it should. Maybe a newer and up to date recycling building would benefit our landfill... If residents were able to combine all recyclable material in one bag instead of separating. As sometime the personnel that collect the garbage also take the recyclable to the dump very :(
34. Do grocery stores and other retail stores comply with organic and cardboard recycling?
35. I am willing to pay for my garbage collection but when I do my own recycling with the bottle deploy why do I have to pay for that. Force people to do their own recycling and get the city out of this business. Be smarter about it and don't waste my taxes!
36. Love the City's green recycling bins - great convenience.
37. Disagree with all options in number 24, it is your job to deal with waste. If reduction is your goal provide large bins for a garbage truck to lift mechanically with weekly recycling on a larger selection of items to recycle.
38. I think it's great that the city has set up this survey, however since living in Cold Lake I find (and also from observation of my street) people's views of recycling low and their willingness to participate in recycling fairly low. With that said I hope even if people views of recycling are low the city does more to encourage people to recycle such as making collection weekly and limiting the amount of garbage allowed to be placed curbside. Also having recycling bins would be awesome, and I feel would encourage more people to recycle :)
39. I think Cold Lake could benefit following the changes that Fort McMurray did - their new waste management programs proved exceedingly effective at minimal effort to the users of the program... if you make it easy, people will do it... if people need to go above and beyond, you can bet the majority will do what they can to prevent doing it.
40. Both garbage and recycling need standard carts. Recycling needs to be simple, no self-sorting and storage for 2 weeks. Composting needs to be clearer what can be included and how.
41. Explain organic waste more clearly; have garbage pickup every second week and recycling every week to encourage recycling; increase fees at the landfill for both garbage and other material.
42. You should think about eliminating the bottle program, it is a pain in the butt to haul recycling in minus 40 temperatures and it is an eyesight to have it laying around until July when it is warm enough to get to the depot. If not, expand the depot to minimize wait times and allow for more access.
43. Keep up the good work.

44. Suggest stronger education program to re-use and recycle. May still throw all into 1 bag!
45. The City should stop the application of Salt & Sand on our residential streets-- The salt has killed the grass next to the black top and promotes weeds to grow.
46. I use the waste collection service about once a month and compost all organics. I would be happy to do my own sorting and recycling.
47. I would ignore phone calls and be dissatisfied with people coming to my door to talk.
48. The landfill should have better control of stuff taken there. There is too much that should be recycled and does not need to be in a landfill.
49. Ask the garbage drivers to be quit being so lazy, I'm tired of picking up diapers or packaging that they clearly see fall to the ground. I'll put it back in the garbage for the next week and they still don't take everything. VERY VERY frustrating!!
50. Lots of stuff can be reused. Authorized picking, and better sorting.
51. To fix the problem, just raise the cost base on usage i.e. a second bin should be available for rent for people with larger families or with small home business. The new program doesn't push me to recycle at all. It made me find other ways to get rid of my garbage bags.
52. Our kids or young (5 and 3) and when they were in diapers we still only put on can of garbage/2 weeks with a twice as much recycling. A pay per bag program would be great for us as we only use on bag every 2 weeks still. Keeping the landfill going is important because although we agree with waste diversification, if people don't have a place to put it they will dump it in the ditches.
53. I have Filipino neighbors who NEVER recycle. They are rampant consumers and easily produce 3x the amount of normal waste. It is disgusting; they are disgusting. There is also prostitution going on; a regular stream of different Caucasian men come & go.
54. Existing system is good.
55. It is ridiculous the amount of money we as residents have to pay for garbage and recycling. Residents should have a choice on how much they pay for garbage because not everyone puts out the same amount of garbage and recycling. I have a family of 4 and we only put out 1, that's right, 1 bag of garbage every month. How is that possible you ask because we recycle and compost when you do that you do not have a lot of garbage. I shouldn't be penalized and pay over 220.00 dollars a year for 12 bags of garbage. I come from Ontario where they use bag tags at $2.75 a tag and you put it on your bag that way it is fair for everyone with a limit of 5 bags a collection and the revenue goes back to the city this is the way it should be done!!!!@
56. I feel Cold Lake's recycling program is excellent and surpasses many big city recycling initiatives.
57. Thank you!
58. Going from 3 cans to 1 large one is not enough. We not only have to pay but in addition go to the dump every week.
59. Love curbside pickup of recycling - bin for household organics may help, unsure how to store while waiting for pickup.
60. I would be willing to pay more for waste collection if there was organic pick-up year round.
61. If recycling collection was every week, I would gladly pay the extra fees.

62. I recycle; some of my neighbors and friends don't. They say it takes time or it is too confusing. Easier to throw it in with the household garbage.
63. City provided blue recycle bins collected weekly would be a crucial step in reducing garbage and increasing recycling.
64. City should have an incinerator (clean burning) and generate steam to heat city landfill buildings and this will extend landfill life.
65. We really like the new garbage bins! Keep up the good work. #24. Encourage retail to do less packaging.
66. I didn't realize the options available at transfer station and organics pick up. Advertise better. Longer Christmas tree pickup please!
67. Teach the kids. Get them involved. Must develop a culture of reduce reuse recycle.
68. Charge people who litter from their cars - big fines.
69. Recycling must start from industry i.e. meat foam trays, plastics, etc. Educate, educate, educate. #24. Other - recycle some of what's in landfill now to extend life.
70. Keep up the good work - we have to do everything to protect and save our environment.
71. It seems to us that the waste management system in Cold Lake is perfect! What's wrong? Hope to read it in the newspaper! Thank you.
72. Blue bins for recycling should be placed.
73. We would be supportive of the city paying for more help at the landfill to make sure garbage is sorted so it can be recycled. So much abuse out there right now! #27. Educate employees at landfill to compost so it can be sold or given to residents.
74. The City is doing a great job as is at least in my part of Town. We are two old senior, we recycle everything. Do not mind if garbage pickup was extended.
75. I don't like the new bins, they are too cumbersome for older people and don't hold 3 cans equivalent, let us have the old way.
76. Weekly pickup of toxic materials rather than organics.
77. Should supply population with compost units (for those of us who don't have one).
78. My utility bill has quadrupled in 5 years. I still only put out 1 small bag of garbage a week.
79. I think you are doing a good job. Would like to see (one) black garbage bag if more charge for it.
80. Emphasize the high costs associated with waste. What are some options used in other areas. Eliminate plastic bag usage in all of City. Other cities have done!!! No more when shopping.
81. More management is needed at the Transfer Station open pits: too much hazardous materials!
82. #23. #1 I suggest to have a green recycling bin the same as the new black garbage bins. We can drop all recycling stuff in it without to separate it (people don't because they are too lazy to do so…) and the city picks it up weekly at the same time of garbage and have a workshop that they separate it up there. I agree to pay more for this service instead to separate it ourselves.
83. Compost and recycling should be mandatory and infractions should result in fines.

84. Glass recycling makes no sense; it uses more energy than saving it. Also, machine to take refundable bottles (like Quebec).

City of Cold Lake

Integrated Waste Management Study

Section 4: Diversion Options Analysis

Advanced Enviro Engineering Ltd.

Providing Solutions for Business and Environment Since 1992

TABLE OF CONTENTS

FIGURES AND TABLES

1.0 INTRODUCTION

The Diversion Options Analysis section of the Cold Lake Integrated Waste Study covers the following:

1. Description and outline of advantages and disadvantages for a range of waste management options including:
    a. Waste Collection
    b. Garbage
    c. Recycling
    d. Composting
    e. Cart Ownership Model
2. Cost and Feasible Options analysis based on the current system review

The following work was conducted as a part of Section 4:

Project Start Up Meeting

1. Interviews of City of Cold Lake personnel associated with waste management activities:

    - Craig Copeland, Mayor
    - Duane Lay, City Councilor
    - Vicky Lefebvre, City Councilor
    - Kelvin Plain,of City Councilor
    - Azam Khan, City of Cold Lake, General Manager of Infrastructure Services
    - George Urlacher, City of Cold Lake, Operations Manager
    - Mark Lowe, City of Cold Lake, Waste Management Foreman
    - City of Cold Lake, Waste Collection Drivers

2. Site Visits of existing waste management facilities and interviews of City and private service providers:

    - Cold Lake Recycling Centre (CLRC) located at 3609-50th Street and interviewed the owner, Hussein Elkadri
    - Cold Lake Regional Transfer Station/Class III landfill and interviewed the waste management foreman, Mark Lowe

- Observed both waste and recyclables collection

3. Review of existing reports, documentation and information related to waste management and demographics, including:

    - The Waste Management Bylaws (277-UT-07, 356-UT-09)
    - *2011 Census Report*
    - City of Cold Lake – Annual Report – 2013-2014
    - City of Cold Lake website
    - *Waste Management Strategy – Regional Waste Management Study – July 2014 by Stantec Consulting Ltd.*
    - *Cost-Benefit Analysis for Waste Disposal at Ryley Class II Landfill - July 2014 by Stantec Consulting Ltd.*
    - *Regional Recycling and Waste Diversion Initiatives Business Plan - August 2013 by Stantec Consulting Ltd.*
    - *City of Cold Lake Integrated Waste Management Study - Section 3: Solid Waste Management Survey- April 2015*

2.0 WASTE COLLECTION OPTIONS

Program Options for Waste Collection:

1. Fully-Automated Collection
2. Truck Technology
3. Semi-Automated Collection

A description of each option as well as the associated advantages and disadvantages are provided below.

2.1 Fully Automated Collection

Automated collection is based on a cart system. Wheeled carts with lids are provided to residents (ownership models are provided in Section 5). Residents place carts along collection routes according to set out specification (1 m distance from each other as well as other objects, etc.). In a fully automated system, the collection truck driver operates a mechanical arm from inside the cab of the truck, which reaches out and grasps the cart, empties the cart into the truck, then mechanically places the cart back at the curb without the operator having to exit the truck.

Approximately 30% of municipalities across Canada have implemented a cart system with this number steadily increasing. The automated cart system appears to be the future model for waste collection.

Advantages

Advantages of fully automated collection:

- Operational cost efficiencies:
  - One man automated collection lowers labor costs.
  - Elimination of manual lifting reduces injuries and Workers Compensation claims.
  - Reduced collection time per household reduces labor and fuel costs, and may require fewer trucks (collection time is estimated at approximately ~15 seconds/household).
- Operational cost efficiencies of an automated system benefit the service provider when collection is contracted out; these efficiencies allow the City to attract competitive pricing from private service providers. Depending on the amount of garbage collected (generally more than 200 kg/person/year) hand-bombing or manual collection prices are higher than automated collection.
- Expandable to waste/organics/recyclables.
- Fewer trucks and reduced collection time reduces greenhouse gas emissions.
- Reduced labour requirements helps address missed pick-ups due to labour shortages.

Advantages of cart system:

- Cart design (ventilation, lids, and holding capacity) allows for year round collection of organics (food and yard waste) and varied collection frequencies.
- Cart design allows for waste collection every two weeks (if coupled with other diversion programs such as weekly organics collection).
- Acceptable volumes of waste are easier to establish with a cart than with bags if a volume limit is imposed – i.e. 1 cart/household.
- Radio Frequency Identification Device (RFID) technology is available in some carts. Capabilities, advantages and disadvantages of RFID technology are discussed in Section 2.4.4
- Funding may be available for municipalities to purchase carts.
- Carts generally have a 10-year warranty with a unit cost of approximately $60-80 (landed). Carts can be financed. Over 10 years, the cost of carts is at least 50% cheaper than bags purchased over the same time frame.

- Less plastic bag waste.
- Reduces damage to bags by animals and rodents.
- Visually attractive (neater than bags) and uniform system.
- Comes in various sizes and colors.
- Easy to maneuver (on wheels).
- It has been accepted in over 30% of Canadian households and continues to be implemented.

Disadvantages

- Capital investment required at outset if municipality purchases containers. A container must be purchased for each household and homeowners may object to paying for any increases in costs (carts can be financed).
- The costs of implementing and maintaining a containerized system compared to bags could be prohibitive unless the costs can be spread out over time.
- If carts are owned by the City, additional administration is required to manage the carts – if residents move, carts are lost, etc. Cart maintenance can be contracted out.
- Difficult to monitor contamination (oil containers in waste, etc.) as operator does not leave truck.
- Might be inconvenient for some residents because of the room needed to store the carts and to place them properly on the curb.
- Trucks may have difficulty collecting carts in specific areas such as cul-de-sacs.
- In order to allow back lane collection with overhead lines, additional retrofitting may be required for the collection truck.
- Cost to retrofit collection trucks for a fully automated system is estimated to be $40,000 to $50,000.

2.2 Truck Technology

Recently there has been a great deal of research and development in the design of carts and trucks.

The following analysis is a preliminary evaluation of different side loader trucks currently available on the market that might improve the performance of the current and future automated collection programs in Cold Lake.

In general the lowest costs are achieved by reducing stop times and increasing waste density on the truck.

The most important benefits are related to fuel consumption, safety and route efficiency.

Videos of all the different truck systems are provided in the attached CD.

2.2.1 Heil Payton

Characteristics:

- 8 second lift cycle (as specified by Heil but Advanced Enviro staff has calculated around 10-11 seconds)
- 9-foot reach.

Other Heil options:

a) HEIL ODYSSEY Automated Front Loader (AFL) with integrated CUROTTO-CAN

The Curotto-Can automated carry can has three main design innovations:

1. The arm is in front of the steer axle
2. It utilizes the front loader platform
3. It has a low lifting arm

The key factor in residential waste collection efficiency is how long a truck is stopped in front of a house for each pick-up. The longer the loading cycle, the lower the efficiency. With a front loader equipped with a Curotto-Can automated carry can, stop time (measured from wheel stop to wheel go) is 5 seconds as compared to 12-18 seconds for the other automated side loaders (ASL).

Comparison by Heil:

- ASL does 10 services @ 10 seconds = **100 seconds**
- Curotto-Can does 10 services @ 5 seconds + 20 second arm/fork cycle = **70 seconds**

AE staff calculates (through direct observation) a lift cycle of 7-8 sec + fork cycle.

Advantages:

- Very fast.

- Design allows for manual collection when necessary.
- A front loader offers a large hopper that allows for the pick up of a wide range of materials, including bulky items like furniture and appliances. Front loaders also have a far greater packing pressure and a larger packing blade than an automated side loader, thus more material can be more densely packed into the body.
- Organic liquids are better contained when emptied into the front loader platform as well as when cycled into the truck's hopper.

Downside:

- Shorter arm compared to other models (around 6-foot reach).
- Very long cabin with the front loader platform.
- Possible debris dispersion during arm/fork cycle.

Figure 1. Heil Odyssey AFL with integrated Curotto-Can

This vehicle has the ability to access tighter corners during collection and allows the driver to have direct visibility of the cart he is approaching. Drivers can see contamination in the front loader platform and can remove it before it is off-loaded into the truck.

The truck can also be used for multi-unit and commercial collection.

Currently are many trucks in service in the USA and a smaller number in Ontario.

Note: the use of this design needs to be verified with Alberta weight restrictions.

See video: "Heil Odyssey AFL with integrated Curotto-Can - GoPro Garbage Pickup!" in the attached CD.

b) Heil's STAAR System

Heil's STARR System is patented as the industry's only semi-trailer refuse and recycling collection system. The STARR consists of an automated arm mounted on a truck tractor, and a detachable semitrailer packer body. This design allows the STARR to circle around other "straight frame" trucks, and to navigate cul-de-sacs and tight spots with fewer potentially dangerous backups.

The STARR System uses Heil's Rapid Rail body design. The automated arm has an 8-foot reach, a 1,600 lb. lift capacity, and an 8-second cycle time.

Figure 2. Heil's STARR

Advantages:

- Very fast (8-10 second cycle time).
- Maneuvers easily around cul-de-sacs.

Downsides:

- Manual collection is not possible.
- Shorter arm compared to other Heil models (around 8-foot reach).
- Very long overall length.

2.2.2 Rotopac by Ginove

Auger type automated side loader.

This fully automated vehicle is the first auger compacted vehicle in North America. It has a compaction ability that is 30% above the industry norm allowing a shorter wheelbase for tighter corners (more precise cart collection and a 12 foot reach).

The truck's hopper is better sealed and hence organics collection is cleaner. Furthermore, organic materials are shredded, reducing work at the processing site.

Currently used in Quebec by Matrec.

Figure 3. Rotopac by Ginove

Advantages:

- Long arm, 12-foot reach, very efficient in cul-de-sacs.
- High compaction in the track's body.

Downsides:

- Slower than other trucks: 10-11 second lift cycle.
- Possible issues with auger efficiency and maintenance costs.

See video: "Rotopac by Ginove" in the attached CD.

2.2.3 Labrie - Expert Dual Helping-Hand - Side Loader

The Expert Helping Hand is a drop frame, side-loading unit adapted for manual or fully automated waste collection operations on both sides. In the case of one-way streets, the operator will always be in the same direction as the traffic.

Advantages:

- Has a fully automated design with dual arms.
- Allows collection on both sides of lanes and one-way streets.
- Drop frame allows some access to check for contamination and manual collection if needed.
- Saves time on route and fuel costs.
- Lift cycle: 9-10 sec.

Downsides:

- Grabs roller carts within less than a foot (30 cm) and at a maximum distance of 6 feet (1.83 m) from the vehicle.

Figure 4. Expert Dual Helping-Hand

The Expert Helping Hand is currently in use in Spokane, WA and City of Milwaukee, WI. Other fully automated designs are used in the City of Calgary.

See video: "New Expert Dual Helping Hand Video" in the attached CD.

2.2.4 McNeilus

The McNeilus automated side loader is similar to Heil Payton's automated arm (8-foot reach) but has a slower lift cycle (14-15sec).

Figure 5. McNeilus auto reach automated side loader

See video: "WM McNeilus Garbage Trucks" in the attached CD.

2.3 Semi-Automated Collection

Semi-automated collection is also based on a cart system. Carts are rolled manually to the collection truck by an operator, attached to a "tipper" or mechanical arm, and then lifted automatically into the truck. In Alberta, most semi-automated trucks are either side load or rear load.

Advantages

- Semi-automated trucks are able to get into more restricted spaces which could allow back lane pickup to continue if required (1 m restriction is eliminated).
- Operational cost efficiencies are the same as fully-automated collection, however semi-automated collection takes more time (estimated at ~30 seconds/household rather than ~15 seconds).
- Retrofits for semi-automated collection are simple and relatively inexpensive (~ $7,000 or less per truck), although most collection service providers in Alberta have automated collection capabilities.
- Creates an opportunity for public education through operator inspections (i.e. if an organics collection program is in place, the operator could check each load for contamination before it is emptied and apply a sticker to the cart, etc. according to program) without any significant impact to collection time.
- Semi-automated system can be implemented and easily scaled up to a fully automated system.

Disadvantages

- In the long term, collection is expected to become fully automated. If semi-automated collection is selected to maintain back lane collection, this essentially postpones the change to front lane collection.
- Collection trucks can damage back lane roadways that are not designed for heavy vehicle traffic, thus significantly increasing costs.

The advantages and disadvantages of carts are the same for both fully- automated and semi-automated systems.

3.0 GARBAGE OPTIONS

Currently the City of Cold Lake provides the residents with a weekly manual curbside residential garbage collection program for approximately 4,469 households and a weekly automated curbside garbage collection (240L black cart) for approximately 1,000 households.

Garbage can also be dropped off at the Transfer Station (located east of Highway 28 at the South edge of the City) by residents at a cost of $141/ton.

The City owns and uses two (2) side loader semi-automated trucks (for manual collection) and one (1) side loader fully automated truck (for automated collection – Labrie side loader) for garbage collection.

These programs collected 2901 tonnes of garbage material in 2014, 83% of the residential waste stream.

Cost in 2014 for the Garbage Collection in Cold Lake (single family residential/year round) was approximately $360,803.22 equal to $124.37/ton or $6.01/household/month.

Cost in 2014 for transportation and disposal of garbage to Ryley Class II Landfill was approximately $335,789.63 equal to $115.75/ton or $5.59/household/month.

Program options for garbage include:

1. Every two Weeks Garbage Collection and Recyclables Processing
2. User Pay Systems/Volume Limits
3. Tag-a-Bag
4. Cart Limit

5. Volume Based Subscription
6. RFID Tracking Systems

A description of each option as well as the associated advantages and disadvantages are provided below.

3.1 Every two Weeks Garbage Collection

Residential garbage collection is reduced to once every two weeks. Every two weeks, garbage collection works best when combined with weekly curbside organics collection as this option addresses residents' concerns regarding odour, especially during summer time.

Advantages

- Cost savings realized from reduced collection can be applied to enhanced diversion programs (cost savings are estimated at 30% to 40% when applied year round).
- Emphasizes diversion at the source – residents may change purchasing habits, etc. to meet needs of collection every two weeks.
- Increases participation in diversion programs (curbside organics and/or recycling collection).

Disadvantages

- Cannot be implemented on its own. In order to implement waste collection every two weeks, alternative diversion options must be provided such as curbside collection of organics and recyclables.
- Requires an effective education program to ensure public acceptance.

3.2 User Pay Systems/Volume Limits

The amount of garbage that can be put out for collection is limited to the size of the container (bag or cart). Residents must pay an additional amount for over-limit waste. Some communities have implemented volume limits for the commercial sector as well. Weight by household systems are beginning to be implemented in the United States. In Canada, approval of weight systems for waste is still under review by Measurement Canada.

Advantages

- Establishes incentive to reduce waste and to use recycling and compost systems.
- Focus on waste disposal leads to decreased waste generation on its own as the public think more about their waste generation and habits.
- Financially more attractive in the long run as landfill costs rise.
- Volume limits can help achieve significantly higher levels of waste reduction and cost savings realized from reduced waste which can be applied to enhanced diversion programs.
- Volume limits can be reduced over time to achieve increasingly higher levels of waste reduction.
- Residents are made aware of the volumes of waste they generate.
- Without waste reduction, the overall waste management program becomes increasingly expensive as both waste and recycling costs remain high (decrease in waste costs offset costs for recycling and composting infrastructure).

Disadvantages

- Can be inconvenient for residents who generate large quantities of waste each week.
- Equity of limits is sometimes challenging (should a large family be limited to same amount as a single person and how do we reward someone who reduces all their waste).
- Incidents of illegal dumping can rise if effective awareness and enforcement mechanisms are not established. (Generally, if illegal dumping occurs it is in the first 6 months. Illegal dumping has not been an issue in Alberta communities that have implemented two-bag/1 cart limits).

The following User Pay/Volume Limit options are described below:

1. Tag-a-Bag
2. Cart Limit
3. Volume Based Subscription

3.3 Tag-a-Bag

The number of bags of garbage that can be set out for collection each week is limited. Bag limit is usually phased in:

- 2014 - 4 bags
- 2015 - 3 bags
- 2016 - 2 bags (equivalent to one 120 litre cart)

Residents are required to purchase tags for over-limit bags at a specified $/tag cost. Diversion programs are enhanced to address increased diversion requirements to meet the waste limit. (No limits are placed on blue bags or organics).

The tag system could also be implemented in an automated cart collection system (for the waste stream) where residents are asked to purchase a tag for over-limit carts.

Advantages

- As listed under User Pay/Volume Limit.
- Easy to count bags.
- Easy to designate additional volumes by adding sticker.
- City is not responsible for bag purchases – homeowners are (this can be an advantage to the municipality, or disadvantage to the homeowner).
- Can be combined with cart system.

Disadvantages

- Residents must continually purchase bags.
- Residents must pay an estimated $20 to $25 per year for bags not including the over-limit cost. Over 10 years the cost of bags to residents exceeds $200 to $250 (therefore, more costly than containers).
- Doesn't allow for operational cost efficiencies available through the cart system, i.e. potentially higher WCB premiums for waste contractors, a cost that is passed on to client.
- Bags themselves add to the overall volume of waste disposed.
- Bags can be overfilled and break, spreading litter and attracting animals/birds/scavengers.
- If moved to a 2 or 3 stream sort – bags can be unsightly.
- Full curbside organics collection is difficult to implement with bags as food waste is heavy.
- Not as convenient for residents as they must be lifted out to curbside.
- Not a standardized unit – size of bags vary.

3.4 Cart Limit

An Automated system is implemented and weekly collection is limited to one cart (cart size can be determined by the municipality i.e. 120 litre, 240 litre or 360 litre). Some municipalities provide 2 or 3 options for cart sizes and/or provide residents with the option to purchase bags (or tags) for additional waste set out.

Advantages

- Waste limit is simple and easy to implement (1 cart).
- Makes enhancements to 2 or 3 stream cart collection systems easier.
- As listed under cart advantages.
- Increased efficiencies of other diversion infrastructure (i.e. composting costs less per tonne for debagged material).

Disadvantages

- As listed under cart disadvantages

3.5 Volume Based Subscription

Residents subscribe to a certain volume of waste and pay accordingly. For example, if implementing the bag system residents may pay $8.75/month for 2 bags, $14.25/month for 4 bags, etc.

For the cart system residents pay a graduated price for small, medium or large carts.

Advantages

- As listed under User Pay System/Volume Limits
- Can be implemented with either the bag or the cart system

Disadvantages

- Increased administrative requirements – various subscription levels must be managed and different sized containers or numbers of bags at various households must be tracked (RFID technology on carts can reduce administrative requirements for carts).
- Increased administrative requirements, increases operational costs.

3.6 RFID Tracking Systems

RFID tracking systems are small electronic devices that consist of a small chip and an antenna. Carts with RFID emit radio signals that enable an electronic reader to collect key data on the cart's use. The RFID serves the same purpose as a bar code; it provides a unique identifier for that object but unlike traditional barcodes, the RFID tags can be

read from a distance. RFID technology is now available with carts (Strathcona County, Devon, St. Albert and Medicine Hat's carts have RFID chips). Coupled with proper software and hardware, an RFID cart system allows for improved scheduling, billing, routing efficiencies, maintenance and inventory tracking. Municipalities can subscribe to a web-based program (at a certain fee/cart), which collects the data from the RFID. Municipalities can log on to the website and obtain real-time data. This is currently being used in the City of Medicine Hat. As the supplier collects data from municipalities across North America, knowledge and information on system efficiencies and data use is pooled and shared.

Advantages

- Provides real-time service verification
    - RFID software can record when and from which container garbage is picked-up and disposed and can also record what is actually being collected and transported.
- Increases accountability of haulers.
- Residents can receive faster customer service data.
- Provides the option to implement an incentive program if RFID technology placed on organics and/or recycling carts (i.e. coupons).
- Allows for more effective cart maintenance – cart history is tracked and can provide prompts for maintenance or replacement.
- Provides a range of tracking options, for example:
    - By linking data to a GPS system, routes can be tracked showing where collection has occurred and which carts remain.

Disadvantages

- The technology is relatively new to the waste sector.
- Currently there is only one proven system in Canada (have supplied RFID carts to Strathcona County, Devon and Medicine Hat). Supplier is looking for a pilot community in Alberta.
- Requires technical know-how to make the most use of data provided. Subscription to web-based program assists with this.
- Durability of chip.
- Software to track RFID data costs $10,000 to $20,000.

3.7 Recommendations

- **It is recommended that the City set a goal for its diversion rate and based on interviews and the residential survey it could be set to 50% by 2020.**

- The current City of Cold Lake's waste stream composition (based on the waste sort conducted in December 2014), shows a high percentage of organics (42%) and recyclables (20%) in the sorted garbage. In addition, based on the residential survey carried out by Advanced Enviro in March 2015, seventy two percent (72%) of the survey respondents support a garbage limit. The City should evaluate the system to significantly increase the organics and recyclables diversion rate (with a goal to capture 75-90% of the organics and of recyclables currently ending up in the garbage stream) in the next 5 years. This will be achieved through the implementation of a more stringent waste limit. Also, setting a limit has been shown to lead to a 20% reduction in waste.
  It is recommended to expand the cart system throughout the City and limit the garbage collection from weekly to biweekly (every two weeks). Introducing a cart limit is an efficient system to reduce garbage generation, augment the City diversion rate and reduce costs. In addition, automated collection would allow:

  - **One man automated collection resulting in lower labor costs.**
  - **Elimination of manual lifting reduces injuries and Workers Compensation claims.**
  - **Reduced collection time per household reduces labor, fuel costs and greenhouse gas emissions.**

  Based on volumes evaluation (section 3.4 Volume Evaluation of Total Waste - Waste Sort Report), **it appears that the City of Cold Lake could reduce frequency for garbage collections using the current garbage cart size (240L). The current black carts allow a bi-weekly collection as in the pilot areas they are less than 1/2 full (approximately 2-3 bags) and in non-pilot areas on average residents generate approximately one (1) garbage bag per household per week.**

4.0 RECYCLING OPTIONS

Recyclables diversion options currently provided by the City include year round biweekly (every two weeks) manual curbside collection using a side loader truck that has three compartments for blue bags, paper, and cardboards and hence residents are obliged to separate their recyclables in these three categories. Recyclables can also be dropped off at the Cold Lake Recycling Centre (CLRC), but data is not available for this stream as recyclables dropped off are not weighed at the CLRC.

These programs diverted 304 tonnes of recyclable material in 2014 (9% of the residential waste stream).

Cost in 2014 for Recyclables Collection in Cold Lake (single family residential/year) was approximately $234,961.14 equal to $772.90/ton or $3.91/household/month.

Program options for recycling include:

- Enhanced Curbside Recyclables Collection – Blue Cart/Blue Bags
- Recyclables Processing
- Enhanced Recycling Depot – Manned

A description of each option as well as the associated advantages and disadvantages are provided below.

4.1 Curbside Recyclables Collection

The following factors affect the collection efficiency and costs of a curbside recyclables collection program:

1. Set out requirements (i.e. how material is sorted, commingled or mixed versus separate containers for each material, etc.).
2. Collection frequency.
3. Increased community participation.
4. Recyclables processing.

In general, the cost of recyclables collection per household:

- **Increases** with the number of separately segregated commodities (single stream, or commingled is the least costly to collect).
- **Increases** with the frequency of collection. Collecting half as frequently (e.g. every other week instead of weekly) can reduce collection costs by 25% to 40%.
- **Decreases** with an increase in diversion rate. Lowest per household cost occurs when recyclables are collected every other week and the diversion rate is high.

4.1.1 Set Out Requirements

Curbside recyclables collection program started in Cold Lake in October 2006. Recyclables are collected manually bi-weekly (every two weeks) alternating with organics. The City collects recyclables using a side loader truck that has three compartments for blue bags, paper, and cardboards and hence residents are obliged to separate their recyclables in these three categories.

Current set out requirements include three streams:

- Newspaper & all other types of paper
- Cardboard & boxboard
- Plastics, glass, tin cans, and beverage containers

Recyclables collected at the curbside are taken to the Cold Lake Recycling Centre without being weighed for processing.

Collection container options (blue box, blue bag, blue cart, reusable bags + blue box) determine general set out requirements.

4.1.1.1 Blue Box

Advantages:

- Familiarity, most residents already have a blue box (provided by the City)
- Does not require regular purchase

Disadvantages:

- Susceptible to wind and rain
- Low capacity especially if materials are separated in bags and then placed into box
- Lower capacity decreases ease of use and capture rate
- Lower capacity does not allow for reduced collection frequency

4.1.1.2 Blue Bags

Advantages:

- Materials are enclosed and therefore not susceptible to wind and rain
- Bags have greater capacity than blue boxes

- Residents can put out several bags of recycling whereas most households only have one blue box
- Blue bags allow single stream collection
- Increased convenience increases capture rate
- Collection frequency can be reduced (residents put out more bags)

Disadvantages:

- Commingled material requires separation at facility
- Separation at facility increases labour costs
- Bags can rip or tear (reusables stronger)
- Bags must be collected manually
- Homeowners must purchase bags
- Single use bags can be unsightly

4.1.1.3 Blue Cart

Advantages:

- Large capacity (available in a range of sizes)
- Visual cue of larger cart encourages more diversion
- Materials are enclosed and protected from rain and wind
- Commingling of materials provides greater convenience to residents, which increases the capture rate. In a 3 year study conducted by North Carolina's Division of Pollution Prevention and Environmental Assistance, a transition from bins to carts saw a 35% to 50% increase in capture rates in municipal curbside collection programs.
- For a two or three stream diversion system, carts appear neater (black – waste, green – organics, blue – recyclables)
- Allows for a lower collection frequency
- Blue carts require an automated collection system as weight is too great for manual collection

Disadvantages:

- Requires initial capital investment to purchase carts
- Commingling requires separation at the facility, which increases labour costs
- Requires automated collection (can also be an advantage)

4.1.1.4 Reusable Bags + Blue Box

This set out requirement is lately getting popular in some areas in Canada (e.g. City of Vancouver, see Figure 6).

Figure 6. Reusable Bags + Blue Box in Vancouver

Advantages:

- Materials are enclosed (bags) and therefore not susceptible to wind and rain
- Does not require regular purchase
- Bags and Boxes allow single stream collection
- Increased convenience increases capture rate
- Collection frequency can be reduced (residents put out more bags)
- Bags are easier to store in the residence
- Reusable Bags don't rip or tear

Disadvantages:

- Commingled material requires separation at facility
- Separation at facility increases labour costs
- Bags must be collected manually
- Susceptible to wind and rain (Box)
- Low capacity (Box) especially if materials are separated in bags and then put into Box

4.1.2 Collection Frequency

The frequency for all collection services can be adjusted to reduce collection costs. This should be considered once other diversion options are decided on. Cold Lake has every two weeks recyclables collection year round and collection on alternating weeks for recyclables and organics during the summer. Garbage collection is weekly year round. Organics are not collected in the winter.

4.1.3 Increased Community Participation

The per tonne cost of collection is reduced by increasing the participation and the diversion rates. That is, the time required to empty a container or collect a bag with fewer materials is the same as that required to empty a full container or bag.

The cost efficiencies generally accrue to the hauler, however, good curbside program performance ensures that the program achieves the results expected when investing in the program.

A garbage limit and commitment to educate residents consistently is recommended and will increase both participation and capture rates for the curbside recyclable program.

4.1.4 Accepted Materials

Currently Cold Lake is in a grey zone as the Transfer Station (managed in house) and Cold Lake Recycling Centre (CLRC-private contactor) are managing separate stream of waste (see Section 1 for more detailed information). Information to residents regarding what materials can and cannot be accepted at the two locations is not always consistent and different communication tools (City website, collection schedule, etc.) provide conflicting information.
An example: under Waste Management Facility Tipping Fee table on the City's website where recyclables, animal carcasses and other waste are taken is not clear (Transfers Station, Compost Facility or Class III Landfill).

It is recommended to have an exhaustive and easily accessible list of materials accepted at each waste management facility on the website. Information regarding what materials can and cannot be accepted at the different locations must be consistent on the link http://www.coldlake.com/content/waste-management and on the City's collections calendar.

4.2 Recyclables Processing

A material recovery facility (MRF) allows for the separation, bailing and marketing of different materials collected through curbside collection and resident drop off.
The average cost paid by municipalities in Alberta for recyclables processing by private contractors is between $40-80/ton.

The current cost paid by the City of Cold Lake to the Cold Lake Recycling Centre (CLRC) for the recycling process is based on the following components (see section 6 for further details):

- $199/tonne cost for processing. This includes processing and freight costs to ship the materials to the final destination.
- $40/tonne revenue from 50% revenue sharing agreement with CLRC.
- **$159/ton final cost for Cold Lake.**

The current high cost paid for the recyclables collection in Cold Lake at the Cold Lake Recycling Centre (CLRC), even if partially mitigated by the 50% revenue sharing, in addition to the uncertainties related to the long term dependability on CLRC (and the lack of other MRFs in the area) suggests that **alternative suitable options have to be evaluated by the City in order to mitigate the current cost and have a feasible long term plan.** Some of the interviewees indicated interest in building a new City-owned facility for processing recyclables.

4.2.1 Review Recyclables Processing Contract

Efficiency and savings can be increased by reviewing the current contract with the Cold Lake Recycling Centre, especially the cost per tonne and 50% revenue. Length of contract to ensure a long-term sustainable option should also be reviewed with input from the contractor. The contractor may have some good solutions.

Other elements to consider when updating the recycling contract include:

- Education component – identify the level of responsibility the service provider has for education, i.e. distribution of material, at least one trained staff member at depot to help with public relations, display of unified signage, etc.
- Incentive programs to boost participation (revenue sharing)
- System to receive complaints and provide feedback – does the contractor respond well to feedback
- Requirement to measure and report back the amounts recycled

4.2.2 New Facility

The current high cost paid for the recyclables processing in Cold Lake and the desire expressed by many of interviewees indicates the need for the City to evaluate the feasibility for a new City-owned facility for processing recyclables as well as better contractor options.

Advantages and disadvantages of a new facility are provided below.

Advantages:

- Building the facility at the Transfer Station area provides the opportunity to develop the Transfer Station into a Resource Recovery Facility
- Encourages a “one stop system” where users can access all their solid waste management needs (recycling, reusing, and in last case - landfilling)
- Increases efficiency of current system
- May show some cost savings (however municipally run options compared apples to apples generally cost three times as much to build and to operate)

Disadvantages:

- Requires significant capital investment
- Requires significant management effort
- Requires residents to drive further distance to access full-scale recycling facility
- Removes opportunity for private sector know how as part of the solution

It is beyond the scope of this project to provide a design for a new recycling facility. Construction costs are expected to range from $700,000 to $1,500,000 depending on technology and finishing. If the City decides to build a new facility it is suggested that the following Material Recycling Facilities be toured:

- Athabasca Transfer Station
- Cochrane Recycling Depot
- Okotoks Recycling Depot
- Canmore Recycling depot

4.2.2.1 Market Evaluation

To get the best prices possible for recyclables, it is important for the service provider to keep current with the market and with operational efficiencies, which might develop over time. Examples of how to do this include:

- Regular check of market prices on the Market Updates page of the Recycling Council of Alberta (RCA) https://www.recycle.ab.ca/markets
- Contact MRF’s and other recyclers for information on how to make the most from collection
- Contact processors directly and ask for suggestions on how to make the most from collection. RCA has a list of processors by material on the Directory Listings tab on its website.

4.3 Enhanced Transfer Station/Depot

A full spectrum of models exists for recycling depots - from unmanned drop off locations to architecturally designed structures that are the visible core of municipalities' integrated waste management system and other operations.

The key components to consider for recycling depots are:

- Design and Signage

  Clear signage promotes the municipalities' goals and/or themes and reinforces the integrated components of the waste management system.

- Gated/Not gated

  Gating a recycling depot allows usage according to a set schedule.

- Manned/Unmanned
  A manned depot allows:

    - Charging user fees (out of City users, commercial users, etc.).
    - Monitoring of contamination (which increases commodity prices).
    - Educating users.
    - Achieving zero net cost (usually pays for itself)
    - Manned depots are cheaper because the recyclables stream is so much cleaner it pays for the staff, and staff can also educate, etc.

- Private/Public Management

  Recycling depots can either be managed in house, usually through the Public Works Department or through a private contractor.

  Generally, the ideal model is for the recycling depot to be contracted out. This allows a targeted focus on achieving higher material prices. Studies have found that private contractors can provide the service at a cost of 60% less than the in-house costs.

Currently Cold Lake is in a grey zone as the Transfer Station (managed in house) and Cold Lake Recycling Centre (CLRC-private contactor) are managing separate stream of waste (see Section 1 for more detailed information). Information to residents regarding what materials can and cannot be accepted at the two locations is not always consistent

and different communication tools (City website, collection schedule, etc.) provide conflicting information.

4.4 Recommendations

The curbside recyclables collection program started in Cold Lake in October 2006. Recyclables are collected manually bi-weekly (every two weeks) alternating with organics. The City collects recyclables using a side loading truck that has three compartments for blue bags, paper, and cardboards and hence residents are obliged to separate their recyclables in these three categories.

- The current recycling system is working well and contamination in the recyclables collected is low. **It is recommended that the City of Cold Lake maintain the current set out system and frequency.**

- **The geographic location doesn't allow for a choice between other sorting facilities, but currently CLRC represents the only option for recyclables processing in Cold Lake. The current high cost paid for the recyclables processing in Cold Lake and the interest showed by many of interviewees strongly indicates the need for the City to evaluate the feasibility for a new City-owned facility for processing recyclables. In order to reduce costs and improve efficiency (due to the larger quantities of recyclables available) collaboration with the Town of Bonnyville and the Municipal District of Bonnyville is recommended. Conversely just requiring a bid from the contractor and from the City itself, on a per tonne basis, with tonnage reporting, criteria for better signage, a person dedicated to education, and a better cash back agreement may result in better pricing.**

- **Signs at the transfer station and at the recycling center, can be improved and made consistent, in order to send a clear message to residents of the different drop off areas. Signs that promote recycling and enhance recycling awareness can be implemented as the transfer station represents a perfect location to communicate and educate the residents.**

- Currently residents don't have any possibilities for dropping off recyclables at the transfer station resulting in recyclables going into the Class II Landfill (Ryley) for disposal. In addition, based on residential surveys carried out by Advanced Enviro in March 2015 the majority (84%) of the survey respondents support a recyclable (plastic containers, cardboard, etc.) material ban at the Cold Lake Transfer Station. **It is recommended to set up bins for recyclables at the**

transfer station to increase the capture rate for recyclables and reducing the amount of recyclables currently ending up in the landfill. A material ban for these materials can then be phased in over time.

- Information to the residents regarding what materials can and cannot be accepted at the Transfer Station and CLRC is not always consistent and different communication tools (City website, collection schedule, etc.) provide conflicting information. **It is recommend to communicate information consistently across all brochures, signs and other.**

5.0 COMPOSTING OPTIONS

Organics options currently provided by the City include summer biweekly curbside collection of food and yard waste, a Christmas tree pick-up and an organics drop off at the composting compound at the Cold Lake Transfer Station.
These programs diverted 276 tonnes of organic material in 2014 (8% of the residential waste stream).

The cost in 2014 for the Organic Collection in Cold Lake (single family residential/April-November) was approximately $172,573 equal to $625.27/ton or $2.88/household/month.

Options for addressing the organic waste stream, which is the largest component of residential waste (about 50%) include:

1. Curbside Yard Waste Collection – Spring through Fall
2. Curbside Organics Collection (Food and Yard Waste)
3. Grass Cycling and Backyard Composting

5.1 Curbside Yard Waste Collection – spring through fall (Cart)

Yard waste (grass, leaves, tree pruning and brush) is collected at the curbside along with normal garbage collection from mid-April through to mid-October each year. Curbside collection of yard waste can be provided either through bags or carts. Options for bags include biodegradable clear bags or the Kraft brown paper bags or reusable bags. Automated carts are recommended for organics collection especially when

capturing both food and yard waste due to the weight of the material. They also have a higher participation and capture rate.

Advantages

- Addresses largest single waste stream (31%).
- Relatively easy to implement.
- Generates a valuable soil amendment product to enhance City and residential properties.

Disadvantages

- Requires effective public communication (social marketing) as do all diversion programs that bring change.

5.2 Curbside Collection of Organics (Food and Yard Waste)

Food and yard waste are collected at the curbside. Due to the weight of the material an automated cart system is the best option for the collection of food and yard waste. The program can be implemented in spring through fall to reduce collection costs or year round. Year round collection increases the capture rate of food waste as spring through fall collection tends to reinforce yard waste collection only, in homeowner's minds.

Advantages

- Provides the biggest "bang for your buck" and the highest diversion potential of any solid waste management program as it addresses 60% of the waste stream, depending on what is included.
- Availability of a valuable soil amendment product to enhance city and residential properties.
- Increases the capture rate, once the program is implemented, and can significantly increase diversion rates (i.e. 75% capture rate of organics can increase Cold Lake's residential diversion rate to 60% through one program).
- Advantages as listed under cart system.

Disadvantages

- Increases capital and operating costs for compost processing and cart supply, yet are less costly per tonne then building a new landfill.

- Processing of food waste requires higher processing sophistication. Cold lake currently does not process food waste but intends to.
- Implementation of a food and yard waste collection program requires effective social marketing to ease adoption.

5.3 Grass Cycling and Backyard Composting

Residents are required by bylaw to leave grass clippings on the lawn and/or use a backyard composter; no pickup provided for yard and/or lawn clippings. This option was implemented by the City of Toronto and they achieved an immediate waste diversion of 20%.

Advantages

- 10% to 20% diversion rate with minimal associated costs (public education costs).

Disadvantages

- Some residents may not easily accept enforcement of how they manage their lawns.

5.4 Organic composting

The City currently operates a Composting Compound as part of the Cold Lake Transfer Station/Class III Landfill area and located east of Highway 28 at the South edge of the City. At the Composting Compound curbside collected food and yard waste and Christmas tree pick-up is delivered.

Cost in 2014 for the Organics Composting at the City's Composting Compound was $55,637 equal to $201.58/ton or $0.93/household/month.

5.5 Recommendations

In summer months the City collects residential organics every two weeks, manually at the curbside using a side-loader truck (alternating weeks with recyclables). The waste sort (December 2014) showed that contamination is insignificant (0.1%) and it shows that residents are using the program only for yard waste as food waste comprises only 0.2%.

- **It is recommended that the City collect organics every two weeks in the winter and every week in the summer** to increase kitchen waste capture rate and organics diversion. Year round collection increases the capture rate of food waste, as spring through fall collection tends to reinforce yard waste collection only. This will allow the City to save by transporting and landfilling less tonnes of garbage (currently at $105/ton)(the capture rate for organics is currently 18%).

- **Implement a cart system (240L green cart for organics) throughout the City.** Based on the waste sort results, organics comprise 43% of the total waste sorted. An organics program helps achieve a higher diversion rate. Based on residential survey, shifting to carts is acceptable as approximately 68% of the survey respondents are willing to use carts for organics curbside collection. In addition automated collection would allow for:

  - Lowered labor costs as a result of a single operator.
  - Elimination of lifting reduces injuries and Workers Compensation claims.
  - Reduced collection time per household reduces labor, fuel costs and greenhouse gas emissions.

- **It is recommended to educate residents on what goes in the organic stream** in order to increase the kitchen waste capture rate and organics diversion as most residents based on waste sort and survey use the program for yard waste only.

- **Considering that 93% of Cold Lake residents live in single houses, a backyard composting program and/or grass cycling program is recommended** delivered through communication and education projects. Residents who participate will lower the overall collection costs, as their houses will not require organics pickup.

- **An organic collection "opt-out" option is recommended in the next two years for the residents who grasscycle or backyard compost.** This program can be introduced after an effective communication and educational plan regarding organics have been delivered for at least two years. This will interest residents who grasscycle and/or compost and don't use the City collection service, or who simply do not want to participate for whatever reason (seasonal residents).

- **It is recommended that Christmas tree pickup be contracted out to a fundraising group in Cold Lake to encourage community spirit**. The trees would be delivered to a public park where a skating and bonfire party could be held and sponsored by the City. The number of real trees is diminishing every year with the use of artificial trees.

6.0 CART OWNERSHIP MODEL

The following ownership options are available for carts.

1. Contractor owned
2. City owned

A description of each ownership model and the associated advantages and disadvantages of each model are provided below.

6.1 Contractor Owned

Under this cart ownership model, the waste hauler (in the case of a waste cart) or cart manufacturer owns the carts. Residents pay a monthly or annual fee directly to the waste hauler or the rental fee can be included in the total cost/tonne or household paid by the municipality to the contractor.

Advantages

- Administration required to manage carts is provided by private sector.
- Private sector is responsible for cart maintenance.
- The cart is never paid off unless this is negotiated in the deal. Then the hauler or manufacturer provides the cart financing.

Disadvantages

- Cost to residents is usually higher than if the municipality purchases the carts. Carts can be purchased outright for between $50 and $80 per unit with bulk pricing or if the City finances the purchase, the carts can be provided to households at a cost of ~ $13/yr. (At $60/cart landed, amortized over five years at 6%, the cost per household per year is ~$13). The carts would be owned by the City after five years.

- Service provider may not have the ability or expertise to manage a large number of carts.
- City may feel committed to stay with service provider simply because the service provider owns the carts and any changes will lead to disruptions to residents and the City.
- City does not own asset. Once a cart system is implemented it is not likely that the City will go back to a manual system. This may result in the City purchasing the carts at the end of contract, in which case – they have paid both a rental fee and the purchase price.

6.2 City Owned

The City purchases carts for all households and manages carts (i.e. additional carts for new developments, transferring of carts from old owner to new owner, etc.). The City can either service any repairs in-house or can contract maintenance out to a private service provider.

Advantages

- City may be able to receive funding for carts reducing the overall cart/household cost.
- City can finance carts over a 5 or 10 year amortization period.
- As City owns carts, it can select the most competitive service provider and not feel obligated to stay with the company that owns the carts.
- If desired, the City can bill homeowners over a period of time.

Disadvantages

- Requires significant capital outlay.
- Increases administrative and management requirements of the City (can be reduced through maintenance service provided by the cart manufacturer).

6.3 Recommendations

The City of Cold Lake is currently providing an in house collection service and owns the carts used for a pilot project for 1000 households (garbage collection).

- Based on residential survey conducted by Advanced Enviro in March 2015, seventy five percent (75%) of residents are willing to use carts for garbage and

sixty eight percent (68%) are willing to use carts for organics curbside collection. It is only 1/5th of the respondents that are not willing to use carts for either garbage or organics. **It is recommend to extended automated collection for garbage city wide and implementing automated collection for organics. This can be phased in over the next 2-3 years.**

- In the case that the City extends the automated collection for garbage citywide and/or implements automated collection for organics, **it is recommended that the City own its own carts**. The City can either service any repairs in-house or can contract maintenance out to a private service provider. Owning the carts will be less costly over time as quality carts tend to last 10 years or more.

- The City is recommended to buy high quality carts to avoid possible complaints from the residents, recovering the higher cost through a lower cost for maintenance. The City can select the most competitive and technologically advanced carts and not feel obligated to stay with the company that owns the carts.

- The City may be able to receive funding for carts reducing the overall cart/household cost. (The City can finance carts over a 5 or 10 year amortization period).

- **It is recommended to further evaluate the most suitable carts for Cold Lake** as many options are available on the market. For example:

  - **The new round bottom cart** provides some unique features that negate the need for a grate and allows moisture to collect at the low point or sink which allows the rest of the material to stay aerobic. Grates trap organic materials at the bottom of the cart, which is smelly and hard to clean. Waste does not freeze in carts in winter.

  - **Thinner width carts** take up less space in storage areas.

  The use of carts gives the following benefits:
  - Cart design (ventilation, lids, and holding capacity) allows for year round collection of organics (food and yard waste) and varied collection frequencies.
  - Carts allow for a cost reduction of 50% whenever changing to biweekly garbage collection (if coupled with other diversion programs such as organics collection).
  - Less plastic waste compared to bag collection.
  - Reduces problems with animals and rodents.

- Visually attractive (neater than bags or variety of customized bins) and uniform system.
- No breakage from overfilling. Animal less likely to get into waste.
- Comes in various container sizes and colors.
- Easy to maneuver (on wheels).

Manufacture

- Carts should be manufactured using an injection molding process.
- Carts to be made with virgin HDPE and resin content should be considered (Some carts use half the resin and hence will last approximately half as long, not 10 years and more).
- Cart to be stable in winter and summer conditions.
- Wheels should be 6 inches in diameter and feature snap on assembly for easy removal. Preference to be given to wheels designed for heavy loads and uneven grounds.

The City of Cold Lake has very challenging cold weather conditions.
It has been determined that these conditions affect speed of collection and the complete emptying on materials. Materials freeze and stick to the inside of collection containers. These cold weather conditions also create additional wear and tear on equipment. Costs for repairing carts on the street are very high, the replacement of wheels are the most prone to damage, cracks in body due to cold weather issues are the next problem. The City should therefore look at the total lifecycle costs of the designs offered by the manufacturer and at residents' satisfaction. Specifically the City should consider:

- How the cart design reduces sticking and freezing of materials to the insides of the cart.
- How the design eliminates inside structures that encourage sticking and freezing such as corners, catch points, flat surfaces.
- Preference should be given to carts that spill contents on first cycle with no residual weight being transferred to cart lifting structures.
- Carts must be designed to be used in cold climate conditions.
- How the design promotes easy cleaning of the inside of the cart.
- Warranty (most carts have a 10 year warranty)

7.0 PUBLIC EDUCATION AND SOCIAL MARKETING

Successful collection and diversion programs require an extensive educational component. An effective public education program that includes social marketing can increase capture and diversion rates for all programs provided by the City.
Options for a public education program include the following:

- Advertising budget specifically for solid waste collection and diversion programs
- Staff position responsible for an education program and/or contract development of an education program to the private sector
- Develop overall theme that is integrated with all collection and diversion programs
- Focus activities and marketing on achieving specific behavioral goals (working closely with schools is very effective in this area)
- Provide training in social marketing techniques to key staff involved in the education program
- Incorporate a Zero Waste statement into City's Waste Management Strategy (Count GHG reductions to support program
- Include GHG reductions in material that shares diversion successes

The following photographs are an example of the use of an overall program to link all diversion programs under one integrated waste management system. Whistler's theme is "Moving Towards a Sustainable Future".

Figure 7. Whistler Signage – Recycling Depot.

Figure 8. Whistler Signage – Organics.

Figure 9. Whistler Signage – Compost.

8.0 COSTS ANALYSIS – How to increase from an 18% (current) to a 50% diversion rate

This section provides the current costs for each of the waste management components for the City of Cold Lake:

- Garbage collection (single family residential/year round) and disposal
- Organics collection (single family residential/April-November) and processing
- Recyclables Collection (single family residential/year round) and processing (CLRC)
- Transfer Station operation including commercial and residential garbage drop off for disposal (Ryley)
- Class III Landfill for inert solid waste (mainly construction and demolition waste)

These costs have been estimated so that future options can be compared to this and assist in the decision-making process.

Calculations for these tables were based on the following assumptions:

- **Status quo is lower than 20% diversion rate** but it doesn't include recyclables dropped off at the Cold Lake Recycling Centre (no data is available) and garbage dropped off at the Transfer Station by residents.
- Total number of households: 5,469
- Number of households currently charged for collection services: 5,002
- Waste generation rate through curbside collection in 2014: 3,481 tonnes
- Garbage collected in 2014: 2,901/tonnes
- Recyclables collected in 2014: 304/tonnes
- Recyclables dropped off at CLRC in 2014: 1,796/tonnes
- Organics collected in 2014: 276/tonnes
- Cost/HH/Month charged to residents in 2014 was $27.50 (single family house). $19/month/household was charged for garbage collection and disposal (but is not based on real cost) and $8.50/month/household for recyclables collection and processing ($5.00/month/unit for apartments and condos). The cost of $27.50/HH/Month also covers other components of the waste management system in Cold Lake (organics collection and processing, Transfer Station, Class III landfill, etc.).
- Costs and revenues are based on the City's 2014 budget and other data provided by the City of Cold Lake.
- Current disposal and processing fees are from 2014.
- Fuel and maintenance costs are based on average equipment and truck usage.

- Revenue in 2014 for recyclables shipped from CLRC was $85,592.62 (profit is shared at 50% with the Cold Lake Recycling Centre (CLRC))

8.1 Garbage Collection (single family residential/year round)

Table 1 presents a summary of cost data for the garbage collection (single family residential/year round) and disposal program in 2014.

Current Residential Garbage Cost

Garbage Collection (Single families residential/year round)		Residential Garbage Disposal-MSW	
Tonnes collected 2014	2,901.00	Tonnes disposed 2014	2,901.00
Description	Cost	Description	Cost
Drivers	$ 170,000	Transport to Ryley	$ 191,284.82
Management	$ 10,300	Transport cost/ton	$ 65.94
Administration	$ 19,500	Disposal to Ryley	$ 145,050.00
Fuel/Maintenace/Parts	$ 60,204	Disposal cost/ton	$ 50.00
Misc and Equipment replacement	$ 100,799	**Total cost**	**$ 336,401**
Total Cost 2014	**$ 360,803**	**Total cost/ton**	**$ 115.96**
Cost/ton	**$ 124.37**	**Cost/household/month**	**$ 5.60**
Cost/household/month	**$ 6.01**		

Table 1. Garbage collection and disposal cost (2014)

Two and a half drivers provide collection service year round. The City owns and uses two (2) side loader semi-automated trucks (for manual collection) and one (1) side loader fully automated truck (for automated collection – Labrie side loader).

Garbage collected is off loaded at the Transfer Station and transferred to Ryley Class II Landfill (260km away from the City of Cold Lake) for disposal. Disposal cost by contract held by Beaver River Regional Waste Commission (BRRWC) was $50/ton in 2014 including the commission for BRRWC. Transportation of garbage to Ryley is currently provided by North East Bulk Transportation Services.

8.2 Organics collection and processing (single family residential/April-November)

Table 2 presents a summary of cost data for organics collection and processing (single family residential/April-November) at the City's compost pad in 2014.

Current Residential Organics Cost					
Organics collection (Single families residential/April-November)			**Organics processing**		
Tonnes collected 2014		276.00	Tonnes processed 2014		276.00
Description		Cost	Description		Cost
Drivers	$	85,000	Operators	$	17,000
Management	$	10,300	Management	$	9,750
Administration	$	19,500	Fuel	$	6,020
Fuel/Maintenace/Parts	$	12,041	Misc and Equipment replacement	$	22,866
Misc and Equipment replacement	$	45,733	**Total cost**	**$**	**55,637**
Total Cost 2014	**$**	**172,574**	**Total cost/ton**	**$**	**201.58**
Cost/ton	**$**	**625.27**	**Cost/household/month**	**$**	**0.93**
Cost/household/month	**$**	**2.88**			

Table 2. Organics collection and processing cost (2014)

One driver provides manual organic collection service from April to November. Organics collected are processed at the City's compost pad. Residents can also drop off organics at the compost pad. The City currently doesn't charge residents for organics collection and composting costs are recovered through garbage and recyclables fees (utility bill).

Current cost for collection and processing per tonne is very high ($625 and $201 respectively). This is due to the low quantity of organics managed. Higher quantities of organics would improve efficiency of the service and reduce the cost per tonne. In 2014 the cost for organics processing did not include grinding and screening operations as they were done in 2013 and likely again in 2015. This cost would be approximately $30,000/year (this are costs not included to match the City's budget for 2014).

8.3 Recyclables collection and processing (single family residential year round)

Table 3 presents a summary of cost data for the recyclables collection and processing (single family residential/year round) and processing at the Cold Lake Recycling Centre (CLRC) in 2014.

Current Residential Recyclables Cost					
Recyclables Collection (Single families residential/year round)				**Recyclables processing (CLRC)**	
Tonnes collected 2014	304.00			Tonnes processed 2014	2100.00
Description	Cost			Description	Cost/Revenue
Drivers	$ 85,000			**Total revenue 2014, 50% profit sharing with CLRC**	**$ 85,593**
Management	$ 20,600			Process	$ 324,428
Administration	$ 97,500			Freight	$ 95,205
Fuel and Maintenance	$ 18,061			**Total Cost 2014**	**419,634**
Equipment	$ 13,800			**Cost/ton**	**$ 199.83**
Total Cost 2014	**234,961**			**Total cost minus revenue**	**$ 334,041**
Cost/ton	**$ 772.90**			**Cost/ton net**	**$ 159.07**
Cost/household/month	**$ 3.91**			**Cost/household/month**	**$ 5.57**

Table 3. Recyclables collection and processing cost (2014)

One driver provides collection service year round. The City owns and uses one (1) side loader truck (for manual collection). Recyclables collected are taken to CLRC for processing without being weighed (CLRC doesn't weigh material received by curbside collection, neither recyclables dropped off at its bins, by residents, and by businesses). CLRC receives and processes recyclables from curbside collection and resident and commercial drop off at its location. While residents pay the City a monthly fee for recyclables collection and processing (through utility bill), commercial businesses can get the service covered by taxes they pay. The cost for processing all the recyclables received at the CLRC is paid entirely by the City. The City currently pays CLRC on a lump sum basis and the cost is not related to the quantities processed.

8.4 Transfer Station Operation and Commercial/Residential Garbage drop off for Disposal (Ryley)

The Transfer Station accepts residential garbage and recyclables (landfilled at the Ryley Landfill), Commercial waste (landfilled at the Ryley Landfill), non-hazardous and Special waste (see section 1 Current System Review).

A tipping fee of $141/ton applies for commission members for mixed loads (garbage and/or recyclables) and ICI (Industrial, Commercial and Institutional) waste and a fee of $185/ton for non-commission members including residential waste as set by the Beaver River Regional Waste Commission (BRRWC). There is no commission charge for member's residential waste.

Table 4 presents a summary of cost data for the transfer station operations and the cost to transport and dispose of garbage dropped off by businesses and residents in 2014.

Current Transfer Station Cost

Transfer Station	
Tonnes Received 2014	9100.00
Description	Cost
Operators	$ 158,500
Management	$ 29,250
Administration	$ 20,600
Fuel/Maintenace/Parts	$ 12,041
Maintenace and control	$ 27,500
Misc and Equipment replacement	$ 52,889
Total Cost 2014	**$ 300,780**
Cost/ton	**$ 33.05**
Cost/household/month	**$ 5.01**

Commercial and Residents Garbage dropped off at Tranfer Station for Disposal (Ryley)	
Tonnes disposed 2014	6,199.00
Description	Cost
Total revenue 2014 for tipping fees	**$ 771,875**
Transport to Ryley	$ 408,747
Transport cost/ton	$ 66
Disposal to Ryley	$ 308,740
Disposal cost/ton	$ 50
Total cost 2014	**$ 717,553**
Total cost/ton	**$ 115.75**
Total cost minus revenue	**$ (54,322)**
Cost/household/month	**$ (0.91)**

Table 4. Transfer Station Operations cost, garbage transportation and disposal (2014)

Garbage from curbside collection as well as garbage dropped off by residents and businesses (tipping fee of $141/ton for commission members) is compacted at the Transfer Station and then transported to Ryley Landfill. Cost for transportation and disposal of garbage from curbside collection is included in section 7.1. Transportation and disposal costs for garbage dropped off at the Transfer Station is totally covered by the tipping fee (surplus $54,322) used to partially cover the Transfer Station operational costs.

8.5 Class III Landfill

The Class III Landfill accepts inert solid waste (construction, renovation and demolition waste, shingles, concrete, furniture, drywall, non-asbestos insulation, wood (clean, not chemically treated) and clean clay fill) that commercial businesses and residents drop off.

Tipping fees charged at the Cold Lake Class III landfill for members and non-members to drop off and dispose of waste are presented in Table 5.

Class III Landfill		
	Member Fee	**Non-Member Fee**
Demolition/Construction and Inert Materials (Residential)	$75.00 per tonne. Under 100kg — No charge	$150 per tonne Min charge $20.00 if below 100kg
Demolition/Construction and Inert Materials (Industrial, Commercial and Institutional)	$75.00 per tonne. Min charge $10.00 if below 100Kg	$150 per tonne. Min charge $40.00 if below 100kg
Asbestos	Not Accepted	Not Accepted
Clean Clay Fill	No Charge	No Charge

Table 5. Cold Lake Class III landfill tipping fees (2014)

Table 6 presents a summary of cost data for the management of the Inert Solid Waste (mainly construction and demolition waste) at the Class III Landfill in 2014.

Current Class III Landfill Cost		
Inert Solid Waste (mainly construction and demolition waste)		
Tonnes Received 2014		6653.00
Description		Cost
Total revenue 2014 for tipping fees	**$**	**352,156**
Operators	$	84,500
Management	$	20,600
Administration	$	19,500
Fuel/Maintenace/Parts	$	12,041
Misc and Equipment replacement	$	45,733
Mantenance and control	$	305,000
Total Cost 2014		**487,374**
Cost/ton	**$**	**73.26**
Total cost minus revenue	**$**	**135,218**
Cost/household/month	**$**	**2.25**

Table 6. Class III Landfill cost (2014)

Costs for Class III Landfill management are not entirely covered by tipping fees charged to residents and businesses for inert solid waste disposal ($75/ton for commission members) and the extra cost ($135,218) is covered by other fees charged to residents (utilities bill).

8.6 Summary of Cold Lake Waste Management cost

Table 7 presents a summary of current costs for waste management in Cold Lake in 2014.

Current residential waste management costs (2014) - Summary									Diversion Rate 18%	
	Tonnes 2014	Total costs collection	Collection Cost/ton	Collection Cost/HH/ Month	Total Processing Cost*	Processing $/ton	Revenue**	Processing net Cost/HH/ Month	Total Other costs	Total Cost/HH/ Month
Garbage curbside	2,901	$360,803.22	$124.37	$6.01	$335,789.63	$115.75		$5.59		$11.61
Recycling curbside	304	$234,961.14	$772.90	$3.91	$60,748.32	$199.83	$85,592.62	$5.57		$9.48
Recycling drop off at CLRC	1,796				$358,894.68	$199.83				
Organics curbside	276	$172,573.72	$625.27	$2.88	$55,636.86	$201.58		$0.93		$3.80
Class III Landfill	6,653				$487,373.72		$352,165.58	$2.25		$2.25
Commercial and residential garbage disposal	6,199				$717,531.86	$115.75	$771,875.00	$ (0.91)		$ (0.91)
Transfer Station management	9,100								$300,779.65	$5.01
TOTAL		**$768,338.07**		**$12.80**	**$2,015,975.07**		**$1,209,633.20**	**$13.43**	**$300,779.65**	**$31.25**
Currently charged to residents										**$27.50**

Table 7. Cost summary for waste management in Cold Lake (2014)

* Costs for transportation, disposal and processing are based on 2014 quantities and contract fees

** Revenue for Class III Landfill, Transfer Station drop off and recyclables profit sharing with CLRC are based on 2014 tipping fees and contracts

Current costs paid by residents in Cold Lake for residential waste management is $27.50/household/month. Current cost for waste management in Cold Lake is $31.25/household/month.
The system doesn't allow the City to fully recover the cost for waste management through utility bills and tipping fees (Transfer Station and Class III Landfill).

8.7 Option A. Garbage collected every 2 weeks, recyclables every 2 weeks, organics every week in summer and every 2 weeks winter - 50% Diversion Rate

Option A for Cold Lake waste management assumes every two weeks garbage collection year round and extends organics collection to every two weeks in the winter months (November-March) and every week in summer months (April-October).

The goal for this option is to achieve a 50% diversion rate.

A communication budget of $50,000/year allows deeper communication with residents and will in 2-3 years lead to an increased capture rate for recyclables and organics by 50%.

This option will reduce garbage generated by 996 tonnes and reduce the current cost to transport and dispose the garbage to Ryley Class II landfill by approximately $115,000/year.

In order to avoid extra garbage dropped off at the transfer station by residents (currently there is no charge for waste dropped off at the Transfer Station by residents) a charge of $10 per load of garbage dropped off by residents is recommended.

Option A doesn't include any assessment and recommendation for Class III Landfill cost reduction as this is the main object of the Report "Class III Landfill Feasibility Study" carried out by Advanced Enviro for the City of Cold Lake in 2015. The study includes options to divert between 50% to 87% of waste currently received at the Landfill reducing overall costs.

Costs and revenues for Residential Waste Management – Option A are based on the following assumptions:

- Number of households charged for collection services: 5,002
- Garbage collection every two weeks year round

- Organics collection every week during summer months (April-October) and every two weeks during winter months (November-March).
- Recyclables collection every two weeks year round
- Waste generation rate through curbside collection: 3,681 tonnes/year
- Garbage collected per year: 1,905 tonnes
- Recyclables collected per year: 598 tonnes (70% capture rate)
- Recyclables dropped off at CLRC: 1,796/tonnes
- Organics collected per year: 976 tonnes including 702 tonnes of food waste (70% capture rate)
- Two drivers for organics collection and one each for recyclables and garbage collections.
- Costs for organics processing are kept as in 2014 as the operations are not affected by higher quantities expected.
- Costs for garbage transportation and disposal to Ryley Class II Landfill are $65.94/ton and $50/ton respectively.
- Costs for garbage (residential curbside collection) transportation and disposal to Ryley Class II Landfill are reduced by $115,263 as reduced quantities of garbage are disposed.
- Diversion rate at 50% doesn't include recyclables dropped off at the Cold Lake Recycling Centre, organics at the compost pad and garbage dropped off at the Transfer Station by residents.
- Cost/HH/Month charged to residents in 2014 is $27.50 (single family house)
- Capital costs and implementation costs are amortized over 10 years (5 years for equipment) at 5.25% fixed interest rate.
- Current disposal, transportation and processing fees (2015).
- $95,720 revenue for material shipped from CLRC (profit is shared at 50% with Cold Lake Recycling Centre (CLRC)) based on $40/ton for material shipped (data 2014)
- Communication cost at $50,000/year.

The cost analysis in Table 8 (Option A) shows how implementing services that are targeted to increase the diversion rate, provide the most efficient solution at a manageable cost.

Option A represents the first step in the Cold Lake 5 year plan, detailed in section 5 of this study "Action Plan/Implementation Report" that provides recommendations and a timeline for the action plan.

Option A - Garbage collected every 2 weeks, recyclables every 2 weeks, organics every week in summer and every 2 weeks winter - 50% Diversion Rate										Diversion Rate 50%
	Tonnes	Total costs collection	Collection Cost/ton	Collection Cost/HH/ Month	Total Processing Cost*	Processing $/ton	Revenue**	Processing net Cost/HH/ Month	Total Other costs	Total Cost/HH/ Month
Garbage curbside	1,905	$172,573.72	$90.58	$2.88	$220,526.17	$115.75		$3.67		$6.55
Recycling curbside	598	$234,961.14	$393.04	$3.91	$119,458.37	$199.83	$95,760.00	$6.37		$10.29
Recycling drop off at CLRC	1,796				$358,894.68	$199.83				
Organics curbside	979	$288,642.58	$294.89	$4.81	$55,636.86	$56.84		$0.93		$5.74
Class III Landfill	6,653				$487,373.72		$352,165.58	$2.25		$2.25
Commercial and residential garbage disposal	6,199				$717,531.86	$115.75	$771,875.00	-$0.91		-$0.91
Transfer Station management	9,100								$300,779.65	$5.01
Communication									$50,000.00	$0.83
TOTAL		**$696,177.43**		**$11.60**	**$1,959,421.66**		**$1,219,800.58**	**$12.32**	**$300,779.65**	**$29.76**
Current Cost										**$31.25**

Table 8. Cost summary for Option A waste management in Cold Lake (Garbage collected every 2 weeks, recyclables every 2 weeks, organics every week in summer and every 2 weeks winter - 50% Diversion Rate)

* Costs for transportation, disposal and processing are based on 2015 contract fees

** Revenue for Class III Landfill, Transfer Station drop off and recyclables profit sharing with CLRC are based on 2014 tipping fees and contract

8.8 Recommendations

Extending organics collection year round will increase the organics capture rate especially when combined with the implementation of a garbage limit (collection every two weeks). This would increase the capture rate for recyclables as well.

The cost per household per month is not expected to increase as the system would efficiently reduce costs for garbage collection and disposal.

Option A could be implemented in 2016 with the new collection calendar, but has to be planned in advanced in order to implement an effective communication plan that allows for the informing, educating and engaging of the residents with respect to program changes.

It is recommended to implement Option A -Garbage collected every 2 weeks, recyclables every 2 weeks, organics every week in summer and every 2 weeks winter- in order to increase diversion from 18% (current) to 50% in 2-3 years at no cost increase.

City of Cold Lake

Integrated Waste Management Study

Section 5: Action Plan/Implementation Report

Advanced Enviro Engineering Ltd.

Providing Solutions for Business and Environment Since 1992

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FIGURES AND TABLES

1.0 INTRODUCTION

This section provides a brief summary of the City of Cold Lake's current residential solid waste management system, recommendations and a timeline for action.

2.0 CURRENT SYSTEM SUMMARY

2.1 Waste Collection and Disposal

The City of Cold Lake provides weekly manual curbside residential garbage collection for 4,025 households and weekly automated curbside garbage collection (240L black cart) for 1,000 households. The City owns and uses two (2) side loader semi-automated trucks (for manual collection) and one (1) side loader fully automated truck for garbage collection. Garbage can be dropped at the Transfer Station by residents at no cost.

The current garbage collection and disposal costs (2014) are:

- Garbage collection: $124.37/tonne or $6.01/month/hh
- Disposal (includes transportation): $115.77/tonne or $5.59/month/hh
- Resident garbage collection fee: $19/month/hh (single houses)

Approximately 2,614 tonnes/yr of residential curbside garbage was sent to the landfill (data from 2011 to 2014). In 2014, 2,901 tonnes of residential garbage (184 kg/capita) was sent to the landfill; compared to the provincial average of 272 kg/capita[1].

2.2 Recycling

The City of Cold Lake provides every two weeks (alternating with organics in the summer), manual curbside recyclables collection (blue bags, paper and cardboard) for 5,002 hh. Additional recycling is available at the Cold Lake Recycling Centre (CLRC) located at 3609-50th Street.

The recycling collection and processing costs (2014) are:

[1] Based on 2010 Statistics Canada residential waste disposal data and Statistics Canada 2010 Population data

- Manual recycling collection: $772.90/tonne ($3.91/month/hh)
- Processing cost (CLRC): $159.07/tonne ($5.57/month/hh)
- Resident recyclable collection fee: $8.50/month/hh and $5/month/apartment unit and condos over 6 units.

In 2014, 304 tonnes of recyclables were collected form the curbside collection program. No data is available for recyclables dropped at the CLRC by residents.

The residential curbside diversion rate is 8%. The curbside program captures under 1/3 of the available recyclable waste stream.

2.3 Composting

The City provides the following organics diversion programs:

- Residential every two week organics collection in the summer, alternating with recyclables. Organics are collected manually at curbside using a side-loader truck.
- Compost compound for organic waste drop off, is located at the Cold Lake Regional Transfer Station (SW26-62-02-W4M).
- Christmas Tree Pickup.

The 2014 organics collection and processing costs are:

- Manual organics collection: $625.27/tonne ($2.88/month/hhold.
- Processing cost (City's Compost Compound): $201.58/tonne or $0.93/month/household.
- Currently the City does not charge for organics collection

In 2014, 276 tonnes of organics were collected at the curbside.

The residential diversion rate for organic curbside collection is 8%. The program captures one quarter of the available yard waste and less than one fifth of the total organics (food and yard waste).

2.4 Cold Lake Transfer Station

In 2014, 9,100 tonnes of waste was received and processed at the Cold Lake Transfer Station (CLTS) generating a revenue of $771,875 in tipping fees.

Commission members pay $141/tonne for mixed loads and ICI (Industrial, Commercial and Institutional) pays $185/tonne (non-commission members including residential waste as set by the Beaver River Regional Waste Commission (BRRWC)). There is no charge to commission members for residential waste.

Materials accepted, at the CLTS, and brought to the Ryley landfill for disposal, include:

- Residential garbage
- Recyclables
- Commercial waste

Residents do not have the option of dropping off recyclables at CLTS resulting in recyclables going to landfill.

The 2014 costs at the CLTS are:

- Transfer Station Management: $300,779.65 ($5.01/month/hh)
- Commercial and Residents Garbage disposal costs at the CLTS are covered by the tipping fees charged to commercial businesses

2.5 Diversion Rates and volume evaluation

Cold Lake's current residential diversion rate is 17%, compared to an average Alberta residential diversion rate of 25%. No recycling data is available prior to 2014. Organic collection quantities have not changed over four years.

High percentages of organics, mostly food wastes are sent to landfill (42% of garbage stream). If waste were sorted at the source (household), only a quarter of the garbage generated would be landfilled. If all the available recyclables and organics were captured through the existing diversion programs, the City would achieve a 68% diversion rate through curbside collection.

Based on a evaluation of waste set out for collection, black carts in the pilot areas are less than 1/2 full (approximately 2-3 bags) and in non-pilot areas residents generate approximately one garbage bag per household per week.

3.0 RECOMMENDATIONS

3.1 Waste Management Strategy and Goals

It is recommended that the City set a goal for a diversion rate of 50% by 2020 and share the goal with the community.

The City of Cold Lake currently has no formal goals for waste diversion and/or reduction. Based on the residential survey, seventy nine percent (79%) of the respondents think that the City should divert more than 40% of its waste from landfill in the next five years. This clearly indicates that the City should set a target for 50% diversion in the next five years.

Based on the residential survey, fifty one percent (51%) of the survey respondents are willing to pay $27 - $30 per month, while eight percent are willing pay $31 or more per month. Ninety five percent (95%) of the respondents indicated that waste diversion and reduction is important to them. These responses indicate City residences are in favor of a Waste Reduction Strategy with an associated goal and they are willing to pay up to $30 per month for that strategy to be implemented.

It is recommended that the City develop and document a Solid Waste Management Strategy that focuses on waste reduction and diversion.

The strategy should be based on first source reduction, then resource recovery, and lastly waste disposal and should include waste reduction goals and targets. This represents resident desires and is cost effective. The strategy should represent a progression towards higher diversion rates and hence a longer life expectancy for the landfill. Documenting a Solid Waste Management Strategy will ensure continued progress towards increased diversion.

Municipalities across Canada, as they become comfortable with the basic elements of waste diversion, are expanding their strategies to achieve higher diversion rates. An example of this is the increasing trend across North America and Europe to incorporate Zero Waste strategies. Zero waste regards all waste as a potential revenue stream and

encourages the redesign of resource life cycles so that products are reused, with an end result of minimal waste being sent to landfill.

The City may choose to include a Zero Waste statement in the strategy to illustrate the City's goal to reduce waste as much as possible. As an example of the implications of including a Zero Waste statement, the Town of Stony Plain has a goal to make all city events Zero Waste. This encourages waste management strategies to be incorporated at the planning stage and considers green procurement, source reduction and reuse for each event.

Recommendation 1: City sets diversion goal and shares it with the community

- **Increase the residential diversion rate to 50% by 2020.**
  This represents an approximate 32% reduction in residential waste being sent to landfill.

Recommendation 2: Develop & Document a Solid Waste Management Strategy

This target should be reviewed after 3 years, and then a 2025 goal can be set. This goal should reflect the achievements made over the 3 years and should move the City closer to its Zero Waste strategy statement.

The chart on the following page illustrates successful diversion program components, to be considered when developing the City's solid waste management strategy.

Recommendation 3: Consider Components of the Successful Diversion Programs Chart When Developing Solid Waste Strategy

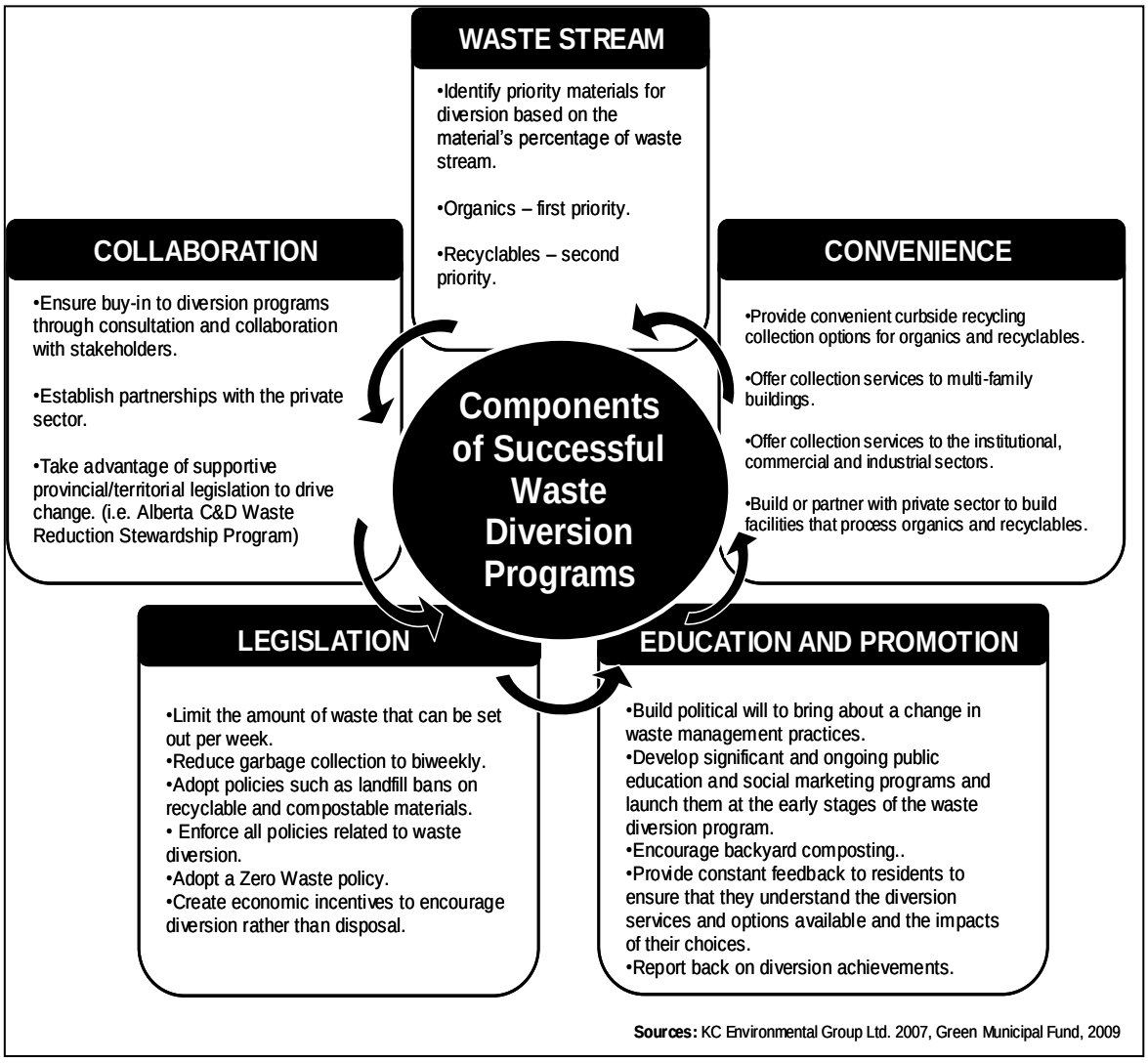


Figure 1. Components of Successful Waste Diversion Programs

3.2 Public Education Program and Enhanced Social Marketing

Successful waste management strategies require a strong public education campaign.

Based on the residential survey, the majority (52%) of residents indicated that they want educational initiatives to be communicated to them more often. This shows resident's interest to learn about waste issues. Council and City staff interviews reinforced the need and desire for public education programs as well as educational programs about recycling in schools.

The education program should:

1. Identify a key staff member responsible for education program delivery.
2. Provide social marketing training to the education program coordinator
3. Inform the public of the City's Waste Management Strategy (Recommendation 1) and Goals (Recommendation 2)
4. Provide information on Cold Lake's waste stream and waste generation rates (information provided in Section 1)
5. Inform the public of the associated benefits and costs of alternative waste management strategies
6. Incorporate social marketing techniques to market the social good of participating in existing and new diversion programs
7. Create environmental education programs for schools that target students from grade one to six; as this is when recycling behaviour is largely formed for life and they are extremely influential in teaching their families how to minimize waste and follow program rules
8. Integrate all solid waste management programs under the City's solid waste management strategy
9. City should educate residents first before implementing program changes
10. Identify a theme that is used for all diversion programs that reinforces an integrated approach to solid waste diversion (i.e. Whistler's "Towards a Sustainable Future, Stony Plain's "Paint Your World Green", etc.)

A range of communication tools should be employed to reach all demographics (online information, schools, articles, etc.). Solid waste management services and diversion programs should be easily accessible on the City's website and linked to the solid waste management strategy and goals.

Program implementation, management and review should include public education and involvement throughout. **An effective program includes a strong social marketing technique which is best recommended by an independent waste management consultant with social marketing expertise.**

The City might also consider mailing the Executive Summary of this Study to households and/or providing the Executive Summary on the City's website.

Recommendation 4: Implement an ongoing public education program that incorporates social marketing and integrates all collection and diversion programs under one theme and strategy

3.3 Composting

Waste management strategies targeted to organics provide municipalities with the biggest "bang for your buck" because organics are the largest component of the waste stream and provide the greatest diversion potential. In order to achieve its goal, the City must enhance its current organics diversion program. For example, even if 100% of the available recyclable stream were captured, the maximum increase in diversion would be 35% compared to a potential 60% if all organics is captured.

Although programs are in place to address organics, the curbside collection program has an extremely low capture rate (18%) and 42% of garbage stream is comprised of organics (mainly food waste). This low capture rate is likely due to two factors: 1) the limited time period for curbside collection of organic waste (6 months) is not of a sufficient duration to change residents' set out habits and 2) residents' lack of awareness on organics collection.

Enhanced organics diversion programs that are integrated into a strong education program will likely be adopted quickly and favorably in Cold Lake, as both interviews and 2015 survey results indicated a high level of understanding among administration and residents of the significance of organics in the overall waste stream.

The City currently pays $2.88/hh/month for 6 months of curbside organic collection, including organics processing at the City's Compost Compound. Year round curbside collection of both food and yard waste could be implemented at an estimated cost of $4.81/hh/month, or an additional fee of $1.93hh/month including all costs (collections and processing).

Assuming a 70% capture rate for organics (currently 18%) the following diversion would be realized:

- Residential diversion rate: Increase from 18% to 41%
  (When combined with a waste limit)
- Residential waste to landfill: Decrease from 83% to 59%

Therefore, implementing this option will allow the City of Cold Lake to come very close to the recommended goal (50% DR by 2020) within the first year of program implementation.

Recommendation 5:	**Implement year round Curbside Collection of Organics (every two weeks in the winter and every week in the summer) by April 2016. Year round organics collection will increase the rate of both kitchen waste capture as well as organics diversion.**

3.4 Garbage Collection

The City of Cold Lake provides weekly manual curbside residential garbage collection for 4,002 households and weekly automated curbside garbage collection (240L black cart) for 1,000 households.

The City of Cold Lake's waste stream composition (based on the Dec 2014 waste sort), shows a high percentage of organics (42%) and recyclables (20%) in the sorted garbage. In addition, based on the residential survey carried out by Advanced Enviro in March 2015 seventy two percent (72%) of the survey respondents support a garbage limit.

The City should evaluate the system to significantly increase the organics and recyclables diversion (with a goal to capture 75% of the organics and recyclables currently ending up in the waste stream) in the next 5 years. This will be achieved through the implementation of a more stringent waste limit.

The current waste management system does not include a sufficient incentive to reduce waste. A one cart limit every two weeks should be implemented at the same time as year round curbside collection of organics is implemented. Bag/cart limits achieve approximately a 20% reduction in waste generation through behavioral changes as a result of an increased awareness of waste habits. Implementing limits also significantly increases capture rates for diversion programs as it forces residents to use the diversion programs already in place. This option will therefore increase the diversion rates for the City's curbside recyclables and organics programs.

Based on the volume of waste set out for collection; black carts in the pilot areas are less than 1/2 full (approximately 2-3 bags) and in non-pilot areas, on average, residents generate approximately one (1) garbage bag per household per week. It appears the City of Cold Lake could reduce its frequency of garbage collection (using the current 240L carts) based on volumes.

Introducing a cart limit is an efficient method of reducing garbage generation, augmenting the City diversion rate and reducing costs.

.

Recommendation 6: Implement Automated Garbage Collection throughout the City in 2015

Recommendation 7: Implement a Cart waste limit – Reduce the garbage collection frequency from weekly to every two weeks

3.5 Curbside Recycling Collection and Recycling processing

The City diverts just over 30% of the available recyclable waste stream.
Based on the waste sort, recyclables comprise twenty percent (20%) of the sorted garbage.

The recommendation to implement a public education campaign, social marketing and a waste limit, is the most effective means to increase participation and capture rates for the curbside recyclables collection program. Increases achieved and other good news stories should be shared with residents.

Implementing a year round organics collection program will also increase capture rates for recycling as long as the education program incorporates these diversion programs under one integrated system. Education focused on an integrated system aimed at increasing participation and capture rates for all components will increase diversion from all programs. If education is focused on only one program, the City risks losing the benefits that could be achieved from increased service.

The public education campaign should also inform residents of the recycling services provided at the Transfer Station.

Once the capture rate for recyclables is close to 70%, the City should evaluate to implement a weekly curbside collection for recyclables (not earlier than two years).

Recommendation 8: Share the achievements of diversion programs with residents

Recommendation 9: In two years' time evaluate to implement a weekly curbside collection for recyclables

The cost paid by the City of Cold Lake to the CLRC for the recycling process is based on these components (for details see Section 4):

- $199/tonne processing cost (includes processing & freight to final destination)
- $40/tonne is from 50% revenue sharing agreement with CLRC.
- **$159/tonne final cost for Cold Lake.**

The current high cost for recyclables collection at CLRC and the lack of competitive MRFs in the area suggest that alternative suitable options need to be evaluated by the City.

Efficiency and savings can be increased by reviewing the current contract with the CLRC, especially reducing the cost per tonne and/or increasing the 50% revenue sharing. The length of the contract should also be reviewed with input from the contractor to ensure a long-term and sustainable option.

The City should evaluate the feasibility for a new City-owned facility for processing recyclables by 2016 (end of current contract with CLRC). The evaluation should include the ICI sector in order to assess the quantities of recyclables available and to measure barriers to, support of and commitment to participate in the project. City could put out a request for EOI (expression of interest) to find a suitable long term option (response can be from public, City itself or private).

The quantities of recyclables collected at the curbside and/or dropped off at CLRC are currently not weighed. Currently, the quantity of recyclables collected is estimated affecting the calculation of the City's diversion rate. Implement an agreement with CLRC to weigh recyclables.

Recommendation 10: Review Recyclables Processing Contract (Cold Lake Recycling Centre)

Recommendation 11: Evaluate the feasibility for a more suitable private or City-owned facility for processing recyclables. Engage the ICI sector to assess the quantities of recyclables available and to measure barriers to, support of and commitment to participate in this project. Put out a request for EOI. (City and Private Contractors can respond).

Recommendation 12: Implement an agreement with CLRC to weigh the quantities of recyclables processed.

3.6 Commercial Diversion

Municipal solid wastes include residential, ICI and C&D (construction and demolition) waste. Although, the scope of this project is limited to residential waste it is recommended that the City consider options for commercial waste, as it comprises 66% of municipal solid waste.

The City should engage the ICI sector to assess the quantities of recyclables available and to measure barriers to, support of and commitment to participate in the City's potential project.

In its waste management strategy, the City should consider the goals and associated bylaws for the commercial sector as well as opportunities for partnership, as this sector comprises a significant portion of Cold Lake's waste stream.

It is recommended that the City conduct a waste diversion study, similar to this project, which addresses diversion options for the commercial sector, as this comprises most of the municipal solid waste stream. Alberta Environment's document, *Too Good to Waste* (included in Appendix A), provides additional information regarding the municipal waste stream, including the definition and composition.

3.7 Transfer Station

Currently Cold Lake is in a grey zone as the Transfer Station (managed in house) and CLRC are managing separate streams of waste. Information communicated to residents regarding what materials can and cannot be accepted at the two locations is not always consistent and different communication tools (City website, collection schedule, etc.) provide conflicting information.

The Transfer station does not offer a drop off service for recyclables, which result in it all being landfilled.

A drop off system for recyclables must to be implemented at the transfer station as a large amount of recyclables are mixed in with garbage and are not diverted. An agreement with CLRC should be reached to manage the recyclables dropped off at the Transfer station.

Recommendation 13: Provide drop off service for recyclables at the Transfer Station

3.7 Class III Landfill

In 2014 the City of Cold Lake received approximately 6,653 tonnes of inert solid waste (mainly C&D and wood waste) at the Class III landfill.

Based on the waste characterization, carried out by Advanced Enviro in December 2014, wood waste is the largest component of waste (60%) by weight, accepted at the landfill, followed by C&D (30%) then recyclables (7%). By diverting the materials delivered to the Class III landfill the City could reduce landfill costs, increase diversion and increase life expectancy for the landfill.

The City could immediately implement a recyclables ban at the landfill, as approximately 7% of the waste disposed of at the landfill could be diverted through programs existing at the CLRC. Diversion of all other materials can be phased in.

Recommendation 14: Implement a recyclables ban at the Class III landfill and use existing programs to divert recyclables from the landfill

Recommendation 15: Divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill in accordance with the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see "Class III Landfill Feasibility Study")

3.8 Plastic Bags Ban

It is recommended to evaluate a plastic bags ban in Cold Lake. This has now been done in slightly different ways in Hawaii, Mexico City (Mexico), Portland (Oregon), Leaf Rapids (Manitoba), and many other locations throughout the world and helps remove plastic from final compost.

For example,

- banning free plastic bags in stores,
- have stores sell compostable bags for customers instead of regular plastic bags,
- have stores charge customers for plastic bags, etc.

Removing plastic bags from the environment makes the community look better, and reduces a serious life threat for many animal species.

Recommendation 16: Evaluate a plastic bags ban in Cold Lake

3.9 Recommendations Summary

Table 1. Recommendations Summary

Recommendation	Description
Recommendation 1	Set a goal for the diversion rate and share it with the community. Increase the residential diversion rate to 50% by 2020.
Recommendation 2	Develop and Document a Solid Waste Management Strategy.
Recommendation 3	Consider components of the successful diversion programs chart when developing Solid Waste Strategy.
Recommendation 4	Implement an ongoing public education program that incorporates social marketing and integrates all collection and diversion programs under one theme and strategy.
Recommendation 5	Implement year round Curbside Collection of Organics (every two weeks in the winter and every week in the summer) by April 2016.
Recommendation 6	Implement Automated Garbage Collection throughout the City in 2015.
Recommendation 7	Implement a Cart waste limit – Reduce the garbage collection frequency from weekly to every two weeks.
Recommendation 8	Share the achievements of diversion programs with residents.
Recommendation 9	In two years' time evaluate implementation of a weekly curbside collection for recyclables
Recommendation 10	Review Recyclables Processing Contract (Cold Lake Recycling Centre).
Recommendation 11	Evaluate the feasibility for a more suitable private or City-owned facility for processing recyclables. Engage the ICI sector to assess the quantities of recyclables available and to measure barriers to, support of and commitment to participate in this project. Put it out for EOI. (City and Private

	Contractors can respond).
Recommendation 12	Implement an agreement with CLRC to weigh the quantities of recyclables processed.
Recommendation 13	Provide drop off service for recyclables at the Transfer Station.
Recommendation 14	Implement a recyclables ban at the Class III landfill and use existing programs to divert recyclables from the landfill.
Recommendation 15	Divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill in accordance with the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see "Class III Landfill Feasibility Study").
Recommendation 16	Evaluate a plastic bags ban in Cold Lake

4.0 IMPLEMENTATION PLAN

Timeline for implementation recommended by Advanced Enviro:

2015

- Finalize Waste Management Strategy and goals:
  - Increase the diversion rate to 50% by 2020 by implementing year round curbside organics collection (food & yard waste) and a waste limit
  - Commit to a long-term Zero-Waste Strategy
- Implement Automated Garbage Collection throughout the City
- Develop and implement a public communication program (this will continue on an ongoing basis)

2016 (1st Half)

- Change bylaw to implement a new organics collection service
- Implement year round Curbside Collection of Organics (every two weeks in the winter and every week in the summer)
- Provide a drop off service for recyclables at the Transfer Station

- Continue the Public Education Program focusing on a review of initial results of the Waste Management strategy and informing the public of the next stages

(2nd Half)

- Change bylaw to implement a cart limit
- Implement a Cart waste limit – Reduce garbage collection from weekly to every two weeks
- Implement a recyclables ban at the Class III landfill and use existing programs to divert recyclables from the landfill
- Divert recyclable materials (wood, concrete, drywall, etc.) from the Class III Landfill following the 5-year plan Advanced Enviro has developed for the City of Cold Lake (see "Class III Landfill Feasibility Study")
- Put out an EOI for suitable options (private or public) for an expanded recyclables processing facility and engage the ICI sector to assess the quantities of recyclables available and measure barriers to, support of and commitment to participate in the project

2017/2018

- Measure data against a baseline and share the results as part of the education campaign
- Waste audit to measure contamination and capture rate
- Review goals and set new targets for the next five years according to the diversion results
- Evaluate implementation of a weekly curbside collection for recyclables
- Continue the public education program sharing the diversion results

2019/2020

- Measure data against the baseline and the share results as a part of the education campaign
- Continue the public education program sharing the diversion results

This implementation plan achieves significant diversion results within a two-year time frame. A similar program was designed for Strathcona County and diversion increased from 27% to 65% in one year. As experienced in Strathcona County, implementing change is often better when done all at once rather than drawing it out, as long as a strong public education program has prepared residents.

Advanced Enviro recognizes that Cold Lake is well situated to realize significant diversion gains, which can be achieved through the implementation of a year round curbside organics collection program with a garbage limit. These two steps will also have a significant impact on the success of the curbside recyclables collection program already in place and will increase participation and capture rates.

5.0 PROJECT LIMITATIONS

This project was completed to the best of the consultants' abilities and in accordance with the APEGA Code of Ethics. The report is based on the information and data reviewed to the extent that the information was available and to the extent considered reasonable within the allocated project time frame and project budget. Advanced Enviro and the environmental consultants who prepared this report do not accept any liability for information that is not within the scope of the project and not identified in the final report. The purpose of the report is to provide the client with further information in order to make a well-informed decision. This report is specifically intended for use by the client and for the purpose the consultant agreed to with the client. This report is a confidential document for the client and will only be distributed with the client's and the consultant's permission. One copy of the report will be maintained in the consultant's files as required by APEGA.

APPENDIX A

ALBERTA ENVIRONMENT'S DOCUMENT – "TOO GOOD TO WASTE"

Too Good to Waste

MAKING CONSERVATION A PRIORITY

Alberta

Contents

at least

80%

of material currently sent to municipal landfills can be recovered

Introduction

Every society produces residual material, or what is commonly known as waste. Waste tends to be an indicator of economic success – the more prosperous society becomes, the more waste we generate. As we move into the future, how we reduce waste and fully utilize our resources will be a more relevant measure of success.

Over the years, Alberta's main approach to managing its waste has been through disposal, primarily through landfills. However, as development has progressed, and technologies have improved, there are many more approaches to waste management that are now available. Opportunities are growing and Alberta must take an innovative approach to waste reduction and management.

Too Good To Waste is Alberta's road map for waste reduction and management. It identifies the issues and opportunities, and outlines the outcomes, strategies and priority actions to help Alberta advance innovative waste management programs in the future. More detailed plans will be developed for specific actions in consultation with stakeholders as we journey ahead.

ALBERTA'S CURRENT WASTE SITUATION

In Alberta, a number of waste management practices are used – these include waste reduction, re-use, recycling and disposal.

Waste management practices, in Alberta, currently favour landfilling because:

- the potential environmental, social and human health costs of producing, treating and disposing of wastes are not necessarily reflected in waste disposal fees; and
- innovative, cost-effective waste reduction options tend to be developed only when waste disposal options become more limited.

Fact

Waste generated in Alberta can be grouped into five broad waste sectors:

> Municipal solid waste
> Hazardous waste
> Oilfield waste
> Forestry residuals
> Agricultural residuals

Waste Management Hierarchy

Waste Reduction
Reduction in the generation of waste through pollution prevention and the more effective use of natural resources is often the most cost-effective waste management option in the long-term.

Re-use
This involves items being used again for the same or different purposes with the objective of long-term cost savings.

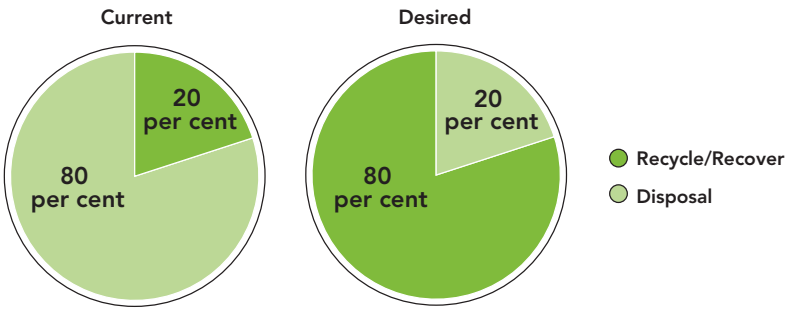
Recycling
Value should be recovered through recycling, composting, refining, or other processes where appropriate. Energy recovery should be considered for materials with high heat value and no recycling options.

Disposal
Landfilling, deep well injection and incineration without energy recovery are examples of alternatives when other options are not feasible.

Alberta must strive to move waste management practices up the waste hierarchy towards a more sustainable position.

Our challenge is to work towards reversing the current waste profile and ultimately work towards a Zero Waste Society.

Municipal Waste Profile



Alberta Leads the Way

Alberta has achieved significant results in waste management over the past 30 years. Alberta has been one of the first provinces in Canada to implement many successful waste management programs, such as:

- a beverage container collection system (1972)
- a pesticide container collection program (1980)
- hazardous waste legislation (1985)
- tire recycling program (1994)
- a used oil materials recycling program (1997)
- an electronics recycling program (2004)

Working with Stakeholders

Alberta Environment has been working with stakeholders primarily from the waste management community over many years to reduce waste and to improve waste management in Alberta.

A Waste Management Stakeholder Group (WMSG) was formed in 2003 to provide direction to the provincial government regarding specific improvements to resource recovery and waste management in Alberta. Discussions amongst the WMSG have focused on improving waste management in Alberta – building on our current strengths. The outcomes, strategies and actions within *Too Good to Waste* have been generated, in large part, due to the discussions and recommendations made by the WMSG. Continued collaborations with the WMSG will be undertaken to develop implementation plans for the strategies identified in *Too Good to Waste*.

WHY DOES ALBERTA NEED A WASTE STRATEGY FOCUSED ON CONSERVATION?

There are many social, economic, and environmental reasons for developing a roadmap that supports innovative approaches to waste management, recycling and resource recovery. Key reasons include the following:

- Resources are becoming scarcer and more valuable. Resource pressures will continue to increase into the future.
- Technology is continuing to improve and there are environmentally sound methods to recover value from materials currently being discarded.
- Addressing waste has environmental as well as resource benefits. A number of major waste management issues contribute to broader environmental issues such as air pollution and greenhouse gas production.
- Recovering value can provide economic opportunities for industrial waste generators, municipalities, and businesses, as one industry's "waste" becomes another industry's feedstock.

Fact

There are significant costs associated with the disposal of waste under Alberta's current approaches. Statistics Canada waste management expenditures for Alberta municipalities were:

> 1996: $101,272,000
> 1998: $105,586,000
> 2000: $148,594,000
> 2002: $152,387,000
> 2004: $181,367,000

Innovative Waste Management is a Government of Alberta Priority

Too Good to Waste is consistent with Alberta's 20-year strategic plan. It provides a framework and long-term commitment to resource conservation and environmental protection while recognizing Alberta's accomplishments and strengths.

There are a number of strategies that have been developed to accomplish the Government's 20-year strategic plan. *Too Good to Waste* is intended to complement and facilitate a number of other broader strategies such as:

- *Albertans and Climate Change: Taking Action* – increasing the amount of waste materials that are recycled, and reducing the disposal of organic residuals at municipal landfills reduces the generation of greenhouse gases and supports Alberta's Climate Change Strategy;
- *Rural Development Strategy* – optimizing the use of agricultural and food residuals will enhance Alberta's value-added agricultural and food industries;
- Alternative energy initiatives that can be supported through the use of agriculture and forestry residuals; and,
- Supporting *Water for Life: Alberta's Strategy for Sustainability* through improved land application practices by optimizing the return of organic residues to land through composting.

PRINCIPLES FOR WASTE MANAGEMENT AND RESOURCE UTILIZATION

Alberta Environment has adopted five principles for moving forward with environmental management. A summary of how these principles apply to waste management and resource utilization is provided below and will be considered as strategies are discussed and implemented.

Government Wide Vision and Implementation

Resource utilization and waste management outcomes will be the same for all materials that share the same characteristics, regardless of the legislation under which these wastes are controlled. Alberta Environment will take the lead role in coordinating and ensuring the compatibility of policies and approaches that have implications for environmental quality. Cross-Ministry and stakeholder collaborations will be integral to policy development.

Best Practices/Continuous Improvement

Resource conservation and waste minimization programs and initiatives will be reviewed regularly to ensure they are consistent with best practices and continual improvement. Accountability and adaptation will be key components of Alberta's waste management system.

Place-Based Approaches

The Alberta government recognizes that needs and priorities will not be the same in all areas of the province, nor for all waste sectors. Policies and programs must consider differences between these areas including variations in population, types of development, and geography without compromising the assurance of provincial outcomes.

Flexible Tools and Incentives

Outcomes will be achieved by promoting preventative approaches; providing incentives as well as penalties; using economic instruments; and developing innovative mechanisms and approaches. The development of tools and incentives will be a shared responsibility along with the development of performance measures and evaluation tools to ensure progress towards outcomes.

Shared Responsibility

The Alberta government recognizes the shared responsibility of municipalities, waste generators, resource managers and the waste management industry in promoting and maintaining excellence and high standards in the achievement of outcomes.

OUTCOMES

Based on consultations with the Waste Management Stakeholder Group and to focus the strategies of *Too Good to Waste*, three broad outcomes have been identified for waste management in Alberta:

1. Albertans take responsibility for **resource conservation and waste minimization**.
2. **Waste management systems are integrated** to provide the capacity for processing and/or recovery of materials that would otherwise be disposed of as wastes.
3. Facilities and practices to manage secondary materials and wastes **are protective of air, land, water and human health**.

These outcomes are supported individually by a number of strategies and actions that are described in detail in the following section.

Outcomes, Strategies and Actions

Outcome 1:

IMPROVED RESOURCE CONSERVATION AND WASTE MINIMIZATION

Critical to the achievement of this outcome is for all Albertans to take responsibility for resource conservation and waste minimization through their own practices and through their support for industries, communities, and initiatives that optimize resource utilization.

Alberta has always supported resource conservation through waste minimization, but our primary focus has been on environmental and human health protection. Our current disposal infrastructure was built to address the health and environmental threats from waste.

Approximately $80M of provincial funds and many more millions of municipal funds have been used to ensure that Alberta has safe municipal landfills. Alberta began regionalizing its municipal landfill system in the 1970s so that, instead of small municipal "dumps" throughout the countryside, regional landfills with a network of transfer stations would consolidate waste. This allowed for the cost-effective development of engineered landfill sites. A network of private landfills has developed in addition to municipal landfills to manage wastes from specific industrial sectors (particularly the oil and gas sector) and to meet the needs of commercial waste generators.

Subsidization of disposal infrastructure has made landfill disposal very economical for waste generators[1]. Private landfills "compete" with each other and municipal landfills for waste, which also tends to keep tipping fees low. Alberta's low tipping fees further encourage disposal over recovery. Unless disposal fees increase, there is little incentive for businesses to get involved in resource recovery.

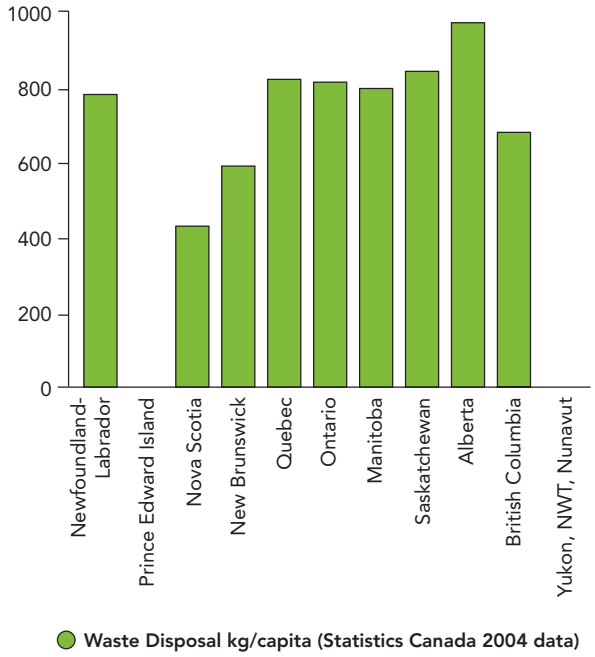
There has been little incentive for industry, manufacturers and consumers to reduce waste generation and disposal. Waste has traditionally been viewed as somebody else's problem. We have become, increasingly, a throwaway society. Alberta has been under additional pressures because of its booming economy. Diversion programs for specific waste streams have been introduced to solve specific problems. These programs have been successful, but they haven't addressed the bulk of waste currently being landfilled.

The result is that Alberta leads the country in the per capita disposal of municipal solid waste[2].

[1] Funding for diversion infrastructure by the province to date is less than 15% of allocations for disposal.

[2] Municipal solid waste includes residential; industrial/commercial/institutional; and construction and demolition wastes.

Municipal Solid Waste Disposal in Canada



Note: Data for Prince Edward Island, Yukon, NWT and Nunavut were suppressed to meet confidentiality requirements of the Statistics Act.

Strategy

The Alberta government will provide leadership in minimizing the environmental footprint of government operations and assuring that our resources are utilized to their best advantage.

Stakeholders were clear that government must set an example for Albertans. The purchasing power of government agencies is significant. Government purchasing policies can provide a "leg up" for industries developing new products from recovered materials. The Alberta government's established reputation for responsible fiscal management can be extended to "waste elimination."

Actions

- Develop and implement green procurement and pollution prevention and conservation policies for provincial government operations.
- Support and participate in recognition programs such as the Leadership in Energy and Environmental Design (LEED) program.
- Continue developing policies to ensure the conservation and optimal use of Alberta's forest, agriculture and oil and gas resources as part of Sustainable Resource and Environmental Management.

Strategy

Reduce municipal solid waste in Alberta.

It is time to reassess the overall strategies for waste reduction in Alberta. It is unlikely that the current target of reducing the amount of municipal solid waste going to landfills to 500 kg per person by the year 2010 will be achieved. Approaches to date have relied primarily on the voluntary actions of industry, municipalities and organizations. While this strategy has led to some waste reduction and diversion from landfills, further improvements are unlikely without more progressive actions. AENV, in consultation with stakeholders, needs to look at all the tools and initiatives available in the context of a long-term plan.

Actions

- Continue provincial public awareness and education to generate awareness of resource conservation and waste reduction.
- Develop economic instruments to discourage waste generation and disposal.
- Develop disposal bans where necessary to facilitate waste reduction initiatives.
- Incorporate full cost accounting into waste management policies to ensure that waste generators pay the full cost of waste disposal.

Strategy

Continue to develop, implement and improve stewardship programs.

Environmental stewardship, at its heart, involves each of us caring for our land, air and water, and is a complex blend of ethics, awareness, education and action. Stewardship programs may be voluntary or regulated, public or private, and involve individual activities or national endeavours. As we move towards the goal of reducing the amount of waste sent to landfills, stewardship programs will play an even greater role in waste reduction efforts. A strong, responsible province-wide approach will help protect and conserve our resources.

Actions

- Work with existing stewardship programs to increase recovery and recycling rates for beverage containers, used oil, scrap tires, and electronics.
- Develop performance measures beyond recovery rates (e.g. cost effectiveness, economic benefits) and monitor the effectiveness of regulated and voluntary stewardship programs.
- Continue to develop and implement regulated stewardship programs for targeted materials.
  - Develop and implement a paint stewardship program and develop additional stewardship programs to address household hazardous wastes and special wastes.
  - Develop and implement a packaging and printed material stewardship program.
  - Develop and implement a stewardship program for the recovery of construction and demolition waste.

Strategy

Ensure continual improvement through policy and program evaluation.

The evaluation and continual improvement of Alberta's waste management system is critical in achieving resource conservation outcomes. The right information must be collected and analyzed to help inform decisions about existing initiatives, projects, programs and policies, and to make informed choices regarding future initiatives.

Information regarding waste management has traditionally focused on specific sectors (municipal, hazardous, oilfield, forestry and agriculture). As we move forward we need to ensure that information reflects waste management and resource utilization as an integrated system.

Actions

- Incorporate reporting, information collection and evaluation as an integral part of Alberta's resource recovery and waste management system.
- Set recovery targets for specific materials along with reliable reporting systems to allow for appropriate measurement.
- Evaluate policies and programs to ensure that resources are utilized to their highest value and that resource recovery programs are providing intended benefits.
- Ensure best practices for resource conservation and waste reduction are identified, shared and implemented broadly across the province.

Outcome 2:

INTEGRATED RESOURCE RECOVERY AND WASTE MANAGEMENT SYSTEMS

Alberta needs to move towards a resource recovery system where waste management centres provide the capacity for processing and/or recovery of materials that are currently disposed of as wastes.

Stakeholders recommended that Alberta Environment provide a flexible set of environmentally sound waste management tools to allow different regions of Alberta to meet resource recovery/waste management needs and priorities in specific areas. Environmental protection must be assured – risk must not be redistributed from one environmental medium or one geographic area to another as the transition to an integrated resource recovery system is made.

One option may be development of environmentally sound options for specific waste materials, assessed and ranked against a set of agreed-to criteria. Each option could then be tied to an incentive or disincentive, which would provide motivation to choose certain options over others.

Waste management regions or authorities would be able to determine their recovery/waste management integration needs in conjunction with broader waste management targets and performance measures instituted on a provincial basis.

The development of a resource recovery infrastructure for Alberta has tremendous potential to turn some of our most problematic "wastes" into "resources".

The **agricultural** sector produces the greatest volume of residual material in Alberta. Most agricultural residuals are recovered for application back to land (e.g. manure, straw) or for further processing (e.g. meat and bone meal, livestock bedding, compost). There is growing interest in exploring opportunities for greater value-added uses of these materials as "feed stocks" into the production of energy and bio-products. Alberta Agriculture's Rural Development Strategy is looking at opportunities that may also provide for the use of municipal and forestry residuals in conjunction with agricultural residuals.

The **forest production and wood processing** industry produces a large volume of wood residues. This sector is striving to enhance recovery and optimize use of recovered material by developing bio-products and bio-energy options for residual materials.

Municipal solid waste (MSW) contains a large percentage (approximately 40 per cent) of diverse organic materials such as leaf and yard waste, vegetable processing wastes, table scraps, etc.

Many organic MSW materials can be composted to produce a soil amendment that can be used to increase nutrient holding, water holding, and to act as an adsorbent for contaminants. The material is useful on urban landscapes, roadsides, reclamation areas and farmland. Municipal composting operations can incorporate agriculture and forestry residues where these materials are close at hand. Forestry residues such as composted bark are already in high demand for use as mulch in urban landscapes.

Organic material that cannot be recycled or composted still has value – as an energy source. The technology being implemented by agriculture and forestry sectors can be used to extract energy value from organic residues. Smaller communities may be able to take advantage of this technology by working with agriculture or forestry interests. Additional opportunities arise from the ability to use woody biomass, particularly willows, to filter and clean municipal wastewater from sewage treatment or storm water drainage and then harvest this material for energy production.

Strategy *Develop sustainable resource recovery infrastructure.*

Over the past 30 years, Alberta has supported the necessary development of waste disposal infrastructure in the province. We now need to focus provincial investment into resource recovery so we can "catch up" on developing this important infrastructure. There are a number of organizations currently supporting research and innovation to reduce operating costs, capture more value from a resource, or reduce environmental liabilities. Government policies need to support resource conservation and optimal resource use.

Actions

- Identify infrastructure requirements to support a resource recovery system across Alberta.
- Develop options for funding resource recovery infrastructure linked with policies and economic tools to encourage resource recovery and discourage disposal as waste.
- Develop policies, including economic incentives, to support research, development and demonstration of new or improved technologies.

Goal

Work towards a goal of integrated resource recovery/waste management facilities.

The Government of Alberta is committed to completing the development of regional landfills through its existing programs; however, there is a need to shift towards supporting recycling, composting, and resource recovery programs and infrastructure.

There has been considerable analysis of municipal solid waste streams nationally, provincially and municipally. At least 80 per cent of material currently disposed of at municipal landfills can be put to some productive use. Stakeholder discussions identify the continuing need for some landfill capacity. For some wastes, landfills provide the only environmentally sound management option.

Actions

- Establish waste management regions to reflect natural boundaries for the transfer of residual materials within Alberta.
- Develop comprehensive waste management plans for integrated resource recovery and waste management across different sectors (industrial, municipal, oil and gas, forestry, agriculture) in each waste management region.
- Allow waste management regions to meet resource recovery/waste management needs and priorities through the implementation of options and tools, and the development of infrastructure best suited to regional needs.
- Link provincial funding and support for regional waste management plans to provincial outcomes and policies regarding resource conservation and waste management.

Outcome 3:

PROTECTION OF AIR, LAND, WATER AND HUMAN HEALTH

The facilities and practices used to manage residual materials and wastes must be protective of air, land, water and human health.

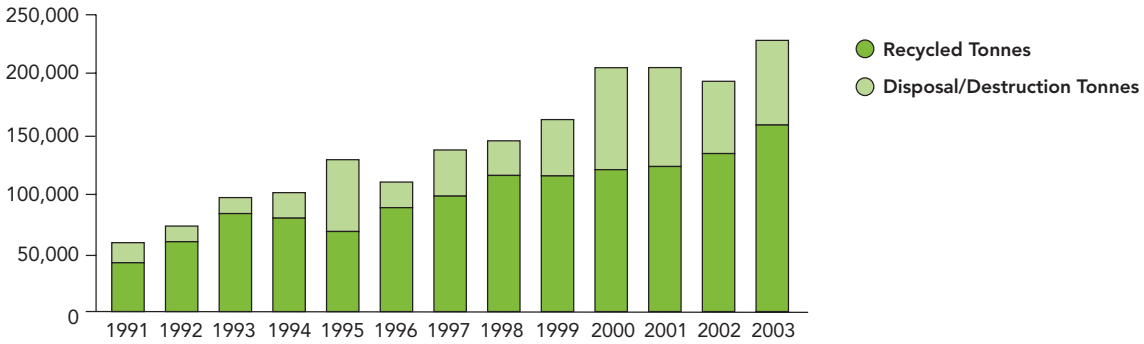
As indicated previously, environmental protection has been the primary focus of waste management in Alberta. Environmental protection will be enhanced through the diversion of municipal, agricultural, and forestry residuals from landfills into appropriate recovery technologies. Infrastructure for both waste management and recovery needs to be carefully managed to ensure that environmental protection is not compromised. Three areas of waste management requiring specific attention to ensure environmental protection follow: hazardous waste; contaminated soil and land application. These areas in particular must be managed to ensure environmental protection as a first priority.

Hazardous Waste

Hazardous waste represents less than 10 per cent of the solid waste generated in Alberta. However, hazardous waste needs special attention to ensure that risks are managed appropriately. Hazardous waste includes materials that are toxic (e.g. leftover pesticide concentrates), flammable (e.g. solvents), corrosive (e.g. strong acids), or reactive (e.g. metallic, sodium or magnesium).

Hazardous waste generation in Alberta is increasing (see graph below). The majority of hazardous waste is recycled. Information regarding hazardous waste recycling is limited. A more detailed analysis of recycling options for high-risk, high-volume hazardous waste streams needs to be conducted to determine the most appropriate option for dealing with these materials. Efforts need to focus on avoiding the use and generation of substances that display hazardous characteristics – particularly where those characteristics are persistent after treatment or disposal. A reduction in the use and generation of hazardous materials will lead to safer industries and safer communities through reduced transportation and handling. As we make progress towards this goal, we need to ensure that hazards are addressed.

Hazardous Waste Generation and Recovery In Alberta (1993-2003)



Contaminated Soil

Contaminated soil is, by weight, Alberta's single largest waste stream. A number of private landfills operate specifically to receive contaminated soil. It is estimated that at least 3,000,000 tonnes of contaminated soil are landfilled in Alberta annually (accurate information regarding contaminated soil disposal is currently limited). Contaminated soil results primarily from oil and gas development, petroleum storage (underground storage tanks), industrial development, and accidental spills[3]. Much of the soil contamination in Alberta is a "legacy" from times when environmental protection standards were less stringent. As former industrial areas have come under re-development, contaminated soil has needed to be remediated or removed. Environmental practices have improved, but industrial development has increased – contaminated soil will continue to require our attention for some time. There is some potential for the remediation or beneficial use of some contaminated soil depending on the type and degree of contamination. In some cases, however, landfilling of contaminated soil will be the best option.

Land application

A significant volume of residual materials (an estimated 1,000,000 dry tonnes annually, not including agricultural manure applications) is applied directly to land every year. This includes applications of residues from septic tanks, drilling waste, compost, wood ash, hydrocarbons, biosolids from sewage treatment plants and pulp sludge. Some of this material provides a benefit to land. Most of the material, however, includes some component that is not beneficial to land. Information regarding the area of land affected by direct land application is not readily available because of the widespread nature of this practice and the fact that very few records are required for most of the materials applied to land.

[3] The Wabamun train derailment resulted in the recovery of approximately 360,000 litres of petroleum products from the spill area. Approximately 22,000 tonnes of contaminated soil was landfilled.

Strategy

Continue to enhance standards for waste management.

Managing environmental and human health risks must remain a priority as Alberta develops a resource recovery system. Environmental performance standards for resource recovery and waste management operations must continue to meet a high standard and comply with national and international agreements.

Actions

- Update hazardous waste management policies to include treatment to ensure a high standard for environmental protection.
- Implement new environmental standards for landfills and composting.
- Develop an over-arching policy for energy recovery from waste in conjunction with Alberta's bio-energy and alternative energy development. Ensure that the policy addresses concerns posed by organic residuals, supports bio-products development, reduces greenhouse gas production and ensures environmental protection.

Strategy

Continue to minimize risk to environmental and human health.

Alberta has developed an environmentally sound waste management system. We want to improve that system. Stakeholder discussions have reinforced environmental and human health protection as the "bottom line" as we move from waste disposal to resource utilization.

Actions

- Enhance pollution prevention initiatives to reduce hazardous waste generation and encourage recycling.
- Enhance hazardous waste reporting to ensure that information regarding hazardous waste disposal and recycling is available to evaluate hazardous waste management.
- Protect land quality by evaluating management practices for excavated soil, contaminated soil and the land application of residual materials to ensure that land is not degraded and that soil and residual materials are used to their best advantage.
- Develop a publicly accessible database of former known landfill locations for use by land purchasers and developers.

Strategy

Revise and update legislation to focus on the achievement of environmental outcomes.

Alberta Environment is responsible for province wide legislation, regulation and guidelines for various wastes under the *Environmental Protection and Enhancement Act*, the *Substance Release Regulation*, and the *Waste Control Regulation*.

Recovery technologies will be diverse to accommodate different waste streams. Alberta must move towards an outcome-based regulatory system that specifies environmental performance targets without limiting technologies that can meet these targets. Support for the development and implementation of new technologies must be developed to ensure that technologies selected will meet stringent performance standards.

Actions

- Revise existing legislation concerning waste management to focus on achieving outcomes for waste recovery and waste management.
- Integrate policies regarding the management of oilfield waste and other industrial wastes to achieve shared environmental outcomes.
- Develop technical networks to support selection of the best recovery technologies for Alberta's waste and resource streams under Alberta's operating conditions.

Measuring Performance to Ensure Success

Implementing *Too Good to Waste* will involve many partners outside of the Government of Alberta – municipalities, delegated administrative organizations, community not-for-profit groups, industry and individual citizens. Accountability remains with the Government of Alberta to assure Albertans that our desired outcomes – improved resource conservation and waste minimization, integrated resource recovery and waste management systems, and protection of environmental and human health – are being met.

Alberta Environment currently reports on a performance measure for the amount of waste disposed of at municipal landfills. The target for reducing municipal solid waste going to landfills is 500 kg per capita by the year 2010 (measured by collecting landfill disposal data from selected municipal landfills in Alberta).

Alberta Environment will continue to evaluate the performance target using disposal data from the same landfills that have been providing data to ensure consistent reporting/evaluation through to 2010. To supplement this data, Statistics Canada data will be used to evaluate changes in waste generation, diversion and disposal. Other available data will also be used to evaluate generation, diversion and disposal for specific MSW components: Residential; Industrial/Commercial/Institutional; and Construction and Demolition.

The current performance measure for hazardous waste reduction is the percentage of hazardous waste recycled. The current target is to increase the percentage of hazardous waste recycled beyond 70 per cent (approximately 70 per cent of hazardous waste in Alberta is currently recycled). Reporting by specific waste streams is required to better evaluate the generation of hazardous waste. Stakeholders have identified the need to reduce hazardous waste generation in addition to increasing recycling. Specific measures for each outcome will be developed in partnership with stakeholders as part of the implementation of specific strategies and actions.

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