

# Waste Diversion Ontario Continuous Improvement Fund

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**TOWNSHIP OF MADAWASKA VALLEY**

**CIF PROJECT #858**

**CONVERSION TO REAR BIN PACKER COLLECTION**



Final Report  
June 2016

Prepared for:  
Waste Diversion Ontario  
Continuous Improvement Fund Office  
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## Acknowledgement

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## Executive Summary

From both a financial and operational view, the CIF Project 858 can be declared a success and the Township and the Blue Box Stewards will see an increase in cost effectiveness and operational efficiency. In general, any municipality with rear load collection equipment should consider the findings of this report and the implementation of rear load compaction to transport recyclables if it is currently using un-compacted roll off containers for its recycling program.

The decision to replace the Township's un-compacted 2 compartment roll off containers with a rear bin loading system and use the Township's existing trucks for compacted collection and transportation proved to be a long term cost saving decision for the Township. As part of the original CIF application, a cost analysis was required to be presented. In that analysis, see appendix A, the payback was projected to be 4.2 years for the entire effort and a 2.1 years payback to CIF. Using the actual 2015 costs incurred the payback is almost the same as the initial estimate of 4.2 years. The project's actual payback is 4.4 years for the entire amount, a 2.8-year municipal payback and a 1.6-year CIF payback.

From an operational perspective, the transition from roll off containers to ground level recycling containers was for the most part well received by attendants and residents. From the resident perspective it was noted that it was easier due to:

- no need to carry items up a ramp
- drive up and deposit material directly from vehicle
- ease of access during winter and other seasons

From the attendants' perspectives it was noted that:

- monitoring of bins and materials seems easier due to large open access
- the health and safety of all residents and staff is now better protected as there is no need for any ramp access. The ramps were a general trip hazard at all times but increased as an issue due to snow and ice in the winter
- if a resident placed material in 'error', it is easier to correct as the material is generally accessible as opposed to a roll off where the material was never reachable.
- there were no rejected loads at the MRF due to contamination or over compaction

For the purposes of this report, the collection monitoring used is from the first collection in November 2014 through to the end of October 2015. The actual monitoring took place from mid October 2014 through to mid December 2015.

The initial projection to collect and transport material was 4.5 hours, the actual time to carry out the work was up to 50% more. Based on observations and extrapolation of the annual truck hours from the GPS tracking system, average time to conduct a collection run was 6.2 hours. The primary reason for the increased time was due to the significant increase in the materials loaded onto the truck. The quantities loaded were also ~50% more, in direct correlation to the increased time.

## Introduction

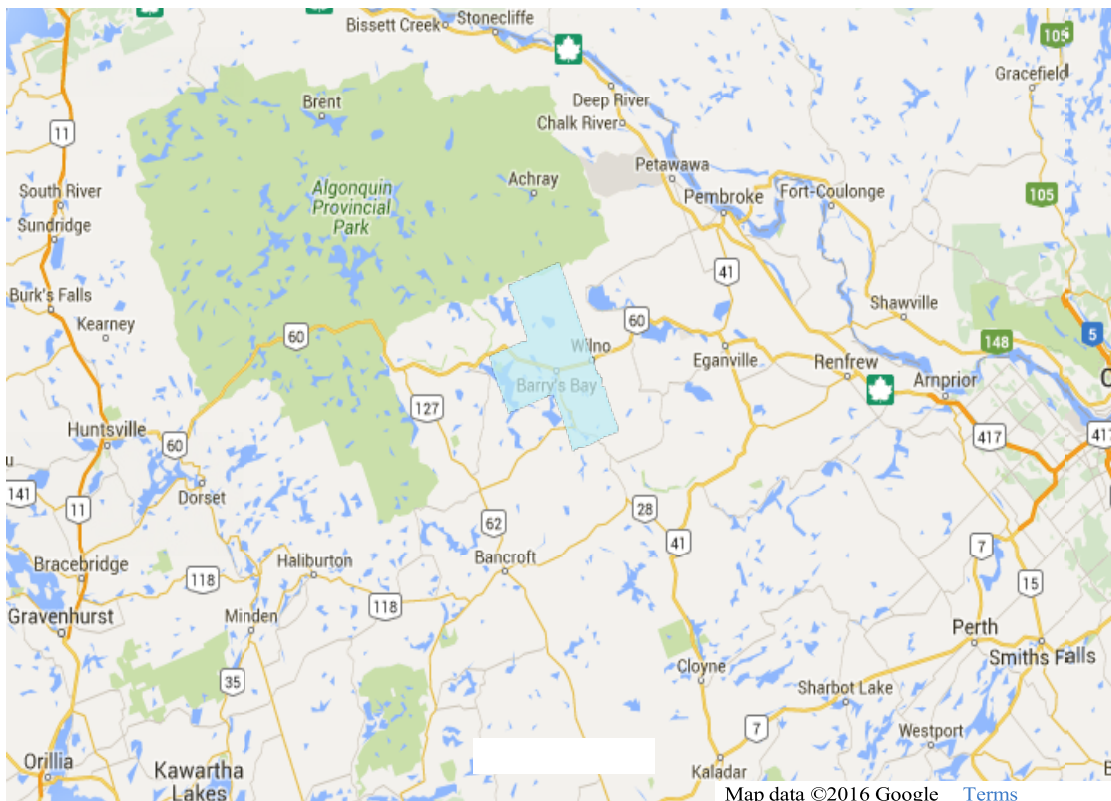
The Township of Madawaska Valley's Waste Management Committee undertook an efficiency review of its three depot recycling operations in early 2014. The scope of the review took into account the operating parameters utilizing un-compacted 40 yd<sup>3</sup> recycling containers and comparing to the possible efficiencies of utilizing its current rear load compaction truck to pick up rear load 8 yd<sup>3</sup> containers and transport to the MRF. This review was intended to determine if there would be an operational improvement and financial savings.

From this review the Township produced a report entitled, *Efficiency Project Proposal* in March 2014. Based on this work, the Township engaged the services of Redi Recycling Inc. to assist with the development of a Continuous Improvement Fund application and project plan to carry out and confirm the results of the *Efficiency Project Proposal*.

## Background

Originally settled over 100 years ago, the Township of Madawaska Valley offers visitors and residents, picturesque forests, plentiful wildlife and over 60 kilometers of navigable waterways. The Township is located two hours from Ottawa, three from Toronto and is in close proximity to Algonquin Provincial Park. It is comprised of three amalgamated communities of Barry's Bay, Combermere and Wilno.

Township of Madawaska ☆



Municipal staff delivers the waste management service for the entire Township; it consists of three depot operations for all areas and curbside services within the Village. Based on the 2015 WDO data-call information the Township has 2,937 households (hhlds), 48 multi family units, 119 IC&I locations and a population of 4,285. Of the household count, there are 775 seasonal units. The Village has 709 hhlds that receives curbside services for recycling, garbage, leaf and yard waste as well as an organics program. The remaining hhlds receive all the waste management elements at the three depots: Combermere, Wilno and Bark Lake. The Township has one active landfill located at Bark Lake. The Township has a full user pay system that charges a rate of one dollar per bag/container for disposal and provides other diversion services at no charge.

In March 2014, the Township applied to the CIF for support in its efforts to improve the recycling system and reduce costs. In the fall of 2014, the CIF entered into an agreement with the Township to provide financial support to purchase rear load bins and project support and reporting as per CIF grant requirements. The CIF funded Project 858 a maximum amount of \$33,931 for capital costs and consulting support which represented 45% of blue box related costs.

## Project Goals

The project goals are:

- Reduce operating costs
- Provide easier access to recycling at depots
- Reduce the number of loads shipped from depots to MRF

## Township Waste Management System Pre Implementation

The Township provided recyclable material collection services at all three depots using 40 yd<sup>3</sup> roll-off bins with 70/30 split (containers/fibre). Each roll-off cost \$375 per load to transport with services provided by the Ottawa Valley Waste Recovery Centre. In 2013, 88 roll-off loads were transported at a cost of \$33,000.

**Figure 1: Roll-Off 2013 loads by Site**

Wilno Transfer Station (15 Loads)		Combermere Transfer Station (39 Loads)		Bark Lake Landfill (34 Loads)	
Containers	Fibre	Containers	Fibre	Containers	Fibre
14,820 kg	13,070 kg	35,480 kg	34,240 kg	34,100 kg	28,870 kg

Photo: a typical top load 40 yd<sup>3</sup> recycling bin and access ramp





As the Township provides curbside collection using a rear load compaction truck, it was known that compaction provides an advantage. During container collection an average weight of 2.09 tonnes was achieved and 4.09 tonnes for fibre. Based on the review, the Township decided to utilize its current truck assets for depot compacted collection.

The projected impact of the compaction implementation using 8 yd<sup>3</sup> rear load containers was to go from 88 two-compartment loads to 47 material specific compacted truck loads calculated as follows:

**Table 1: Compaction Transport Estimates**

Material	Annual Tonnes	Average Tonnes/Load	Loads
Containers	85.38	2.75	31
Fibre	76.18	4.75	16

As is the case using non-compacted roll-offs, a bin must be transported whenever either compartment is full. In general, the container section usually becomes full first. And regardless of whichever is full, given the bin is not compacted; it is mostly air that is being transported relatively speaking. The 2013 records from the OVWRC provide a baseline comparison prior to project implementation (Table 2).

**Table 2: OVWRC 2013 Material Summary**

Material	Loads	Tonnes	Average
<b>Barry's Bay Curb</b>			
Container	29	60.72	2.09
Fibre	26	106.37	4.09
OCC	52	100.43	1.93
<b>Wilno TS</b>			
Container	15	14.82	0.99
Fibre	15	13.07	0.87
<b>Combermere TS</b>			
Container	39	36.46	0.93
Fibre	39	34.24	0.88
<b>Bark Lake</b>			
Container	34	34.10	1.00
Fibre	32	28.87	0.90
<b>Depot Summary</b>			
Container		85.38	0.98
Fibre		76.18	0.88

## Rear Bin Implementation

In order to establish the rear load bin system, each location was landscaped to enable bin placement, ease of resident access and annual yard maintenance. As well, a request for quotation for 30 bins was issued and the successful fabrication company was Shanahan of Phelpsston Ltd. Each container was \$1,325 plus applicable taxes and load delivery. Subsequent to this purchase, an additional two bins were acquired due to increase need for the new system's recyclable material storage at Bark Lake. Further, an additional truck was modified to enable it as a back up to the primary collection truck.

Based on the number of roll of containers and weights of recyclables, the 32 containers were distributed to the three depot locations as follows:

**Table 3: Bin Location**

Site	Bins
Bark Lake	13
Combermere	12
Wilno	7

Bark Lake----->

Note that this photo shows the original ramp that was in place to access the previous side panel 40 yd<sup>3</sup> containers of which there were two (one on each side). In this photo, the rear load bins are accessed from the front the containers at ground level.



←-----Wilno TS

This Transfer Station was re-landscaped and ramps removed and placement of bins near the attendant's shelter for regular supervision. As is the case at all location, organics is also collected using the Molok system to the left of bins in photo.



Combermere TS ----->

Similar to the Wilno Site, bins are placed in a single line to allow ease of access for residents with each bin having a magnetic sign in place noting the material to be placed into it for recycling. The bins in this photo have been opened by the driver just prior to collection.





## Project Period and Observations

For the purposes of this report, the collection monitoring used is from the first collection in November 2014 through to the end of October 2015. The actual monitoring took place from mid October 2014 through to mid December 2015. The purpose of using data a couple weeks after the change was to ensure the transition was complete from the staff perspective (site attendants and drivers). It was expected that the timing of pick up would have been slower in the beginning and an adjustment for learning the system an process was needed. Information was tracked following the one-year simply to ensure enough data was captured. As well, a one-year cycle was used to enable a one-year comparison of tonnage to the roll off system.

The transition from roll off containers to ground level recycling containers was for the most part well received by attendants and residents. From the resident perspective it was noted that it was easier due to:

- no need to carry items up a ramp
- drive up and deposit material directly from vehicle
- ease of access during winter and other seasons

From the attendants' perspectives it was noted that:

- monitoring of bins and materials seems easier due to large open access
- the health and safety of all residents and staff is now better protected as there is no need for any ramp access. The ramps were a general trip hazard at all times but increased as an issue due to snow and ice in the winter
- if a resident placed material in 'error', it is easier to correct as the material is generally accessible as opposed to a roll off where the material was never reachable.
- there were no rejected loads at the Centre due to contamination or over compaction

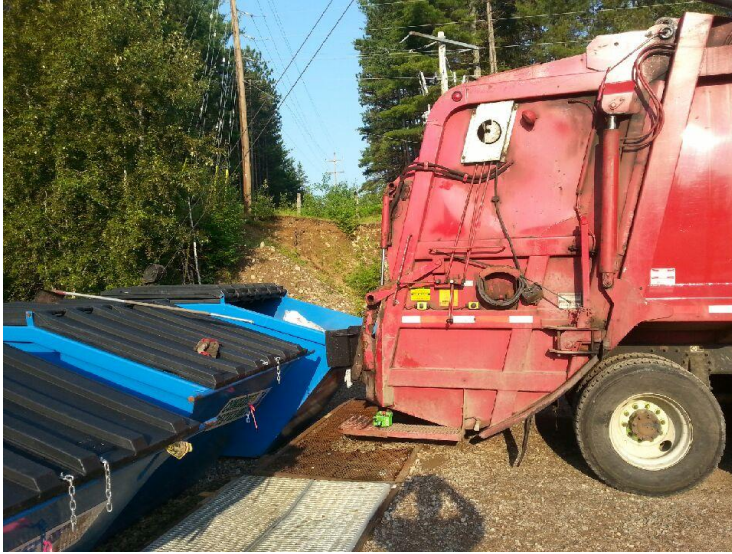
However, not all aspects of the change were without a downside. Staff note that yard maintenance, in the winter specifically, needed a bit of extra time to keep the front of bins clear. With a roll off it was the ramp that had to be cleared, for the rear load bins each bin needs to be maintained. As well, when the truck came to pick up containers, upon bin tipping materials fall out of the hopper via the gap in the side. This overflow requires regular yard clean up by the drivers and attendants. In the case of a roll off, it was not needed unless the wind caught material or a resident dropped something down between ramp and bin.



As well, on an operational note, the rear bin rods required minor modification. During fabrication, the tip rods that sit on the truck guide were squared at the ends. Staff modified this to a slight angle so that when the truck backed up to a bin, the bin could shift into place via the angle cut. Previously the square end would not allow the bin self adjust.

Note end of rod has been slightly cut and is no longer square.

During a site pick up, the driver generally cleaned the rear camera prior hooking onto a bin.



When the truck and bin are in proper position, the lift cable is attached to rear of the bin. The cable control at the rear right of the truck is then utilized by driver to lift and tip the bin into the hopper. Material is then compacted at regular intervals as needed. Note in the two photos here, the driver stepped away to allow for a photo of truck control area. The photo below shows another pick up event and with driver at controls.



## Collection Timing

For the purposes of the project, the collection truck's GPS records were downloaded and reviewed to ascertain the time for:

- yard start to site 1
- site 1 arrival and collection
- drive to site 2 and collection
- drive to site 3 and collection
- drive to MRF and return

The initial projection to collect and transport material was 4.5 hours, the actual time to carry out the work was up to 50% more. Based on observations and extrapolation of the annual hours, average time to conduct a collection run was 6.2 hours. The primary reason for the increased time was due to the significant increase in the materials collected. It should be noted that generally the GPS records were useful to calculate the timing however, for approximately 20 percent of the collection events the GPS did not properly record. As well, during the collections, staff occasionally was called upon to undertake other work that would interrupt the route timing. When this occurred, there was no reference as to why the collection time was above average.

Collection Timing	
Truck Hours	228
Truck Loads	37
Avg Trip Hours	6.2

Based on site observations and discussions with staff, it can be determined that the total time to collect recyclable materials varied by site based on the number of containers requiring service. As well, the average time to service each bin was relatively the same ranging from 5 minutes to 7 minutes per bin.

In comparing general timing of a roll off system to that of the rear packer system; the rear packer system can be declared a success. Even though the time spent is more than expected, the quantities picked up make up for this as they are substantially more and the number of trips greatly reduced.

**Table 4: Time Summary**

System	Site-MRF-Site	Site to Site	Time On Site	Yards serviced
Roll Off un-compacted	2 hours	N/A	~30 min	40
Rear Packer compacted	2 hours	15 – 30 min	15 – 75+ min	72 yards minimum

## Load Comparison

During the one-year collection period the following quantities were collected from each depot:

**Table 5: Total Depot Kgs and 8 yd<sup>3</sup> Bins**

	Wilno		Combermere		Bark Lake		Totals	
	KGs	Bins	KGs	Bins	KGs	Bins	KGs	Bins
<b>Totals</b>	26,045	86	66,257	223	69,606	240	161,908	549
<b>Fibre</b>	13,187	24	33,176	61	32,706	61	79,069	146
<b>Container</b>	12,858	62	33,081	162	36,900	179	82,839	403



Comparing the rear bin collection to the previous roll-off year of 2013, the total tonnage collected between all three sites only varied by 400kgs. As such, the comparison of costs and ultimate savings can be attributed to a more efficient method of collection and transportation.

**Table 6: Baseline Tonnages and Averages**

Note: the following table weights are listed in Tonnes. Multiply by 1000 to convert to kgs.

	<b>Wilno</b>	<b>Combermere</b>	<b>Bark Lake</b>	<b>Totals</b>
2013 Total Weight	27.89	70.70	62.97	161.56
Fibre	13.07	34.24	28.87	76.18
Containers	14.82	36.46	34.10	85.38
2013 Load Average	1.86	1.81	1.85	1.84
Fibre Load Average	0.87	0.88	0.85	0.87
Container Load Average	0.99	0.93	1.00	0.97

The 2015 site weights were calculated based on applying a 'bin count' percentage to the total truckload weight. The 'bin count' percentage was determined by the number of bins collected at each site compared to the total bins collected from all three sites.

After each collection event the site weight was calculated as follows:

Site Weight = site bin count/total bin count \* total material weight

The collection over the year provided a relatively steady average bin weights when comparing sites:

**Table 7: Site Average Material Bin Weights**

	<b>Wilno</b>	<b>Combermere</b>	<b>Bark Lake</b>	<b>Average</b>
Fiber Bin Avg	549	544	536	542
Container Bin Avg	207	204	206	206

Note: bin weights are in KGs

Table 7 figures show that the staff is following the same process to collect and compact materials and have successfully maximized the truck capacity.

Table 8 presents information on the total yards collected at each site and respective roll off bin calculation. During each collection event, the driver logged the number of bins picked up at each site as reported in Table 5. The total bin yards for each site is calculated by multiplying the number of bins by 8. The roll off equivalent amounts are calculated by dividing the bin yards by 40.

Table 8 assumes all the rear load bins were at capacity and can be divided exactly into full roll off quantities and represents the best-case scenario. This approach was taken to provide a simple comparative. But as noted, the roll off quantities are greater in Table 8 than the baseline year of 2013 which had 15 bins from Wilno, 39 from Combermere and 34 from Bark Lake and only varied by less than one tonne.

**Table 8: Rear Load Bin Comparison to Roll Off**

	<b>Wilno</b>	<b>Combermere</b>	<b>Bark Lake</b>	<b>Totals</b>
Total Bin Yards	688	1784	1920	4392
<b>Fibre Bin Yards</b>	192	488	488	1168
<b>Container Bin Yards</b>	496	1296	1432	3224
<b>Roll off equivalent All</b>	17.2	44.6	48	109.8
<b>RO equivalent Fibre</b>	4.8	12.2	12.2	29.2
<b>RO equivalent Cont</b>	12.4	32.4	35.8	80.6

Note: table 8 is the number of cubic yards generated and the roll off equivalent is calculated by dividing total bin yards by 40 to give the number of estimated roll offs.

## Cost Comparison

For the purposes of the comparing the cost of roll offs to the rear load system, two methods are being presented. The first is a cost per tonne rate and the second is the methodology from the initial Madawaska Valley PLC report.

### Cost Per Tonne

In 2013 the Township spent \$33,000 on roll off hauling services. For the purposes of comparison, the 2013 expenditure has been increased by 1.5% CPI over 2 years to provide a comparable rate to the 2015 costs. With the move to a compacted collection system, the Township reduced the hauling costs by 36%.

	<b>Annual Cost</b>	<b>Tonnes</b>	<b>\$/Tonne</b>
2013	\$33,998.00	161.56	\$210.44
2015	\$21,793.00	161.91	\$134.60
		<b>\$/Tonne</b>	<b>%</b>
Savings		\$75.84	36%

### PLC Methodology

The initial PLC report noted:

The cost for in-house transportation of recyclables has been estimated as **\$351** per load. OVWRC charged \$375 per load in 2013. Comparing these costs per load does not reveal all the benefit derived from in-house transport however a comparison of the total annual costs for each method of transportation does reveal significant savings. In 2013, OVWRC was paid \$375 per load to transport 88 loads, resulting in a total annual cost of \$33,000 to transport recyclables. This report shows that while the in-house transportation cost is \$351 per load, only 47 loads will need to be transported because of compaction. This means the estimated total annual cost of in-house transportation of recyclables is \$16,497. In-house transport should produce a significant operating cost savings, estimated at **\$16,503** annually.

Following the initial report methodology the cost comparison is based a number of factors and assumptions. The first assumption is that all collectin bins were full i.e. 8 yards which was then used to



calculate the total number of roll off container equivalents. The other factors were to use the Township operating costs at a rate of \$95/hour for truck and staff and the actual average time taken of 6.2 hours to do a collection run of all depots.

	Loads	Rate	Total
Roll Off	110	\$ 375.00	\$ 41,250.00
Rear Packer	37	\$ 589.00	\$ 21,793.00
Savings			\$ 19,457.00

As part of the application, a cost analysis was required to be presented. In that analysis, see appendix A, the payback was projected to be 4.2 years for the entire effort and a 2.1 years payback to CIF. Using the actual 2015 costs incurred the payback is almost the same as the initial estimate of 4.2 years. The project's actual payback is 4.4 years for the entire amount, a 2.8-year municipal payback and a 1.6-year CIF payback.

## Project Budget

In the fall of 2014, the CIF entered into an agreement with the Township to provide financial support to purchase rear load bins and project support and reporting as per CIF grant requirements. The CIF funded Project 858 a maximum amount of \$33,931 for capital costs and consulting support which represented 45% of blue box related costs. The proposed budget was:

Project Budget	Total Cost
8 yard rear load bins	\$44,880.00
Site Earth works - 3 sites	\$4,500.00
Management and reporting	\$7,500.00
Truck modification	\$3,120.00
<b>TOTAL</b>	<b>\$60,000.00</b>

The Municipality invoiced CIF for bins, truck modifications, and reporting.

Operational Invoices			Project Support Invoices		
Invoice	Date	Bin cost	Invoice	Date	Bin cost
Inv. 25486	17-Jun-14	\$20,875.00	15188	18-Jun-15	\$2,000.00
Inv. 25493	11-Jun-14	\$20,875.00	16143	18-May-16	\$5,500.00
inv. 25671	01-Apr-15	\$3,250.00			\$7,500.00
Truway	30-Jun-15	\$1,697.50		HST	\$975.00
		\$46,697.50			\$8,475.00
	1.76% HST	\$821.88		CIF Allowable	\$3,955.00
		<u>\$47,519.38</u>			
	CIF 45%	\$21,383.72			

## Conclusions

The decision to replace the Township's un-compacted 2 compartment roll off containers with a rear bin loading system for compacted collection and transportation proved to be a long term cost saving decision. As part of the original CIF application, a cost analysis was required to be presented. In that analysis, see appendix A, the payback was projected to be 4.2 years for the entire effort and a 2.1 years payback to CIF. The actual payback is similar and is 4.4 years for the project, 2.8 years for the municipality and 1.6 years for the CIF.

From an operational perspective, the transition from roll off containers to ground level recycling containers was for the most part well received by attendants and residents. From the resident perspective it was noted that it was easier due to:

- no need to carry items up a ramp
- drive up and deposit material directly from vehicle
- ease of access during winter and other seasons

From the attendants' perspectives it was noted that:

- monitoring of bins and materials seems easier due to large open access
- the health and safety of all residents and staff is now better protected as there is no need for any ramp access. The ramps were a general trip hazard at all times but increased as an issue due to snow and ice in the winter
- if a resident placed material in 'error', it is easier to correct as the material is generally accessible as opposed to a roll off where the material was never reachable.
- there were no rejected loads at the MRF due to contamination or over compaction

In conclusion, from both a financial and operational view, the CIF Project 858 can be declared a success and the Township and the Blue Box Stewards will see an increase in cost efficiency and operational effectiveness. In general, any municipality with a rear load collection equipment should consider this method to transport recyclables if it is currently using un-compacted roll off containers for its recycling program.

## Future Considerations

While the mandate of this project was achieved as it improved the recycling collection system and reduced operating costs, the Township should consider further changes. Currently the recycling collection trucks include 2 rear load packers and one side load truck. With the three vehicles there is an added burden of insurance and additional maintenance due to an aging fleet. Given recent truck equipment innovations, the Township should consider reducing its fleet to one vehicle and utilizing a front end collection truck equipped with a Curroto Can. This change would reduce the labour requirements of collection and further reduce the time required to collect material at the recycling depots.

As noted in the report, the cycle time of a rear load bin is 5-7 minutes. The cycle time for a Curroto Can is about 30 seconds. Given the number of depot containers collected at each of the 3 depot locations, the time taken could be reduced significantly resulting in further operational savings.

Further savings may possible if the Township were to work with the current Shared Services Centre of Excellence partners. A review of the respective communities programs and needs can be undertaken to determine if there is an opportunity to share in the equipment purchase, maintenance and operations. As each community only uses the recycling truck twice per week, once for curbside and once for depots, there may be an opportunity to generate a larger collection circuit and fully utilize one vehicle for all communities interested.



Photos  
from  
<http://www.thecurotto.com/>



## Appendix A: Payback Analysis

### 2013 Payback Analysis

#### Current Practices

Annual Operating Costs	Total Cost
Maintenance - site bins	\$4,500.00
Contractor Charges- roll off transport	\$33,000.00
<b>TOTAL Annual Cost for Current Practices</b>	<b>\$37,500.00</b>

#### The New Plan

Part 1: Capital Purchases	Unit Lifetime	Unit Salvage Value	Total Cost
8 yard rear load bin	20.0 years	\$100.00	\$44,880.00
Site Earth works - 3 sites	20	0	\$4,500.00
ECA, management and reporting	20	0	\$7,500.00
Truck modification	15	0	\$3,120.00
etc.			-
<b>TOTAL Capital Items</b>			<b>\$60,000.00</b>

Part 2: New Annual Operating Costs	Total Cost	% of Investment
Maintenance and Fuel	\$8,800.00	7%
Labour (1 staff - burdened costs)	\$7,040.00	
License Fees	\$1,468.00	
Insurance	\$1,000.00	5%
Asset Management Plan - equipment replacement	\$5,060.00	
Amortization Payments	-	
<b>TOTAL Annual Cost for Current Practices</b>	<b>\$23,368.00</b>	

#### Savings and Payback

	Year 1	Year 2	Year 3	Year 4
Annual Savings	\$14,132.00	\$14,132.00	\$14,132.00	\$14,132.00
Year End Balance	\$45,868.00	\$31,736.00	\$17,604.00	\$3,472.00
<b>Payback on Total Project Costs (net of CIF Funding)</b>	4.2 years		4.2 years	
<b>Pay Back Period (CIF Funding)</b>	2.1 years	funding:	<b>\$30,000</b>	
<b>Payback on Total Project Costs (excl. of CIF Funding)</b>	2.1 years			

## 2015 Payback Analysis

### Current Practices

Annual Operating Costs	Total Cost
Maintenance - site bins	\$4,500.00
Contractor Charges- roll off transport	\$33,000.00
<b>TOTAL Annual Cost for Current Practices</b>	<b>\$37,500.00</b>

### The New Plan

Part 1: Capital Purchases	Unit Lifetime	Unit Salvage Value	Total Cost
8 yard rear load bin	20.0 years	\$100.00	\$45,000.00
Site Earth works - 3 sites	20	0	-
ECA, management and reporting	20	0	-
Truck modification	15	0	\$1,697.50
etc.			-
<b>TOTAL Capital Items</b>			<b>\$46,697.50</b>

### Part 2: New Annual Operating Costs

	Total Cost	% of Investment
All in Truck and Staff cost	\$21,793.00	
Asset Management Plan - equipment replacement	\$5,060.00	
Amortization Payments	-	
<b>TOTAL Annual Cost for Current Practices</b>	<b>\$26,853.00</b>	

### Savings and Payback

	Year 1	Year 2	Year 3	Year 4
Annual Savings	\$10,647.00	\$10,647.00	\$10,647.00	\$10,647.00
Year End Balance	\$36,050.50	\$25,403.50	\$14,756.50	\$4,109.50
<b>Payback on Total Project Costs (net of CIF Funding)</b>	4.4 years		4.4 years	
<b>Pay Back Period (CIF Funding)</b>	2.8 years	funding:	<b>\$30,000</b>	
<b>Payback on Total Project Costs (excl. of CIF Funding)</b>	1.6 years			



## Appendix B: Photos

Lifting Cable side/rear view



Lifting Cable: side view



Rear Camera above hopper



Split Lid rear load bin

