

**Guelph Automated Waste Cart Collection System
Curbside Collection Performance and Monitoring Report**
Quarterly Report No.4
Final Report

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CIF Project No: 284

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1.0 INTRODUCTION AND BACKGROUND

Provide background information on CIF Project #284 including goals, objectives and rationale

Waste Diversion Ontario's (WDO) Continuous Improvement Fund (CIF) committed funding to the City of Guelph (the City) to convert from a plastic bag based collection system to a fully automated cart based collection system for the recyclables, organics and garbage streams.

Conversion of Guelph households from plastic bags to carts for curbside collection was considered best practice for waste collection and also aligned with the Ministry of the Environment's (MOE) condition for not accepting organic waste in plastic bags at the City's state-of-the-art Organic Waste Processing Facility.

With the new automated collection system, all three waste streams were collected using automated trucks which replaced the manual collection vehicles. The collection of recyclables also changed from weekly to biweekly, such that recycling and garbage carts could be collected biweekly on alternate weeks using the same truck. Organics continued to be collected on a weekly basis.

All carts (blue, green and grey) were provided to residents at no cost.

Under CIF Project #284, the City of Guelph was required to submit four monitoring reports and data for the new collection program. This report fulfils the City's requirements to submit the fourth quarter monitoring data and final report to WDO.

2.0 MONITORING AND MEASURING

The following section describes how each of the efficiency and effectiveness benefits were measured or assessed.

2.1 Key Project Features

As specified in the CIF Project Application, the key project features are as follows:

1. THAT the City of Guelph move from a plastic bag based collection system to a cart based collection system for recyclables, as well as, organics and garbage.

- 100% of the recycling routes have transitioned from a bag based collection system to a cart based collection system as of November 2014 (along with the organics and garbage streams)
2. THAT a ~360L recyclables cart be provided at no cost to each household along with promotional and educational materials.
- households have received recyclables carts at no cost to the household along with promotional and educational materials as of November 2014
 - households were provided with the 360L default size of cart unless they specified a smaller size of cart based on accessibility or other household needs
3. THAT side load, ~60/40 fully automated split trucks will be used to replace the manual side load 60/40 split collection vehicles.
- 100% of the manual collection vehicles have been replaced with automated collection vehicles; of which fourteen (14) are now fully automated 60/40 split trucks and one (1) is a dedicated single stream automated truck for recycling.
4. THAT the recycling stream will be collected biweekly as opposed to weekly; such that recycling and garbage carts can be collected biweekly on alternative weeks using the same trucks.
- 100% of the recycling routes were converted from weekly collection to biweekly collection as of November 2014

2.2 Projected Efficiency and Effectiveness Benefits

Projected efficiency and effectiveness benefits outlined in the application include:

1. Reduces allocation of collection trucks for recycling from 60% to 30%. Reduces entire collection fleet from 18 trucks to 15 trucks.

The full implementation of the new collection fleet was completed in November 2014 where the collection fleet was reduced from the initial 18 trucks to 15 trucks. Fourteen (14) are now fully automated 60/40 split trucks and have had their truck allocation for recycling reduced from 60% to 30%. One (1) is a dedicated single stream automated truck for recycling at a 100% allocation, as a result of greater than anticipated volumes on recycling. A single stream

automated truck was purchased, in order to explore ways to refine collection methods and see if efficiencies can be gained. Ideally for the mix of volume currently being co-collected, a 70%/30% split would have been a more suitable percentage for collecting recycling/organics, while the 60%/40% split trucks have proven to be ideal for co-collecting waste/organics. A 70%/30% split truck was not available from our vendor.

2. Increases diversion rates by ~2.4%¹ and reduces disposal costs by ~4.6%² :
 - a. Cost savings in residue waste disposal from the MRF can be realized through the elimination of plastic bags, as well as, the loss of any recyclables remaining entrained inside the bags. A summary of the residue costs savings and the MRF recovery rate is shown in Section 3.6, Table 6.
 - b. Cart collection increases recycling diversion rates by increasing resident participation rates and capture rates due to the improved convenience. A summary of the tonnage of recyclables collected is shown in Section 3.6 Table 6.
 - c. Creates the opportunity to move to a type of user pay system which results in increased recycling rates. User pay systems support a zero waste philosophy by reducing the amount of waste generated by changing resident's purchasing habits. It promotes purchasing of products with less packaging and more recyclable materials. A user pay program can be an effective way for residents to pay for curb side collection proportionate to their use of the service.

The opportunity exists to move to a type of user pay system. All of the carts have been equipped with a radio frequency identification (RFID) tag. A database has been created that provides the RFID number and the corresponding serial number that identifies the type and size of cart with each household address.

¹ Final Report City of Toronto Recycling Container Pilot Project Summary, Stewardship Ontario, Project No. 1045190).

² 2.4% increased capture + 2.2% reduction in plastic film; bag audit

3. Moving from manual collection to automated collection allows for a reduction in replacement staff costs related to staff injuries (90%), illness rates (50%) and modified job duties (90%) as well as reduced WSIB claims (90%)³ (e.g. minimizes exposure to sharps such as broken glass or needles; minimizes repetitive strain injuries to shoulder, knees, back; minimizes physical fatigue for collection staff; reduces direct exposure and risk of injury from unfavourable weather such as rain, snow, ice and extreme hot and cold temperatures; and minimizes exposure to traffic risks while working at the side and rear of the collection vehicles). The reduction in physical activity and disagreeable conditions may also have a positive financial effect on the inputs for job compensation and lower labour costs. Automated cart collection also allows for a more diverse workforce (e.g. physical ability, gender, age). A summary of the staffing costs is shown in Section 3.4 Table 4.

4. Processing efficiencies in the Materials Recovery Facility (MRF) could be increased with the elimination of plastic bags, such as, the removal and the replacement of bag shearing equipment (amortized savings of \$30,000 per year) and reducing the amount of staff time required to remove the plastic bags from the sorting lines.

- The bag breaker was removed from the MRF and the associated equipment amortization of \$30,000 has been realized in the budget.
- A drum feeder currently feeds the pre-sort line which has allowed improvements to the MRF system by providing a consistent material feed rate, increasing throughput and reducing material surges.

2.3 Additional System Benefits

Additional system benefits identified in the Agreement are summarized below:

1. Automated Collection ensures that collection in the City of Guelph is competitive under a full Extended Producer Responsibility (EPR).
 - Benefit still holds true, automated collection is a best management practice and allows for co-collection of organics and garbage under a full EPR.

³ City of Vancouver, Automated Collection of Solid Waste

2. Project is transferable to other municipalities.

- Benefit still holds true. Other municipalities could adopt automated collection for single or dual stream collection.

3. Carts allow for new materials to be added to the collection system in the future without disruption to the collection process and allow for changes in the recycling stream mixture as a result of consumer and seasonable changes.

- Benefit still holds true. The 360L carts enable adequate space to accommodate collection of new consumer materials and seasonal fluctuations to the recycling stream.

4. Curb side collection efficiency may be increased by eliminating the collection of multiple smaller containers (e.g. compared to using blue boxes or bags).

- Benefit still holds true. The 360L carts enable adequate space to accommodate single recycling stream collection from households.

5. Carts, as opposed to blue boxes, also ensure recyclables remain dry when placed at the curb, resulting in higher market values for fibre.

- Benefit still holds true. Carts are equipped with lids that help keep recyclables dry when set out in wet conditions.

6. Carts reduce the possibility of litter strewn in neighbourhoods from wind blowing bags away from the curb or the contents out of the blue boxes, thereby reducing the loss of recyclables from being collected. Carts also deter animals from tearing open the recyclables bag.

- The carts are designed to withstand moderately windy conditions and have passed manufacturer testing of 50 kph winds without the lid blowing open or the cart tipping over. The carts also have been safety rated by the American National Standards Institute for slope stability, durability during pulling, centre of balance and force to tip. On very windy days, some carts do blow over. In these instances, collections staff do their best to collect the litter from the streets and re-position the carts in driveway entrances. There have been four (4) significant wind related days since collection began in the fall of 2012 to the end of the fourth quarter in 2014.

- Animal complaint calls have been reduced. There have been fewer than 20 to date between the fall of 2012 to the end of the first quarter in 2014; 12 calls in the second quarter of 2014, and 17 calls in the third quarter, and 2 calls in the fourth quarter). The calls received are primarily related to damage complaints from squirrels chewing holes in carts, with no apparent preference to type of cart (e.g. organics, recyclables or garbage).

7. Carts also reduce the Solid Waste's department time and cost in dealing with issues on snow banks, as the automated arm has the ability to collect and return the carts to the top of a snow bank. In the 2008/ 2009 winter season, there were 195 resident calls where waste was not collected as a result of snow banks, resulting in higher department costs associated with resolving customer complaints and sending additional staff out to collect.

- The automated trucks are fully capable of collecting most carts placed on snow banks. However, residents are asked to place carts on a spot shoveled from snow, to minimize carts tipping over. The 2013-2014 winter had a higher than normal snowfall. Weather related cart complaints were significantly lower (approximately half) than collection complaints related to residents still on bag collection. Complaints related to cart collection resulted from carts being tipped by snow removal equipment. These issues were primarily addressed by collection staff.

8. Facilitates the transition for collecting multi-residential properties by acquiring collection equipment appropriate for this sector, thereby increasing diversion rates. Bags are cumbersome and inefficient to collect at multi-residential properties due to the volume and un-segregated placement of the three streams at the curb. Large piles of waste, leftover garbage and blowing debris are a significant problem for neighbours of multi-residential properties that utilize charge piles, resulting in increased costs for the department in resolving the matter.

- For multi-residential complexes where space is very limited (i.e. no garages, no backyards, small porches) an individual set of blue, green and grey carts is not always feasible. In these cases, the City recommends communal carts. Communal carts allow residents to bring waste to one or several central cart locations, shared by other residents in their complex. In-unit recycling containers

and kitchen scraps containers would be provided to facilitate the transfer of material to these communal locations. Larger containers and more frequent collection also facilitate a reduced number of containers and help with storage issues. Alternatively, the City also allows residents to use “dual use” carts, which alternates one week as a garbage cart and the following week as a recyclables cart. This reduces the total number of carts to two, as they would still be provided with an organics cart. The City has developed “dual use” stickers to place on these carts to identify them to the collections staff.

9. Automated collection also allows for other methods of efficiency without the constraints placed on staff by physically lifting and tipping containers, such as operating four day, ten hours per day workweeks.

- Benefit still holds true. Automated collection reduces the physical demand of collection and may allow for extended work days.

10. Supports Guelph's Solid Waste Management Master Plan which was developed as our Integrated Waste Management Plan to minimize waste (i.e. carts eliminate the need for plastic bags to contain the recyclables).

- Benefit still holds true. Bags are no longer required in the recycling, organics or garbage carts.

3.0 COST AND COST EFFECTIVENESS

In the CIF funding application, the City predicted the following cost benefits associated with the new cart based system:

When complete, how will this affect your net annual blue box program costs:

- Decrease

How much will implementing this project affect your blue box program's cost effectiveness:

- Increase cost-effectiveness

The monitoring and measurement results are summarized below.

3.1 Number of Collection Trucks Allocated for Recycling

Table 1: Number of Collection Trucks Allocated for Recycling

	Baseline	Current	Initial Projection	Actual Implemented
Total number of trucks	18	18	15	15
Trucks allocated for recycling	15 at 60%	15 at 60%	15 at 30%	14 at 30% 1 at 100%

Baseline Collection Fleet

- 11 split trucks, manual toss side loaders (60% recyclables, 40% organics)
- 2 trucks, manual toss side loaders (waste)
- 1 truck, manual toss rear packer (waste)
- 1 truck, manual toss rear packer for odd jobs
- 3 spare split trucks, manual side loaders (60% recyclables, 40% organics)

Figure 1: Baseline Collection Fleet

Manual											Manual				Manual		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	Waste	Waste	Waste	Odd	Spare	Spare	Spare
40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%							

Transition Collection Fleet

In the first three quarters of 2014, two thirds of the city had converted to automated collection. Additional trucks were required during the transition phase to accommodate the multiple types of collection being completed and allow for backup vehicles for each type of collection truck.

- 3 split trucks, manual toss side loaders (60% recyclables, 40% organics)
- 1 truck, manual toss side loaders (waste)
- 10 automated split truck (60% recycling/waste, 40%organics)
- 1 spare split trucks manual side loader (60% recyclables, 40% organics)
- 1 truck spare manual toss side loader (waste)
- 2 spare automated split trucks (60% recycling/waste, 40%organics)

With the completion of the transition to automated collection, the system will allow for a reduction of spare vehicles by standardizing the fleet.

Figure 2: Transition Collection Fleet

Manual				Automated										Manual		Automated	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
60%	60%	60%	100%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	Spare	100%	Spare	Spare
40%	40%	40%	Waste	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%		Waste		

Initial Projection of Automated Collection Fleet

- 6 split trucks, automated side loaders (60% recyclables, 40% organics)
- 6 split trucks, automated side loaders (60% waste, 40% organics)
- 1 split truck, automated truck for odd jobs
- 2 spare split trucks, automated side loaders

Figure 3: Initial Projection of Automated Collection Fleet

Automated														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
60%	60%	60%	60%	60%	60%	Odd	60%	60%	60%	60%	60%	60%	Spare	Spare
40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%		

Actual Implementation of Automated Collection Fleet

- 7 split trucks, automated side loaders (60% recyclables, 40% organics)
- 1 single stream automated truck
- 5 split trucks, automated side loaders (60% waste, 40% organics)
- 2 spare split, automated truck

Figure 4: Actual Implementation of Automated Collection Fleet

Automated														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
60%	60%	60%	60%	60%	60%	60%	100%	60%	60%	60%	60%	60%	Spare	Spare
40%	40%	40%	40%	40%	40%	40%		40%	40%	40%	40%	40%		

The full implementation of the new collection fleet was completed in November 2014 where the collection fleet was reduced from the initial 18 trucks to 15 trucks. Fourteen (14) are now fully automated 60/40 split trucks and have had their truck allocation for recycling reduced from 60% to 30%. One (1) is a dedicated single stream automated truck for recycling at a 100% allocation, as a result of greater than anticipated volumes

on recycling. A single stream automated truck was purchased, in order to explore ways to refine collection methods and see if efficiencies can be gained. Ideally for the mix of volume currently being co-collected, a 70%/30% split would have been a more suitable percentage for collecting recycling/organics, while the 60%/40% split trucks have proven to be ideal for co-collecting waste/organics. A 70%/30% split truck was not available from our vendor.

3.2 Evaluation of Truck Route Mapping

Table 2: Total Number of Trucks Allocated for Recycling per Total Number of Households

	Baseline	Initial Projection	Actual Implemented
Households	48,496	49,966	49,966
Households per truck	690	750	770

The actual implementation for the collection fleet was approximately 770 households per truck (49,966 households divided by 13 routes divided by 5 collection days per week).

3.3 Equipment Maintenance

Table 3: Equipment Maintenance Cost - Service and Mechanical Failures

	1 st Quarter 2014	2 nd Quarter 2014	3 rd Quarter 2014	4 th Quarter 2014
Equipment maintenance	\$153,361	\$151,537	\$159,442	153,185

* In the first three quarters of 2014, two thirds of the city had converted to automated collection. The final third of the city transitioned to automated collection in the fourth quarter. The entire fleet was automated by December 1, 2014.

The equipment maintenance includes the entire fleet (automated and manual). With the completion of the transition to automated collection, the system will allow for a reduction of spare vehicles by standardizing the fleet.

3.4 Staffing Cost Savings

Table 4: Staff Cost Savings Related to Lost Time and Replacement Labour Costs

	Baseline	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Initial Projection	Actual
WSIB	\$ 11,980	0	0	\$556	0	\$ 1,198*	\$556
sick time (hours)	1,954	208	144	132	120	977**	604
modified duty (hours)	2,216	0	0	0	0	222*	0
time loss injuries / short term disability (hours)	160	100	482	473	-8	16*	1055
Hourly Salary (including benefits)	\$40	\$40	\$40	\$40	\$40	\$40	\$40
Total replacement labour costs	\$173,836	\$12,320	\$25,040	\$24,200	\$4,480	\$48,762	\$66,040

* initial projection of 90% reduction

** initial projection of 50% reduction

In the first three quarters of 2014, two thirds of the city had converted to automated collection. The cost savings related to replacement labour costs were slightly higher than the initial projected targets, however, 558 short term disability hours were related to medical issues unrelated to work injuries.

3.5 Container Replacement Costs

Table 5: Container Replacement Costs

	1st Quarter 2014	2nd Quarter 2014	3rd Quarter 2014	4th Quarter 2014
Recycling Carts	\$1,660	\$639	\$1,944	\$101

* In the first three quarters of 2014, two thirds of the city had converted to automated collection. One third of the carts were approximately one year old, while the second third of carts were approximately two years old.

The carts have a 13 year manufacturer warranty however the costs of cart replacement were included in the figure above to indicate a complete cost viewpoint.

3.6 Processing Efficiency

Table 6: MRF Residue Costs Savings and MRF Recovery Rate

Municipal datacall	2010	2011	2012	2013
Households	48,496	49,100	49,482	49,966
Residential waste generation (tonnes)	42,903 885kg/HH	43,358 883kg/HH	43,760 884kg/HH	50,108 1,003kg/HH
Total residential recyclable collection (tonnes)	10,016	9,737	9,509	10,037
Residential capture rate	23.3%	22.5%	21.7%	20.0%
Shipped for disposal (tonnes)	1,400	960	1081	1,074
MRF recovery rate	74.7%	75.0%	88.5%	88.5%
MRF Residue disposal cost	\$77,000	\$52,800	\$59,455	\$59,070
Disposal cost per household	\$1.59	\$1.08	\$1.20	\$1.18
Residential Diversion Rate	45%	46%	68%	69%

Note: In 2012, one third of the city had converted to carts for approximately two months while in 2013, one third of city had converted to automated collection for the entire year and the second third of the city had converted for approximately 2 months.

The projected diversion rate was expected to increase 2.4% after all three phases of the City have converted to carts, however, the residential capture rate has been trending lower even before carts were rolled out; potentially due changes in consumer behaviour and packaging trends. However the diversion rate for the City has increased due to other diversion initiatives including but not limited to the opening of the new Organics Waste Processing Facility, increased construction and demolition recycling and electronics recycling.

The projected disposal cost was expected to be reduced 4.6%. The trend for the disposal cost is expected to exceed the target potentially due to additional improvements in the MRF processing (e.g. PET optical sorter, etc.) and diligent resident sorting.

3.7 Market Feedback

Table 7: Market Feedback

Market	1st Quarter 2014	2nd Quarter 2014	3rd Quarter 2014	4th Quarter 2014
Penalties	0	0	0	0
Rejected loads	0	0	0	0

There have been no penalties or rejected loads to date as a result of converting collection from bags to carts.

3.8 Customer Feedback

The City of Guelph commissioned Metroline Research Group Inc., an independent research company in Kitchener, to administer telephone interviews on behalf of the City to a statistically significant sample of 409 Guelph households using carts, between February 21 and March 5, 2013. The results of this survey are representative of the households that received carts within the first third of the rollout in the city.

The telephone survey revealed 80 per cent of residents using waste carts are satisfied with the City's new waste collection system. This majority is composed of 56 per cent of survey respondents who are "somewhat more satisfied" or "much more satisfied" with the waste carts collection system compared to the previous bag-based program, and an additional 24 per cent who are just as satisfied.

Generally, respondents find the new carts easier to use, and easier to store. Many like not having to buy bags anymore, and find things less messy. For some, the larger bins means they can fit more garbage in, and perhaps put the bins out less often.

Respondents provided the following responses to the question, "What if anything, do you like about the new cart system":

- Easier to use/simpler 51%
- Easier to store 18%
- No longer buy bags 31%
- Less mess 27%
- Don't like anything 14%
- Store more garbage in larger bins 13%
- Harder for animals to get in 11%
- They don't need to go out as often 8%
- Don't know 4%

The majority of respondents do not feel much differently about the new cart system than the “bag” system: 60% of residents find that sorting their waste – organics, recyclables and waste with the cart system – requires a similar effort and process as before the new cart system, 28% find the process “somewhat” or “much easier” and 12% find it “a little” or “a lot” more challenging. Among the 28% who find it easier, the containers make it easier to sort and store and they like not having to buy bags as much/at all. Among the 12% who find it more challenging, they find the sorting process more difficult for some reason, they don’t like the carts in winter and there is more “mess” for them to clean up/rinse out.

3.9 Annual Recycling Collection Costs

Table 8: Annual Recycling Collection Costs

Municipal datacall	2010	2011	2012	2013
Households	48,496	49,100	49,482	49,966
Recycling Collection Capital Depreciation Charge	\$184,283	\$122,284	\$294,139	\$422,248
Recycling Curbside Collection Operating Expenses	\$1,022,178	\$713,814	\$825,785	\$1,032,793
Total Recycling Collection Cost	\$1,206,460	\$836,098	\$1,119,924	\$1,455,041

In 2012, the City purchased 7 trucks and carts for one third of the City, while in 2013 the City had purchased another 5 trucks and carts for the second third of the City. The operating costs are higher in 2012 and 2013 due to the capital depreciation for the new trucks and carts, plus the material management costs for the additional trucks that are required during the transition phase to accommodate the multiple types of collection being completed, and allow for backup vehicles for each type of collection truck. With the completion of the transition to automated collection, the system will allow for a reduction of spare vehicles by standardizing the fleet.

3.10 Cost Implications Compared to Budgeted Information

The entire project included the City of Guelph moving from a plastic bag based collection system to a cart based collection system for recyclables, as well as, organics and garbage. The recycling stream was converted to biweekly collection as opposed to weekly; such that recycling and garbage carts are collected biweekly on alternative weeks using the same trucks. The funding requested to CIF for \$2,675,075 only represents the proportion of costs related to the recycling stream.

Table 8 - Program Savings

CAPITAL COSTS		Baseline Manual	Projected Automated	Amortized Years	Initial Projected Savings/Year	Actual	Actual Savings/Year
Capital cost of collection trucks/equipment		\$232,273	\$300,840			\$292,210	
Number of trucks allocated for recycling collection	x	15 at 60%	15 at 30%			14 at 30% 1 at 100%	
Cost of trucks required for recycling stream		\$2,090,457	\$1,353,780	7	\$105,240	\$1,519,491	\$81,587
Replacement cost/ maintenance of bag breaker in MRF		\$210,000	\$-	7	\$30,000	\$-	\$30,000
Recycling carts		\$0	\$2,335,271	10	-\$233,527	\$1,795,180	-\$179,518
OPERATING COSTS							
Annual Salary (including benefits)		\$83,573	\$83,573			\$83,573	
Number of Collection Staff Allocated to Recycling	x	11 at 60%	12 at 30%			11 at 30% 1 at 100%	
Cost of labour required for recycling stream		\$551,582	\$300,863		\$250,719	\$359,364	\$192,218
Total Landfill Management Costs		\$55	\$55			\$55	
Tonnes of Residue Waste to Landfill	x	1,400	1,400			1,074	
Less Diverted Percentage	x	100%	96%				
Reduction in Landfill Costs		\$77,000	\$73,920		\$3,080	\$59,070	\$17,930
WSIB		\$11,980	\$1,198		\$10,782	\$556	\$11,424
sick time (hours)		1,954	977			604	
modified duty (hours)		2,216	222			0	
time loss injuries (hours)		160	16			1055	
Hourly Salary (including benefits)	x	\$40	\$40			\$40	
Total replacement labour costs		\$173,836	\$48,762		\$125,074	\$66,581	\$107,255
Program savings per year					\$291,367		\$260,875

Table 9 – Project Payback Period

Project Payback for Funding Request		Projected Automated	Actual Based on CIF Funding Model	Actual Based on Percent Allocated to Recycling
Incremental cost of automation per truck		\$68,567	\$59,937	\$59,937
Number of automated trucks collecting recyclables	x	7	7	14 at 30%
Assumption – 50% allocation of automation to recycling	x	50%	50%	1 at 100%
Total incremental recycling related vehicle costs		\$239,984	\$209,779	\$311,672
Related P&E costs		\$99,819	\$99,819*	\$120,876
Recycling carts		\$2,335,271	\$1,795,180	\$1,795,180
Funding Request to CIF		\$2,675,075	\$2,104,778	\$2,227,727
Percentage Funding Recommended (rounded)	x	52%	52%	52%
Total		\$1,391,039	\$1,094,484	\$1,158,418
Program Savings as Measured in \$/year		\$291,367	\$263,875	\$260,875
Payback Period on CIF Funding (years)		4.8	4.2	4.4

*P&E claimed was based on funding limit established as part of the CIF submission

The automated cart project was completed on time and under budget with a payback period on the grant of 4.4 years based on the 52% funding request.