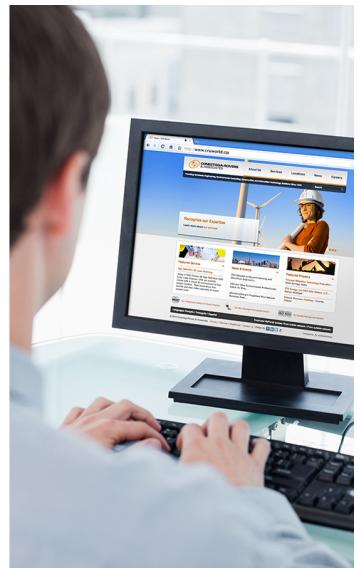




**CONESTOGA-ROVERS
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Draft Report

Optimization of Recycling Service Delivery in the North-Eastern Ontario Wasteshed

Prepared for: Continuous Improvement Fund

Conestoga-Rovers & Associates

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February 2015 • 082981 Report 1

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Final Report 730:

Northeastern ON Optimization: Service Delivery Model Option Development & Evaluation

Notice to Readers

In 2012, the MIPC commissioned a report entitled, A Study of the Optimization of the Blue Box Material Processing System in Ontario1. Volume 7 of the Study focused on Northern Ontario, and included various recommendations on how to optimize the Blue Box system at a regional level.

This report outlines options for a new service delivery and cost sharing model that is based on the Study findings, and optimizes the recycling services in the Northeastern ON waste shed, while taking into consideration the collection, consolidation, haulage and processing of the recyclable materials generated.

The report remains a 'draft' as the participating municipalities elected not to complete the final section, 'Section 6.0: Next Steps'.

After much consideration, the participating groups chose to work independent of one another. The CIF worked collaboratively with Kapuskasing and Hearst to investigate and cost out joint program delivery opportunities. Ultimately, it was the decision of Hearst's council to establish a transfer station in their community and transition their depot program to a curbside recycling collection initiative independently. Kapuskasing also moved to an independent recycling program, building a transfer station near their landfill – a location different than the one used in the scenario analysis for this report. Findings on Hearst's transition can be found under CIF project report 978, 'Hearst Transition from Depot to Curbside Service'.

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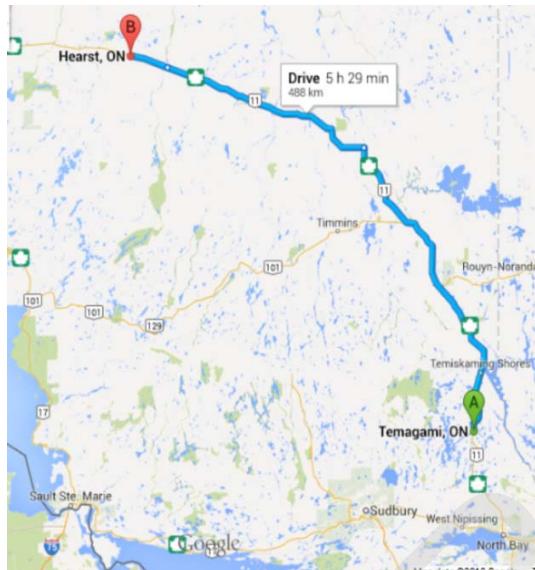
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Section 1.0 Introduction

The Continuous Improvement Fund (CIF) is a program developed through a partnership between Waste Diversion Ontario (WDO), the Association of Municipalities of Ontario (AMO), the City of Toronto, and Stewardship Ontario to improve the effectiveness and efficiency of Ontario's municipal Blue Box recycling program. Based on direction from the Municipal Industry Program Committee (MIPC) and the WDO Board, the CIF provides technical support and training services in addition to funding assistance to municipalities to implement best

practices and technological solutions to enhance the operation of Ontario's Blue Box program.



In 2012, the MIPC commissioned a report entitled *A Study of the Optimization of the Blue Box Material Processing System in Ontario*¹. Volume 7 of the Study focused on Northern Ontario, and included various recommendations on how to optimize the blue box system at a regional level.

The Cochrane Temiskaming Waste Management Board (CTWMB), serving municipalities in the North-Eastern Ontario (NE-ON) wasteshed, expressed interest in receiving CIF funding to conduct a local analysis and refine the

recommendations of the Study in order to establish an appropriate implementation strategy. The CIF approved the funding, and retained Conestoga-Rovers & Associates (CRA) to develop and evaluate options for the optimized delivery of recycling services for the communities, not only participating as part of the CTWMB, but for all those operating in the NE-ON wasteshed in and around the stretch of highway between Temagami and Hearst. Further, KPMG was retained to review the proposed service delivery models, as well as provide thoughts and analysis on potential cost sharing mechanisms.

This report outlines options for a new service delivery and cost sharing model that is based on the Study findings, and optimizes the recycling services in the NE-ON wasteshed while taking into consideration the collection, consolidation, haulage and processing of the recyclable materials generated.

¹ A Study of the Optimization of the Blue Box Material Processing System in Ontario, Resource Recycling Systems and Steward Edge, June 2012. <http://cif.wdo.ca/projects/blue-box-opt-study/#report>

Section 2.0 Background

The CTWMB was originally established in 1995 by a consortium of 16 municipalities in the NE-ON wasteshed in order to consolidate the collection, transfer, haulage and processing of recyclable materials. CTWMB members were divided into two groups, namely, the Northern Node (the Towns of Kapuskasing, Hearst, Cochrane, and Iroquois Falls; and the Townships of Mattice-Val Côté, Opasatika, Fauquier-Strickland, and Moonbeam) and the Southern Node (the Towns of Charlton-Dack, Englehart, New Liskeard, Haileybury, and Cobalt; and the Townships of Chamberlain, Evanturel, Dymond, and Temagami). The City of Temiskaming Shores was created in 2004 by the amalgamation of New Liskeard, Haileybury, and Dymond.

Member municipalities were serviced through a depot-based program utilizing a series of 2 or 3 cubic yard haul-all collection bins for source-separated materials. A total of 112 collection bins were situated at over 30 depot sites throughout the region. The bins were owned by the individual municipalities. Depot bins were emptied regularly using one truck in each node operating on established collection routes and schedules. Materials were delivered to one of two Material Recovery Facilities (MRFs): Kapuskasing in the Northern Node, and Temiskaming Shores in the Southern Node. The CTWMB collectively owned the two trucks and two small MRFs, but the land for each MRF was owned by the municipality where it was located.



The CTWMB membership agreement shared the annual costs to run the program on a per household basis for each participating municipality. Any revenues gained from the resale of recyclables were used to subsidize program costs. One member municipality was assigned to act as the treasurer, and was responsible for monitoring costs and revenues, completing the WDO Municipal Datacall, and assigning fees to the other members. In 2013, the program collected approximately 1,504 tonnes of material from a total of 17,461 households (hh), at a cost of \$22 per hh.

Certain municipalities expressed dissatisfaction with the CTWMB cost sharing agreement and depot-based collection program. In 2012, the Town of Cochrane decided to withdraw from the CTWMB and implement their own curbside collection program. Similarly, in 2014, the City of Temiskaming Shores and the Town of Cobalt also gave notice that they intended to withdraw from the CTWMB as of January 2015 and implement their own curbside collection programs.

The remaining members faced increased pressure from local residents to move from depot-based collection to curbside pick-up, and were concerned that continued participation in the CTWMB restricted their ability to consider changes to the existing system. With the departure of its two largest contributing members, the CTWMB recognized that it was unable to continue to operate with financial stability and recommended that the CTWMB dissolve, which came into effect on December 31, 2014.

With the dissolution of the CTWMB, member municipalities from the Northern Node established a temporary board on January 1, 2015. The temporary board will maintain the depot based collection system until a more permanent arrangement can be put in place. Kapuskasing Town Council has allocated \$450,000 to the temporary board.

Municipalities in the Southern Node that were formerly part of the CTWMB have been exploring options to maintain recycling programs in their communities. Some municipalities have entered into short-term agreements with the City of Temiskaming Shores to receive their materials and haul them to a MRF for processing. The depot bins remain in place in some of the municipalities, facilitating the continued use of a depot based system if collection agreements are established with private contractors. However, Earlton and Chamberlain are the only two municipalities in the Southern Node that have not already switched to curbside collection. Other municipalities have temporarily halted the collection of recyclables pending the outcome of this study and/or the establishment of new contract arrangements.

The City of Timmins, which is comprised of 20,300 hh, the Town of Kirkland Lake which has 3,700 hh, and a few other North-Eastern municipalities that were not formerly part of the CTWMB will also be included in this analysis. Of primary concern for all municipalities involved is the need to increase waste diversion rates and conserve landfill space while controlling program costs. To that end, CRA was to gather and analyze key data and look for service delivery options that allowed for the highest diversion at the lowest cost possible by realizing economies of scale achieved through multi-municipal collaboration and program harmonization. The overall gross cost per tonne, which is a common comparator of Blue Box program costs, ranged from \$504 to \$977 for this region in 2013. **Table 1** provides a consolidated summary of the size and range of municipalities participating in the project and reflects their baseline position.

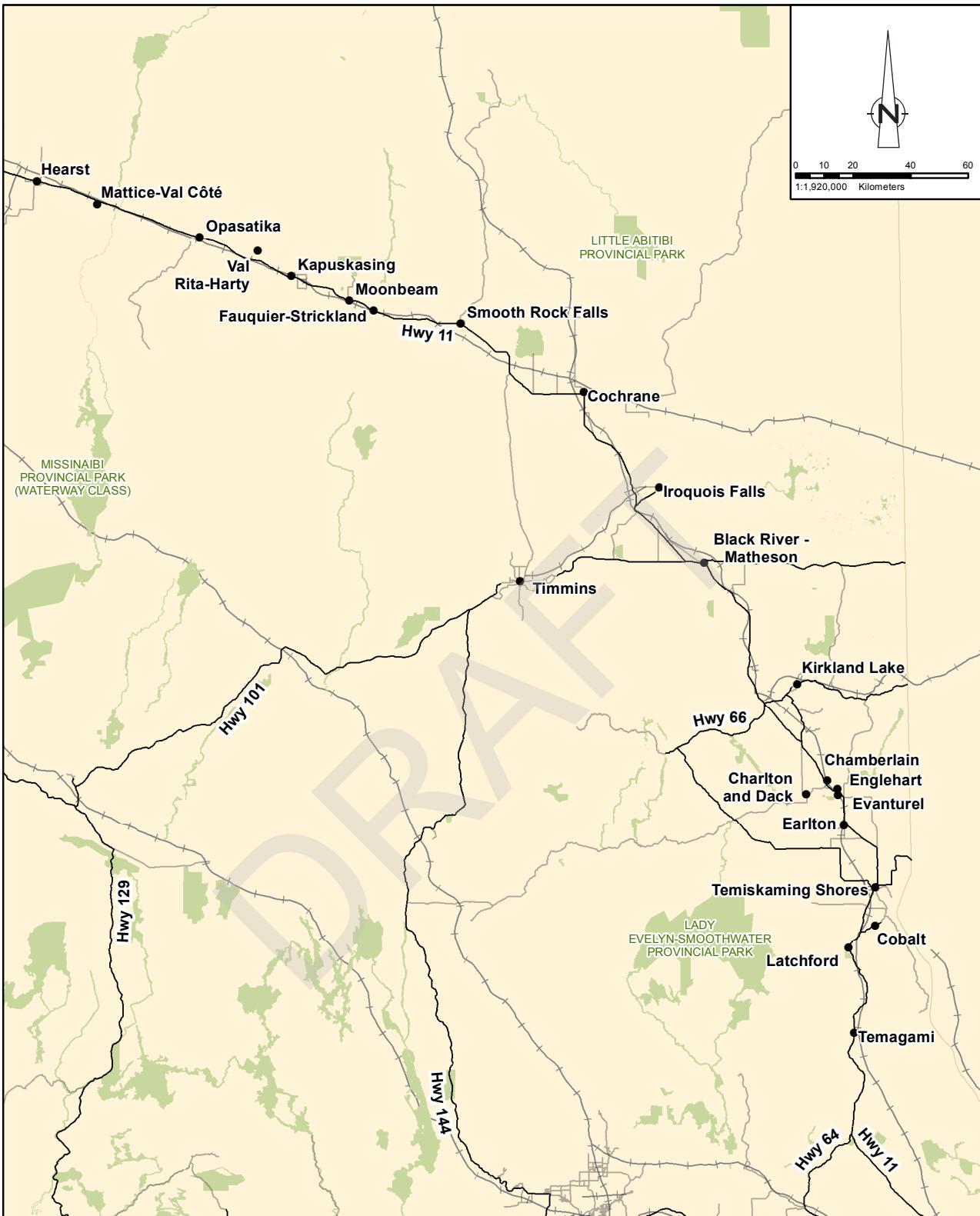
Table 1 – Participating Municipalities

Municipality	Households	Depot/ Curbside	Single/ Dual	Gross Cost/ Tonne
Hearst*	2,524	Depot	Dual	\$539
Mattice*	340	Depot	Dual	\$539
Opasatika*	133	Depot	Dual	\$539
Val Rita-Harty	368	Depot	Dual	N/A
Kapuskasing*	4,090	Depot	Dual	\$539
Moonbeam*	563	Depot	Dual	\$539
Fauquier-Strickland*	270	Depot	Dual	\$539
Smooth Rock Falls	693	Curbside	Single	N/A
Cochrane*	2,245	Curbside	Single	\$586
Iroquois Falls*	2,234	Curbside	Single	\$539
Black River - Matheson	1,172	Curbside	Single	N/A
Timmins	18,806	Curbside	Single	\$504
Kirkland Lake	4,234	Curbside	Single	\$509
Chamberlain*	161	Depot	Dual	\$539
Englehart*	751	Curbside	Single	\$539
Evanturel*	208	Curbside	Single	\$539
Charlton and Dack*	274	Curbside	Single	\$539
Armstrong (Earlton)	516	Depot	Dual	N/A
Temiskaming Shores*	4,402	Curbside	Single	\$539
Cobalt*	623	Curbside	Single	\$539
Latchford	202	Curbside	Single	\$977
Temagami*	471	Curbside	Single	\$539

*Former Members of the CTWMB

Section 3.0 Existing Infrastructure

With the dissolution of the CTWMB and the decreasing lifespan of local landfills, municipalities in NE-ON (**Figure 1**) were keen to explore alternative waste management options in order to meet their waste diversion goals. Faced with the challenge of balancing landfill space with the cost of diversion, many of the municipalities have, or are in the process of, switching from a depot based program to curbside collection. This is significant in that curbside collection is now used to collect more than 80 percent of the recyclable materials generated in the region.



Source: MNR NRVIS, 2013. Produced by CRA under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2015;
Coordinate System: NAD 1983 UTM Zone 17N

figure 1

STUDY AREA



— Rail
■ Provincial Park

Further to this, the Total Residential Diversion Rate reported to WDO in 2011² averaged approximately 39.8 percent for municipalities with curbside collection, and approximately 26.9 percent for municipalities using a depot based system. Notwithstanding the above, the depot-based system remains in place in some municipalities, and has the potential to continue to operate into the future.

An inventory of the existing waste management systems and infrastructure currently in use by NE-ON municipalities is summarized below. This allowed for the examination of local conditions and consideration of the extent to which they affected the MIPC study recommendations for the region. A summary of the existing waste management facilities in the NE-ON wasteshed is provided in **Table 2** (following the text). The purpose of this section is to understand what infrastructure currently exists within the wasteshed in order to establish a baseline. Once the baseline has been established, recommendations on infrastructure requirements will be discussed as part of the analysis of each option.

3.1 Collection Vehicles and Depot Bins

With respect to old CTWMB assets, two collection vehicles are still operable, but are thought to be nearing the end of their useful service lives. Replacing one or both of these vehicles would need to be considered should the depot system continue to operate in some capacity. Depot Bins within the municipalities who were part of the old CTWMB still utilize this collection infrastructure. While some municipalities have decommissioned their depot bins, those that remain are thought to be in fair condition, and would likely be able to continue their function into the foreseeable future with regular maintenance.

For municipalities with individual collection programs, some have purchased their own collection vehicles to suit the specific needs of their programs. For example, the Town of Cochrane implemented an automated curbside collection system and purchased cart-and-arm type collection vehicles. There are a number of municipalities who were formerly members of the CTWMB that now rely on privately contracted collection vehicles, rather than operating their own fleet.

3.1.1 Timmins

With a population of approximately 43,000, the City of Timmins is the biggest municipality in the NE-ON wasteshed, but was not historically part of the CTWMB. Prior to 2011, the City utilized a manual dual stream collection program for waste and recyclables. Wanting to

² WDO, 2011 Residential GAP Diversion Rate by Municipal Groupings.

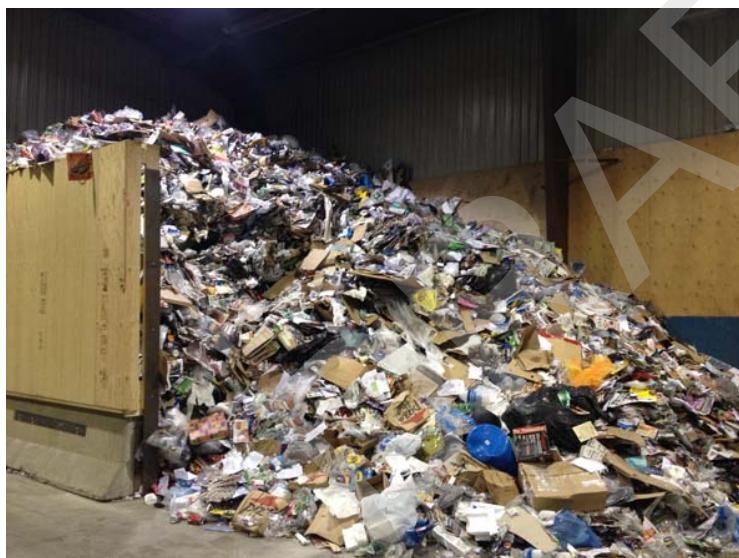
<http://www.wdo.ca/learn/documents/#blueboxprogram>

increase diversion rates, the City implemented an automated dual stream collection system, purchasing a fleet of three new automated/manual dual stream refuse trucks and 25,000 residential carts, expanding the list of materials collected and increasing the blue box collection frequency to weekly. The new carts were installed with Radio Frequency Identification (RFID) technology, and data management software (C.A.R.T.S.) that can be used to track deliveries, swaps and repair issues. Implementation of the program improved the collection efficiency of operators and overall public participation rates through an increase in tonnage of 32 percent with seasonal peaks up to 37 percent. Additional details are provided in a CIF report entitled *Automated Blue Box Recycling Collection*³.

3.2 Transfer Stations

3.2.1 Temiskaming Shores

The former MRF in Temiskaming Shores was purchased by the City of Temiskaming Shores from the old CTWMB for approximately \$235,000. The building has since been re-configured to



serve exclusively as a transfer station, including an additional \$50,000 investment to add a grade-separated loading ramp directly behind the building. The City is currently preparing an ECA application for the facility.

In addition to the City of Temiskaming Shores, the facility is also currently accepting material from the Townships of Harley, Armstrong, and Evanturel, and the Town of Cobalt. The facility is



³ CIF Project #173 – Automated Blue Box Recycling Collection, CIF, June 2012. http://cif.wdo.ca/pdf/reports/173-Timmins_Final_Report.pdf

operated by Phippen Waste Management under a 12-month contract, and under normal operations there are approximately two 4-hour shifts per week. The facility receives approximately 210 – 250 cubic yards of material every bi-weekly collection. The building footprint is approximately 6,000 square feet and has a functioning in-floor scale, and vehicles are weighed both inbound and outbound. In addition, the facility contains a baler, which is used primarily for consolidating cardboard and clean fibres.

Approximately three 53-foot walking floor trailers are loaded every two weeks using a front-end loader. Compaction of the material using the loader bucket has been able achieve payloads of up to 20 tonnes. Approximately 100 tonnes per month of material are shipped to the R&D Recycling MRF in North Bay for processing. It should be noted that there is excess capacity at the facility, and the City of Temiskaming Shores is willing to accept additional material at a rate of \$250 per tonne (including tipping fees, haulage, and processing. 2015 rate, reviewed on an annual basis).

3.2.2 Cochrane

The Town of Cochrane withdrew from the CTWMB in 2012, and implemented an automated system for the curbside collection of recyclables and waste. To support their new system, the Town elected to build a new transfer station facility to consolidate recyclables prior to shipping them to processors.

The transfer station has been in operation since July 2012, and only accepts source-separated recyclables from the Town and the occasional load from the commercial sector (i.e., cardboard). The facility is not equipped with a weigh scale; tonnages are reported to the Town by the contracted MRF(s) that receive materials from the transfer station. The facility managed 477 tonnes of material in its first year of operation, between August 2012 and July 2013.

The transfer station is constructed of intermodal shipping containers for the side and back walls and a translucent fabric roof supported on semicircular steel trusses. The facility is not serviced by any utilities (e.g., hydro, water, sanitary). The interior of the transfer station is approximately 3,200 square feet. Based on the type and volume of materials managed, the



facility was exempt from obtaining an Environmental Compliance Approval (ECA) from the Ministry of Environment and Climate Change (MOECC).

Ancillary assets to this transfer station include a front end loader, which is used as required to manage stockpiles and to load material into 53-foot open top transfer trailers. Approximately one transfer trailer every second week is loaded and shipped to a contracted MRF for processing. Using the loader bucket to compact the materials, the net weight of each load averages approximately 18 tonnes.

Annual operation and maintenance costs for the facility were estimated at approximately \$93 per tonne, although this is expected to increase as the facility ages and as throughput increases. Additional cost information and details of the facility can be found in a CIF report entitled *Cochrane Transfer Station Construction and Annual Operation Cost Analysis*⁴.

3.2.3 Timmins

Collected materials are transported to the transfer station located at the Deloro Landfill Site, which uses Haul-All Transtors, and is regulated under MOECC Certificate of Approval No. A580703. The facility consists of one Transtor unit with a capacity of 8 tonnes per day, and two compaction trailers each with a capacity of 25 tonnes, or the equivalent of approximately 80 cubic yards. Haulage and processing of the recyclable materials at the Sudbury Processing Facility has been sub-contracted by the City. Although the compaction trailers are rated for a capacity of 25 tonnes, the City has only been able to achieve a maximum capacity of approximately 17 tonnes per trailer on average, reportedly due to issues surrounding the formation of ice within the units. The City is currently investigating the feasibility of covering the Transtors to shield them from the elements, to reduce downtime and maintenance, and to increase capacity. Additional details are provided in a CIF report entitled *Recycling Transfer Station*⁵.

The City has indicated a willingness to have their Transtor transfer facility factored into the service delivery model options.

⁴ CIF Project #726 – Cochrane Transfer Station Construction and Annual Operation Cost Analysis, EBA Engineering Consultants Ltd., 2013. http://cif.wdo.ca/projects/documents/726-Cochrane_Final_Report.pdf

⁵ CIF Project #162 – Recycling Transfer Station, CIF, June 2012. http://cif.wdo.ca/pdf/reports/162-Timmins_Final_Report.pdf

3.3 Material Recovery Facilities

3.3.1 Temiskaming Shores

As previously mentioned in Section 3.2.1 above, the former MRF in Temiskaming Shores is owned by the municipality after the facility (building and equipment) was purchased from the old CTWMB for approximately \$235,000. It has subsequently been converted to operate exclusively as a transfer station.

3.3.2 Kapuskasing

With the dissolution of the CTWMB, member municipalities from the Northern Node established a temporary board on January 1, 2015. The temporary board will maintain the depot based collection system until a more permanent arrangement can be put in place. Kapuskasing Town Council has allocated \$450,000 to the temporary board, which will likely be used to purchase the collection trucks and the existing MRF from the CTWMB.

The existing MRF in Kapuskasing is similar in size and configuration to the former MRF in Temiskaming Shores. The facility sits on a 2.5 hectare site, and operates under MOECC Provisional Certificate of Approval No. A770076.



The building contains various bays for sorted recyclables, including metal, plastic, and fibres, and materials are moved around using a front-end loader. There is one conveyor with a magnetic bar to separate ferrous metals, and one baler to consolidate materials. The facility has an in-floor scale, but it is not currently functioning. The building has been appraised at \$160,000, while the value of the equipment within the facility has not been assessed, although it is believed that it only has value as scrap metal.

The facility is in operation 5 days per week. There is limited storage space within the building, and materials are generally stored uncovered outside. There is a small ramp behind the building used to load baled material onto trucks. Materials are typically sold to Renewable Energy Management Inc. or Paper Fibres Inc.



If the service arrangement for the Northern Node were to change, the facility would need to be sold to the new management board with the proceeds being split amongst the former CTWMB members. The facility has the potential to be re-configured into a transfer station similar to what has been established in Temiskaming Shores.

3.3.3 Private Facilities

In addition to the municipally owned facilities, there are a number of private facilities within the wasteshed as well:

- **Teck Northern Roads (TNR)** – Operates a facility in Kirkland Lake, able to process up to 3 tonnes per day, operates 7 days a week (1,095 tonnes per year)
- **Northern Environmental Services (NES)** – Operates a facility in Timmins, single stream, price of \$100/tonne
- **R&D Recycling** – Operates a facility in North Bay, single stream with no restrictions, price of \$100/tonne

Further details on these facilities is provided in **Table 2** (following text).

3.4 Other Infrastructure

Infrastructure within other municipalities that have been included in the regional wasteshed are limited largely to collection vehicles. For example, while the Town of Kirkland Lake has never been a part of the CTWMB, they began residential curbside recycling in 2003. Single stream recyclables are placed in blue boxes, and are manually collected from approximately 3,700 households on a bi-weekly basis by Teck Northern Roads (TNR), under contract to the Town. The Town also operates a central depot site where residents can drop-off recyclable materials directly.

The Town of Smooth Rock Falls has not historically been a member of the CTWMB, but have been pursuing the implementation of an automated curbside collection system for recyclables.

The Town has held preliminary discussions with neighbouring municipalities to gauge their interest in moving to a curbside system and entering into a shared services arrangement for the collection vehicle, which they intend to purchase.

The Township of Black-River Matheson operates an independent recycling system, separate from the CTWMB. The Township provides weekly curbside collection of single stream recyclables through a contract with TNR, which also services the communities of Ramore, Holtyre, and Val Gagné.

Section 4.0 Service Delivery Options

In developing an optimized blue box service delivery model for Ontario, CIF and MIPC agreed to assess the province on a wasteshed basis, and not by municipal boundaries. In line with this strategy, CIF has dedicated funding toward system regionalization and helping municipalities find new ways to work together to optimize the wasteshed. The service delivery options developed for the NE-ON municipalities will consider the recommendations of the MIPC Study while seeking additional input through consultation with the CIF and local municipalities.

4.1 MIPC Study Recommendations

The MIPC study modeled the optimized system of MRFs and transfer stations to handle a standard suite of materials, minimize transportation and transfer logistics, and identify gaps in the existing system. Based on the regional analysis, Volume 7 of the MIPC study reached the following conclusions for Northern Ontario:

- Savings can be achieved in the Northern Region by reducing the number of MRFs from 14 down to a minimum of 3 state-of-the-art MRFs (though smaller in scale than optimum given the low density of the region) that would anchor the processing and transfer system
- Adding a fourth MRF in Timmins increases costs by 6 percent but still realizes significant savings
- Maximizing the use of existing facilities as transfer stations has minimal impact on operating costs and capital costs due to the low volumes, lack of existing facilities and the long haul distances
 - This means that decisions on transfer station locations should be based on direct haul collection optimization, not on the location of facilities determined by this processing optimization model
- Regional hub MRFs should be situated in Sudbury, Thunder Bay and Winnipeg as well as a potential hub MRF in Timmins

- The optimal solution should utilize as many existing facilities as possible to minimize the effect on direct haul and to lower the capital investment

Thus, developing three primary hub MRFs and potentially a secondary hub MRF in Timmins could form an optimized system for the Northern Region. Under all of the scenarios assessed, the former CTWMB MRF facilities in Kapuskasing and Temiskaming Shores were expected to operate as transfer stations.

4.2 Consultation

In order to discuss the development and evaluation of options with the stakeholders, two separate consultation meetings were held between CRA, CIF, and local municipalities. The first meeting was held on December 15, 2014 in Temiskaming Shores with the southern municipalities, and the second meeting was held on December 16, 2014 in Kapuskasing with the northern municipalities. The meetings involved a presentation of the proposed methodology and preliminary details of the analysis, and were followed by open discussions with the attendees.

Project team members from CIF and CRA also undertook site visits to various facilities, including the Temiskaming Shores transfer station, the Kapuskasing MRF, and the private MRF owned by Northern Environmental Services (NES) in Timmins. The site visits provided an opportunity to discuss design and operational details with the facility operators.

Subsequent to these meetings, the City of Temiskaming Shores issued a letter to the project team, dated December 18, 2014, outlining concerns and recommendations put forward by City representatives. The City indicated that they would not be in a position to enter into an agreement that would subsidize recycling programs for Southern Node municipalities (Chamberlain to Temagami), but rather enter into agreements to accept recyclable material at an associated fee for consolidation, hauling, and processing.

A copy of the presentation materials, as well as the letter from Temiskaming Shores have been included in **Appendix A**.

4.3 Option Development

The service delivery options should consider all aspects of the waste management system including the collection, hauling, and processing of materials. To facilitate the development and analysis of options, the process was sub-divided into the following six stages (See **Figure 2**):

1. Generation
2. Collection
3. Haul to Primary Node (TS)
4. Transfer Station Consolidation
5. Haul to Secondary Node (MRF)
6. Material Recovery Facility Processing

Program administration, promotion, and education considerations were also noted for each option, and potential partnerships and cost and asset sharing arrangements were examined. Options were evaluated on the basis of their cost and diversion potential as well as their ability to meet desired service delivery standards and achieve consensus amongst the participating municipalities.

4.3.1 Data Sources

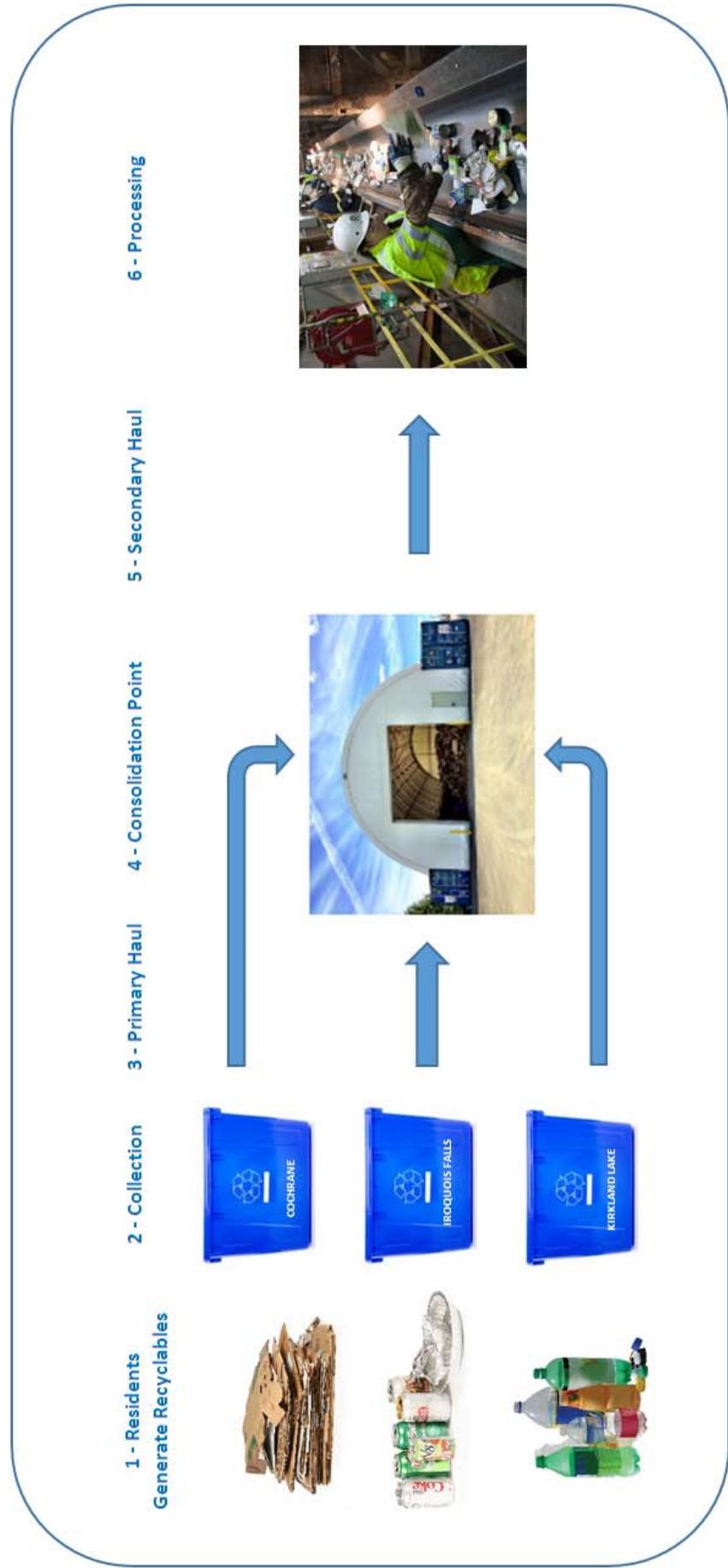
In order to complete the analysis, information was obtained from various data sources including, but not necessarily limited to:

- Data supplied by NE-ON representatives
 - Tonnages
 - Existing infrastructure (e.g., equipment and facility ownership, processing capabilities, inventory and valuation of assets, and salvage value of equipment)
 - Staffing details
 - Program participation rates
 - Program costs
 - Operating reports
 - Financial records and budgets
- Previous studies completed through CIF or independently
- Statistics Canada
- WDO Datacall

- CTWMB Agreement (e.g., terms and conditions of membership, fee structure and board management)
- Partnership Agreements for other operators in the Province (as a sample only).

DRAFT

Figure 2 – Material Flow Diagram



4.3.2 Limitations

In order to determine the full system potential, the analysis aimed to consider all of the municipalities in the NE-ON wasteshed, including those that were not historically part of the CTWMB. As such, the model and scenarios were developed using a regional approach that may not necessarily align with the program considerations of each individual municipality, such as existing contract arrangements and financial limitations.

The flexibility to vary input parameters has been built into the model wherever possible; however, the options generated are dependent on the robustness and completeness of the data. General assumptions have been documented where required to supplement the available data.

The model has been limited to consider only the categories noted above. External effects on other municipal operations, such as the cost associated with avoiding disposal at landfill, have not been included in this analysis. However, the effects of the various options on the waste diversion rate have been detailed to the extent possible to demonstrate potential savings associated with the landfill that may be realized. Each municipality will need to consider the options presented in the context of their individual waste management systems.

4.4 Model

4.4.1 Overview

The model was created to gain an understanding of the costs involved with providing recycling services at a regional level, and the underlying management options and their respective costs at the individual municipality level.

Using available data, projections, and information from other sources, the model assessed each stage of the materials management process, and assigned costs to individual municipalities. Where possible, the model also considered the existing infrastructure and service arrangements for each municipality. Various permutations were developed at each stage of the model, with a common goal of determining the most cost effective solution for each of the municipalities considered.

The model includes three distinct scenarios for the management of recyclables in the NE-ON wasteshed. Each scenario is defined by the location of its primary nodes, or consolidation points, selected largely based on minimizing haul distances from each municipality. The primary node typically acts as a transfer location where material collected from individual municipalities is consolidated for a secondary haul to the end processing point. Multiple MRFs

are presented for each scenario to clearly outline the costs of shipping and processing material at various locations across the province.

The overall model is presented in **Appendix B**, while a detailed description of the information, data, and assumptions that were used in each stage is presented in the sections that follow. The title of each tab in the model spreadsheet is highlighted in **bold blue text**.

4.4.2 Generation

The input data and calculations related to the generation of recyclables in each municipality are summarized in **Appendix B - Tables 1A, 1B, and 1C**, as presented in Tab "**1 – Generation**". The following general methodology was used:

- Population and households data for each municipality were obtained from Statistics Canada (2011).
- The waste generation rate (kg/capita) for each municipality was obtained from information reported to the WDO Datacall (2012). Representative data was used for municipalities where no data was available.
- The total residential waste generated for each municipality was calculated based on the population and waste generation rate.
- The residential solid waste composition was approximated using representative waste audit data from West Nipissing contained in the CIF *Guidebook for Creating a Municipal Waste Recycling Strategy*⁶. This waste composition was further confirmed through similar results obtained in a waste audit undertaken for the City of Timmins entitled *Residential Waste Audit Report: City of Timmins*.
- The amount of recyclable material in the waste stream was calculated based on the total residential waste generated and the residential solid waste composition.
- The recyclable material capture rate was estimated for each municipal group based on the 2012 Residential Gap Diversion rates reported for Timmins, Kirkland Lake, and the CTWMB. Anecdotally, Cochrane estimates that their diversion rate increased from 5 percent to 25 percent with the introduction of curbside collection. Similarly, Temiskaming Shores estimates that their diversion rate increased from 18 percent to 55 percent after switching from a depot-based program to curbside collection.
- The estimated recyclable materials diverted for each municipality were calculated based on the type of collection program (depot or curbside), and the corresponding capture rate.

⁶ CIF *Guidebook for Creating a Municipal Waste Recycling Strategy*, Trow, March 2010
http://cif.wdo.ca/wdocs/CIF_wrs_template.doc.

⁷ *Residential Waste Audit Report: City of Timmins*, AET, November 2009.

Calculated values represent theoretical amounts based on the parameters noted above, and do not necessarily reflect actual values for each municipality.

4.4.3 Collection

Using the estimated tonnages of recyclables diverted for each municipality as calculated in Tab "**1 – Generation**", **Appendix B - Tables 2A through 2D** on Tab "**2A – Collection**" calculate the corresponding weekly material volumes and the number of collection vehicles required to transport materials from either individual households or depot locations to the primary node (consolidation point). With respect to the collection of recyclable materials, the following general methodology was used:

- The weekly tonnages of recyclables collected from each municipality were calculated based on the total recyclable materials diverted, assuming 52 weeks a year.
- The weekly volumes of recyclables collected from each municipality were calculated based on the weekly tonnages and the assumed un-compacted material densities.
- Tonnages and volumes were calculated as both multi-stream and single stream. Depot based collection programs were assumed to be multi-stream, while curbside based collection programs were assumed to be single stream.
- The number of weekly trips by collection vehicle for each municipality was calculated based on the weekly material volumes, and assumptions surrounding the vehicle type including capacity and compaction ratio. Note that the numbers represent consolidating the material in each municipality (via curbside, or at a depot) and don't reflect hauling the material anywhere or sharing services with other municipalities at this stage.

Appendix B Table 2E, as presented in Tab "**2B – Collection Costs**", outlines collection costs for select municipalities based on information reported in the 2013 WDO Datacall. The following notes are provided:

- Overall program costs sourced from WDO 2013 Blue Box Financial Summary.
- Residential collection costs per tonne calculated for each reporting municipality in the NE-ON wasteshed. Weighted average of residential collection costs per tonne calculated for each municipal group.
- Residential depot/transfer costs per tonne, and total costs per tonne calculated based on reported information.

- Note that full system costs (e.g., processing, administration, promotion and education, interest, revenues) are not included in these calculations. Full system costs are presented in Section 4.5.
- Tab “**2C – Depot Collection**” further breaks down the costs incurred in providing depot services to municipalities in the Northern Node. These costs provide a basis for the recommended cost sharing arrangements presented in Section 5.

4.4.4 Haul to Primary Node

Based on the number of weekly trips by collection vehicle calculated in Tab “**2A – Collection**”, assumptions surrounding the operation of collection vehicles, and the distances between collection points and primary nodes, **Appendix B - Tables 3A and 3B** on Tab “**3 – Haul to Primary Node**” summarize the costs associated with direct hauling material from each municipality to the nearest primary node (i.e., a transfer station or material recovery facility). The following general methodology was used:

- Four separate scenarios were developed, reflecting different numbers and locations of primary nodes throughout the region:
 - **Scenario 1:** Primary nodes located in Kapuskasing, Timmins, and Temiskaming Shores
 - **Scenario 2:** Primary nodes located in Kapuskasing, Cochrane, Timmins, and Temiskaming Shores
 - **Scenario 3:** Primary nodes located in Kapuskasing, Iroquois Falls, Kirkland Lake, Timmins, and Temiskaming Shores
 - **Scenario 4:** Primary nodes located in Timmins and Temiskaming Shores
- Primary nodes were situated based on where they make the most geographical sense in terms of minimizing total haul distance from each municipality. Generally speaking, increasing the number of primary nodes reduces the total haul distance for the overall system.
- The locations of the primary nodes identified under each scenario are presented in **Figures 3-1 to 3-4** (following text).
- There are countless other scenarios possible, however, those presented above are thought to be the most feasible and most cost effective based on the existing system. As noted in the MIPC study, decisions on transfer station locations should be based on direct haul collection optimization due to the increased costs associated with longer haul distances.

- The number of weekly trips by collection vehicle were totaled based on the collection method and contributing municipalities, and rounded up to the nearest whole number.
 - Municipalities using a curbside collection system were assumed to independently direct haul material to the primary node: sharing of curbside collection vehicles between multiple municipalities was not modeled.
 - Municipalities using a depot based collection system are assumed to share a collection vehicle that stops in each municipality to collect material before proceeding to the primary node, similar to the current system.
- Round trip distance was calculated based on the shortest direct path between each municipality and primary node for curbside collection systems, and based on the shortest collection route between all municipalities sharing a depot system and the primary node.
- Weekly haul costs were calculated based on the number of weekly trips, the round trip distance, and direct haul truck assumptions including the average speed and cost per hour.
 - The cost to operate a typical direct haul collection vehicle was estimated at \$103/hour based on reported industry values.
 - An average vehicle speed of 70 km/h was chosen based on the assumed average highway travel speed.
- Estimated per tonne costs were calculated based on the weekly costs and the total tonnage hauled for each municipality or municipal grouping.
- The per tonne costs for each scenario are as follows:
 - Direct haul costs for depot based systems averaged \$136/tonne across Scenarios 1 to 3, and up to \$232/tonne for Scenario 4.
 - Direct haul costs for curbside collection systems averaged from \$97/tonne to \$101/tonne across Scenarios 1 to 4.
- Scenario 4 was not considered beyond this stage due to the relatively high hauling costs compared to the other scenarios.

4.4.5 Transfer Station Consolidation

The costs to consolidate materials at each primary node are presented in **Appendix B – Tables 4A and 4B** on Tab “**4A – TS Consolidation**”, and in **Appendix B - Table 4C** on Tab “**4B – TS Operating Cost**”. The following general methodology was used:

- The incoming weekly material volume for each material stream was calculated assuming that material from depot based collection systems arrives loose (un-compacted), while

single stream material from curbside collection programs arrives compacted at the corresponding compaction ratio indicated in **Appendix B - Table 4B**.

- The outgoing weekly material volume for each material stream was calculated based on the compaction ratios identified in **Appendix B - Table 4B**, with the exception of single stream material from curbside collection which arrives compacted and does not undergo further compaction.
- **Appendix B - Table 4C** outlines typical operating costs for municipally owned transfer stations including: staffing requirements, equipment, utilities and fuel, as well as maintenance and other costs.
- The estimated consolidation cost per tonne was calculated based on the total incoming tonnage and the total facility operating cost from **Appendix B - Table 4C**. Assumes that the entire annual operating cost is fixed and is independent of the actual tonnage consolidated relative to the facility operating capacity.
- The weekly consolidation cost was calculated based on the estimated processing cost per tonne, the incoming weekly material volume, and the corresponding density in **Appendix B - Table 4B**.
- The per tonne consolidation costs are as follows:
 - Consolidation costs for the individual transfer stations identified in all scenarios range from \$52/tonne to \$162/tonne. Higher per tonne consolidation costs are a result of the fixed operating costs and lower throughput. Lower per tonne consolidation costs reflect facilities that are utilizing capacity more efficiently.
 - The average consolidation costs under each scenario range from \$86/tonne to \$137/tonne.
- The information contained in the three scenario **Appendix B Tabs “4C – S1,2,3 - TS Cost Share”** break down the recommended cost sharing arrangements for each transfer station and respective municipalities. The cost sharing arrangements are based on economies of scale, similar to how water utilities distribute costs to clients based on use, and reflect prices based on the economies of scale realized with larger volumes or tonnes of material contributed by a municipality.

4.4.6 Haul to Secondary Node

The costs associated with hauling consolidated materials from each of the primary nodes to their end point at the secondary node, or MRF, are summarized in **Appendix B - Tables 5A and 5B** as presented in Tab “**5 – Haul to Secondary Node**”. The following general methodology was used:

- The annual compacted waste volume was taken as the total outgoing material volume from the given primary node.

- The annual number of transfer haul trucks (e.g., 53' walking-floor trailers) required was calculated based on the annual compacted waste volume and the average truck payload in **Appendix B - Table 5B**.
- The annual haul costs to the given destination nodes under each Scenario were calculated based on the number of haul trucks, the round-trip distance, as well as the average truck speed and the cost per hour noted in **Appendix B - Table 5B**.
 - The cost to operate a typical transfer haul vehicle was estimated at \$120/hour based on reported industry values.
 - An average vehicle speed of 70 km/h was chosen based on the assumed average highway travel speed.
- Costs were calculated assuming all material leaving a given primary node location is hauled to the same secondary node.
- Thunder Bay, Sudbury, and Timmins represent the regional MRFs proposed under the MIPC Study. NES – Timmins, R&D – North Bay, and Guelph represent private and municipally owned MRFs that may be willing to accept material.
- The locations of the secondary nodes identified under each scenario are presented in **Figure 4** (following the text).

Rail Haul

In addition to hauling by truck, hauling material by train was also investigated. Ontario Northland Transportation Commission⁸ was able to provide the following information regarding the haul of recyclables by rail:

- Approximate cost of \$7,500 per privately supplied rail car
 - Cost is per one-way trip between Kapuskasing and Hamilton or Guelph on the ONT-NBAY-CN rail lines
 - Subject to fuel surcharge
 - Maximum Weight of 125 tons (freight)
 - Rate applies to rail cars not exceeding 10' W x 10' H by 50' L
- Subject to establishing a suitable loading area at the origin and a suitable unloading area at the destination
- Conditional on consignee being rail served by CN
- Zero mileage compensation for private cars

⁸ Information received via email from Mr. Stephen Hayne on December 5, 2014.

- Subject to environmental approval
- Subject to regular train service
- Subject to existing infrastructure
- Rate quoted for feasibility purposes and is only valid for 30 days
- Subject to review when more information is available

A significant investment would be required to establish and operate suitable loading/unloading facilities, obtain required approvals, and haul by truck to the destination MRF. Given these issues it is presumed that hauling by rail will be prohibitively expensive when compared to hauling by truck. Rail haul may be better suited for long distances when there are no suitable facilities nearby, which is not the case in the NE-ON wasteshed.

4.4.7 Material Recovery Facility Processing

The costs to process materials at identified MRFs are summarized in **Appendix B - Tables 6A and 6B** as presented in Tab “**6 – MRF Processing**”. The following general methodology was used:

- The MRFs in Thunder Bay, Sudbury, and Timmins represent the regional MRFs proposed under the MIPC Study. The NES – Timmins, R&D – North Bay, and Guelph MRFs represent private and municipally owned MRFs that may be willing to accept material.
- The processing costs per tonne were as quoted by facility operators, or estimated based on the values provided.
 - Per tonne costs will need to be negotiated with a given facility as part of the material processing agreement. Costs can vary ± \$30 per metric tonne depending on a variety of factors such as material quantity, quality, and contamination (i.e., the amount of unacceptable materials in the recycling stream).
 - Some MRF operators may offer revenue sharing arrangements with a municipality based on the sale of recovered materials.
- Annual processing costs under each Scenario were calculated based on the cost per tonne and the total tonnage processed at the given facility.
- The Guelph MRF has quoted a neutral processing cost of \$0/tonne. This appears to be a unique case that requires further discussion with Guelph. Cochrane is currently sending material to the Guelph MRF.

4.5 Summary

4.5.1 Existing Program Costs

In Ontario, municipalities and Boards such as the CTWMB submit annual reports to the WDO outlining details of their recycling programs, including type of service offered, materials collected, material quantities, and financial data including operating costs and the revenue from the sale of materials⁹.

Differences in program characteristics can have significant effects on the net costs of operation. Municipalities in the NE-ON wasteshed fall into one of two WDO groupings: Rural Depot – North (Municipal Group 8), or Rural Collection – North (Municipal Group 6). Recycling programs in the North typically have higher recycling net costs per tonne, as larger shipping distances must be travelled to process and market the material, and there are fewer tonnes over which to spread the costs. Indeed, the Rural Depot – North grouping had the highest reported costs in 2013 at \$666/tonne, while the Rural Collection – North grouping had the third highest at \$485/tonne. Program costs for 2013 are summarized in **Table 3**.

Table 3 – Summary of Program Costs

Municipal Group	Program Name	Calculated Blue Box Tonnes Marketed	Gross Costs Per Tonne Marketed (\$)	Gross Revenue Per Tonne Marketed (\$)	Net Cost Per Tonne Marketed (\$)
Rural Collection - North					
6	Township of Cochrane	428	584	-	584
6	Town of Kirkland Lake	316	506	-	506
6	City of Timmins	3,216	504	0	503
Municipal Group Weighted Average			497	11	485
Rural Depot - North					
8	Cochrane Temiskaming Waste Management Board	1,531	539	94	445
Municipal Group Weighted Average			697	31	666
Total – All Municipal Groups					
Weighted Average			365	97	268

⁹ 2013 data sourced from the WDO website, including "2013 Blue Box Financial Data by Municipal Group" and "2013 Blue Box Financial Summary".

The average net cost per tonne of material processed for all programs in Ontario was \$268 in 2013, an increase of 9.6 percent over the past five year period. Over the five year period from 2008 to 2013, gross costs to operate the Blue Box program have increased annually at an average rate of 4 percent. Revenues from the sale of materials (and other reported program revenue) decreased by 1.6 percent between 2012 and 2013.

The average gross cost per tonne spent by Ontario municipalities on the Blue Box program is allocated as follows¹⁰:

- Promotion & Education - \$8
- Collection - \$193
- Processing - \$119
- Depot - \$27
- Administration & Interest - \$19

The collection and processing of materials typically represent the two largest costs in a recycling program, accounting for 53 percent and 32 percent of the total gross cost per tonne, respectively.

4.5.2 Proposed Program Costs

Tab “**7 – Summary**” brings together the costs for the whole model on a regional wasteshed level. Costs for each of the 6 steps involved in recycling service delivery are summarized per metric tonne of recyclables. This allows for the costs incurred at each step to be summarized as a total cost per tonne for the entire wasteshed.

In order to develop the representative costs for each municipality, additional tabs were generated that further break down these costs. The nomenclature for these tabs is as follows:

- S# (where # refers to either Scenario 1, 2, or 3)
- C# (where # refers to the primary node)

Similar to Tab 7, costs for each step in the system delivery model are presented in a cost per metric tonne of recyclables. The difference between the S#C# tabs and Tab 7 is that now the costs are presented for each municipality in the respective scenarios. This data is also informative for generating cost sharing arrangements at appropriate steps in service delivery.

¹⁰ Data Report #2 – 2013 Blue Box Program Cost & Revenue, WDO, December, 2014

4.5.3 Other Considerations

In developing and reviewing options, certain elements within each of the options require further analysis and discussion to determine their viability. A number of these are described below.

Kapuskasing as MRF – After visiting and reviewing the current operations at the current Kapuskasing facility, it would appear that a number of modifications and upgrades would be required in order for this facility to operate as a MRF. For example, there are existing capacity limitations and infrastructure requirements that would be needed in order to receive additional material under the current setup. All of these elements affect the capability of the facility to process, store and load for transfer. Further, if there is a move to curbside (single stream) collection within some of the northern municipalities, this will invariably increase the amount of material to process. It should be noted that this may be a short-term solution, but it is not consistent with a long term, regional solution for the overall wasteshed.

Kirkland Lake – Given Kirkland Lake's location relative to other municipalities in the area, and the amount of tonnages generated, the development of a transfer station may be an appropriate option. This would avoid a direct haul to Temiskaming Shores (considerable hauling distance) or Timmins. A relatively small operation could be designed and developed here, that would most likely not require permits (i.e. exempt from ECA's for small scale facility, similar to Cochrane's). The key factor lies in whether the cost of developing and operating a Transfer Station would in fact be cheaper than a direct, long haul to another municipality.

Cochrane TS – As previously mentioned, Cochrane moved to curbside (single stream) collection and removed themselves from the CTWMB, and in doing so, also developed their own infrastructure and contracts. Part of the infrastructure relates to the Transfer Station that Cochrane has put in place to consolidate their materials and then send to a processor. In our analysis, given the limited size of the Cochrane Transfer Station, it is unlikely to be shared with other municipalities within the northern node of the wasteshed. Further, given its proximity to Kapuskasing and Timmins, it is not efficient to be operating a transfer station along with the consolidation points in these other locations. While the transfer station in Cochrane is not operating as efficiently as it potentially could be, it is unlikely to close down based on other recommendations made in this report given how new the facility is. It is important to note that the model developed shows that increased operating costs for more transfer stations are largely offset by the reduced haul costs from shorter distances. Therefore, this Transfer Station continuing to operate is reasonable given that Cochrane would not see much in terms of savings if they were to send their material elsewhere.

Timmins – Given the annual tonnages, Timmins acts as a central hub in the region. There is the potential for a regional MRF to be established in Timmins under the MPIC recommendations. This option has been modeled using costs estimated based on other facilities. If the proposed facility is built, it is assumed that it would process material from all municipalities in the region. However, design and construction of the facility may take several years so it will still be necessary to establish interim processing capacity using alternate facilities.

4.6 Cost Model Review

A review of the costs and cost model was undertaken by KPMG as a way of verifying the results by a third party. Specifically, KPMG we have undertaken the following procedures in connection with the review:

- Tested the CRA financial model for mathematical accuracy, including a review of formulas and cross-referencing within the model and a comparison of the model to reference materials cited by CRA
- Performed certain procedures intended to assess the reasonableness of the assumptions used in the financial model, including the comparison of financial indicators to other reference materials relating to collaborative models for the management of recyclables
- Assessed the potential impact of changes in key assumptions on the total costs to the participating municipalities, which is intended to provide an indication of the potential financial risks to the participating municipalities (i.e., minor changes in assumptions that result in significant changes to financial costs are considered to be an indicator of higher risk)

KPMG found that the assumptions utilized were reasonable and by making changes in key assumptions (i.e. sensitivity analysis), the model was sound and appropriate. **Appendix C** provides further details on the results of KPMG's analysis.

Section 5.0 Cost Sharing Model

As mentioned previously, the goal of the model is to determine the least cost option that results in the highest diversion, while ensuring that the selected option keeps the performance of the regional wasteshed within the past cost range. As part of this project, KPMG reviewed the existing cost sharing model that the CTWMB had in place, as well as other comparable cost sharing arrangements within the Province.

Several alternatives exist for the sharing of operating costs incurred in connection with the shared approach to the management of recyclables. In selecting a preferred cost sharing model, KPMG suggested that the following attributes be reflected (further details available in **Appendix C**):

- **Fairness**, with costs allocated based on utilization of the system
- **Consistency**, with communities that have similar circumstances being allocated the same proportion of costs
- **Ease of administration and understanding**, avoiding the need for complex formulae or onerous record keeping
- **Sustainability**, with the cost sharing model encouraging as many municipalities as possible to participate in the initiative as well as providing some form of incentive to maximize the amount of recyclable materials diverted

In addition to these considerations, the development of a cost sharing model should consider two key questions:

1. Which costs are to be borne by the individual municipalities as opposed to shared by the group? This is referred to as a “local cost”.
2. For so-called “shareable costs”, how will these be allocated among the participating municipalities?

Local collection costs

Based on the analysis completed by KPMG, it is suggested that the collection costs within the community should be excluded from the determination of shareable costs on the basis that:

- Local communities retain the right (and responsibility) to determine the appropriate level of service (e.g. curbside vs. depot, frequency of collection)
- The collection of recyclables is often undertaken at the same time as other solid waste collection and as such, separating costs between recyclables vs. other waste streams will be problematic

Transportation costs from communities to transfer stations

Based on the analysis completed by KPMG, it was suggested that transportation costs from the participating communities to the transfer stations should be included in the determination of shareable costs (with an appropriate level of adjustment as needed). While it could be argued

that the inclusion of these costs is unfair to those communities where transfer stations exist (as they do not need to ship recyclable materials over longer distances), we note that the overall cost of the initiative does not change significantly as the number of transfer stations increases. In addition, the exclusion of transportation costs from communities to transfer stations would provide a disincentive to those communities without transfer stations to participate in the initiative, particularly those that are of considerable distance from a transfer station. As transfer station costs are fixed in nature (as well as any capital investment requirements), the participating of more communities reduces the overall costs for all communities, including those that have transfer stations.

Other operating costs

As operating costs relating to transfer stations, transportation to the MRFs and MRF costs are incurred on a shared basis, these costs should be considered as shareable costs allocated to the participating municipalities.

Capital costs, amortization and reserves

While the financial model does not reflect capital expenditures, we suggest that capital expenditures incurred for transfer stations or MRFs be considered a shareable cost as all participating municipalities benefit from the investment.

In order to ensure the long-term sustainability of the initiative from a capital reinvestment perspective, consideration could be given to including amortization and/or reserve contributions in the determination of shareable costs.

5.1 Cost per tonne Analysis

While a number of alternatives exist for the sharing of operating costs to be incurred by the initiative, the most common form of cost allocation used by similar initiatives involves sharing costs on a per tonne basis. While proponents of this approach cite the fact that it provides arguably the best linkage between utilization and costs, as well as representing a mechanism that is easy to administer and understand, we suggest this is only the case where the participating municipalities have similar characteristics in terms of volumes of waste diverted and distances from the primary and secondary nodes. Where these characteristics differ, the use of a per tonne allocation model can actually result in an unfair allocation of costs:

- The use of a single rate per tonne of waste diverted does not address the incremental costs associated with significant distances covered within this wasteshed. Rather, all

municipalities pay the same rate regardless of transportation costs associated with primary and secondary mode shipments.

- Given the geographic area contemplated for this initiative (both from an overall perspective and for the individual transfer stations), there will be significant differences in transportation costs by communities, notwithstanding the sharing of vehicles amongst different municipalities.
- The use of a single rate per tonne does not reflect the inherent economies of scale that are derived from increasing amounts of diverted waste. While certain components of the initiative have purely variable costs that fluctuate directly with the amount of waste diverted (e.g. MRF processing fees), other components are primarily fixed in nature (e.g., transfer station operating costs).
- For fixed costs components, the actual cost per tonne decreases as the volume of waste diverted increases and the use of a single rate per tonne effectively results in larger municipalities subsidizing smaller municipalities.

5.2 Cost Sharing Framework - Recommendations

In light of the cost per tonne analysis provided in Section 5.1, consideration could be given to a hybrid model that involves the allocation of costs on the following basis:

Table 4 – Cost Sharing Framework

Cost Component	Allocation Method and Rationale
Local collection costs	No cost allocation between the participating municipalities. Rather, each municipality is required to fund their own collection costs based on the fact that local collection is not shared and service levels are entirely at the discretion of the communities.
Transportation costs from communities to transfer station	An allocation of costs on a per tonne basis that adjusts for distances between the participating municipality and the transfer station. The adjustment for distance is intended to provide for a fair reflection of the increased transportation costs associated with those municipalities located at a further distance from the transfer station.
Transfer station operating costs	Per tonne charge that decreases in blocks as the level of waste diverted by an individual municipality increases. The use of a decreasing per tonne charge is intended to reflect the economies of scale realized from higher waste volumes, with a resultant benefit to municipalities that divert more waste. Transfer station operating costs are primarily fixed and as such, increased waste volumes reduce the per tonne charge for all municipalities. Our experience demonstrates that a declining variable rate is used for the pricing of other municipal services, most notably water and wastewater rates, primarily to reflect the economies of scale that result from increased volumes.

Cost Component	Allocation Method and Rationale
Transportation costs from transfer stations to MRF	Single per tonne charge. The use of a single charge (as opposed to a declining charge) reflects the fact that these costs are 100% variable, with minimal economies of scale realized from increased volumes.
MRF operating costs	

While subject to negotiation, the details of the proposed cost share allocations and the per tonne cost to the participating municipalities under each scenario are summarized in **Appendix D**. A per household cost to each municipality has been established for each option based on the proposed framework.

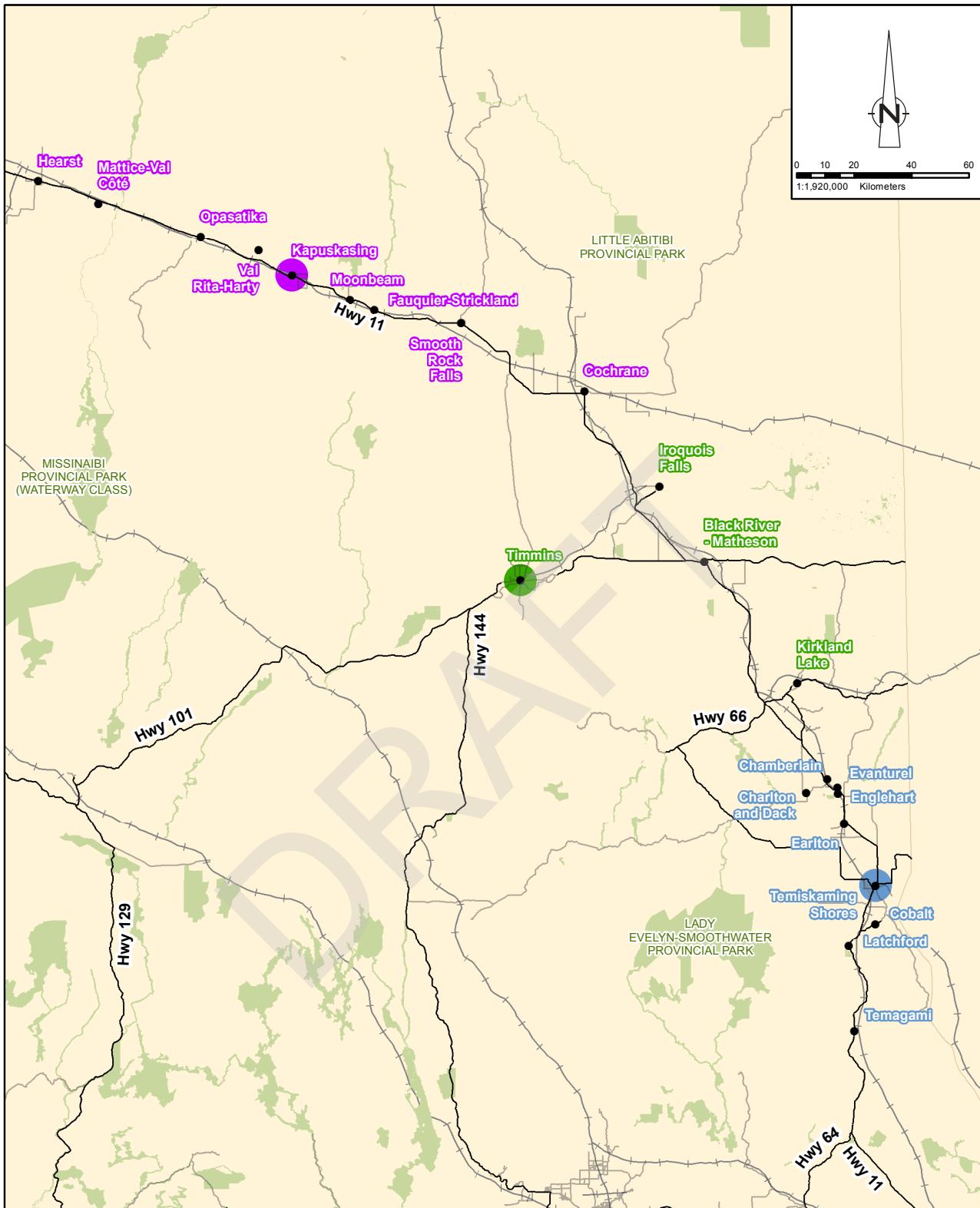
It is important to note that at this point in time only the framework has been developed for discussion and consideration. Once the framework has been reviewed and revised (if necessary) a more formal membership agreement will be drafted that will provide greater detail on implementation.

Section 6.0 Next Steps

Next Steps to be determined after discussion with Municipalities on this Draft Report

Figure 3-1 to 3-4

Location of Primary Nodes

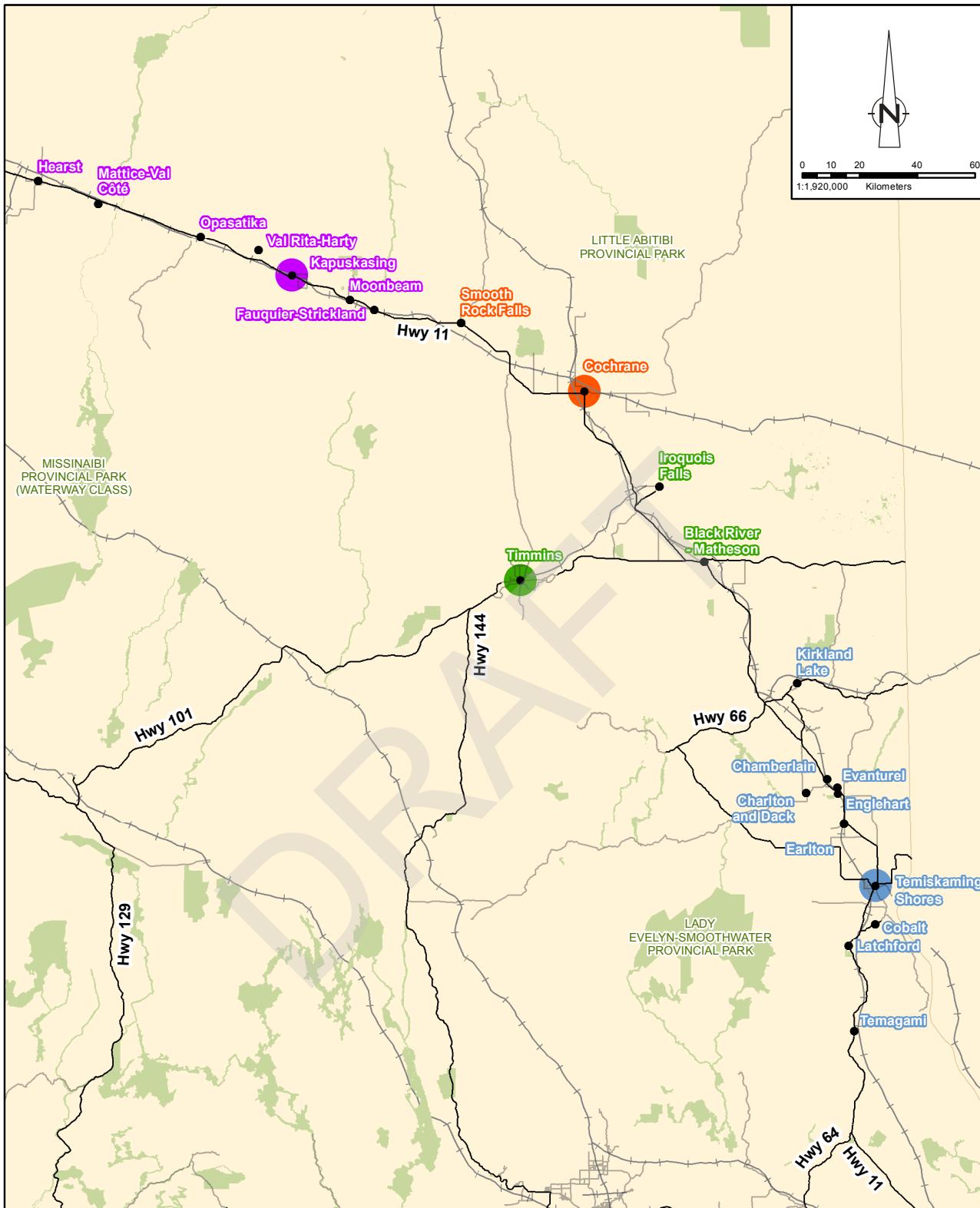


Source: MNR NRVIS, 2013. Produced by CRA under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2015;
Coordinate System: NAD 1983 UTM Zone 17N

figure 3-1

**DIRECT HAUL TO PRIMARY NODE
SCENARIO 1**



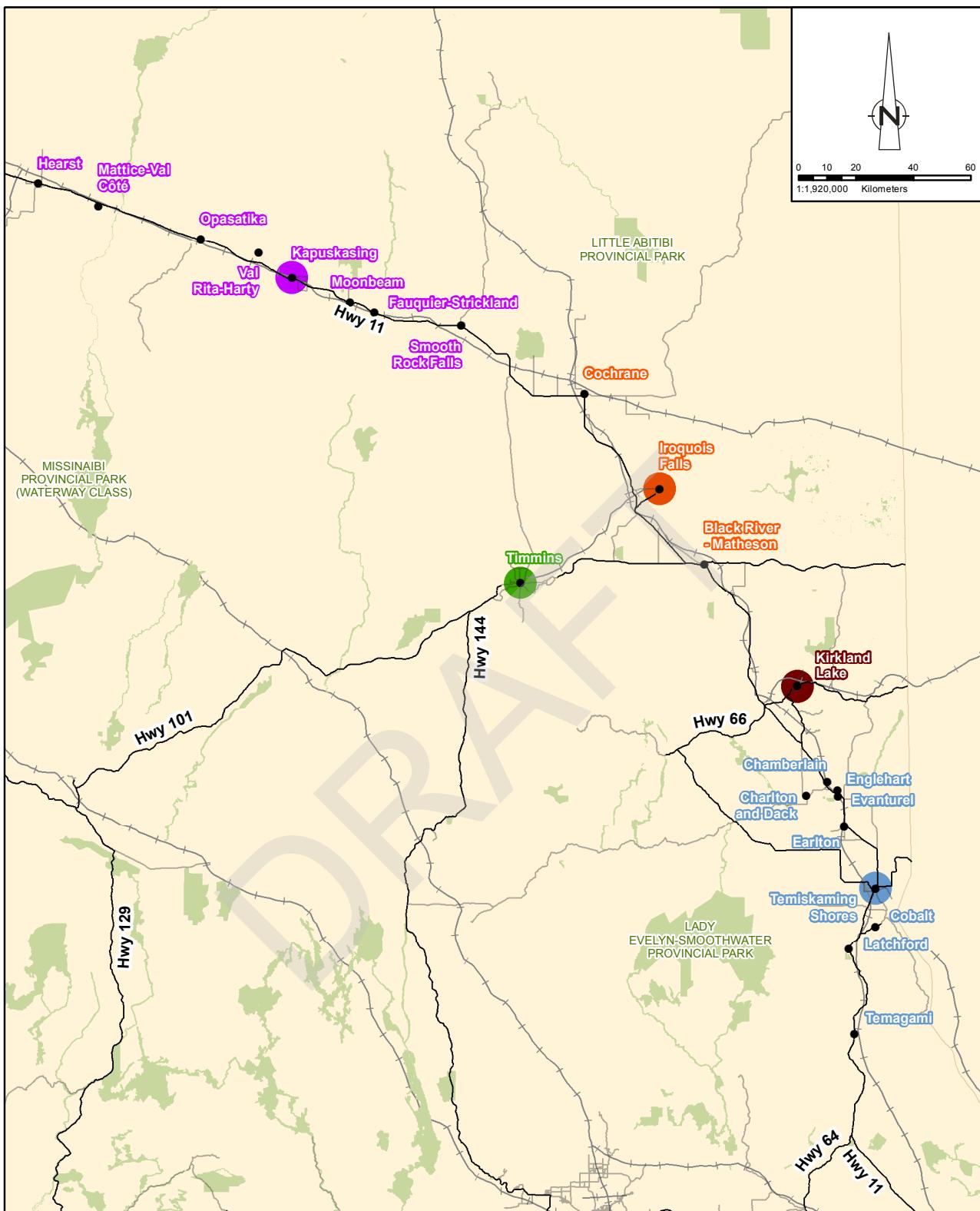


Source: MNR NRVIS, 2013. Produced by CRA under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2015;
Coordinate System: NAD 1983 UTM Zone 17N

figure 3-2

DIRECT HAUL TO PRIMARY NODE SCENARIO 2





Source: MNR NRVIS, 2013. Produced by CRA under licence from Ontario Ministry of Natural Resources, © Queen's Printer 2015;
Coordinate System: NAD 1983 UTM Zone 17N

figure 3-3

**DIRECT HAUL TO PRIMARY NODE
SCENARIO 3**



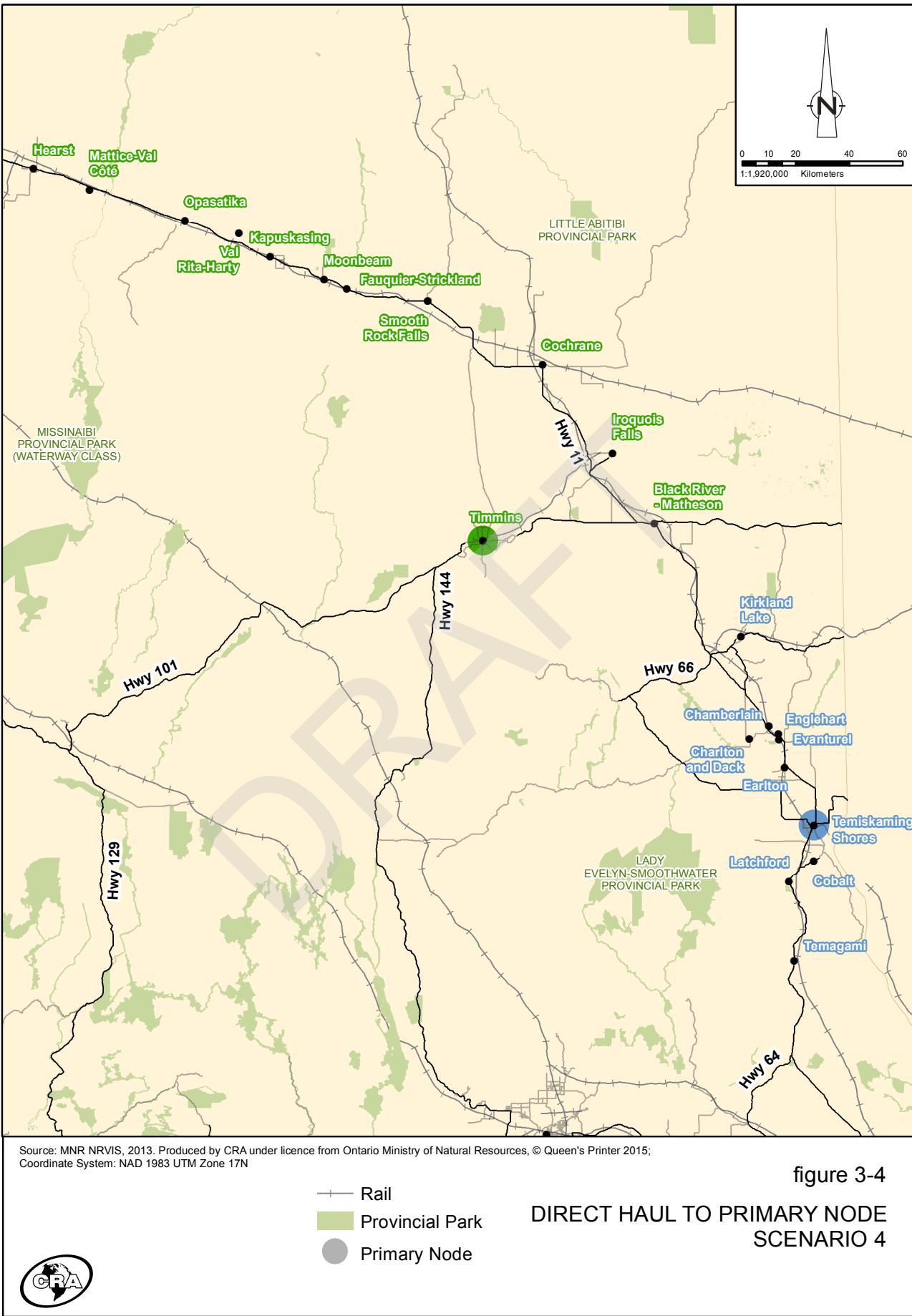


Figure 4

Location of Secondary Nodes

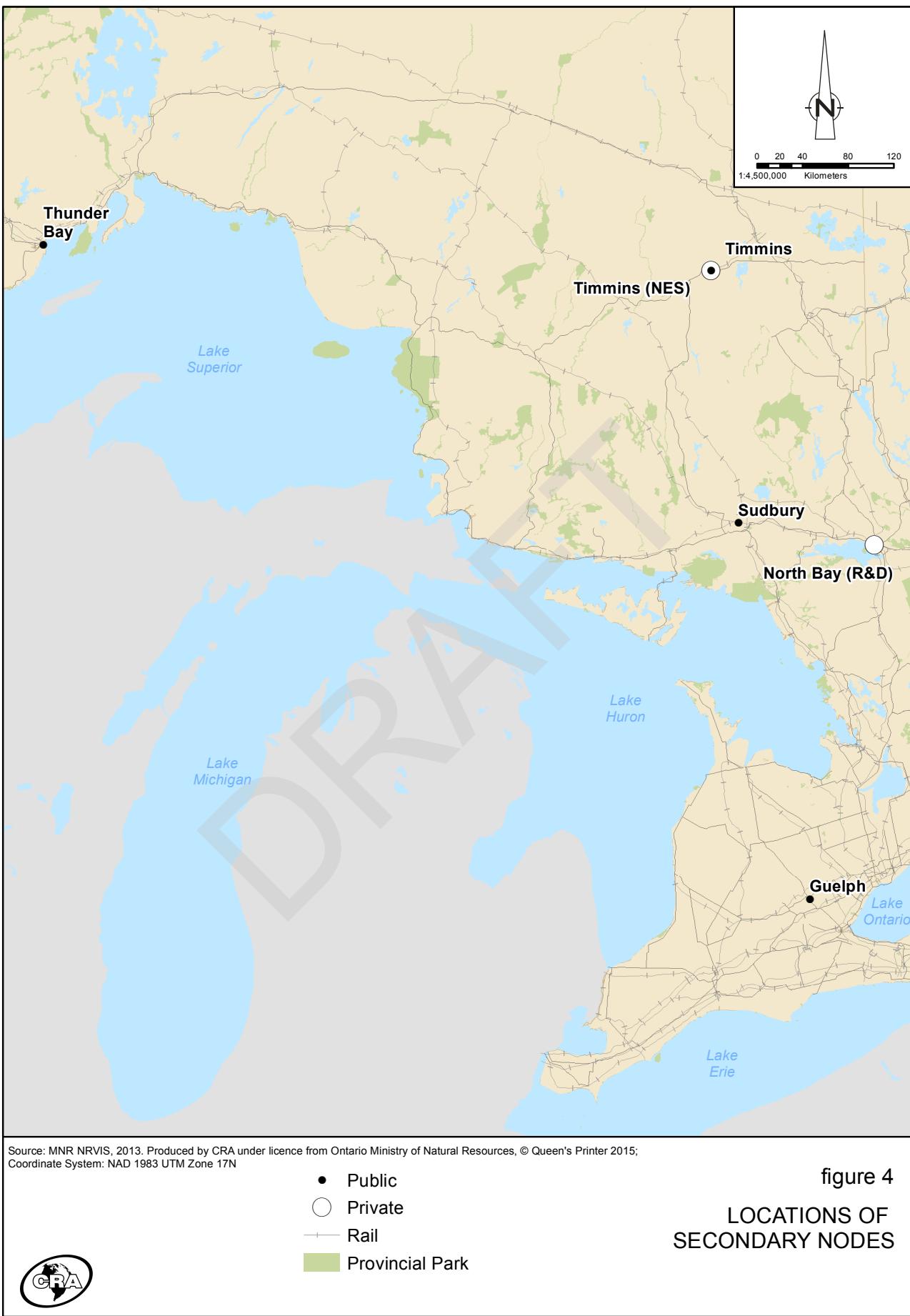


Table 2

Existing Waste Management Facilities

Table 2
CIF Service Delivery Model
Existing Waste Management Facilities

page 1 of 1

Summary of Waste Management Facilities in the North Eastern Ontario Watershed

Facility Location	Facility Type	Address	Public/ Private	Owner/ Operator	ECA	Size	Accepted Materials	Capacity	Quoted Price per tonne*	Other Information
Cochrane	Transfer Station (intermodal shipping container walls with translucent fabric roof)	Public Works Yard Public	Public	Owner: Town of Cochrane Operator: Town of Cochrane	Exempt from ECA requirements	Building approximately 80 ft x 40 ft	Single stream - no plastic film, polystyrene (based on where material is currently processed)	477 tonnes (in first year)	ns	Utilities: none Scale on site: none Hours of operation: restricted to daylight hours Tech: n/a Other:
Timmins	Transfer Station (Transtors)	Deloro Landfill Site	Public	Owner: Corporation of the City of Timmins Operator: City of Timmins	A580703	375.2 ha (site)	Single stream - no restrictions	8 tonnes/day	ns	Utilities: none Scale on site: none Hours of operation: restricted to daylight hours Tech: n/a Other:
Temiskaming Shores	Transfer Station (enclosed steel frame structure, former MRF)	Barr Drive	Public	Owner: City of Temiskaming Shores Operator: Phippen Waste Management	Application in works		Single stream - no restrictions		\$250/MT	Utilities: yes Scale on site: yes Hours of operation: restricted to normal business hours Tech: n/a Other: may be nearing capacity
Kirkland Lake	Recycling Centre (Material Recovery Facility)	37 Duncan Avenue North	Private	Owner: Teck Northern Roads (TNR) Operator: TNR	2768-6UW/NL4	0.67 ha (site)	Material must be pre-sorted to be consistent with current collection arrangements	3 tonnes/day (can receive waste 7 days per week, therefore approx. 1,095 tonnes/year)	ns	Utilities: unknown Scale on site: unknown Hours of operation: unknown Tech: manual sort Other:
North Bay	Processing Facility (Material Recovery Facility)	112 Patton Street	Public	Owner: Corporation of the City of North Bay Operator: Miller Waste Inc	A530114	1.74 ha	Material must be pre-sorted to enter facility. No Glass permitted in waste streams.		ns	Utilities: yes Scale on site: yes Hours of operation: restricted to normal business hours Tech: State of art facility Other:
Guelph	Waste Resource Innovation Centre (Material Recovery Facility)	110 Dunlop Drive	Public	Owner: Corporation of the City of Guelph Operator: City of Guelph	A170128	29.54 ha (site)	Single stream - no plastic film, polystyrene	Max 1,200 tonnes/day (residual waste transferred from); Organic waste 60,000 tonnes/year (received)	\$0/MT	Utilities: yes Scale on site: yes Hours of operation: restricted to normal business hours Tech: State of art facility Other:
Sudbury	Recycling Centre (Material Recovery Facility)	1825 Frobisher Street	Public	Owner: City of Greater Sudbury Operator: Canada Fibers Inc.	A5240231		Single stream - no restrictions	193 tonnes/day	\$98.55/MT	Utilities: yes Scale on site: yes Hours of operation: restricted to normal business hours Tech: State of art facility Other:
Kanuskasing	Material Recovery Facility	181 Brunetville Road	Public	Owner: Cochrane Temiskaming Waste Management Board (CTWMB) Operator: CTWMB	A770076	2.5 ha (site)	Material must be pre-sorted to be consistent with current collection arrangements. Single sort material may be accepted, though this would impact processing efficiency		ns	Utilities: yes Scale on site: yes Hours of operation: restricted to normal business hours Tech: State of art facility Other:
Timmins	Material Recovery Facility	740 Pine Street South	Private	Owner: Northern Environmental Services Inc. (NES) Operator: NES		Unknown	Single stream - restrictions unknown		\$100/MT	Utilities: yes Scale on site: none Hours of operation: restricted to normal business hours Tech: manual sort Other:
North Bay	Material Recovery Facility	Highway 17 West	Private	Owner: R&D Recycling Operator: R&D Recycling		Unknown	Single stream - no restrictions		\$100/MT	Utilities: yes Scale on site: none Hours of operation: restricted to normal business hours Tech: Manual sort Other:

* ns = No price set or no quote received for managing materials through these facilities

Appendix A

Municipality Correspondence & Interim Presentation

DRAFT

North-Eastern Ontario Optimization: Service Delivery Model Option Development & Evaluation CIF Project #730

Project Kick-off Meeting

December 15 & 16, 2014



Introductions

- CIF Team
 - Carrie Nash, Project Manager
 - Bradley Cutler, Project Support
- CRA & KPMG Team
 - Blair Shoniker, CRA, Team Lead
 - Brian Dermody, CRA, Infrastructure Review & Support
 - Oscar Poloni, KPMG, Strategic Planning Support

Project Highlights

- Project goal:

Development of a service delivery & cost sharing model to optimize recycling services in the NorthEastern (NE) wasteshed

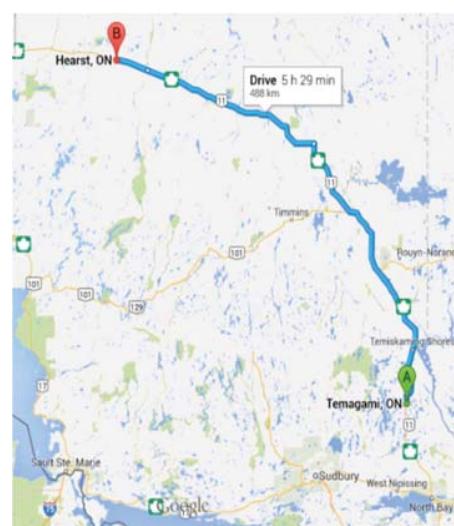
- Anticipated Impacts:

- Consolidation of collection, hauling, transfer and processing of recyclables
- Newly defined partnership & cost sharing arrangements

■ ■ ■ 3

Why this Project?

- **To help** manage the outcomes of the CTWMB dissolution in December 2014
- **To assist** municipalities from Temagami to Hearst in identifying and engaging in on going collaborative opportunities
- **To identify** opportunities to keep performance within past range:
 - Municipal Group 8
 - Net Cost \$328.63
 - Municipal Group Avg. \$643.08



■ ■ ■ 4

Project Steps

1. Review Current Service Delivery Model
 - Assets
 - Membership (existing & new)
 - Cost Sharing Agreement
2. Consideration of MIPC Study recommendations
3. New Option Development
 - Long list
 - Short list



■ ■ ■ 5

Model: Approach to Cost Analysis

- Model – 5 parts
 1. Collection within your municipality (Depot or Curbside)
 2. Hauling to Consolidation Point
 3. Consolidate material for transfer
 4. Hauling to Processor
 5. Processing

■ ■ ■ 6

Option(s) Development

- All municipalities are included in the analysis as the starting point
 - Economies of Scale/ Strength in numbers
- Analysis is based on Wasteshed approach, with 3 Regions (some flexibility on Central Region)
- Northern Region
 - Hearst to Cochrane
- Central Region
 - Iroquois Falls, Black River-Matheson, Kirkland Lake (Timmins)
- Southern Region
 - Chamberlain to Temagami

... 7

Starting Point - Generation

- Statistics Canada (2011) data for each municipality
 - Population and Households
- Waste generation rate kg/capita
 - Data sourced from WDO Datacall
 - Used representative data for municipalities where no data existed (302 kg/capita/year)
- Data and assumptions generated for Solid Waste Composition
- Estimated Recyclable Materials Diverted for each municipality, based on:
 - Collection Program (Depot or Curbside)
 - Recyclable Material Capture Rate

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1 - Collection

- What is the current collection program?
 - Depot / Curbside
 - Multi-stream (containers, fibres) / Single Stream
- Weekly Tonnage
 - Diversion rate
- Weekly Volume
 - Calculated based Weekly Tonnage and Density (kg/m³)
- Collection Vehicles
 - Estimated volume
- How many weekly trips are required?

■ ■ ■ 9

2 - Hauling to Consolidation

- How many weekly trips are required to bring in:
 - depot collected material?
 - curbside collected material (direct haul)?
- What is the weekly travel distance for:
 - round trip 'milk run' pick-up of depot material?
 - round trip direct haul for curbside material?
- What is the haulage costs?
 - Based on:
 - assumed average speed
 - hourly trucking cost
 - distance travelled by all vehicles
(trips per week x round trip distance)

■ ■ ■ 10

3 - Consolidation for Transfer

- What volume of material comes in per week?
 - depot collected material
 - curbside collected material
- What volume of material goes out per week?
 - What is the volume if shipped as Multi-Stream
 - What is the volume if shipped as Single Stream
- What does it cost to operate a transfer facility?
- What does it cost to process material each week?
 - operating cost per week
 - tonnage per week

■ ■ ■ 11

4 - Hauling to Processor

- What is the volume of material hauled per week?
 - How much if Multi-Stream (containers, fibres)
 - How much if Single Stream
- What is the round trip travel distance ?
- What is the haulage costs?
 - Based on
 - assumed average speed
 - hourly trucking cost
 - distance travelled by all vehicles (trips per week x round trip distance)

■ ■ ■ 12

5 - Processing

- What volume of material hauled per week to MRF?
- What is the per tonne cost?
- What is the weekly processing cost?



■ ■ ■ 13

Where did we start?

- Hauling
 - to Consolidation (Part 2)
 - to Processor (Part 4)
- Most expensive costs in the “lifecycle” of the process
- Model may be altered for these parts (i.e. distance to nodes)
- Flexibility built in to the Model
- Processing locations may be altered, identified potential/starting point
- **This session allows us to start the conversation on potential options**

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Option Variables

For all options, the following will be determined:

- Rough depot vs curbside collection costs
- Cost to construct or update transfer points
- Cost to operator transfer stations points

■ ■ ■ 15

Option 1: North, Central & South

Consolidation Points

- Kapuskasing (MRF, Transfer Station)
- Timmins (Transfer Station, with & without)
- Temiskaming Shores (Transfer Station)

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Option 2: Central & South

Consolidation Points

- Timmins (Transfer Station, with & without)
- Temiskaming Shores (Transfer Station)

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Option 3: Additional Nodes North & South

Additional Consolidation Points

- Cochrane
- Kirkland Lake Timmins

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Processors Considered

- Kapuskasing
 - \$277/t
- Timmins (NES)
 - \$100/t
- North Bay (R&D Recycling)
 - \$100/t
- North Bay (Miller as Operator)
 - \$TBD; will not accept Single Stream
- Sudbury
 - \$97.55/t – “very little flexibility on price”
- Guelph
 - No charge

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Option Total Costs ‘Under Construction’

Option	Collection	Hauling to Consolidation	Consolidation	Hauling to Processor	Processor	Total
1						
2						
3						
4						

- Option X – least cost effective
 - Rationale
- Option X – most cost effective
 - Rationale

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Key Assumptions

GOAL: Which Option provides for least cost, highest diversion?

- All Municipalities are included in the Options
 - Economies of scale are key throughout the 5 Steps
- Generation Rates, Recycling Rates, Capture Rates
- Models can accommodate both Depot and Curbside programs
- Haulage Costs
- Transfer Station Operating Costs
- Processing Costs

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Option	Comments
Per Household	<ul style="list-style-type: none">• Costs are allocated to participating communities based on number of households• Easiest model to administer for residential waste assuming common basis for determined number of households (MPAC, Statistics Canada)• More of a challenge for ICI waste due to absence of base data as well as differences in types and size of ICI• Treats all municipalities the same with no consideration of distances from community to central site
Collection time	<ul style="list-style-type: none">• Costs are allocated based on the amount of time that a vehicle spends in a specific community• Could be based on employee timesheets, which would form a proxy for equipment time• Eliminates issues with respect to residential vs. ICI as all types of users are included in analysis• Would result in higher cost allocated to communities located further away due to travel times involved, unless basis is only for time spent in the community
Waste collected	<ul style="list-style-type: none">• Costs allocated based on amount of waste collected (tonnes or m³)• May not fully recover the cost of the service for low volume communities while at the same time not realizing economies of scale for high volume communities• Would require a verifiable means of tracking how much waste is produced by community (e.g. weigh scales)

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What does this mean?

- What will this cost my municipality?
- Starting point for discussion = New opportunity
- Strength is in your numbers – Processors want to work with 1 collective voice
- New Cost Sharing Agreement
- Stranded Assets

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Next Steps

- Review feedback/ input from this meeting on Interim Options
- Visit facilities in Temiskaming Shores, Kapuskasing and Timmins
- Alter Model, Refine Numbers
- Circulate numbers & accept feedback
- Final Recommendations on Options – Webinar
- Final Report – January 30, 2015

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Q&A Opportunity

- We need your feedback and input
- Opportunity to provide thoughts on model and options
- Identify on going collaborative opportunities
- Incorporation of this session will influence the Final Report/ Recommendations

■ ■ ■ 25

Thank
you!

■ ■ ■ 26

December 18, 2014

Attention: Ms. Carrie Nash
92 Caplan Avenue, Suite 511
Barrie, ON L4N 0Z7

Sent via email: carriennash@wdo.ca

Dear Ms. Nash:

Subject: Service delivery options for Northeastern Ontario recycling programs

This letter outlines concerns and recommendations by City representatives further to the meeting held on Monday, December 15th from 1:30 p.m. until 4:00 p.m. regarding service delivery options for Northeastern Ontario recycling programs.

On February 7th, 2014, the City of Temiskaming Shores sent letters to the members of the Cochrane-Temiskaming Waste Management Board, providing notice of withdrawal from the joint management and operation of a municipal waste management (recycling) program. The letter also indicated that the City is proceeding with a Full Solid Waste Management Program, which includes the curbside collection of recyclable material, and the City anticipated the program would be developed to allow neighbouring municipalities to utilize facilities established under the program on a fee for service basis.

On September 2nd, 2014, the City of Temiskaming Shores began the curbside collection of garbage and single-stream recyclables on an alternating (bi-weekly) collection schedule. It is the City's understanding, that the CRA was retained after this date to complete interim work on Northeastern Ontario recycling programs. The City communicated its intentions to move towards an independent recycling program well in advance of this study and since then, has expended significant capital costs for its execution, and entered into long-term agreements for the programs operation.

A priority of the Continuous Improvement Fund was to find programs of the least cost and highest diversion. The City has achieved this objective by increasing diversion from 18 percent with the CTWMB to 55 percent (a 37 percent increase in three months), and we are anticipating that our net cost per tonne will be well below the Group 8 average of \$643.08. As discussed during the meeting, the City would not be in a position to enter into an agreement that would subsidize recycling programs for Southern Node municipalities (Chamberlain to Temagami), but rather enter into agreements to accept recyclable material at an associated fee for processing and transportation, as previously recommended on February 7th.

An area of concern is that the "least cost" term does not take into account long-term savings for municipal operations, such as those associated with landfills. The City's existing landfill was projected to reach capacity between 2018 and 2020 applying the 18 percent waste diversion rate achieved through the CTWMB program. Our newly established single-stream recycling program will lengthen the lifespan

of the landfill - a significant cost saving to the municipality, and is of considerable importance with respect to decision making.

Concerns were also expressed at the meeting regarding our acceptance of the recommendations outlined in the report. In the event the City does not accept the recommendations due to conflicts with the City's new program and objectives, would his decision adversely affect our WDO Data Call despite the significant and progressive improvements established as of September 2014.

The City of Temiskaming Shores respectfully requests that the CIF and CRA consider the above-noted concerns while developing their report, and to include the recommendation of the City accepting material from Southern region municipalities. The 2015 processing fee to accept materials is \$250.00 per tonne (reviewed on an annual basis), and the costs associated with this option is anticipated to be well below the Group 8 average net cost per tonne, depending on the collection system used by the municipality and the transportation method and frequency to the City's Spoke Transfer Station . This appears to be the only feasible option for the City of Temiskaming Shores, as we already have a significant investment into our single-stream curbside collection recycling program.

Should you have any questions, please contact me using the coordinates listed below.

Regards,



Christopher W. Oslund
City Manager
(705) 672-3363 ext. 4120
coslund@temiskamingshores.ca

cc: Brad Cutler, CIF
Blair Shoniker, CRA
Brian Dermody, CRA

Appendix B

Model Spreadsheets

DRAFT

Table 1A - Residential Solid Waste Generated

Municipality	Considered in Evaluation? (Yes or No)	Population	Households	Waste Generation Rate (kg/capita/year)	Total Residential Waste Generated (tonnes/year)	Recyclable Material in Waste Stream (tonnes/year)			Collection Program (Depot or Curbside)			Estimated Recyclable Material Diverted (tonnes/year)		
						Blue Box Metals	Blue Box Plastics	Recyclable Glass	Blue Box Papers	Total	Blue Box Metals	Blue Box Plastics	Recyclable Glass	Blue Box Papers
Heurist	Yes	5,980	2,524	1,537	46	123	61	354	594	55	21	21	159	263
Mattice - Val-Cote	Yes	686	340	302	207	6	17	48	15	79	3	7	4	35
Opasatika	Yes	214	133	302	65	2	5	3	57	25	1	2	1	11
Val Rita-Harty	Yes	817	368	302	247	7	20	10	94	94	3	9	4	42
Kenora-Hunting	Yes	8,090	4,090	8,956	2,475	74	158	99	569	941	33	89	45	296
Moosonee	Yes	11,101	5,953	302	333	10	27	13	76	126	4	12	6	341
Faquier - Etrickland	Yes	530	270	302	160	5	13	6	37	61	2	6	3	27
Smooth Rock Falls	Yes	1,376	693	302	416	12	33	17	96	158	9	23	12	67
Cochrane	Yes	5,340	2,245	302	1,613	48	129	65	371	613	34	90	45	429
Ironwood Falls	Yes	4,955	2,234	302	1,388	42	111	56	319	527	29	78	39	369
Black River - Matheson	Yes	2,110	1,172	302	728	22	58	29	167	277	15	41	20	117
Timmins	Yes	43,165	18,816	280	12,086	363	967	483	2,780	4,533	254	677	338	1,946
Kirkland Lake	Yes	8,333	4,234	303	3,278	98	262	131	754	1,245	69	184	92	528
Chamberlain	Yes	297	161	302	90	3	7	4	21	34	1	3	2	15
Englehart	Yes	1,519	751	302	459	14	37	18	106	174	10	26	13	74
Eastnor	Yes	452	208	302	137	4	11	5	31	52	3	8	4	36
Cheltenham and Orisk	Yes	671	274	302	203	6	16	8	47	77	11	6	7	33
Armstrong (Elderton)	Yes	1,216	516	302	367	11	29	15	84	140	5	13	7	54
Cobalt	Yes	10,400	4,402	302	3,141	94	251	126	722	1,194	66	176	88	633
Latchford	Yes	1,133	623	302	342	10	27	14	79	130	7	19	10	506
Tenagami	Yes	387	202	302	117	4	9	5	44	44	2	7	3	31
TOTAL	-	98,548	45,280	-	29,633	889	2,371	1,105	6,816	11,261	-	581	1,250	775
Notes														4,456

1. "Population" data sourced from Statistics Canada, Census 2011 (<http://www2.statcan.gc.ca/census-recensement/2011/dp-dm/t1/LANG-Eng8-f+30185-38O-D1/>)2. "Waste Generation Rate" data sourced from Waste Division Ontario Municipal Datacell, Residential GAD Diversion Rates, 2012 Residential Diversion Rate by Municipality (<http://www.wdo.ca/partners/municipalities/municipal-datacell/>)

3. "Recyclable Material in Waste Stream" data calculated based on "Total Residential Waste Generated" and data from Table "Residential Solid Waste Composition"

4. "Estimated Recyclable Material Diverted" calculated based on "Collection Program", and data from Table "Residential Solid Waste Composition"

Table 1B - Residential Solid Waste Composition

Material Category	Components	Estimated Percent of Total Waste
Blue Box Metals	Aluminum, Steel, Mixed Metal	3.0%
Blue Box Plastics	Containers, Tubs & Lids	8.0%
Recyclable Glass	-	4.0%

Notes

1. "Target Capture Rate" data sourced from Guidebook for Creating a Municipal Waste Recycling Strategy, Table 1, Town, March 2010. (http://cltwdo.ca/pdf/guidelines/wrs_guidebook.pdf)2. "Estimated Capture Rate" data estimated based on Waste Division Ontario Municipal Datacell, Residential GAD Diversion Rates, 2012 Residential Diversion Rate by Municipality - Residential Recyclables Diverted (<http://www.wdo.ca/partners/municipalities/municipal-datacell/>)

Table 1C - Recyclable Material Capture Rate

Municipal Group	Target Capture Rate (%)	Estimated Capture Rate (%)
Rural Depot - North	65%	45%
Rural Collection - North	70%	70%

Notes

1. "Target Capture Rate" data sourced from Guidebook for Creating a Municipal Waste Recycling Strategy, Table 1, Town, March 2010. (http://cltwdo.ca/pdf/guidelines/wrs_guidebook.pdf)2. "Estimated Capture Rate" data estimated based on Waste Division Ontario Municipal Datacell, Residential GAD Diversion Rates, 2012 Residential Diversion Rate by Municipality - Residential Recyclables Diverted (<http://www.wdo.ca/partners/municipalities/municipal-datacell/>)

Table 2A - Residential Solid Waste Generated

Municipality	Population	Households	Waste Generation Rate (kg/capita/year)	Total Residential Waste Generated (tonnes/year)	Collection Program (Depot or Curbside)	Estimated Recyclable Material Diverted (tonnes/year)
Heurist	5,980	2,524	1,537	46	123	354
Mattice - Val-Cote	686	340	302	6	17	8
Opasatika	214	133	302	65	3	15
Val Rita-Harty	817	368	302	247	7	57
Kenora-Hunting	8,090	4,090	8,956	2,475	74	158
Moosonee	11,101	5,953	302	333	10	99
Faquier - Etrickland	530	270	302	160	5	37
Smooth Rock Falls	1,376	693	302	416	12	17
Cochrane	5,340	2,245	302	1,613	48	129
Ironwood Falls	4,955	2,234	302	1,388	42	111
Black River - Matheson	2,110	1,172	302	728	22	58
Timmins	43,165	18,816	280	12,086	363	967
Kirkland Lake	8,333	4,234	303	3,278	98	262
Chamberlain	297	161	302	90	3	7
Englehart	1,519	751	302	459	14	37
Eastnor	452	208	302	137	4	11
Cheltenham and Orisk	671	274	302	203	6	16
Armstrong (Elderton)	1,216	516	302	367	11	29
Cobalt	10,400	4,402	302	3,141	94	251
Latchford	1,133	623	302	342	10	27
Tenagami	387	202	302	117	4	9
TOTAL	98,548	45,280	-	29,633	889	2,371
Notes						

Notes

1. "Estimated Percent of Total Waste" data sourced from Guidebook for Creating a Municipal Waste Recycling Strategy, Figure 1, West Nipissing, Town, March 2010. (http://cltwdo.ca/pdf/guidelines/wrs_guidebook.pdf)

Table 2A - Weekly Amount of Recyclables Collected

Municipality	Collection Program (Depot or Curbside)	Containers			Fibres			Total			Single Stream		
		Weekly Tonnage (tonnes)		Weekly Volume (m³)	Weekly Tonnage (tonnes)		Weekly Volume (m³)	Weekly Tonnage (tonnes)		Weekly Volume (m³)	Weekly Tonnage (tonnes)		Weekly Volume (m³)
		Depot	Curbside										
Hearst	Depot	2.00	39.91	3.06	20.40	5.05	60.30	1.05	50.70	50.70	2.41	2.02	
Mattawa - Val-Cote	Depot	0.27	5.38	0.41	2.75	0.58	8.13	0.00	6.50	6.50	0.33	0.22	
Opasatica	Depot	0.08	1.68	0.13	0.86	0.21	2.54	0.00	2.54	2.54	0.10	0.07	
Val Rita-Hartley	Depot	0.32	6.41	0.49	3.27	0.81	9.68	0.01	8.14	8.14	0.39	0.22	
Kapuskasing	Depot	3.21	64.26	4.93	32.84	8.14	97.10	3.14	81.40	81.40	3.88	3.26	
Moosehead	Depot	0.43	8.63	0.56	4.41	1.09	13.04	0.00	10.90	10.90	0.52	0.34	
Faquier - Strickland	Depot	0.21	4.16	0.32	2.12	0.53	6.28	0.00	5.28	5.28	0.25	0.17	
Smooth Rock Falls	Curbside	0.69	16.20	1.19	5.58	2.13	20.36	2.13	21.33	21.33	1.01	0.40	
Cochrane	Curbside	3.06	65.13	4.99	31.29	8.35	98.41	8.35	82.49	82.49	3.93	1.57	
Iroquois Falls	Curbside	0.60	12.46	0.60	7.46	0.60	10.06	0.00	10.06	10.06	0.50	0.30	
Black River - Matheson	Curbside	2.07	25.30	2.05	15.22	2.05	37.52	2.05	37.52	37.52	1.07	0.71	
Timmins	Curbside	24.40	488.10	37.42	249.17	61.83	737.37	249.17	618.33	618.33	29.44	11.78	
Kirkland Lake	Curbside	0.02	132.06	0.01	67.65	0.01	200.02	0.01	167.77	167.77	7.09	3.19	
Champlain	Depot	0.12	2.33	0.18	1.19	0.19	3.52	0.00	3.52	3.52	0.14	0.10	
Englehart	Curbside	0.25	18.23	1.12	5.12	2.25	25.52	2.25	23.47	23.47	1.12	0.45	
Eventure	Curbside	0.28	5.51	0.42	2.82	0.70	8.33	0.70	7.68	7.68	0.33	0.13	
Charlton and Dack	Curbside	0.41	8.18	0.63	4.18	1.04	12.27	1.04	10.37	10.37	0.49	0.20	
Armstrong (Eatonton)	Depot	0.48	9.53	0.73	4.87	1.21	14.41	1.21	13.20	13.20	0.58	0.36	
Temiskaming Shores	Curbside	0.49	9.22	0.54	5.13	1.07	15.42	1.07	16.07	16.07	0.65	0.46	
Cobalt	Curbside	0.59	13.82	1.06	7.06	1.75	20.84	1.75	17.50	17.50	0.83	0.33	
Latchford	Curbside	0.44	4.72	0.46	2.41	0.60	7.13	0.60	5.98	5.98	0.29	0.11	
Ferniegan	Curbside	0.54	6.57	0.54	3.57	0.75	10.86	0.75	10.11	10.11	0.56	0.24	
TOTAL	-	7	142	11	73	18	215	18	124	124	8.60	2.41	23.53

Notes

1. "Containers" includes "Blue Box Metals", "Blue Box Plastics", and "Recyclable Glass".

2. "Fibres" includes "Blue Box Papers".

3. "Weekly Tonnage" data calculated based on "Estimated Recyclable Material Diverted", assuming 52 weeks/year.

4. "Weekly Volume" data calculated based on "Weekly Tonnage" and density data from Table "Material Densities".

Table 2C - Material Densities

Material	Density (kg/m³)
Containers	50
Fibres	150
Single Stream	100

Notes

1. "Densities" data sourced from *Report on Transfer of Blue Box*, Genivar, July 2009. (CIE Report #48).2. "Capacity (m³)" based on *Report on Transfer of Blue Box*, Genivar, July 2009. (CIE Report #48).3. "Compaction Ratio" based on *Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making*, Section 3.1. Genivar, July 2009. (CIE Report #48).

4. "Capacity (m³)" assumed for Depot Collection Vehicle, and calculated based on "Capacity (kg)", "Compaction Ratio", "Density", and "Compartment Split" for Curbside Collection Vehicle. Represents the equivalent un-compacted material volume.

Table 2B - Collection Vehicles

Vehicle	Collection Type	Compartment Split	Material Stream			Capacity (kg)	Compaction Ratio	Capacity (m³)			
			Depot Direct Haul								
			Multi-Stream	Single Stream	Co-collected with Garbage						
Depot	Multi-Stream	-	-	-	-	-	-	25			
Curbside	Co-collection	60%	Garbage	40%	Recyclables	3,500	1.5	21			
Curbside	Single Stream	-	Recyclables	-	-	3,500	1.5	53			

Notes

- "Compartment Split" assumed based on standard rear packer waste collection vehicle.
- "Capacity (kg)" based on *Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making*, Table C1, *Typical Payload in Collection Truck*, Genivar, July 2009. (CIE Report #48).
- "Compaction Ratio" based on *Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making*, Section 3.1. Genivar, July 2009. (CIE Report #48).
- "Capacity (m³)" assumed for Depot Collection Vehicle, and calculated based on "Capacity (kg)", "Compaction Ratio", "Density", and "Compartment Split" for Curbside Collection Vehicle. Represents the equivalent un-compacted material volume.

Optimization of Recycling Service Delivery in the North-Eastern Ontario Wasteshed

Appendix B

Tab 2B - Collection Costs

Table 2E - Summary of Collection Costs

Municipal Group	Program Name	Reported and/or Calculated Marketed Tonnes	Single Stream	Residential Collection Costs (\$)	Residential Collection Costs per Tonne (\$/tonne)	Residential Depot/ Transfer Costs (\$)	Residential Depot/ Transfer Costs per Tonne (\$/tonne)	Total Residential Collection, Depot/ Transfer Costs per Tonne (\$/tonne)
Rural Collection - North								
6	Township of Cochrane	428	Yes	159,954	374	6,133	14	388
6	Town of Kirkland Lake	316	Yes	147,685	467	0	0	467
6	Town of Latchford	27	Yes	23,895	885	0	0	385
6	City of Timmins	3,216	Yes	835,404	278	357,715	111	390
Municipal Group Weighted Average				306	-	94	-	400
Rural Depot - North								
8	Cochrane Temiskaming Waste Management Board	1,531	-	0	-	323,816	212	212
Municipal Group Weighted Average				49	-	482	-	531

Notes:

1. Data sourced from WDO 2013 Blue Box Financial Summary (http://www.wdo.ca/index.php/download_file/1540/231/)
2. Values represent gross costs, and do not include material processing, program administration, promotion and education, interest, or revenues.

Tab 3 - Haul to Primary Node

Scenario 1 - Nodes in Kapskasing, Timmins, and Temiskaming Shores									
Municipality	Number of Weekly Trips by Collection Vehicle			Number of Weekly Trips by Collection Vehicle			Estimated Per Tonne Cost (\$/tonne)		
	Depot Direct Haul		Curbside Direct Haul	Depot Direct Haul		Curbside Direct Haul	Depot Direct Haul		Curbside Direct Haul
	Multistream	Single Stream	Co-Collection with Garbage	Multistream	Single Stream	Co-Collection with Garbage	Multistream	Single Stream	Co-Collection with Garbage
Heurist	2.41	0.33	0.10	8	7	-	256	\$1.60	\$3.013.49
Wainfleet - Val-Cote	0.33	0.10	0.10	-	-	-	256	\$1.60	\$2.637
Obasika-Harby	0.39	0.26	0.10	-	-	-	256	\$1.60	-
Kapskasing	3.88	1.26	0.40	-	-	-	256	\$1.60	-
Wooden Mountain	0.52	0.13	0.10	-	-	-	256	\$1.60	-
Strickland	0.25	0.21	0.10	-	-	-	256	\$1.60	-
Thompson Rock Falls	-	-	-	-	-	-	256	\$1.60	-
Timmins	-	-	-	-	-	-	256	\$1.60	-
North Bay	-	-	-	-	-	-	256	\$1.60	-
Port Arthur	-	-	-	-	-	-	256	\$1.60	-
French Falls	-	-	-	-	-	-	256	\$1.60	-
Black River - Matheson	-	-	-	-	-	-	256	\$1.60	-
Grindal Lake	-	-	-	-	-	-	256	\$1.60	-
Timmins	-	-	-	-	-	-	256	\$1.60	-
Temiskaming Shores	-	-	-	-	-	-	256	\$1.60	-
Total Direct Haul	8	7	6	8	7	6	256	\$1.60	\$3.013.49
Kapskasing Total	8	7	6	8	7	6	256	\$1.60	\$2.637
Timmins Total	1	1	1	1	1	1	256	\$1.60	\$3.013.49
Temiskaming Shores Total	1	1	1	1	1	1	256	\$1.60	\$2.637
Total	8.60	7.53	6.50	8.60	7.53	6.50	256	\$1.60	\$3.013.49

Notes
1. "Number of Weekly Trips by Collection Vehicle" data calculated based on total

- number of trips for each municipality sharing the same collection type, rounded up to the nearest whole number.
 - "Depot Direct Haul" totals are calculated based on the assumption that bins are collected on a shared service basis within other municipalities with a depot system.
 - "Round Trip Distance" reflects the estimated total round trip distance, using the route that minimizes the total distance travelled.
 - "Curbside Direct Haul" totals are calculated based on the assumption that curbside collection vehicles have a limited feasible consolidation point.
 - "Weekly Cost" data is calculated based on the assumptions in Table Direct Haul Trucks Summary.
 - "Estimated Per Tonne Cost" calculation based on "Weekly Cost", and corresponding tonnage data from "Cost" calculation.

Table 3B - Direct Haul Truck Assumptions	
Metric	Value
Average Truck Speed (km/hr)	70
Cost per Hour (\$/hr)	\$103

ates
"Number of Weekly Trips by Collection Vehicle" data calculated based on total
number of trips for each municipality sharing the same collection type, rounded

- "Depot Direct Haul" totals are calculated based on the assumption that bins are collected on a shared service basis with other municipalities with a depot system. "Ground Trip Distance" reflects the estimated total round trip distance, using the route that minimizes the total distance travelled.

"Curbside Direct Haul" totals are calculated based on the assumption that curbside collection vehicles haul to the nearest feasible consolidation point.

"Truck Assumptions":

 - "Weekly Cost" is calculated based on the assumptions in Table "Direct Haul to the Nearest Whole Number".
 - "Estimated Per Ton Cost" is calculated based on "Weekly Cost", and corresponding tonnage data from "Ton Collection".

b1a3B - Direct Haul Truck Assumptions

Table 3B - Direct Haul Truck Assumptions		Value
Metric	Average Truck Speed (km/h)	Cost per Hour (\$/hr)
	70	\$103

Tab 3 - Haul to Primary Node

Notes

1. "Number of Weekly Trips by Collection Vehicle" data calculated based on total number of trips for each municipality sharing the same collection type, rounded

- up to the nearest whole number.
 - "Depot Direct Haul" totals are calculated based on the assumption that bins are collected on a shared service basis with other municipalities within a depot system.
 - "Round Trip Distance" reflects the estimated total round trip distance, using the route that minimizes the total distance travelled.
 - "Curbside Direct Haul" totals are calculated based on the assumption that curbside collection vehicles head to the nearest reachable consolidation point.
 - "Weekly Cost" data is calculated based on the assumptions in Table "Direct Haul Truck Assumption".
 - "Tonnage per Tonne Cost" calculated based on "Weekly Cost", and corresponding tonnage data from "Table Collection".
 - "Estimated Per Tonne Cost" calculated based on "Weekly Cost", and corresponding tonnage data from "Table Collection".

T-16-22 Sustained Tension

Table 3B - Direct Rail Truck Assumptions

Metric	Value
Average Truck Speed (km/h)	70
Cost per Hour (\$/hr)	\$103

Lab 3 - Haul to Primary Node

Notes
1. "Number of Weekly Trips by Collection Vehicle" data calculated based on total number of trips for each municipality, choosing the same collection type rounded

- number of trips to each municipality spanning all service connection types, rounded up to the nearest whole number.
 2. "Depot Direct Haul" rates are calculated based on the assumption that bins are collected on a shared service basis with other municipalities within a depot system.
 3. "Round Trip Distance" reflects the estimated total round trip distance, using the route that minimizes the total distance travelled.
 4. "Curbside Direct Haul" rates are calculated based on the assumption that curbside collection vehicles haul to the earliest feasible consolidation point.

Truck Assumptions:

 - Weekly Cost data is calculated based on the assumptions in Table Direct Haul
 - "Estimated Per Tonne Per Call" calculation based on "Weekly Cost", and corresponding tonnage data from "Call Collection".

Table 2B - Direct Haul Truck Assumptions

Table 3B - Direct Haul Truck Assumptions	
Metric	Value
Average Truck Speed (Km/h)	70
Cost per Hour (\$/hr)	\$103

Table 4A - Consolidation of Materials

Notes

1. "Incoming Weekly Material Volume" calculated based on the assumption that all material arrives loose, with the exception of "Single Stream" material from curbside collection which arrives compacted.
 2. "Outgoing Weekly Material Volume" calculated based on the compaction ratios identified in Table "Material Properties", with the exception of "Single Stream" material from curbside collection which arrives compacted and does not undergo further compaction.
 3. "Estimated Consolidation Cost Per Tonne" calculated based on "Total Facility Cost" from Tab "TS Operating Cost", assuming that the entire annual cost is divided by the incoming tonnage consolidated, regardless of the facility operating capacity.
 4. "Weekly Consolidation Cost" calculated based on "Estimated Consolidation Cost Per Tonne", "Incoming Weekly Material Volume", and relevant densities listed in Table "Material Properties".

Tabelle 4B - Material Properties

Influence of Intrinsic Properties		Density (kg/m ³)	Compaction Ratio
Material			
Containers		50	1.5
Fibres		150	2.7
Single Stream		100	1.5

Notes
1. "Density" and "Compaction Ratio" data sourced from Report on Transfer of Blue Box Recyclable Materials; Factors Affecting Decision Making, Genivar Inc., 2000 (IEC Report #11-181)

Table 4A - Consolidation of Materials

Notes

1. "Incoming Weekly Material Volume" calculated based on the assumption that all material arrives loose, with the exception of "Single Stream" material from curbside collection which arrives compacted.
 2. "Outgoing Weekly Material Volume" calculated based on the compaction ratios identified in Table "Material Properties", with the exception of "Single Stream" material from curbside collection which arrives compacted and does not undergo further compaction.
 3. "Estimated Consolidation Cost Per Tonne" calculated based on "Total Facility Cost" from Tab "TS Operating Cost", assuming that the entire annual cost is divided by the incoming tonnage consolidated, regardless of the facility operating capacity.
 4. "Weekly Consolidation Cost" calculated based on "Estimated Consolidation Cost Per Tonne", "Incoming Weekly Material Volume", and relevant densities noted in Table "Material Properties".

Tab 4A - TS Consolidation

10

- | Table 4B - Material Properties | | |
|--------------------------------|---------------------------------|------------------|
| Material | Density
(kg/m ³) | Compaction Ratio |
| Containers | 50 | 1.5 |
| Fibres | 150 | 2.7 |
| Single Stream | 100 | 1.5 |

Notes

"Density" and "compaction ratio" data is sourced from Report on Transfer of Blue Box Recyclable Material Factors Affecting Decision Making, Genivar, July 2009, (ICF Report #1438).

Optimization of Recycling Service Delivery in the North-East Ontario Wasteshed

Appendix B

Tab 4A - TS Consolidation

Table 4A - Consolidation of Materials

Municipality	Material Volume (m ³)		Scenario 3 - Consolidate in Kapuskasing, Iroquois Falls, Timmins, Kirkland Lake and Temiskaming Shores								
			Incoming Weekly Material Volume (m ³)			Outgoing Weekly Material Volume (m ³)			Estimated Consolidation Cost Per Tonne (\$/tonne)	Weekly Consolidation Cost (\$/week)	
	Multi Stream	Single Stream	Containers	Fibres	Multi-Stream	Single Stream	Containers	Fibres			
Hearst	39.91	20.40	50.63	-	Kapuskasing	130	67	110	25	110	\$1,431
Matrice - Val Cote	5.38	2.75	5.71	-	Kapuskasing	-	-	-	-	-	-
Opasatka	0.86	0.86	2.13	-	Kapuskasing	-	-	-	-	-	-
Val Rita-Harty	6.41	3.27	8.11	-	Kapuskasing	-	-	-	-	-	-
Kapuskasing	64.26	32.84	71.60	-	Kapuskasing	-	-	-	-	-	-
Moonbeam	8.63	4.41	10.97	-	Kapuskasing	-	-	-	-	-	-
Faquier - Strickland	4.16	2.12	5.26	-	Kapuskasing	-	-	-	-	-	-
Smooth Rock Falls	7.77	3.75	11.26	-	Kapuskasing	-	-	-	-	-	-
Cochrane	65.13	33.29	82.49	-	Iroquois Falls	-	-	-	-	-	-
Iroquois Falls	57.04	28.64	70.99	-	Iroquois Falls	-	-	-	-	-	-
Black River - Matheson	2.50	1.50	3.72	-	Iroquois Falls	-	-	-	-	-	-
Timmins	488.10	245.47	618.26	-	Timmins	-	-	-	-	-	-
Kirkland Lake	132.76	67.65	167.66	-	Kirkland Lake	-	-	-	-	-	-
Chamberlain	2.33	1.19	2.47	-	Temiskaming Shores	2	1	2	0	-	-
Englehart	185.1	94.67	23.47	-	Temiskaming Shores	-	-	-	-	-	-
Evansville	5.51	2.82	6.38	-	Temiskaming Shores	-	-	-	-	-	-
Charlton and Dark	6.16	4.76	10.37	-	Temiskaming Shores	-	-	-	-	-	-
Armstrong (Fartton)	9.53	4.87	10.00	-	Temiskaming Shores	10	5	6	2	106	\$50
Temiskaming Shores	126.84	64.83	160.66	-	Temiskaming Shores	-	-	-	-	-	-
Cobalt	1.46	0.70	17.50	-	Temiskaming Shores	-	-	-	-	-	-
Latchford	4.24	2.41	5.98	-	Temiskaming Shores	-	-	-	-	-	-
Tenagami	10.00	5.11	12.67	-	Temiskaming Shores	-	-	-	-	-	-
Kapuskasing Total	130	67	14	87	25	14	-	-	-	\$1,431	\$104
Iroquois Falls Total	-	-	-	127	-	-	-	-	-	-	\$2,668
Timmins Total	-	-	-	-	412	-	-	-	-	-	\$4,657
Kirkland Lake Total	-	-	-	-	-	-	-	-	-	-	\$2,668
Temiskaming Shores Total	12	6	158	8	158	2	131	-	-	-	\$63
Total	288	147	1,050	142	73	824	95	27	824	\$63	\$1,527
Notes											\$12,807

1. "Incoming Weekly Material Volume" calculated based on the assumption that all material arrives loose, with the exception of "Single Stream" material from curbside collection which arrives compacted.

2. "Outgoing Weekly Material Volume" calculated based on the compaction ratios identified in Table "Material Properties", with the exception of "Single Stream" material from curbside collection which arrives compacted and does not undergo further compaction.

3. "Estimated Consolidation Cost Per Tonne" calculated based on "Total Facility Cost" from Tab "TS Operating Cost", assuming that the entire annual cost is divided by the incoming tonnage consolidated, regardless of the facility operating capacity.

4. "Weekly Consolidation Cost" calculated based on "Estimated Consolidation Cost Per Tonne", "Incoming Weekly Material Volume", and relevant densities noted in Table "Material Properties".

Table 4B - Material Properties

Material	Density (kg/m ³)	Compaction Ratio
Containers	50	1.5
Fibres	150	2.7
Single Stream	100	1.5

Notes
1. Density" and "Compaction Ratio" data sourced from Report on Transfer of Blue Box Recyclable Material Factors Affecting Decision Making, Genivar, July, 2009. (CIF Report #148).

Optimization of Recycling Service Delivery in the North-Eastern Ontario Wasteshed

Appendix B

Tab 4B - TS Operating Cost

Table 4C - Operating Costs for a Municipally Owned Transfer Station

Description	Cost (\$/year)		Comments
	2,500 tonnes/year	5,000 tonnes/year	
Staffing Requirements			
Site Supervisor	\$ 9,500	\$ 14,200	Based on: annual salary of \$60,000, 10%-15% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years)
Loader Operator	\$ 28,400	\$ 56,800	Based on: annual salary of \$45,000, 40%-80% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years). Assumed to include time for snow plowing (varies by year).
Labour	\$ 1,040	\$ 2,080	Based on: net hour rate of \$40 and 0.5-1 hour per week. Estimated based on Cochrane Report.
Maintenance Staff	\$ 15,800	\$ 31,600	Based on: annual salary of \$50,000, 20-40% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years). Reduced from Reference Report due to limited equipment and site features.
Administration Staff	\$ 3,200	\$ 6,400	Based on: annual salary of \$40,000, 5%-10% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years).
Equipment, Utilities and Fuel			
Front End Loader	\$ 10,200	\$ 20,300	Based on: annual lease of \$3,000/month, 25%-50% of time, 2% annual inflation rate (6 years). Assumed to include major repairs etc.
Fuel and Tires (Front End Loader)	\$ 21,000	\$ 32,000	Based on: 1 vehicle, \$1.10 per litre of fuel, 10 litres of fuel per hour, 4-8 hours per day, 250 days per year. Fuel increased from \$1.00 in Reference Report to \$1.10 to account for inflation. Estimate of \$10,000 for tires based on Cochrane Report.
Utilities (water, electricity, natural gas)	\$ 10,200	\$ 15,300	Based on \$1,000-\$1,500/year for water, \$4,000-\$6,000/year for electricity, \$4,000-\$6,000/year for natural gas or propane, 2% annual inflation rate (6 years).
Maintenance and Other			
Building, road, site work	\$ 10,000	\$ 15,000	Based on: 0.5% of design, site preparation, services, approvals, and construction capital cost of \$2,000,000-\$3,000,000
Reporting, consultant, legal, etc. fees	\$ 11,300	\$ 16,900	Based on: \$10,000-\$15,000/year, 2% annual inflation rate (6 years).
Totals			
Subtotal	\$ 120,640	\$ 210,580	
Contingency (15%)	\$ 18,096	\$ 31,587	
Total Facility Cost	\$ 138,736	\$ 242,167	

Reference Reports:

1. *Report on Transfer of Blue box Recyclables Materials: Factors Affecting Decision Making*, July 2009, Prepared for Continuous Improvement Fund, Prepared by Genivar Ontario Inc. Costs in Reference Report are 2009 dollars. Annual inflation rate of 2% utilized to develop 2015 costs (6 years).
2. *Cochrane Transfer Station Construction and Annual Operational Cost Analysis*, September 2013, Prepared for Continuous Improvement Fund, Prepared by EBA.

Optimization of Recycling Service Delivery in the North-Eastern Ontario Wasteshed

Appendix B

Tab 5 - Haul to Secondary Node

Table 5A - Transfer Haul to Secondary Node

Primary Node	Annual Compacted Waste Volume (m ³)			Annual Number of Transfer Haul Trucks Required			Annual Haul Costs to Secondary Node									
	Scenario			Scenario			Scenario			Scenario			Scenario			
	1	2	3	1	2	3	Secondary Node	Round-Trip Distance (km)	Cost	Secondary Node	Round-Trip Distance (km)	Cost	Secondary Node	Round-Trip Distance (km)	Cost	
Kapuskasing	9,402	6,542	88	55	62	334	NES - Timmins	\$50,386	\$1,491	NES - Timmins	\$31,491	\$334	NES - Timmins	\$35,499	\$334	\$35,499
				Timmins	334	\$50,386	Timmins	334	\$31,491	Timmins	334	\$334	Timmins	334	\$334	\$334
				Thunder Bay	1,234	\$186,158	Thunder Bay	1,234	\$116,349	Thunder Bay	1,234	\$131,157	Thunder Bay	1,234	\$131,157	\$131,157
				Guelph	1,780	\$268,526	Guelph	1,780	\$167,829	Guelph	1,780	\$189,189	Guelph	1,780	\$189,189	\$189,189
Cochrane	-	3,597	-	-	34	-										
Iroquois Falls	-	-	6,611	-	-	62										
Timmins	30,997	25,184	21,433	290	236	201	NES - Timmins	0	\$0	NES - Timmins	0	\$0	NES - Timmins	0	\$0	\$0
				Timmins	0	\$0	Timmins	0	\$0	Timmins	0	\$0	Timmins	0	\$0	\$0
				Sudbury	586	\$291,326	Sudbury	586	\$237,079	Sudbury	586	\$201,919	Sudbury	586	\$201,919	\$201,919
				R&D - North Bay	728	\$361,920	R&D - North Bay	728	\$294,528	R&D - North Bay	728	\$250,848	R&D - North Bay	728	\$250,848	\$250,848
Kirkland Lake	-	-	5,812	-	-	55										
Temiskaming Shores	8,766	14,578	8,766	82	137	82	NES - Timmins	414	\$58,197	NES - Timmins	414	\$97,231	NES - Timmins	414	\$121,063	\$121,063
				Timmins	414	\$58,197	Timmins	414	\$97,231	Timmins	414	\$58,197	Timmins	414	\$58,197	\$58,197
				Sudbury	454	\$63,819	Sudbury	454	\$106,625	Sudbury	454	\$63,819	Sudbury	454	\$63,819	\$63,819
				R&D - North Bay	324	\$45,545	R&D - North Bay	324	\$76,094	R&D - North Bay	324	\$45,545	R&D - North Bay	324	\$45,545	\$45,545
Total	49,164	49,164	49,164	460	462	462										

Notes

1. "Annual Compacted Waste Volume" based on corresponding Scenario from Tab "TS Consolidation".

2. "Annual Number of Transfer Haul Trucks Required" calculated based on 'Annual Compacted Waste Volume' and "Average Truck Payload" from Table "Transfer Haul Truck Assumptions".

Table 5B - Transfer Haul Truck Assumptions

Metric	Value
Average Truck Speed (km/h)	70
Average Truck Payload (m ³)	107
Cost per Hour (\$/hr)	\$120

Notes

- "Average Truck Payload" data sourced from Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making , Genivar, July, 2009. (CIE Report #148).
- Assumes haul by transfer trailer with 140 cubic yard capacity, and assumes that Ontario roadway weight restrictions are not exceeded.

Optimization of Recycling Service Delivery in the North-Eastern Ontario Wasteshed

Appendix B

Tab 6 - MRF Processing

Table 6A - Annual Tonnage from Primary Nodes

Primary Node Location	Scenario		
	1	2	3
Kapuskasing	1,309	859	970
Cochrane	0	540	0
Iroquois Falls	0	0	992
Timmins	4,649	3,778	3,215
Kirkland Lake	0	0	872
Temiskaming Shores	1,314	2,186	1,314
Total	7,362	7,362	7,362

Notes:

1. "Cost per Tonne" as quoted by facility operator, except for Timmins, Sudbury and Thunder Bay which were estimated based on quoted values.
2. "Annual Processing Cost by MRF" under each Scenario only includes the tonnages from Primary Nodes which supply material to the MRF.
3. Assumes that all identified MRFs are able to receive material. MRFs may have limited capacity or other restrictions on processing that affect the assumed distribution of materials.

Table 6B - MRF Processing Cost

MRF	Annual Processing Cost by MRF		
	Cost per Tonne	1	2
NES - Timmins	\$100	\$736,182	\$736,182
Timmins	\$100	\$736,182	\$736,182
Thunder Bay	\$100	\$139,852	\$85,901
Sudbury	\$100	\$596,330	\$650,281
R&D - North Bay	\$100	\$596,330	\$650,281
Guelph	\$0	\$0	\$0
Total	\$0	\$0	\$0

Table 7A - Summary of Recommended Options

Scenario	Description	1 - Generation		2 - Collection		3 - Haul to Primary Node		4 - Consolidation				
		Annual Tonnage Generated	Cost Per Tonne (\$/tonne)	Depot Collection	Curbside Collection	Depot Collection	Curbside Collection	Kapuskasing	Cochrane	Iroquois Falls	Timmins	Kirkland Lake
1	Primary Nodes in Kapuskasing, Timmins, and Temiskaming Shores	7,362	531	400	136	100	99	-	-	52	-	106
2	Primary Nodes in Kapuskasing, Cochrane, Timmins, and Temiskaming Shores	7,362	531	400	136	97	162	257	-	64	-	63
3	Primary Nodes in Kapuskasing, Iroquois Falls, Timmins, Kirkland Lake and Temiskaming Shores	7,362	531	400	136	97	143	-	140	75	159	106

Table 7a - Summary of Recommended Options

Scenario	Description	5 - Haul to Secondary Node																
		Average Cost Per Tonne by Primary Node (\$/tonne)																
		Kapuskasing			Cochrane			Iroquois Falls			Timmins			Kirkland Lake			Temiskaming Shores	
		High	Low	Average	High	Low	Average	High	Low	Average	High	Low	Average	High	Low	Average		
1	Primary Nodes in Kapuskasing, Timmins, and Temiskaming Shores	\$192	\$36	\$99	-	-	-	-	-	\$163	\$0	\$61	-	-	\$119	\$35	\$58	
2	Primary Nodes in Kapuskasing, Cochrane, Timmins, and Temiskaming Shores	\$195	\$37	\$101	\$167	\$23	\$76	-	-	\$163	\$0	\$61	-	-	\$120	\$35	\$58	
3	Primary Nodes in Kapuskasing, Iroquois Falls, Timmins, Kirkland Lake and Temiskaming Shores	\$220	\$41	\$114	-	-	-	\$156	\$15	\$67	\$163	\$0	\$61	\$30	\$64	\$119	\$35	\$58

Table 7A - Summary of Recommended Options

Scenario	Description	6 - MRF Processing			7 - Promotion & Education			8 - Administration & Interest			9 - Revenue			Total		
		Cost Per Tonne (\$/tonne)		Cost Per Tonne (\$/tonne)	Cost Per Tonne (\$/tonne)	Cost Per Tonne (\$/tonne)	High	Low	Average							
		High	Low													
1	Primary Nodes in Kapuskasing, Timmins, and Temiskaming Shores	\$100	\$0	\$8	\$19	\$100	\$992	\$479	\$769							
2	Primary Nodes in Kapuskasing, Cochrane, Timmins, and Temiskaming Shores	\$100	\$0	\$8	\$19	\$100	\$1,147	\$488	\$820							
3	Primary Nodes in Kapuskasing, Iroquois Falls, Timmins, Kirkland Lake and Temiskaming Shores	\$100	\$0	\$8	\$19	\$100	\$1,034	\$499	\$806							

Appendix C

Review of Financial Model & Cost Share Options

DRAFT



cutting through complexity

Northeastern Ontario Optimization Project

Review of Financial Model and Cost Share Options

Draft Report
January 14, 2015



Northeastern Ontario Optimization Project

Introduction

KPMG LLP ('KPMG') has been retained by Conestoga-Rovers & Associates ('CRA') to assist with the development and evaluation of potential models for the delivery of recycling services by municipalities situated along the Highway 11 corridor between Temagami and Hearst. We understand that the development of a model for the collaborative management of recyclables in the area is required due to the dissolution of the former Cochrane Timiskaming Waste Management Board.

Pursuant to the terms of our engagement, KPMG has been requested to review the financial model developed by CRA with respect to the potential service delivery models, as well as provide our comments and suggestions relating to potential cost sharing mechanisms. Specifically, we have undertaken the following procedures in connection with our review:

- We have tested the CRA financial model for mathematical accuracy, including a review of formulas and cross-referencing within the model and a comparison of the model to reference materials cited by CRA;
- We have performed certain procedures intended to assess the reasonableness of the assumptions used in the financial model, including the comparison of financial indicators to other reference materials relating to collaborative models for the management of recyclables;
- We have assessed the potential impact of changes in key assumptions on the total costs to the participating municipalities, which is intended to provide an indication of the potential financial risks to the participating municipalities (i.e. minor changes in assumptions that result in significant changes to financial costs are considered to be an indicator of higher risk); and
- We have identified and evaluated potential cost sharing mechanisms for consideration by the participating municipalities.

This report outlines the results of our analysis.



Northeastern Ontario Optimization Project Restrictions

This report is based on information and documentation that was made available to KPMG at the date of this report. KPMG has not audited nor otherwise attempted to independently verify the information provided unless otherwise indicated. Should additional information be provided to KPMG after the issuance of this report, KPMG reserves the right (but will be under no obligation) to review this information and adjust its comments accordingly.

Pursuant to the terms of our engagement, it is understood and agreed that all decisions made in connection with the implementation of advice and recommendations as provided by KPMG during the course of this engagement shall be the responsibility of, and made by, the participating municipalities. KPMG has not and will not perform management functions or make management decisions for or on behalf of the participating municipalities.

This report includes or makes reference to future oriented financial information. Readers are cautioned that since these financial projections are based on assumptions regarding future events, actual results will vary from the information presented even if the hypotheses occur, and the variations may be material.

Comments in this report are not intended, nor should they be interpreted to be, legal advice or opinion.

KPMG has or currently provides professional services to certain of the participating municipalities. However, KPMG has no present or contemplated interest in CRA, the participating municipalities or the Waste Diversion Ontario Community Improvement Fund (collectively the 'Parties') nor are we an insider or associate of the Parties or their management teams. Our fees for this engagement are not contingent upon our findings or any other event. Accordingly, we believe we are independent of the Parties and are acting objectively.

In connection with the development and evaluation of potential service delivery options, CRA has developed a financial model that estimates the total costs to participating municipalities under different scenarios, that considers:

- The collection of recyclables in the participating municipalities;
- The shipment of recyclables from the communities to transfer stations to be established in the region for consolidation; and
- The shipment of recyclables from the transfer stations to existing material recovery facilities (MRFs) in either Timmins or North Bay.

The scenarios considered in the financial models reflect differences in the number and location of transfer stations, as follows:

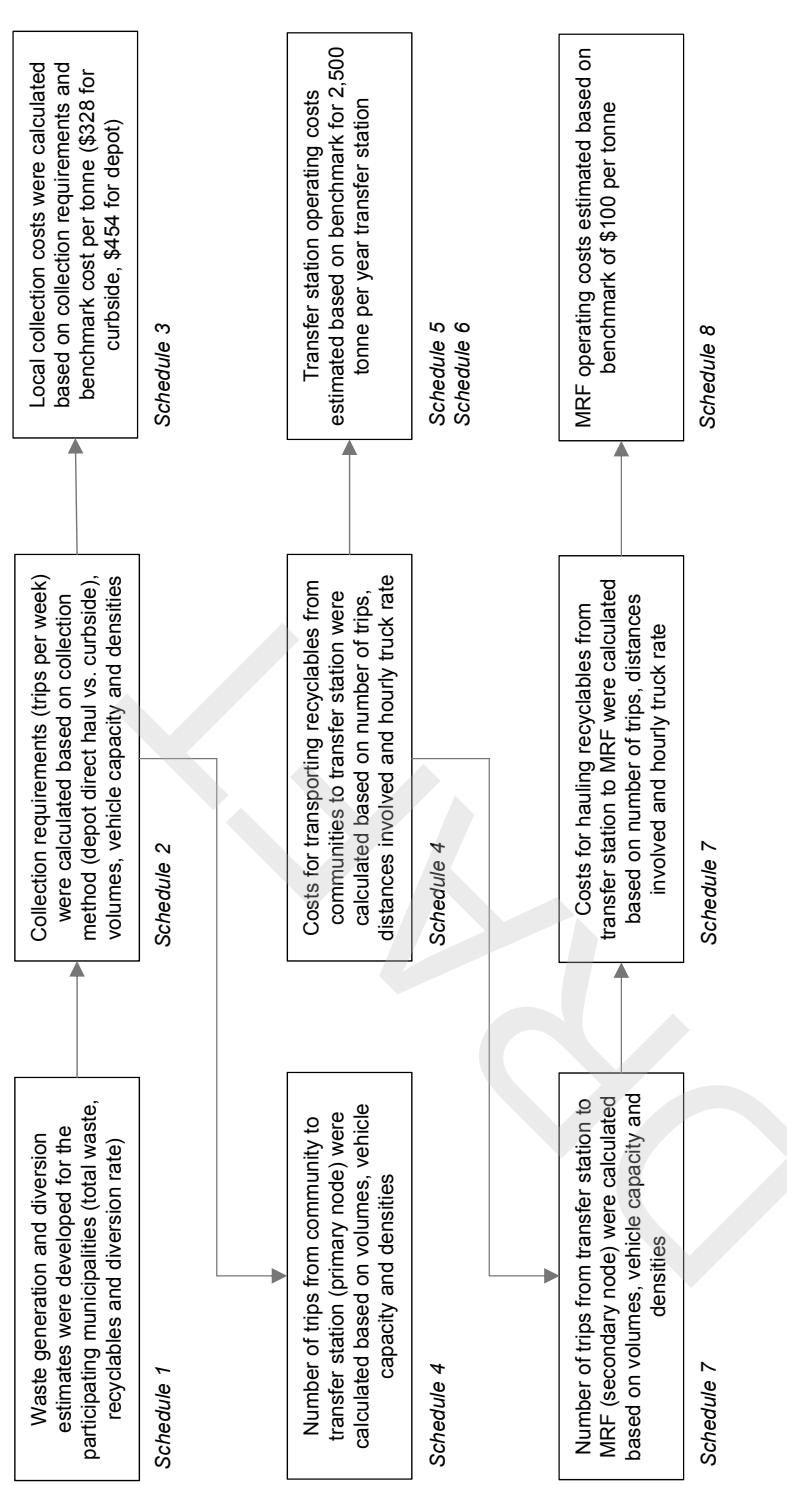
Transfer Station Locations	Scenario 1	Scenario 2	Scenario 3
	Transfer Station Locations		
• Kapuskasing	• Kapuskasing	• Kapuskasing	• Kapuskasing
• Timmins	• Timmins	• Timmins	• Timmins
• Temiskaming Shores	• Temiskaming Shores	• Temiskaming Shores	• Temiskaming Shores
	• Cochrane	• Iroquois Falls	• Iroquois Falls
		• Kirkland Lake	• Kirkland Lake

Included as Appendix A is a copy of the CRA financial model that outlines the estimated costs associated with each stage of the process, as summarized below.

Weekly costs	Scenario 1	Scenario 2	Scenario 3
Local collection costs			
Transportation to transfer stations	\$7,711	\$6,161	\$4,090
Transfer station operations	\$6,124	\$8,165	\$10,207
Transportation to MRF	\$1,734	\$2,185	\$2,196
MRF operations	\$13,496	\$13,496	\$13,496
Total	\$29,065	\$30,007	\$29,989

A graphical depiction of the CRA financial model is included on the following page.

Local stage	<ul style="list-style-type: none"> Community collection
Primary node	<ul style="list-style-type: none"> Transportation from community to transfer station Consolidation of recyclable streams at transfer station
Secondary node	<ul style="list-style-type: none"> Transportation from transfer stations to material recovery facility Preparation of recyclables for marketing to end-users



Total operating costs are comprised of:

- Local collection costs (Schedule 3)
- Transportation costs from communities to transfer stations (Schedule 4)
- Transfer station operating costs (Schedule 5)
- Transportation costs from transfer stations to MRF (Schedule 7)
- MRF operating costs (Schedule 8)

Readers are cautioned that the financial model only projects operating costs associated with the different scenarios and does not include necessary capital expenditures.

Accuracy testing

We have reviewed the electronic copy of the CRA financial model for the purposes of determining its mathematical accuracy. These procedures included:

- Reviewing the accuracy and reasonableness of mathematical formulae;
- Reviewing the accuracy of totals; and
- Reviewing the accuracy of cross-referencing between schedules.

As a result of our procedures, we noted the following inconsistency which has subsequently been revised by CRA:

Spreadsheet	Formula	Description of inconsistency
Transfer Station Operating Costs Schedule 6	Calculation of fuel and tire costs for front end loader	Front end loader costs are to be determined based on four hours of operation per day. However, the formula included in the financial model considered two hours of operation per day. As a result of this inconsistency, fuel and tire costs for the front end loader were understated by \$5,500 per year (\$15,500 vs. \$21,000).

The CRA financial model has been adjusted to reflect the accurate calculation of fuel and tire costs (i.e. four hours of operation per day).

Reasonableness assessment

As part of our review of the CRA financial model, we have agreed key assumptions with respect to waste generation rates, diversion rates and costs to supporting documentation cited by CRA and did not identify any discrepancies. In addition, we have considered the reasonableness of the following key assumptions considered in the financial model.

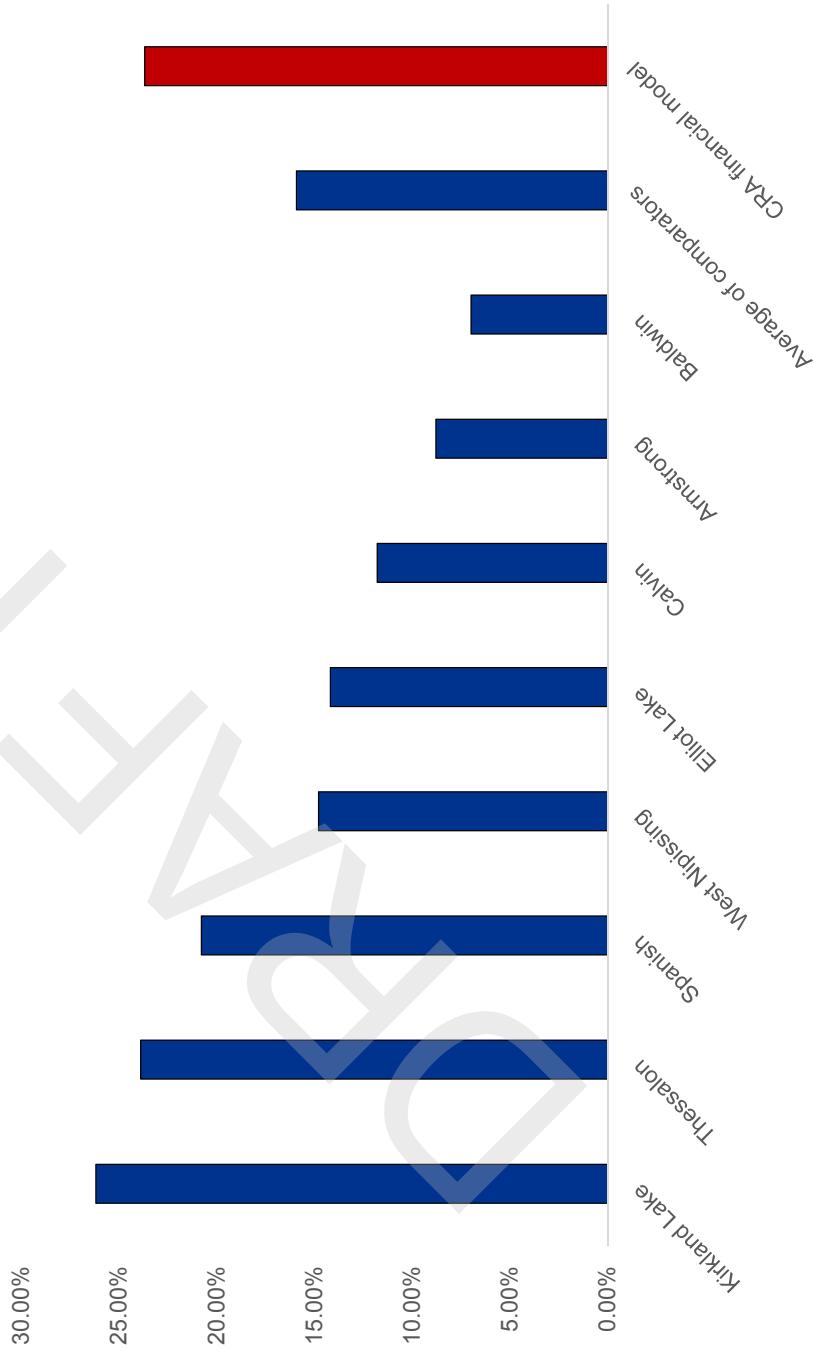
Residential waste generated (per capita and per household)

The CRA financial model considers an average residential waste generation rate that is the equivalent of 300 kg per year per capita or 655 kg per year per household. We note that this is consistent with the residential waste generated for selected Northeastern Ontario municipalities, as reported in the 2013 Financial Information Return.



Diversion rates

The CRA financial model assumes that 7,018 tonnes of residential waste (out of a total of 29,633 tonnes generated) will be diverted, representing an average diversion rate of 23.7%. A review of diversion rates for selected Northeastern Ontario municipalities (based on 2013 Financial Information Returns) indicates that while the diversion rate considered in the CRA financial model is higher than the average of the selected municipalities, it is consistent with the reported diversion rates of some of the municipalities selected for review.



Effect of changes in key assumptions

As part of our review, we have considered the financial impact of changes to key assumptions considered in the CRA financial model. The fluctuation of key assumptions provides a measure of the risk inherent in the financial model in that small changes to assumptions that result in relatively large financial changes are viewed as being reflective of a higher overall risk level associated with the initiative. In comparison, financial models that demonstrate that large changes in assumptions can be absorbed without significantly impacting financial results are considered to reflect a lower degree of risk.

For the purposes of our so-called 'stress testing', we have considered fluctuations in the following key assumptions:

- Waste generation rates per capita
- Recyclable capture rates
- Percentage of solid waste comprised of recyclable materials (blue box paper)
- Transfer station operating costs
- MRF processing costs

We have included our assessment of the financial impact of changes to these assumptions on the following pages, expressed in terms of total financial impact (i.e. annual operating costs) and cost per household). As the financial model considers three different scenarios for transfer station locations, our stress testing reflects the changes under each scenario. As noted in the following pages, we consider the impact of changes to the key assumptions to have a relatively minor impact when considered on a per household basis.

In addition to assessing the financial impact of changes to the above-noted assumptions, we have also considered the effect of removing certain municipalities from the model so as to demonstrate:

- The financial impact associated with the withdrawal of one or more municipalities; and
- Whether the financial model results in some form of cross-subsidization, with municipalities with certain characteristics subsidizing other municipalities. For example, if the withdrawal of one or more municipalities results in a significant decrease in costs for the remaining municipalities, it could be argued that the model has an inherent degree of cross-subsidization, recognizing that the ultimate sharing of costs is yet to be determined.

As noted in the following pages, our analysis of the impact of the withdrawal of one or more municipalities would appear to indicate that the financial impact would be relatively inconsequential, recognizing that the municipalities considered are smaller communities and do not include the largest municipalities in the area (who's participation is viewed as necessary for the project's success).

Impact of Changes in Key Assumptions – Scenario 1

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Waste generation rate	302 kg	332 kg	+10%	\$1,511,413	\$1,572,320	\$60,907
Waste generation rate	302 kg	272 kg	-10%	\$1,511,413	\$1,434,309	(\$77,104)
Capture rates	45% (N) 70% (S)	30% (N) 50% (S)	-15% (N) -20% (S)	\$1,511,413	\$1,189,213	(\$322,200)
Capture rates	45% (N) 70% (S)	65% (N) 80% (S)	+20% (N) +10% (S)	\$1,511,413	\$1,769,159	\$257,746
Solid waste composition (blue box papers)	23%	33%	+10%	\$1,511,413	\$1,760,068	\$248,656
Solid waste composition (blue box papers)	23%	13%	-10%	\$1,511,413	\$1,245,988	(\$265,425)
TS operating costs (includes 10% contingency)	\$106,150	\$161,150	+\$50K	\$1,511,413	\$1,676,413	\$165,000
TS operating costs (includes 10% contingency)	\$106,150	\$216,150	+\$100K	\$1,511,413	\$1,841,413	\$330,000
MRF processing cost	\$100	\$150	+\$50	\$1,511,413	\$1,862,308	\$350,896
MRF processing cost	\$100	\$200	+\$100	\$1,511,413	\$2,213,204	\$701,791
						\$15.50

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Remove Northern Municipality- Opasatika	Included	Excluded	Excluded 1	\$1,511,413	\$1,510,308	\$(1,105)
Remove Northern Municipality- Opasatika & Moonbeam	Included	Excluded	Excluded 2	\$1,511,413	\$1,502,332	\$(9,081)
Remove Central Municipality-Black River (Matheson)	Included	Excluded	Excluded 1	\$1,511,413	\$1,479,712	\$(31,701)
Remove Southern Municipality- Evanturel	Included	Excluded	Excluded 1	\$1,511,413	\$1,488,199	\$(23,214)
Remove Southern Municipality- Evanturel & Cobalt	Included	Excluded	Excluded 2	\$1,511,413	\$1,480,712	\$(30,701)

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Waste generation rate	302 kg	332 kg	+10%	\$1,559,877	\$1,619,584	\$59,707
Waste generation rate	302 kg	272 kg	-10%	\$1,559,877	\$1,483,373	(\$76,504)
Capture rates	45% (N) 70% (S)	30% (N) 50% (S)	-15% (N) -20% (S)	\$1,559,877	\$1,240,653	(\$319,224)
Capture rates	45% (N) 70% (S)	65% (N) 80% (S)	+20% (N) +10% (S)	\$1,559,877	\$1,820,938	\$261,061
Solid waste composition (blue box papers)	23%	33%	+10%	\$1,559,877	\$1,805,557	\$245,680
Solid waste composition (blue box papers)	23%	13%	-10%	\$1,559,877	\$1,297,973	(\$261,904)
TS operating costs (includes 10% contingency)	\$106,150	\$161,150	+\$50K	\$1,559,877	\$1,759,877	\$220,000
TS operating costs (includes 10% contingency)	\$106,150	\$216,150	+\$100K	\$1,559,877	\$1,999,877	\$440,000
MRF processing cost	\$100	\$150	+\$50	\$1,559,877	\$1,910,773	\$350,896
MRF processing cost	\$100	\$200	+\$100	\$1,559,877	\$2,261,668	\$701,791
						\$15.50

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Remove Northern Municipality- Opasatika	Included	Excluded	Excluded 1	\$1,559,877	\$1,558,199	\$(1,678)
Remove Northern Municipality- Opasatika & Moonbeam	Included	Excluded	Excluded 2	\$1,559,877	\$1,550,223	\$(9,654)
Remove Central Municipality-Black River (Matheson)	Included	Excluded	Excluded 1	\$1,559,877	\$1,528,176	\$(31,701)
Remove Southern Municipality- Evanturel	Included	Excluded	Excluded 1	\$1,559,877	\$1,537,208	\$(22,669)
Remove Southern Municipality- Evanturel & Cobalt	Included	Excluded	Excluded 2	\$1,559,877	\$1,529,176	\$(30,701)

Impact of Changes in Key Assumptions – Scenario 3

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Waste generation rate	302 kg	332 kg	+10%	\$1,558,898	\$1,619,339	\$60,441
Waste generation rate	302 kg	272 kg	-10%	\$1,558,898	\$1,500,943	(\$57,955)
Capture rates	45% (N) 70% (S)	30% (N) 50% (S)	-15% (N) -20% (S)	\$1,558,898	\$1,266,891	(\$292,008)
Capture rates	45% (N) 70% (S)	65% (N) 80% (S)	+20% (N) +10% (S)	\$1,558,898	\$1,802,443	\$243,545
Solid waste composition (blue box papers)	23%	33%	+10%	\$1,558,898	\$1,787,559	\$228,660
Solid waste composition (blue box papers)	23%	13%	-10%	\$1,558,898	\$1,326,127	(\$232,771)
TS operating costs (includes 10% contingency)	\$106,150	\$161,150	+\$50K	\$1,558,898	\$1,833,898	\$275,000
TS operating costs (includes 10% contingency)	\$106,150	\$216,150	+\$100K	\$1,558,898	\$2,108,898	\$550,000
MRF processing cost	\$100	\$150	+\$50	\$1,558,898	\$1,909,794	\$350,896
MRF processing cost	\$100	\$200	+\$100	\$1,558,898	\$2,260,690	\$701,791
						\$15.50

Assumption	Original Value	Revised Value	Change	Original Annual Cost	Revised Annual Cost	Increased Annual Cost per Household
Remove Northern Municipality- Opasatika	Included	Excluded	Excluded 1	\$1,558,898	\$1,557,221	\$(1,678)
Remove Northern Municipality- Opasatika & Moonbeam	Included	Excluded	Excluded 2	\$1,558,898	\$1,549,245	\$(9,654)
Remove Central Municipality-Black River (Matheson)	Included	Excluded	Excluded 1	\$1,558,898	\$1,531,257	\$(27,641)
Remove Southern Municipality- Evanturel	Included	Excluded	Excluded 1	\$1,558,898	\$1,535,684	\$(23,214)
Remove Southern Municipality- Evanturel & Cobalt	Included	Excluded	Excluded 2	\$1,558,898	\$1,528,198	\$(30,701)

Several alternatives exist for the sharing of operating costs incurred in connection with the shared approach to the management of recyclables. In selecting a preferred cost sharing model, we suggest that the following attributes be reflected:

- **Fairness**, with costs allocated based on utilization of the system;
- **Consistency**, with communities that have similar circumstances being allocated the same proportion of costs;
- **Ease of administration and understanding**, avoiding the need for complex formulae or onerous record keeping; and
- **Sustainability**, with the cost sharing model encouraging as many municipalities as possible to participate in the initiative as well as providing some form of incentive to maximize the amount of recyclable materials diverted.

In addition to these considerations, the development of a cost sharing model should consider two key questions:

1. Which costs are to be borne by the individual municipalities as opposed to shared by the group?
2. For so-called shareable costs, how will these be allocated among the participating municipalities?

Local vs. shareable costs

As noted earlier in our report, the financial model considers five different cost components:

- Local collection costs
- Transportation costs from communities to transfer stations
- Transfer station operating costs
- Transportation costs from transfer stations to MRF
- MRF operating costs

Local collection costs

Based on our analysis, we suggest that collection costs within the community should be excluded from the determination of shareable costs on the basis that:

- Local communities retain the right (and responsibility) to determine the appropriate level of service (e.g. curbside vs. depot, frequency of collection); and
- The collection of recyclables is often undertaken at the same time as other solid waste collection and as such, separating costs between recyclables vs. other waste streams will be problematic.

Transportation costs from communities to transfer stations

Based on our analysis, we suggest that transportation costs from the participating communities to the transfer stations should be included in the determination of shareable costs. While it could be argued that the inclusion of these costs is unfair to those communities where transfer stations exist (as they do not need to ship recyclable materials over longer distances), we note that the overall cost of the initiative does not change significantly as the number of transfer stations increases. In addition, the exclusion of transportation costs from communities to transfer stations would provide a disincentive to those communities without transfer stations to participate in the initiative, particularly those that are of considerable distance from a transfer station. As transfer station costs are fixed in nature (as well as any capital investment requirements), the participating of more communities reduces the overall costs for all communities, including those that have transfer stations.

Other operating costs

As operating costs relating to transfer stations, transportation to the MRFs and MRF costs are incurred on a shared basis, these costs should be considered as shareable costs allocated to the participating municipalities.

Capital costs, amortization and reserves

While the financial model does not reflect capital expenditures, we suggest that capital expenditures incurred for transfer stations or MRFs be considered a shareable cost as all participating municipalities benefit from the investment.

In order to ensure the long-term sustainability of the initiative from a capital reinvestment perspective, consideration could be given to including amortization and/or reserve contributions in the determination of shareable costs.

Basis of cost allocation

Ideally, the allocation of shareable costs to the participating municipalities should be undertaken on a per tonne basis as this provides a direct linkage between usage and costs while at the same time representing an allocation method that is relatively easy to administer and understand. However, the use of a per tonne allocation may not be possible due to (i) the absence of weigh scales at transfer stations; or (ii) the co-mingling of recyclables from different communities, which precludes a per tonne allocation. In these instances, we suggest that an allocation based on the number of households be considered, which we consider to be appropriate given the fact that the initiative is dealing with residential waste streams only.

As a means of encouraging increased utilization and participation, consideration could be given to establishing a tiered rate structure whereby higher users receive a discounted per tonne charge. In addition to reflecting the inherent economies of scale associated with higher recyclable volumes, this also provides incentive for increased waste diversion at the local level. One strategy could be to establish bands for per tonne rates, with costs decreasing as certain threshold volumes are achieved.

In addition to the above, consideration could also be given to establishing regional rates based on transfer station utilization clusters so as to provide an additional linkage between usage and costs.



cutting through complexity

Northeastern Ontario Optimization Project

Appendix A Financial Model



Weekly Volume of Recyclables Collected

Municipality	Collection Program (Depot or Curbside)	Multi-Stream						Single Stream			Number of Weekly Trips by Collection Vehicle	
		Containers		Fibres		Total		Multi-Stream		Single Stream		
		Weekly Tonnage (tonnes)	Weekly Volume (m³)	Weekly Tonnage (tonnes)								
Northern Region	Depot	2.00	36.91	3.06	20.40	5.05	60.30	0.05	0.05	0.05	2.02	
	Depot	0.27	5.38	0.41	2.75	0.68	8.13	0.16	0.16	0.16	0.33	
	Depot	0.08	1.68	0.13	0.86	0.21	2.54	0.03	0.03	0.03	0.27	
	Depot	0.32	6.41	0.49	3.27	0.81	9.68	0.17	0.17	0.17	0.59	
	Depot	3.21	62.26	4.93	32.84	8.14	97.10	0.14	0.14	0.14	0.32	
	Depot	0.43	8.63	0.66	4.41	1.09	13.04	0.20	0.20	0.20	0.36	
	Fauquier - Strickland	0.21	4.16	0.32	2.12	0.53	6.28	0.53	0.53	0.53	0.44	
Central Region	Smooth Rock Falls	0.63	11.78	1.29	8.58	2.13	25.16	2.13	21.26	0.01	0.40	
	Cochrane	0.63	11.78	1.29	8.58	2.13	25.16	2.13	21.26	0.01	0.40	
	Uxbridge Falls	0.63	11.78	1.29	8.58	2.13	25.16	2.13	21.26	0.01	0.40	
	Black River - Matheson	0.94	18.90	1.45	9.66	2.19	28.55	2.19	28.55	0.01	0.40	
	Timmins	2.40	45.00	2.75	20.75	5.20	65.75	5.20	65.75	0.01	0.40	
	Kirkland Lake	0.62	12.00	0.75	5.25	1.50	20.75	1.50	20.75	0.01	0.40	
	Chamberlain	0.12	2.33	0.18	1.19	0.29	3.52	0.29	2.95	0.01	0.40	
Southern Region	Englehart	0.60	11.91	0.91	6.09	1.51	18.00	1.51	15.00	0.01	0.40	
	Evanurel	0.18	3.54	0.27	1.81	0.45	5.36	0.45	4.40	0.01	0.40	
	Clayton and Duck	0.26	5.26	0.40	2.69	0.67	7.95	0.67	6.65	0.01	0.40	
	Armstrong (Eaton)	0.48	9.53	0.73	4.87	1.21	14.41	1.21	12.00	0.01	0.40	
	Temiskaming Shores	0.21	4.21	0.25	2.25	0.50	6.00	0.50	5.50	0.01	0.40	
	Cobalt	0.44	8.88	0.68	4.54	1.13	13.42	1.13	12.00	0.01	0.40	
	Latchford	0.15	3.03	0.23	1.55	0.38	4.59	0.38	3.84	0.01	0.40	
Tembagami	Depot	0.32	6.43	0.49	3.29	0.81	9.72	0.81	8.74	0.01	0.40	
	Northern Region Sub-Total	-	7	10	67	17	197	10	104	0.01	0.40	
	Central Region Sub-Total	-	3	55	4	28	7	83	79	765	0.01	0.40
	Southern Region Sub-Total	-	3	51	4	26	6	77	16	161	0.01	0.40
TOTAL		12	26	18	121	30	357	105	1,050	20.01		

Notes

1. "Containers" includes "Blue Box Metals", "Blue Box Plastics", and "Recyclable Glass".

2. "Fibres" includes "Blue Box Papers".

3. "Weekly Tonnage" data calculated based on "Estimated Recyclable Material Diverted", assuming 5.2 weeks/year.

4. "Weekly Volume" data calculated based on "Weekly Tonnage" and density data from Table "Material Composition".

Material Composition

Material	Density (kg/m³)	Vehicle	Collection Type	Compartment Split	Material Stream	Capacity (kg)	Compaction Ratio	Capacity (m³)
Containers	50	Depot	-	-	-	-	-	-
Fibres	150	Curbside	Co-Collection	-	Garbage	3,500	-	21
Single Stream	100		Single Stream	-	Recyclables	3,500	1.5	53

Notes

1. "Compartiment Split" assumed based on standard rear marker waste collection vehicle.

2. "Capacity (kg)" based on Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making, Table C1, Typical Payload in Collection Truck, Générat., July 2009, (Cf. Report #148).

3. "Compaction Ratio" based on Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making, Section 3.1, Générat., July, 2009, (Cf. Report #149).

4. "Capacity (m³)" assumed for Depot Collection Vehicle, and calculated based on "Capacity (kg)", "Compaction Ratio", "Density", and "Compartiment Split" for Curbside Collection Vehicle.

Might be issues if the collection program changes consider changing to it
Missing formula

Notes

1. Number of Weekly Trips by Collection Vehicle
based on "Weekly Volume" and "Capacity (m³)".

2. Capacity (kg) based on Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making, Table C1, Typical Payload in Collection Truck, Générat., July 2009, (Cf. Report #148).

3. "Compaction Ratio" based on Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making, Section 3.1, Générat., July, 2009, (Cf. Report #149).

4. "Capacity (m³)" assumed for Depot Collection Vehicle, and calculated based on "Capacity (kg)", "Compaction Ratio", "Density", and "Compartiment Split" for Curbside Collection Vehicle.

Weekly Volume of Recyclables Collected

Municipality	Collection Program (Depot or Curbside)	Annual Tonnage (tonnes)	Cost per Tonne (\$)	Depot Collection Costs
Northern Region	Depot	26,236	\$ 119,286.99	Total number of bins collected
	Depot	35,433	\$ 16,078.14	Average weight of bin (kg)
	Depot	11,055	\$ 5,025.63	Annual Material Collected
	Depot	42,119	\$ 19,148.46	Collection cost per bin
	Depot	42,336	\$ 192,083.94	Equivalent collection cost per tonne
	Depot	56,861	\$ 25,804.71	
	Depot	27,337	\$ 12,421.89	Notes:
	Curbside	110,542	\$ 29,844.94	1. Based on reported values from Cochrane and Timmins
	Curbside	22,957	\$ 165,154.56	2. Includes program administration, bin collection, and haulage.
	Depot	23,739	\$ 107,695.42	
Central Region	Depot	12,466	\$ 56,444.43	For further Consideration:
	Curbside	3,214,933	\$ 868,030.88	Look for curb-side collection costs from other municipalities
	Depot	87,184	\$ 235,397.16	Look for curb-side collection costs from WDO by municipal grouping
	Curbside	87,184	\$ 6,960.94	Apply costs developed for both collection systems, and apply the
	Depot	15,345	\$ 36,631.60	corresponding values to each municipality
	Depot	75,244	\$ 10,535.76	
	Depot	23,334	\$ 15,726.58	
	Depot	34,165	\$ 28,500.03	
	Depot	62,820	\$ 225,572.26	
	Curbside	83,445	\$ 26,534.71	
Southern Region	Depot	58,511	\$ 9,070.32	
	Depot	15,992	\$ 19,248.77	
	Depot	47,355	\$ 584,899.26	
	Northern Region Sub-Total	-	\$ 1,399	
	Central Region Sub-Total	-	\$ 4,240	
	Southern Region Sub-Total	-	\$ 4,171	
	TOTAL	-	\$ 7,018	
				Notes

For further Consideration:
Look for curb-side collection costs from other municipalities
Look for curb-side collection costs from WDO by municipal grouping
Apply costs developed for both collection systems, and apply the corresponding values to each municipality

For further Consideration:
Haulage costs from each municipality to primary node under
the scenarios presented on Tab "Haul to Primary Node".

6.960.94 ranges from \$160 - \$456 per tonne. However, these costs do not reflect

any inclusion of program administration costs, and do not reflect

the same configuration as the existing system.

Will estimate these costs to develop a comprehensive per tonne rate

that can be applied to new system

Will also look into costs for current system to see if these costs can be

estimated

Curb-side Collection Costs		
Cochrane (\$/tonne)	\$385	
Timmins (\$/tonne)	\$270	
Average collection cost per tonne	\$328	

Notes:
1. Based on reported values from Cochrane and Timmins

The following table contains the results of the analysis of the data collected during the survey. The table includes the following information:	
Parameter	Value
Parameter A	Value A
Parameter B	Value B
Parameter C	Value C
Parameter D	Value D
Parameter E	Value E
Parameter F	Value F
Parameter G	Value G
Parameter H	Value H
Parameter I	Value I
Parameter J	Value J
Parameter K	Value K
Parameter L	Value L
Parameter M	Value M
Parameter N	Value N
Parameter O	Value O
Parameter P	Value P
Parameter Q	Value Q
Parameter R	Value R
Parameter S	Value S
Parameter T	Value T
Parameter U	Value U
Parameter V	Value V
Parameter W	Value W
Parameter X	Value X
Parameter Y	Value Y
Parameter Z	Value Z

Transfer Station Operating Costs

Description	Cost ⁽¹⁾ (\$/year)	Municipally Owned Small Transfer Station Comments
Staffing Requirements		
Site Supervisor	\$ 9,500	Based on: annual salary of \$60,000, 10% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years)
Loader Operator	\$ 14,200	Based on: annual salary of \$45,000, 20% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years). Assumed to include time for snow plowing (varies by year). Decreased from 50% in Reference Report to 20% based on Cochrane Report.
Labour	\$ 1,000	Based on: net hour rate of \$40 and 0.5 hour per week. Estimated based on Cochrane Report.
Maintenance Staff	\$ 7,900	Based on: annual salary of \$50,000, 10% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years). Reduced from 30% of time in Reference Report to 10 % of time due to limited equipment and site features.
Administration Staff	\$ 3,200	Based on: annual salary of \$40,000, 0.5% of time, 1.4 overhead and benefits factor, 2% annual inflation rate (6 years). Decreased from 10% in Reference Report to 5% based on Cochrane Report.
Equipment, Utilities and Fuel		
Front End Loader	\$ 8,200	Based on: annual lease of \$3,000/month, 20% of time, 2% annual inflation rate (6 years). Assumed to included major repairs etc.
Fuel and Tires (Front End Loader)	\$ 15,500	Based on: 1 vehicle, \$1.10 per litre of fuel, 10 litres of fuel per hour, 4 hours per day, 250 days per year. Fuel increased from \$1.00 in Reference Report to \$1.10 to account for inflation. Estimate of \$10,000 for tires based on Cochrane Report. Incorrect calculation = \$1.10 of fuel x 40 Litres/hour @ 4 hours * 250 days) + \$10,000 Total cost \$21,000
Utilities (water, electricity, natural gas)	\$ 10,200	Based on \$1,000/year for water, \$4,000/year for electricity, \$4,000/year for natural gas or propane, 2% annual inflation rate (6 years).
Maintenance and Other		
Building, road, site work	\$ 10,000	Based on: 0.5% of design, site preparation, services, approvals, and construction capital cost of \$2,000,000.
Reporting, consultant, legal, etc. fees	\$ 11,300	Based on: \$10,000/year, 2% annual inflation rate (6 years).
Subtotal	\$ 91,000	
Contingency (10%)	\$ 9,100	
Total Facility Cost		\$ 100,100

Note:

Reference Report: Report on Transfer of Blue box Recyclables Materials: Factors Affecting Decision Making, July 2009, Prepared for Continuous Improvement Fund, Prepared by Genivar Ontario Inc.. Cost based on Transfer Station for 2,500 tonnes per year.
Cochrane Report: Cochrane Transfer Station Construction and Annual Operational Cost Analysis, September 2013, Prepared for Continuous Improvement Fund, Prepared by EBA.
(1) Costs in Reference Report are 2009 dollars. Annual inflation rate of 2% utilized to develop 2015 costs (6 years).

Transfer Haul to Secondary Node		Annual Haul Costs to Destination Node									
		Scenario									
Primary Node Location	Annual Compacted Waste Volume [m³]	Annual Number of Transfer Haul Trucks Required		Scenario							
		1	2	3	1	2	3	1	2	3	1A - Guelph/NRF
Kalpursing	9,402	5,805	6,542	8,8	55	62	NES-Timmins	\$50,386.29	\$34	\$51,491.43	\$268,525.71
Cochrane	-	3,597	-	34	-	-	NES-Timmins	-	-	-	-
Timmins	29,690	23,877	21,433	278	224	201	NES-Timmins	0	\$0	NES-Timmins	1,780
Iroquois Falls	-	-	-	5,304	-	50	NES-Timmins	-	-	NES-Timmins	-
Kirkland Lake	-	-	-	5,812	-	55	NES-Timmins	-	-	NES-Timmins	-
Toromakaming Shores	7,836	13,649	7,836	74	128	74	R&D-North Bay	\$40,341	318	\$49,728.29	\$24,388.57
Total	46,928	46,928	46,928	440	441	442	R&D-North Bay	652	\$90,727	864	\$113,026
Notes	1. Annual Compacted Waste Volume based on corresponding Scenario from Tab "TS Consolidation". 2. Annual Number of Transfer Haul Trucks Required calculated based on "Annual Compacted Waste Volume" and "Average Truck Payload" from Table "Transfer Haul Truck Assumptions".										

Transfer Haul Truck Assumptions

Metric	Value
Average Truck Speed [km/h]	70
Average Truck Payload [m³]	107
Cost per Hour (\$/hr)	\$120

Notes

1. "Average Truck Payload" data sourced from Report on Transfer of Blue Box Recyclable Materials: Factors Affecting Decision Making, Genivar, July 2009, CII Report #149.
- Assume haul by transfer trailer with 140 cubic yard capacity, and assumes that Ontario roadway weight restrictions are not exceeded.

Rail Haul Transfer Notes

1. \$7.50 per privately supplied rail car
2. Maximum weight: 125 tons (freight)
3. Cost per trip between Timmins to Hamilton or Guelph on ONT-NBAY-CN
4. Subject to fuel surcharge
5. Subject to establishing a suitable loading area
6. Subject to establishing a suitable unloading area
7. Condition on consignee being rail served by CN
8. Rate applies to rail cars not exceeding 10' W x 10' H by 30' L
9. Zero mileage compensation for private cars
10. Subject to environmental approval
11. Subject to regular train service
12. Subject to existing infrastructure
13. Subject to review when more information is available
14. Rate quoted for feasibility purposes only
15. Rate valid for 30 days only
16. December 5, 2014, via email, Stephen.Hayne@ontarionorthland.ca

blank cell
Correct amount? Zero km for travel to Timmins (possible if hub)

Annual Tonnage Received			
Annual Waste Tonnage from Primary Nodes (tonnes)			
Primary Node Location	Scenario		
	1	2	3
Kapusasing	1,399	859	970
Cochrane	-	540	-
Timmins	4,449	3,577	3,215
Iroquois Falls	-	-	791
Kirkland Lake	-	-	872
Temiskaming Shores	1,171	2,043	1,171
Total	7,018	7,018	7,018

MRF Processing Cost

Annual Processing Cost by MRF			
MRF	Total Cost Scenario		
	Cost per Tonne	1	2
NES - Timmins	\$100	\$584,705	\$497,520
R&D - North Bay	\$100	\$117,086.76	\$204,270.89
Guelph	-\$30	-	-
Total	\$701,791	\$701,791	\$701,791

Notes on Processing

As Received Compacted Bulk Density		
Metric	Density (kg./m ³)	
As received compacted bulk density	150	

As Received Compacted Bulk Density

Metric	Density (kg./m ³)
As received compacted bulk density	150

Notes on Processing

1. Need to identify viable MRFs, processing costs, labour requirements.
 2. Existing MRFs may limited capacity available, or other restrictions on processing that needed to be clarified.
 3. Need to determine existing infrastructure and what additional equipment may warrant being installed.
 4. Need to identify material markets.
- Approximate costs for Equipment:
- Baler: \$500K to \$750K – equipment, installed, commissioned
 Small cross belt magnet: \$100K – equipment installed commissioned
 Eddy current: \$150K – equipment installed commissioned
- Limited market for glass. MRF costs might be optimized if this material can be used locally at landfills (could be shipped with residue and not sorted at the facility).

Summary of Recommended Options

Scenario	Description	Total Weekly Haul Distance			Weekly Costs				ORIGINAL Total	Difference	
		To Primary Node (km)	To Secondary Node (km)	Total (km)	Collection	Haul to Primary Node	Consolidation	Haul to Secondary Node	Processing		
1	Nodes in Kapuskasing, Timmins, and Temiskaming Shores	2,126	652	2,778	\$42,890	\$7,711	\$5,775	\$1,745	\$13,496	\$71,616	\$0
2	Primary Nodes in Kapuskasing, Cochrane, Timmins, and Temiskaming Shores	1,772	864	2,636	\$42,890	\$6,161	\$7,700	\$2,185	\$13,496	\$72,432	\$0
3	Primary Nodes in Kapuskasing, Iroquois Falls, Timmins, Kirkland Lake and Temiskaming Shores	1,500	1,078	2,578	\$42,890	\$4,090	\$9,625	\$2,207	\$13,496	\$72,308	\$0
4	Primary Nodes in Timmins and Temiskaming Shores	4,182	-	4,182	\$42,890	\$15,854	\$3,850	50	\$13,496	\$76,089	\$78,296
											-\$2,207

**Do not match clients records.

1 Collection would depend on service delivery type. Used total cost divided by number of weeks to calculate fixed cost.

Client Notes

Collection costs depend on service delivery type

Weekly haul distance to primary node shows the difference between each scenario, and forms part of the basis of how scenarios were developed interesting that the cost of hauling to primary node and cost of consolidation



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Appendix D

Cost Share Allocation Model

DRAFT

NORTHEASTERN ONTARIO WASTE OPTIMIZATION INITIATIVE

Summary of Proposed Cost Allocations

Scenario 1
Primary Nodes - Kapuskasing, Timmins and Temiskaming Shores
MRF - Timmins and North Bay

Municipality	Primary Node	MRF	Households (Schedule 1)	Material Diverted (Schedule 1)	Local Collection (note 1)	Haul to Primary Node (note 1)	Transfer Station (note 2)	Haul to Secondary Node (note 3)	MRF Processing (note 4)	Total Allocated Costs	Cost Per Tonne	Cost Per Household	
Hearts	Kapuskasing	Timmins	2,524	\$263	\$29,950	\$19,899	\$9,479	\$26,300	\$85,628	\$325.58	\$	\$33.93	
Matrice - Val Cole	Kapuskasing	Timmins	340	35	\$14,071	\$2,849	\$1,261	\$3,500	\$21,682	\$619.48	\$	\$63.77	
Opasika	Kapuskasing	Timmins	133	11	\$6,576	\$896	\$365	\$1,200	\$8,968	\$815.27	\$	\$67.43	
Val Rita-Harby	Kapuskasing	Timmins	368	42	\$4,758	\$3,419	\$1,514	\$4,200	\$13,891	\$330.74	\$	\$37.75	
Kanukobam	Kapuskasing	Timmins	4,090	423	\$22,473	\$31,440	\$15,246	\$42,300	\$111,459	\$263.50	\$	\$27.25	
Mooneham	Kapuskasing	Timmins	563	57	\$6,677	\$4,640	\$2,054	\$5,700	\$19,072	\$334.59	\$	\$38.88	
Fauquier - Strickland	Kapuskasing	Timmins	270	27	\$7,777	\$2,198	\$973	\$2,700	\$12,643	\$468.47	\$	\$46.85	
Smooth Rock Falls	Kapuskasing	Timmins	693	111	\$11,232	\$8,935	\$4,003	\$11,100	\$35,267	\$317.72	\$	\$50.89	
Cochrane	Kapuskasing	Timmins	2,455	429	\$42,432	\$31,873	\$15,462	\$42,900	\$122,665	\$309.25	\$	\$50.99	
Iroquois Falls	Kapuskasing	Timmins	2,254	237	\$36,532	\$8,174	\$6,233	\$23,700	\$70,495	\$297.07	\$	\$31.52	
Black River - Matheson	Kapuskasing	Timmins	1,172	194	\$12,324	\$7,234	\$7,234	\$-	\$	\$200.71	\$	\$33.22	
Timmins	Kapuskasing	Timmins	18,806	3715	\$-	\$68,852	\$-	\$	\$311,500	\$380,352	\$121.42	\$	\$20.16
Kirkland Lake	Temiskaming Shores	Timmins	4,234	872	\$9,840	\$21,910	\$5,150	\$87,200	\$208,950	\$239.62	\$	\$49.35	
Chamberlain	Temiskaming Shores	North Bay	161	15	\$8,583	\$1,510	\$667	\$1,500	\$12,260	\$871.33	\$	\$76.15	
Eaglehart	Temiskaming Shores	North Bay	751	78	\$16,762	\$7,852	\$5,469	\$7,800	\$35,882	\$460.03	\$	\$47.78	
Evenlode	Temiskaming Shores	North Bay	208	23	\$8,075	\$3,215	\$1,023	\$3,300	\$6,390	\$596.02	\$	\$61.33	
Charlton and Dack	Temiskaming Shores	North Bay	274	35	\$12,281	\$3,523	\$1,556	\$3,500	\$20,864	\$596.02	\$	\$61.33	
Armstrong (Eaton)	Temiskaming Shores	North Bay	516	63	\$12,682	\$6,342	\$2,802	\$6,300	\$28,125	\$446.43	\$	\$54.51	
Temiskaming Shores	Temiskaming Shores	North Bay	4,402	835	\$-	\$71,321	\$37,132	\$83,500	\$191,953	\$229.88	\$	\$43.61	
Colbalt	Temiskaming Shores	North Bay	623	59	\$1,933	\$5,939	\$2,624	\$5,900	\$16,396	\$277.90	\$	\$26.32	
Latchford	Temiskaming Shores	North Bay	202	31	\$1,099	\$3,121	\$1,379	\$3,100	\$8,698	\$280.58	\$	\$43.06	
Temagami	Temiskaming Shores	North Bay	471	42	\$2,689	\$4,228	\$1,868	\$4,200	\$12,985	\$309.16	\$	\$27.57	
			45,280	7,097	\$360,746	\$318,450	\$5	\$102,905	\$5	\$1,491,801	\$5	\$293.88	\$43.61

Notes:

(1) Haul to primary node costs have been calculated as follows:

Primary Node	Transportation Cost to Primary Node (Schedule 3)	Allocated Based on Distance 50%	Weekly Trips	Total Mileage (Schedule 3)	Based on Share of Trips	Allocated Costs Based on Share of Miles	Total
Kapuskasing			2,41	96	\$13,959	\$15,991	\$29,950
Kapuskasing	\$ 91,282	\$ 45,641	0.33	73	\$1,911	\$12,160	\$14,071
Kapuskasing	\$	\$	0.10	36	\$579	\$5,997	\$6,776
Kapuskasing	\$	\$	0.39	15	\$2,154	\$2,499	\$4,758
Kapuskasing	\$	\$	3.88	-	\$22,473	\$-	\$22,473
Kapuskasing	\$	\$	0.25	22	\$3,012	\$-	\$3,012
Kapuskasing	\$	\$	0.25	32	\$1,448	\$5,665	\$6,677
Kapuskasing	\$	\$	0.40	63	\$5,616	\$5,616	\$11,232
Kapuskasing	\$	\$	0.40	63	\$2,121	\$2,121	\$4,243
Timmins	\$ 42,432	\$ 21,216	1.57	119	\$5,712	\$19,266	\$38,532
Timmins	\$ 38,532	\$ 19,266	2.18	72	\$6,162	\$6,162	\$12,324
Timmins	\$ 12,324	\$ 6,162	0.71	69	\$-	\$-	\$-
Timmins	\$	\$	-	1178	\$-	\$-	\$-
Timmins	\$ 99,940	\$ 49,920	\$19	140	\$49,920	\$49,920	\$99,840
Timmins			0.14	46	\$2,110	\$6,427	\$8,553
Timmins			0.40	42	\$10,852	\$5,910	\$16,762
Timmins			0.21	42	\$3,165	\$4,823	\$8,458
Timmins			0.32	53	\$2,872	\$7,458	\$12,281
Timmins			0.58	28	\$3,940	\$19,266	\$24,682
Timmins			-	3,066	\$-	\$-	\$-
Timmins			0.54	18	\$1,485	\$448	\$1,933
Timmins			0.11	32	\$303	\$796	\$1,099
Timmins			0.39	65	\$1,072	\$1,617	\$2,689
Timmins			0.55	65	\$-	\$-	\$-
Timmins			0.72	65	\$-	\$-	\$-
Timmins			0.21	65	\$-	\$-	\$-
Timmins			0.32	65	\$-	\$-	\$-
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Timmins			0.32	65	\$-	\$-	\$-
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Timmins			0.32	65	\$-	\$-	\$-
Timmins			0.58	65	\$-	\$-	\$-
Timmins			0.06	65	\$-	\$-	\$-
Timmins			0.54	65	\$-	\$-</td	

Summary of Proposed Cost Allocations

Scenario 1
Primary Nodes - Kapuskasing, Timmins and Temiskaming Shores
MWRF - Timmins and North Bay

(2) Transfer station operating costs have been calculated as follows:

Transfer Station Operating Costs (Schedule 4b)	Materials Diverted (in tonnes)	Average Cost Per Tonne	Proposed Pricing				Materials Diverted by Tier				Allocated Costs by Tier				
			Tier 1 First 100 Tonnes	Tier 2 101 to 200 Tonnes	Tier 3 201 to 500 Tonnes	Tier 4 Over 500 Tonnes	Tier 1 First 100 Tonnes	Tier 2 101 to 200 Tonnes	Tier 3 201 to 500 Tonnes	Tier 4 Over 500 Tonnes	Total Tonnes	Tier 1 First 100 Tonnes	Tier 2 101 to 500 Tonnes	Tier 3 501 to 1,000 Tonnes	Tier 4 Over 1,000 Tonnes
106.150	263 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	100	163	-	263 \$	81.41 \$	11,758 \$	-	19,999 \$
	35 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	35	35	2,849 \$	-	-	-	-	2,849 \$
	11 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	11	11	836 \$	-	-	-	-	836 \$
	42 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	42	42	3,419 \$	-	-	-	-	3,419 \$
	423 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	100	323	423 \$	81.41 \$	23,299 \$	-	-	23,299 \$
	57 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	57	57	4,640 \$	-	-	-	-	4,640 \$
	27 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	27	27	2,138 \$	-	-	-	-	2,138 \$
	111 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	100	111	8,141 \$	-	-	-	-	8,141 \$
	429 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	100	329	429 \$	81.41 \$	7,935 \$	-	-	7,935 \$
	237 \$	75.93 \$	81.41 \$	81.41 \$	72.13 \$	68.34 \$	64.54	100	137	237 \$	81.41 \$	23,723 \$	-	-	23,723 \$
	23.49 \$	51.16 \$	51.16 \$	51.16 \$	21.15 \$	21.15 \$	21.15 \$	51.16	51.16	3,058 \$	5	5	5	5	3,058 \$
	194 \$	23.49 \$	51.16 \$	51.16 \$	22.32 \$	22.32 \$	22.32 \$	19.97	100	19.4 \$	5.116 \$	19.4 \$	5	5	18.74 \$
	321.5 \$	23.49 \$	51.16 \$	51.16 \$	21.15 \$	21.15 \$	21.15 \$	19.97	100	400 \$	5.116 \$	8,928 \$	5	5	7,214 \$
	872 \$	23.49 \$	51.16 \$	51.16 \$	22.32 \$	22.32 \$	22.32 \$	19.97	100	400 \$	5.116 \$	8,928 \$	5	5	68,852 \$
	15 \$	89.88 \$	100.66 \$	85.39 \$	21.15 \$	15 \$	15 \$	15 \$	372	872 \$	5.116 \$	7,856 \$	-	-	7,856 \$
	78 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	400	15 \$	1.510 \$	-	-	-	1.510 \$
	23 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	78	7.882 \$	-	-	-	-	7.882 \$
	35 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	23	23.35 \$	-	-	-	-	23.35 \$
	63 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	35	3,523 \$	-	-	-	-	3,523 \$
	835 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	63	6,342 \$	-	-	-	-	6,342 \$
	59 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	400	835 \$	10,066 \$	835 \$	34,155 \$	34,155 \$	71,231 \$
	31 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	59	5,939 \$	-	-	-	-	5,939 \$
	42 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	80.89 \$	80.89 \$	76.40	42	3,121 \$	-	-	-	-	3,121 \$
										42 \$	4,228 \$	-	-	-	4,228 \$

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Primary Node	Secondary Node	Total Tonnes	Total Cost (Schedule 5)	Cost per Tonne
Kapuskasing	Timmins	1,398	\$ 50,386	\$ 36.04
Timmins	Timmins	4,518	\$ -	\$ -
Temiskaming Shores	North Bay	2,181	\$ 52,519	\$ 44.47

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NORTHEASTERN ONTARIO WASTE OPTIMIZATION INITIATIVE

Summary of Proposed Cost Allocations

Scenario 2
Primary Nodes - Kapuskasing, Cochrane, Timmins and Temiskaming Shores
MRF - Timmins and North Bay

Municipality	Primary Node	MRF	Households (Schedule 1)	Material Diverted (Schedule 1)	Local Collection Costs	Haul to Primary Node (Schedule 1)	Transfer Station Operating Costs	Haul to Secondary Node (Schedule 1)	Transfer Station Operating Costs	Haul to Node (Schedule 1)	Processing Costs	Total Allocated Costs	Cost Per Tonne	Cost Per Household	
Hearst	Kapuskasing	Timmins	2,524	\$263	\$29,950	\$32,338	\$1,285	\$26,300	\$98,244	\$373.54	\$38.92				
Matrice - Val Cote	Kapuskasing	Timmins	340	35	\$14,071	\$4,613	\$3,500	\$3,500	\$23,469	\$670.53	\$69.03				
Opasika	Kapuskasing	Timmins	133	11	\$6,576	\$1,450	\$404	\$1,100	\$9,530	\$866.32	\$71.65				
Val Rita-Harby	Kapuskasing	Timmins	368	42	\$4,758	\$5,536	\$1,542	\$4,200	\$16,035	\$381.79	\$43.57				
Konwakagan	Kapuskasing	Timmins	4,090	423	\$22,473	\$51,143	\$15,525	\$42,300	\$131,441	\$310.74	\$32.14				
Moabtown	Kapuskasing	Timmins	563	57	\$6,677	\$7,513	\$2,092	\$5,700	\$21,982	\$385.64	\$30.04				
Fauquier - Strickland	Kapuskasing	Timmins	270	27	\$6,777	\$3,559	\$991	\$2,700	\$14,027	\$519.52	\$51.95				
Smooth Rock Falls	Cochrane	Timmins	693	111	\$10,140	\$2,540	\$11,100	\$4,716.5	\$47,163	\$424.89	\$68.06				
Cochrane	Timmins	Timmins	2,455	429	\$23,382	\$8,268	\$1,200	\$11,100	\$42,900	\$315.81	\$60.35				
Ironwood Falls	Timmins	Timmins	2,254	237	\$36,532	\$8,724	\$1,200	\$23,700	\$70,495	\$297.07	\$53.52				
Black River - Matheson	Timmins	Timmins	1,172	194	\$12,324	\$7,234	\$ -	\$ -	\$200.71	\$53.52	\$32.22				
Timmins	Timmins	Timmins	18,806	3,215	\$68,852	\$99,840	\$ -	\$311,500	\$390,352	\$121.42	\$20.76				
Kirkland Lake	Timmins	Timmins	4,234	872	\$21,910	\$ -	\$ -	\$87,200	\$208,950	\$239.62	\$49.35				
Chamberlain	Temiskaming Shores	North Bay	161	15	\$8,583	\$667	\$1,500	\$12,260	\$18,733	\$460.03	\$76.15				
Englehart	Temiskaming Shores	North Bay	751	78	\$16,762	\$7,852	\$7,800	\$3,469	\$14,713	\$35,882	\$47.78				
Evanort	Temiskaming Shores	North Bay	208	23	\$12,075	\$3,215	\$3,523	\$12,281	\$12,281	\$1,556	\$596.02				
Charlton and Dack	Temiskaming Shores	North Bay	274	35	\$12,281	\$6,342	\$3,600	\$12,682	\$6,342	\$2,802	\$446.43				
Armstrong (Eaton)	Temiskaming Shores	North Bay	516	63	\$3,132	\$6,342	\$6,300	\$37,132	\$83,500	\$191,953	\$446.43				
Temiskaming Shores	Temiskaming Shores	North Bay	4,402	835	\$ -	\$ -	\$ -	\$37,132	\$28,125	\$28,125	\$446.43				
Temiskaming Shores	Temiskaming Shores	North Bay	623	59	\$5,939	\$5,939	\$5,900	\$5,900	\$16,396	\$277.90	\$26.32				
Cobalt	Temiskaming Shores	North Bay	202	31	\$1,099	\$3,121	\$1,379	\$3,100	\$8,698	\$280.58	\$43.06				
Latchford	Temiskaming Shores	North Bay	471	42	\$2,689	\$4,228	\$4,200	\$4,200	\$12,985	\$309.16	\$309.16				
Temagami	Temiskaming Shores	North Bay	45,280	7,097	\$317,222	\$424,600	\$5	\$96,367	\$709,700	\$1,547,889	\$218.10	\$341.18			

Notes:

(1) Haul to primary node costs have been calculated as follows:

Primary Node	Transportation Cost to Primary Node (Schedule 3)	Allocated Based on Distance 50%	Weekly Trips	Total Mileage (Schedule 3)	Based on Share of Trips	Allocated Costs Based on Share of Miles	Total			
Hearst	Kapuskasing	\$	\$9,1282	\$45,641	\$45,641	\$2,41	\$13,959	\$15,991	\$29,950	
Matrice - Val Cote	Kapuskasing	\$	\$ -	\$ -	\$0.33	\$73	\$1,911	\$12,160	\$14,071	
Opasika	Kapuskasing	\$	\$ -	\$ -	\$0.10	\$36	\$579	\$5,997	\$6,756	
Val Rita-Harby	Kapuskasing	\$	\$ -	\$ -	\$0.15	\$15	\$2,259	\$2,449	\$4,758	
Moabtown	Kapuskasing	\$	\$ -	\$ -	\$3.88	\$ -	\$22,473	\$ -	\$22,473	
Fauquier - Strickland	Kapuskasing	\$	\$ -	\$ -	\$0.02	\$22	\$1,012	\$ -	\$ -	
Smooth Rock Falls	Cochrane	\$	\$10,140	\$5,070	\$5,070	\$0.25	\$3,22	\$3,665	\$6,677	
Cochrane	Timmins	\$	\$ -	\$ -	\$0.40	\$63	\$1,448	\$5,329	\$6,777	
Ironwood Falls	Timmins	\$	\$38,332	\$19,266	\$19,266	\$1.57	\$119	\$5,070	\$10,340	
Black River - Matheson	Timmins	\$	\$12,234	\$6,162	\$6,162	\$2.18	\$72	\$1,262	\$1,262	
Timmins	Timmins	\$	\$ -	\$ -	\$0.71	\$69	\$6,162	\$6,162	\$12,324	
Wabigoon Lake	Temiskaming Shores	\$	\$9,9340	\$49,920	\$49,920	\$11.78	\$ -	\$ -	\$ -	
Chamberlain	Temiskaming Shores	\$	\$ -	\$ -	\$1.14	\$140	\$49,920	\$49,920	\$99,840	
Englehart	Temiskaming Shores	\$	\$59,384	\$29,692	\$29,692	\$0.72	\$42	\$10,852	\$16,762	
Temiskaming Shores	Temiskaming Shores	\$	\$ -	\$ -	\$0.21	\$42	\$3,165	\$5,910	\$9,075	
Temiskaming Shores	Temiskaming Shores	\$	\$ -	\$ -	\$0.32	\$53	\$4,233	\$7,458	\$12,281	
Cobalt	Temiskaming Shores	\$	\$ -	\$ -	\$0.58	\$28	\$8,742	\$3,940	\$12,682	
Latchford	Temiskaming Shores	\$	\$5,720	\$2,860	\$2,860	\$0.04	\$ -	\$ -	\$ -	
Temagami	Temiskaming Shores	\$	\$ -	\$ -	\$0.11	\$32	\$303	\$448	\$448	
		\$	\$317,222	\$158,611	\$158,611	\$0.39	\$65	\$1,072	\$1,617	\$2,689
		\$	\$ -	\$ -	\$ -	\$ -	\$ -	\$158,611	\$158,611	\$317,222

NORTHEASTERN ONTARIO WASTE OPTIMIZATION INITIATIVE

Summary of Proposed Cost Allocations

Scenario 2
Primary Nodes - Kapuskasing, Cochrane, Timmins and Temiskaming Shores
MRF - Timmins and North Bay

(2) Transfer station operating costs have been calculated as follows:

Transfer Station	Operating Costs (\$/cubic 40p)	Materials Diverted (in tonnes)	Average Cost Per Tonnie	Proposed Pricing				Materials Diverted by Tier				Allocated Costs by Tier				Total
				Tier 1 First 100 Tonnes	Tier 2 101 to 500 Tonnes	Tier 3 501 to 1,000 Tonnes	Tier 4 Over 1,000 Tonnes (15% Discount From Average)	Tier 1 First 100 Tonnes	Tier 2 101 to 500 Tonnes	Tier 3 501 to 1,000 Tonnes	Tier 4 Over 1,000 Tonnes	Tier 1 First 100 Tonnes	Tier 2 101 to 500 Tonnes	Tier 3 501 to 1,000 Tonnes	Tier 4 Over 1,000 Tonnes	
Hearst - Val Cote	\$ 106,150	263 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	100	163	-	-	263 \$	131.80 \$	19.158 \$	-	\$ 461.3
Monticello - Val Cote	\$ 106,150	35 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	35	-	35 \$	4,613 \$	-	-	-	-	\$ 4,613
Al Rith-Harby	\$ 106,150	11 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	11	-	-	-	-	-	-	-	\$ 5,536
Al Rith-Harby	\$ 106,150	42 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	42	-	-	-	-	-	-	-	\$ 51,143
Al Rith-Harby	\$ 106,150	423 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	100	-	423 \$	13.80 \$	37,963 \$	-	-	-	\$ 3,559
Al Rith-Harby	\$ 106,150	57 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	57	-	57 \$	7.613 \$	-	-	-	-	\$ 2,386
Al Rith-Harby	\$ 106,150	27 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	27	-	27 \$	3.559 \$	-	-	-	-	\$ 1,579
Al Rith-Harby	\$ 106,150	111 \$	123.72 \$	131.80 \$	117.53 \$	111.35 \$	105.16 \$	11	-	111 \$	21.328 \$	2,054 \$	-	-	-	\$ 23,865
Al Rith-Harby	\$ 106,150	429 \$	198.57 \$	211.28 \$	186.75 \$	176.92 \$	167.09 \$	100	-	429 \$	21.328 \$	6,439 \$	-	-	-	\$ 82,768
Al Rith-Harby	\$ 106,150	237 \$	23.49 \$	51.16 \$	22.32 \$	21.15 \$	19.97 \$	100	-	237 \$	5.116 \$	3,098 \$	-	-	-	\$ 18,744
Al Rith-Harby	\$ 106,150	194 \$	23.49 \$	51.16 \$	22.32 \$	21.15 \$	19.97 \$	100	-	194 \$	3.948 \$	2,098 \$	-	-	-	\$ 7,214
Al Rith-Harby	\$ 106,150	215 \$	23.49 \$	51.16 \$	22.32 \$	21.15 \$	19.97 \$	100	-	400 \$	3.215 \$	10,573 \$	44,235 \$	68,852	-	\$ 68,852
Al Rith-Harby	\$ 106,150	872 \$	23.49 \$	51.16 \$	22.32 \$	21.15 \$	19.97 \$	100	-	872 \$	5.116 \$	8,928 \$	7,866 \$	5	-	\$ 7,866
Al Rith-Harby	\$ 106,150	15 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	15	-	15 \$	1.510 \$	-	-	-	-	\$ 1,510
Al Rith-Harby	\$ 106,150	78 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	78 \$	7.852 \$	-	-	-	-	\$ 7,852
Al Rith-Harby	\$ 106,150	23 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	23 \$	2.315 \$	-	-	-	-	\$ 2,315
Al Rith-Harby	\$ 106,150	35 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	35 \$	3.523 \$	-	-	-	-	\$ 3,523
Al Rith-Harby	\$ 106,150	63 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	63 \$	6.342 \$	-	-	-	-	\$ 6,342
Al Rith-Harby	\$ 106,150	835 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	835 \$	10.066 \$	34,155 \$	27,099 \$	71,321	-	\$ 71,321
Al Rith-Harby	\$ 106,150	59 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	59 \$	5.939 \$	-	-	-	-	\$ 5,939
Al Rith-Harby	\$ 106,150	31 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	31 \$	3.212 \$	-	-	-	-	\$ 3,212
Al Rith-Harby	\$ 106,150	42 \$	89.88 \$	100.66 \$	85.39 \$	80.89 \$	76.40	-	-	42 \$	4.228 \$	-	-	-	-	\$ 4,228

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Primary Node	Secondary Node	Total Tonnes	Total Cost (\$/tonne/5)	Cost per Tonne
Kapuskasing	Timmins	858	\$ 31,491	\$ 36.70
Cochrane	Timmins	540	\$ 12,357	\$ 22.88
Timmins	Timmins	4,518	\$ -	\$ -
Temiskaming Shores	North Bay	1,181	\$ 52,519	\$ 44.47
			\$ 0.265	

(a) Calculated at a rate of \$100 million

NORTHEASTERN ONTARIO WASTE OPTIMIZATION INITIATIVE

Summary of Proposed Cost Allocations

Scenario 3
Primary Nodes - Kapuskasing, Cochrane, Kirkland Lake, Timmins and Temiskaming Shores
MRF - Timmins and North Bay

Municipality	Primary Node	MRF	Households (Schedule 1)	Material Diverted (Schedule 1)	Local Collection Costs	Haul to Primary Node (note 1)	Transfer Station Operating Costs	Haul to Secondary Node (note 2)	Transfer Station Operating Costs	Haul to Processing Node (note 3)	Processing Costs	Total Allocated Costs	Cost Per Tonne	Cost Per Household	
Hearst	Kapuskasing	Timmins	2,524	\$ 263	\$ 29,950	\$ 32,338	\$ 1,285	\$ 26,300	\$ 98,244	\$ 373.54	\$ 38.92				
Matrice - Val Cole	Kapuskasing	Timmins	340	\$ 35	\$ 14,071	\$ 4,613	\$ 1,285	\$ 3,500	\$ 23,469	\$ 670.53	\$ 69.03				
Opasika	Kapuskasing	Timmins	133	\$ 11	\$ 6,576	\$ 1,450	\$ 404	\$ 1,100	\$ 6,530	\$ 866.32	\$ 71.65				
Val Rita-Harby	Kapuskasing	Timmins	368	\$ 42	\$ 4,758	\$ 5,536	\$ 1,542	\$ 4,200	\$ 16,035	\$ 381.79	\$ 43.57				
Konwakagan	Kapuskasing	Timmins	4,090	\$ 423	\$ 22,473	\$ 51,143	\$ 15,525	\$ 42,300	\$ 131,441	\$ 310.74	\$ 32.14				
Mooboom	Kapuskasing	Timmins	563	\$ 57	\$ 6,677	\$ 7,513	\$ 2,092	\$ 5,700	\$ 21,982	\$ 385.64	\$ 30.04				
Fauquier - Strickland	Kapuskasing	Timmins	270	\$ 27	\$ 6,777	\$ 1,559	\$ 991	\$ 2,700	\$ 14,027	\$ 519.52	\$ 51.95				
Smooth Rock Falls	Cochrane	Timmins	693	\$ 111	\$ 10,140	\$ 23,382	\$ 2,540	\$ 11,100	\$ 47,163	\$ 424.89	\$ 68.06				
Cochrane	Cochrane	Timmins	2,455	\$ 429	\$ 82,768	\$ 9,837	\$ 2,540	\$ 42,690	\$ 135,484	\$ 315.81	\$ 60.35				
Iroquois Falls	Timmins	Timmins	2,254	\$ 237	\$ 36,532	\$ 10,716	\$ 2,540	\$ 23,700	\$ 307.88	\$ 323.55	\$ 35.20				
Black River - Matheson	Timmins	Timmins	1,172	\$ 94	\$ 12,324	\$ 9,527	\$ -	\$ -	\$ 212.63	\$ 212.63	\$ 21.66				
Timmins	Timmins	Timmins	18,806	\$ 3215	\$ -	\$ 85,906	\$ -	\$ 321,500	\$ 407,405	\$ 126.72	\$ 252.01	\$ 51.90			
Kirkland Lake	Temiskaming Shores	Timmins	4,234	\$ 872	\$ 106,150	\$ 26,400	\$ 6,667	\$ 87,200	\$ 219,750	\$ 12,260	\$ 817.33	\$ 76.15			
Chamberlain	Temiskaming Shores	Timmins	161	\$ 15	\$ 8,583	\$ 1,510	\$ 667	\$ 1,500	\$ 7,882	\$ 34.69	\$ 460.03	\$ 47.78			
Englehart	Temiskaming Shores	Timmins	751	\$ 78	\$ 16,762	\$ 7,852	\$ 7,800	\$ 7,800	\$ 35,882	\$ 147.13	\$ 639.70	\$ 70.74			
Eventurel	Temiskaming Shores	Timmins	208	\$ 23	\$ 12,281	\$ 3,235	\$ 1,023	\$ 3,500	\$ 20,864	\$ 596.02	\$ 76.13				
Charlton and Dack	Temiskaming Shores	Timmins	274	\$ 35	\$ 12,281	\$ 3,523	\$ 1,556	\$ 3,500	\$ 20,864	\$ 596.02	\$ 76.13				
Armstrong (Eaton)	Temiskaming Shores	Timmins	516	\$ 63	\$ 12,682	\$ 3,642	\$ 2,802	\$ 6,300	\$ 28,125	\$ 446.43	\$ 54.51				
Temiskaming Shores	Timmins	Timmins	4,402	\$ 835	\$ -	\$ 71,321	\$ 37,132	\$ 83,500	\$ 191,953	\$ 229.88	\$ 43.61				
Temiskaming Shores	Timmins	Timmins	623	\$ 59	\$ 5,939	\$ 5,939	\$ 2,624	\$ 5,900	\$ 16,396	\$ 277.90	\$ 26.32				
Cobalt	Temiskaming Shores	Timmins	202	\$ 31	\$ 1,099	\$ 3,121	\$ 1,379	\$ 3,100	\$ 8,698	\$ 280.58	\$ 43.06				
Latchford	Temiskaming Shores	Timmins	471	\$ 42	\$ 2,689	\$ 4,228	\$ 1,868	\$ 4,200	\$ 12,985	\$ 309.16	\$ 309.16				
Temagami	Temiskaming Shores	Timmins	45,280	\$ 7,097	\$ 217,382	\$ 530,750	\$ 5	\$ 122,767	\$ 709,700	\$ 1,580,599	\$ 222.71	\$ 34.91			

Notes:

(1) Haul to primary node costs have been calculated as follows:

Primary Node	Transportation Cost to Primary Node (Schedule 3)	Allocated Based on Distance 50%	Weekly Trips	Total Mileage (Schedule 3)	Based on Share of Trips	Allocated Costs Based on Share of Miles	Total
Kapuskasing	\$ 91,282	\$ 45,641	\$ 45,641	2,41	96	\$ 13,959	\$ 15,991
Kapuskasing	\$	\$	\$	0.33	73	\$ 1,911	\$ 29,950
Kapuskasing	\$	\$	\$	0.10	36	\$ 579	\$ 1,407.16
Kapuskasing	\$	\$	\$	0.39	15	\$ 2,259	\$ 6,476.57
Kapuskasing	\$	\$	\$	3.88	-	\$ 2,449	\$ 6,476.57
Kapuskasing	\$	\$	\$	0.52	22	\$ 22,473	\$ 22,473
Kapuskasing	\$	\$	\$	0.25	32	\$ 1,448	\$ 6,677
Cochrane	\$ 10,140	\$ 5,070	\$ 5,070	63	\$ 5,070	\$ 5,070	\$ 10,140
Timmins	\$ 38,532	\$ 19,266	\$ 19,266	1.57	119	\$ -	\$ -
Timmins	\$ 12,244	\$ 6,162	\$ 6,162	2.18	72	\$ 19,266	\$ 38,532
Timmins	\$	\$	\$	0.71	69	\$ 6,162	\$ 12,324
Kirkland Lake	\$	\$	\$	11.78	-	\$ -	\$ -
Temiskaming Shores	\$	\$	\$	140	\$ -	\$ -	\$ -
Temiskaming Shores	\$ 59,384	\$ 29,692	\$ 29,692	0.72	42	\$ 10,852	\$ 16,762
Temiskaming Shores	\$	\$	\$	0.21	42	\$ 3,165	\$ 9,075
Temiskaming Shores	\$	\$	\$	0.32	53	\$ 4,823	\$ 12,281
Temiskaming Shores	\$	\$	\$	0.58	28	\$ 8,742	\$ 12,682
Temiskaming Shores	\$	\$	\$	3.06	-	\$ -	\$ -
Cobalt	\$	\$	\$	0.54	18	\$ 448	\$ 1,933
Latchford	\$ 5,720	\$ 2,860	\$ 2,860	0.11	32	\$ 303	\$ 1,099
Temagami	\$	\$	\$	0.39	65	\$ 1,072	\$ 2,689
	\$ 217,382	\$ 108,691	\$ 108,691	\$ 5	\$ 108,691	\$ 108,691	\$ 217,382

NORTHEASTERN ONTARIO WASTE OPTIMIZATION INITIATIVE

Summary of Proposed Cost Allocations

Scenario 3
Primary Nodes - Kapuskasing, Cochrane, Kirkland Lake, Timmins and Temiskaming Shores
MRF - Timmins and North Bay

(2) Transfer station operating costs have been calculated as follows:

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Primary Node	Secondary Node	Total Tonnes	Total Cost (\$/schedule 5)	Cost per Tonne
Capusasing	Timmins	858	\$ 31,491	\$ 36.70
Ochreane	Timmins	540	\$ 12,357	\$ 22.88
Redland Lake	Timmins	812	\$ 26,407	\$ 32.28
	Timmins	3,646	\$ -	\$ -
	Wabigoon River	1,184	\$ 3,720	\$ 3.14
	Chewy	1,184	\$ 3,720	\$ 3.14

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