

Operating Effective Depots

Gary Everett, CIF

Depots In Ontario

- Over 300,000 t/y diverted
- Over 150 depots operating

From Huge



To Tiny



Love Depots



Hate Depots



Speakers

Almost all of us have a depot!

- Small Municipal Depot Guidebook
 - Amanda Hopkins, Stantec Consulting Ltd.
- Small Depot Program Case Studies:
 - April Stockfish, McMurrich/Monteith
 - Gayle Short, Township of Algonquin Highlands
- Operating Efficient Depot Programs
 - Rick Vandersluis, Try Recycling
 - Density Study update – Gary Everett, CIF



Small Municipal Depot Guidebook

CIF Project # 738

Amanda Hopkins
Stantec Consulting Ltd.

Project Highlights

- Goals:
 1. Provide small municipalities with practical information & costing model
 2. Help identify & accurately allocate activity based capital & operating costs for estimating full cost of current/planned depot diversion activities
- Impacts: More cost effective design & operations through use of costing tool & incorporation of better practices
- More information:
 - Amanda.hopkins@stantec.com
 - www.stantec.ca

Outline

Introduction & Purpose



Target Audience

The Guidebook Overview

The Depot Model

Question Period

Introduction

- Drop off depots play a vital role in waste management systems
- Effective alternative to waste collection
- Commonly used in rural, small volume settings
- Balancing materials managed with depot costs
- Safety & efficiency are tops in depot design & operations



Project Purpose

- Information & strategies for those planning & operating depots
- Present industry best practices on depot development & operation
- Answer the 'who, what, why, how & where'
- Emphasis on the 'what' & 'how'



Target Audience

- Intended for municipalities with <500 tpy of recyclable materials
- Municipalities who:
 - currently operate depots or
 - are looking to develop new facilities
- Existing facilities – determine financial & operational impacts of expanding programs



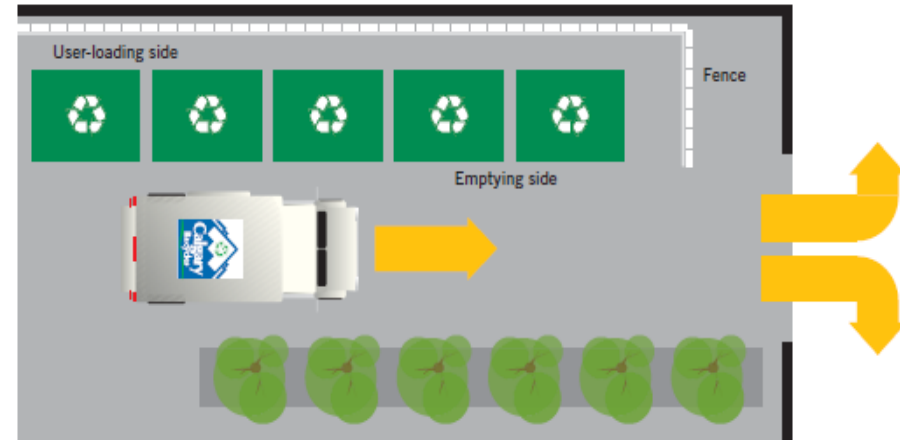
The Guidebook

- Guidebook divided into 3 sections:
 1. Planning, siting, design & approvals
 2. Operations & better/best practices
 3. Costing Model
- Allows users to easily access specific parts of Guidebook

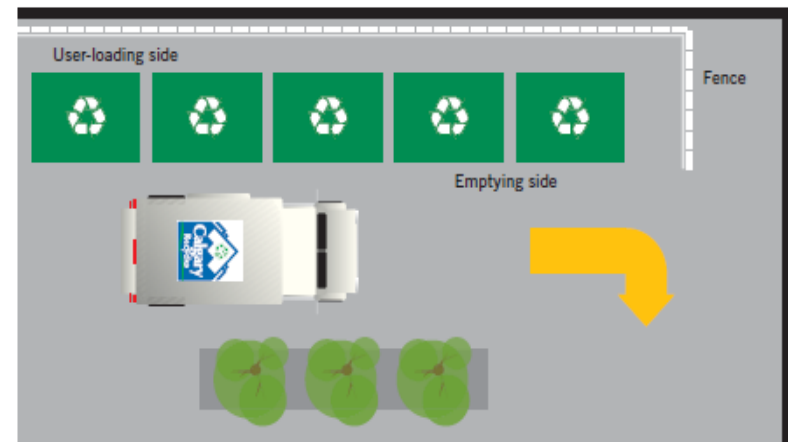


Guidebook Sections (1)

- Planning a Depot
- Depot Design
 - Design for materials handling
 - Vehicle & traffic management
 - Designing for materials movement off-site
 - Other Site Design Considerations
- Siting a Depot
- Depot Operations
- Approvals Required
- Costs
- Promotion & Education
- Resources



Solution A. The truck can drive straight through the CRD



Solution B. The truck has enough room to turn as it exits the CRD

Guidebook Sections (2)

Costs

- Operating & capital costs can vary between depots
- Dependent on a number of factors:
 - Existing site conditions
 - Configuration
 - Staffing requirements
 - Quantity & types of materials managed

***Depot Costing Model** is designed to help determine potential capital & operating costs for new depot development or existing depot program modifications*

Depot Costing Model

- Allows user specific input including:
 - Tonnages & material types
 - Sorting configurations (single, dual, multi stream)
 - Collection & haul vehicle configurations
 - Known & unknown program costs
- The model has defaults where information is unavailable
- Enables users to compare costs
- Compare multiple scenarios
- Not intended as replacement for procurement process or obtaining quotes



Depot Costing Model Highlights



Depot Costing Model

Depot Cost Analysis Model - Tonnages



Directions: Input information in yellow fields, follow pop up prompts

Throughout the model, where 'Stream 1', 'Stream 2', etc. is shown, you may adjust the text to reflect your individual sorting programs

Step 1: Determining Whether Tonnage Estimates are Required

Have you already developed depot tonnage estimations?

no

Skip 2a - Proceed to Step 2b below

Step 2a: Annual Tonnages Requiring Management

RECYCLABLES

	Single Stream	Dual Stream		Multi Stream					
		Fibres	Containers	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5	Stream 6
Annual Tonnes									
Combined Tonnage	0	0				0			0

ADDITIONAL MATERIALS

	Wood	Metal	Drywall	Shingles	Brush	Leaf and Yard Waste	Used Tires	Mattresses	Carpet	Garbage	Concrete	Mixed C&D
Annual Tonnes												

Depot Costing Model

Step 2b: Estimating Annual Tonnage Handling Requirements

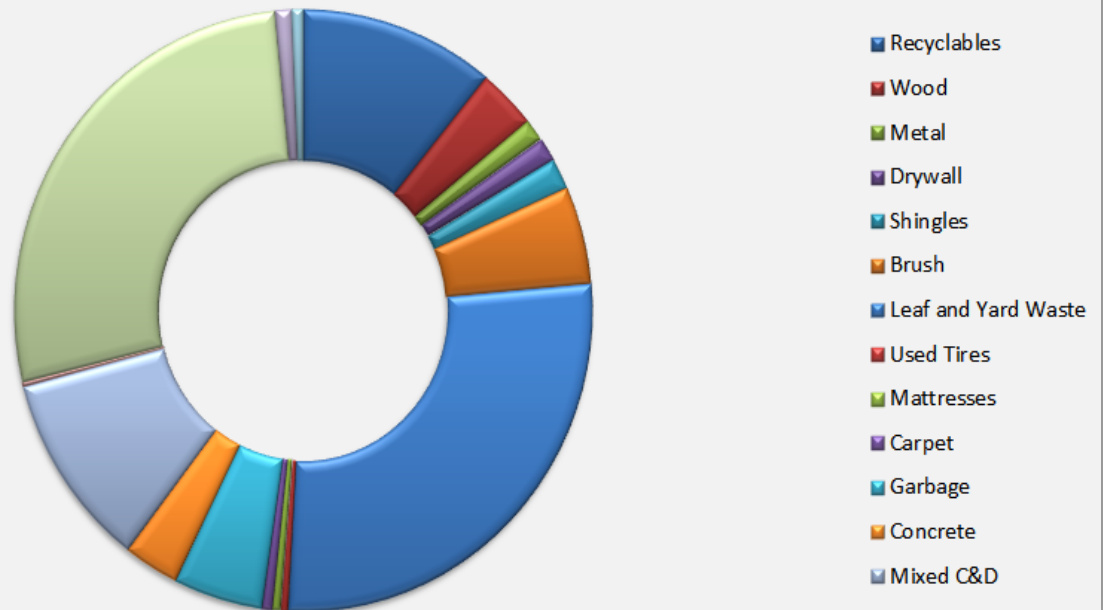
What is the population that will be serviced by the depot?

1000

Once tonnage has been assessed, please proceed to Tab 2 - Density Calculations

Material	Estimated Annual Tonnage Requiring Management
Recyclables	23
Wood	7
Metal	3
Drywall	3
Shingles	4
Brush	11
Leaf and Yard Waste	58
Used Tires	1
Mattresses	1
Carpet	1
Garbage	11
Concrete	7
Mixed C&D	22
CFC	1
Reuse	58
Ewaste	2
MHSW	1

Step 2b - Estimated Annual Tonnage Requiring Management



Depot Costing Model

Depot Cost Analysis Model - Density Calculations



Directions: Input information in yellow fields, follow pop up prompts

Select which materials will be included in each stream (e.g. in a 2 stream paper fibres/containers system, select all applicable materials)

Once you have selected which materials will be included in each stream, please proceed to Tab 3 - Direct Haul Costs

Density averages determined through numerous waste audit and composition studies conducted in Ontario

Step 3: Determining Volumes Requiring Management

On Page 1, were tonnage estimates developed for you (Step 2b)?

yes

Do you have predetermined waste composition percentages?

no

Waste composition percentages have been calculated automatically

Enter the names of your sorting streams into the

Click the check boxes under the

Waste composition percentages have been calculated automatically										Containers	
Materials		Waste Composition	Annual Tonnage	Density (Kg/m3)	Volume	Materials	Volume	Materials	Tonnage	Volume	
Paper Fibres	Newspaper	30.6%	7.08	250	28.30	<input checked="" type="checkbox"/>	28.30	<input type="checkbox"/>	0.00	0.00	
	Magazines and Catalogues	7.6%	1.76	280	6.28	<input type="checkbox"/>	6.28	<input type="checkbox"/>	0.00	0.00	
	OCC	12.4%	2.87	55	52.13	<input checked="" type="checkbox"/>	52.13	<input type="checkbox"/>	0.00	0.00	
	Boxboard	10.5%	2.43	60	40.47	<input checked="" type="checkbox"/>	40.47	<input type="checkbox"/>	0.00	0.00	
	Polycoat and Aseptics	0.8%	0.18	30	6.17	<input checked="" type="checkbox"/>	6.17	<input type="checkbox"/>	0.00	0.00	
	Telephone Books	0.7%	0.16	280	0.58	<input checked="" type="checkbox"/>	0.58	<input type="checkbox"/>	0.00	0.00	
	Residential Fine Paper	0.7%	0.16	150	1.08	<input checked="" type="checkbox"/>	1.08	<input type="checkbox"/>	0.00	0.00	
	Other Paper	6.3%	1.46	150	9.71	<input checked="" type="checkbox"/>	9.71	<input type="checkbox"/>	0.00	0.00	
	Total	69.6%									
Plastics	PET	5.0%	1.16	25	46.25	<input type="checkbox"/>	0.00	<input checked="" type="checkbox"/>	1.16	46.25	
	HDPE Bottles	2.0%	0.46	25	18.50	<input type="checkbox"/>	0.00	<input checked="" type="checkbox"/>	0.46	18.50	
	PVC	1.2%	0.28	25	11.10	<input type="checkbox"/>	0.00	<input checked="" type="checkbox"/>	0.28	11.10	
	Plastic Film	1.7%	0.39	28	14.04	<input type="checkbox"/>	0.00	<input checked="" type="checkbox"/>	0.39	14.04	

Depot Costing Model

Depot Cost Analysis Model - Direct Haul Costs



Directions: Answer questions below in the yellow fields.

Step 4: Determining Direct Haul Costs Using Collection Vehicles (No Depot)

What is the capacity of the collection vehicle? (May enter multiple sizes for comparison)

Vehicle 1	32	cubic metres
Vehicle 2	42	cubic metres
Vehicle 3	48	cubic metres

Please enter compaction ratios for collection vehicles listed above. If only one collection vehicle exists, only enter compaction ratios under the Vehicle

	Fibres	Containers	test name	Stream 4	Stream 5
Vehicle 1	2	2			
Vehicle 2	0	0	0	0	0
Vehicle 3	0	0	0	0	0

What is the driving time to your processing facility (i.e. MRF)?

2 hours

What are your collection costs for recyclables?

\$ 100.00 per hour

Total Annual Volume of Recyclables Collected

Reference:

If current hourly collection costs are not available the following operating cost estimates can be used.
Average Operating Costs for Collection Vehicles in Ontario (includes estimated 20% profit margin):
Fully Automated = \$78/hr
Semi-Automated = \$69/hr

Depot Costing Model

Depot Cost Analysis Model - Transfer Costs



Directions: Answer questions below in the yellow fields.

Step 5: Determining Transfer Vehicle Haul Costs (with Depot)

What is the capacity of the transfer vehicle/ trailer? (May enter multiple sizes for comparison)

Trailer 1	<input type="text" value="42"/>	cubic metres
Trailer 2	<input type="text" value="52"/>	cubic metres
Trailer 3	<input type="text" value="62"/>	cubic metres

Please enter compaction ratios for stationary compactors or transfer vehicles listed above. If only one collection

	Fibres	Containers	test name	Stream 4	Stream 5
Vehicle 1	<input type="text" value="2"/>	<input type="text" value="2"/>			
Vehicle 2	<input type="text" value="3"/>	<input type="text" value="3"/>			
Vehicle 3	<input type="text" value="4"/>	<input type="text" value="4"/>			

Will you own the trailer?

What is your average hourly haul cost for the hauler?

per hour

What is your average hourly haul cost for the trailer?

per hour

What is the driving time to your processing facility (i.e. MRF)?

hours

Depot Costing Model

Depot Cost Analysis Model - Depot Capital and Operational Costs



Directions: Depot costs **are estimated and** can be modified as needed. **Insert local costs whenever possible**
Enter chosen amortization period and interest rate

Step 6: Selecting Applicable Depot Components

Select which components will be included in your depot design, siting and construction by entering the quantity into the table below

Blank 'cost per unit' fields indicate costs are still being determined

Depot Components	Quantity	Cost per Unit	Unit	Total Cost	Best Practice
Infrastructure					
Property Purchase				\$ -	
Site Lighting	10	\$ (800.00)	light pole	\$ (8,000)	Site lighting is required when hours of operation extend poles on site will depend on pole height, lighting intensity
Site Electrical		\$ (90.00)	square metre	\$ -	Connect to permanent electrical power source from the
Gas/Diesel/Propane/Solar Generator Costs		\$ (2,000.00)	diesel generator	\$ -	May be suitable for very small sites and very small elect
Water/ Sanitary	100	\$ (500.00)	metre	\$ (50,000)	Potable water supply is required for depot staff. Either bottled water and well for non-potable uses. Connect w sewer or construct septic system.
Septic Installation		\$ 25,000.00	per unit installed	\$ -	Drilled well and septic system installation.

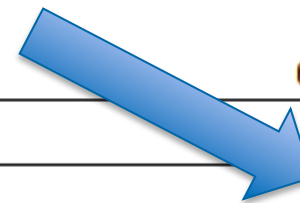
Depot Costing Model

Step 7: Identifying Depot Operating Costs

Operational Requirements	Quantity
Staffing	
Loader Operator (hrs./wk.)	6
Site Supervisor (hrs./wk.)	
Scalehouse Operator, site attendants (hrs./wk.)	
Site admin, legal, HR support (hrs./wk.)	
Staff Training (per staff)	
Staff Material and Supplies	1
Recyclable Containers and Materials Processing	
Utilities	
Electricity	
Propane	
Water	

Depot Costing Model

Operational Requirements	Quantity	Unit Cost
Staffing		
Loader Operator (hrs./wk.)	6	\$ + 35.00
Site Supervisor (hrs./wk.)		= \$25/hr *1.4 (estimated HR& admin costs)
Scalehouse Operator, site attendants (hrs./wk.)		
Site admin, legal, HR support (hrs./wk.)		



Depot Costing Model

Amortization of Capital Costs

Infrastructure

Total Capital Costs	\$	(171,500)
Amortization Period		20 years
Interest Rate		2%

Equipment

Total Capital Costs	\$	(275,000)
Amortization Period		10 years
Interest Rate		0%

Amortized Capital Costs (Annual Payment)

\$10,488

Amortized Capital Costs (Annual Payment)

\$27,500

Depot Costing Model

Depot Cost Analysis Model - Cost Summary



Total Annual Direct Haul Collection Costs	
Collection Cost	\$ 1,200.00

Total Depot Costs

Haul/Transfer Costs	
Vehicle 1	\$ 1,080.00
Annual Amortized Depot Capital Cost	
Infrastructure	\$10,488.38
Equipment	\$27,500.00

Annual Depot Operating Cost	
\$	10,920.00



Total Annual Depot Transfer Costs
\$

Step 9: Determining Costs per Tonne for Depot and Collection Scenarios

If tonnage estimates were determined for you on Tab 1, please refer to the costs in Table 3 below

Table 1: Costs per tonne for pre-determined recyclables tonnages

	Single Stream	Dual Stream		Multi Stream				
		Fibres	Containers	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5

Depot Costing Model

Step 9: Determining Costs per Tonne for Depot and Collection Scenarios

If tonnage estimates were determined for you on Tab 1, please refer to the costs in Table 3 below

Table 1: Costs per tonne for pre-determined recyclables tonnages

	Single Stream	Dual Stream		Multi Stream				
		Fibres	Containers	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Annual Tonnes	0	0	0	0	0	0	0	0
Combined Tonnage	0	0				0		
Annual Cost per Tonne with Collection								
Annual Cost per Tonne with Depot								

Table 2: Costs per tonne for pre-determined additional material tonnages

ADDITIONAL MATERIALS								
	Wood	Metal	Drywall	Shingles	Brush	Leaf and Yard Waste	Used Tires	Mattresses
Annual Tonnes	0	0	0	0	0	0	0	0
Annual Cost per Tonne with Depot								

Table 3: Costs per tonne for calculated material tonnages

Material	Estimated Annual Tonnage	Annual DIRECT HAUL Cost/Tonne	Annual DEPOT Cost/Tonne
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Small Depot Program Success: A Case Study from the Township of McMurrich-Monteith

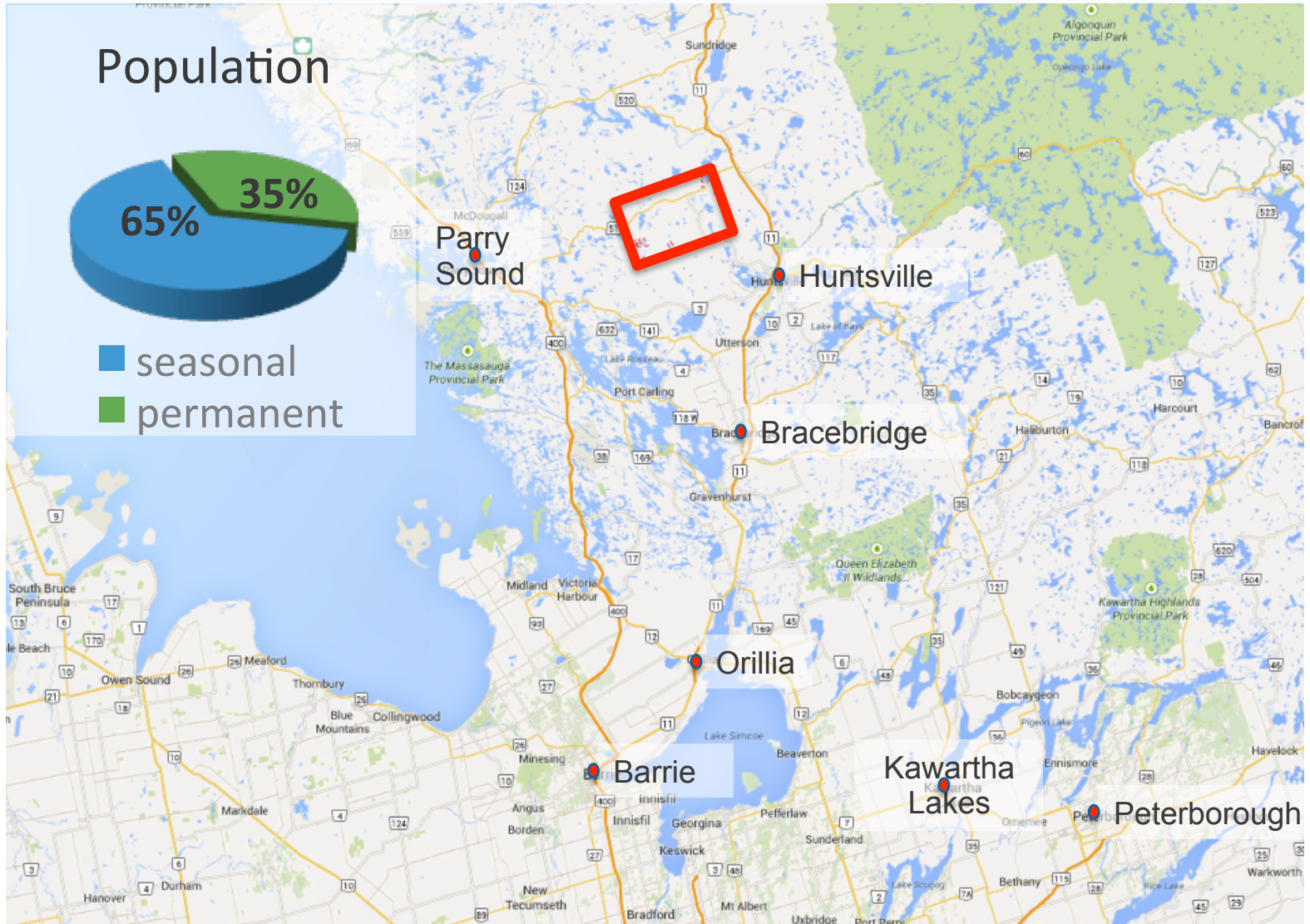
April Stockfish

Township of McMurrich-Monteith

Project Highlights

- Project goal: Improve customer service & communication to achieve full participation & maximize diversion
- Impacts: BB tonnes are increasing, costs are under control, & residents are satisfied
- More information:
 - astockfish@Hotmail.com
 - www.mcmurrichmonteith.com

Township of McMurrich-Monteith

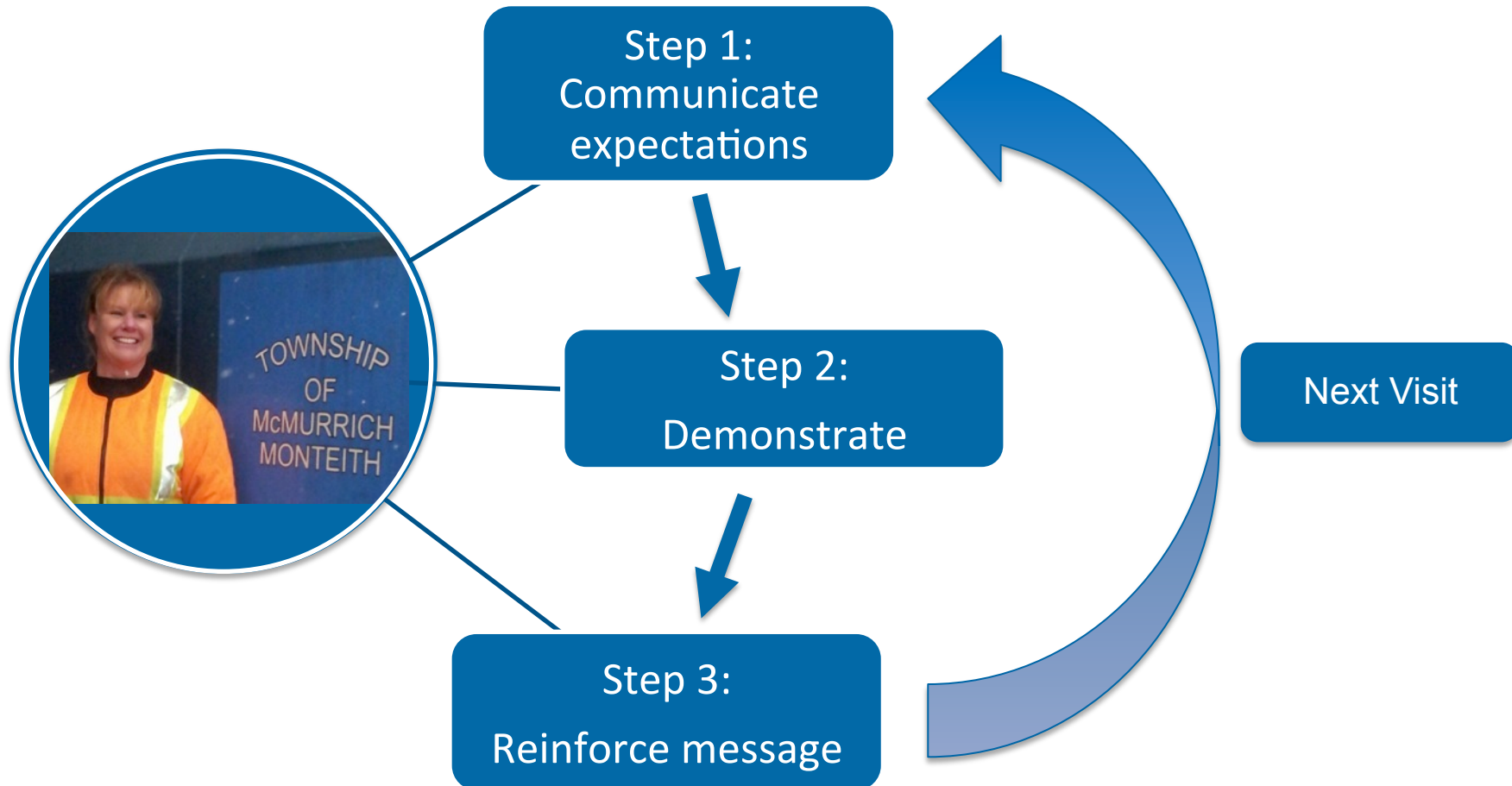


Make Changes that Make Sense

- 2011 – assessment of operations
 - Good policy
 - Underachieving results
- Fall, 2011 – identify opportunity
- June, 2012 – clear bags launch






Strategy: Customer Service Model








Step 1: Communicate Expectations

PAPER PRODUCTS

 BOXBOARD CEREAL - CRACKER-PASTA BOXES	 MAGAZINES
 EGG CARTONS	 JUNK MAIL & ENVELOPES
 SPIRAL WOUND CONTAINERS	 TAKE OUT COFFEE CUPS KEEP LIDS ON
 MILK & JUICE CARTONS TETRA PACKS - JUICE BOXES	 WRAPPING PAPER BOWS-RIBBONS-GIFT TAGS
 NEWSPAPER	 CARDBOARD BOXES BREAK DOWN TO SIZE OF BLUE BOX OR SINGLE NO LARGER THAN 150CM X 150CM X 25CM
 BOOKS HARD COVER - SOFT COVER	 FABRIC TEXTILES NO BUTTONS OR ZIPPERS SECURE IN A CLEAR PLASTIC BAG

CONTAINERS

 PLASTIC BOTTLES & JUGS	 PLASTIC BAGS & FILM
 PLASTIC TUBS & LIDS	 FOOD & BEVERAGE CANS
 CHIP BAGS & WRAPPERS GRANOLA BAR - FRUIT SNACK	 GLASS JARS & BOTTLES
 PLASTIC CLAMSHELLS	 EMPTY DRY PAINT CANS
 SMALL PLASTIC PLANT POTS	 ALUMINUM TRAYS & FOIL
 GROCERY STORE STYROFOAM	 AEROSOL CANS HEALTH, BEAUTY, & FOOD ONLY

RECYCLING RULE: IF IT IS PACKAGING FROM THE GROCERY STORE IT CAN BE RECYCLED IN THE BLUE BOX

NOT RECYCLABLE X	METAL OR PLASTIC HANGERS, VHS TAPES, CD'S OR CASSETTE TAPES, LIGHT BULBS LAUNDRY BASKETS, CONSTRUCTION WASTE, DIAPERS, CHRISTMAS LIGHTS, ARTIFICIAL XMAS TREES
NOT RECYCLABLE X	PACKING STYROFOAM & PEANUTS, DRINKING GLASSES, CERAMIC DISHES, WOODEN ORANGE CRATES, POTS OR PANS, MIRROR OR WINDOW GLASS, PLASTIC TPYS OR OTHER DURABLE PLASTIC PRODUCTS

LANDFILL HOURS

SUMMER HOURS APRIL 1- NOVEMBER 30		WINTER HOURS DEC. 1 - MARCH 31	
MONDAY	9 am - 5 pm	1 pm - 5 pm	
TUESDAY	9 am - 5 pm	1 pm - 5 pm	
WEDNESDAY			
THURSDAY			
FRIDAY	9 am - 5 pm	1 pm - 5 pm	
SATURDAY	9 am - 5 pm	1 pm - 5 pm	
SUNDAY	9 am - 5 pm	1 pm - 5 pm	

OUR LANDFILL SITE ACCEPTS ONLY CLEAR GARBAGE BAGS

LANDFILL SITE IS CLOSED ON STATUTORY HOLIDAYS BETWEEN NOVEMBER 1st - MAY 1st

Residents may now drop off their used tires without rims, free of charge

Take Pride, Where you Reside

DON'T LITTER!!

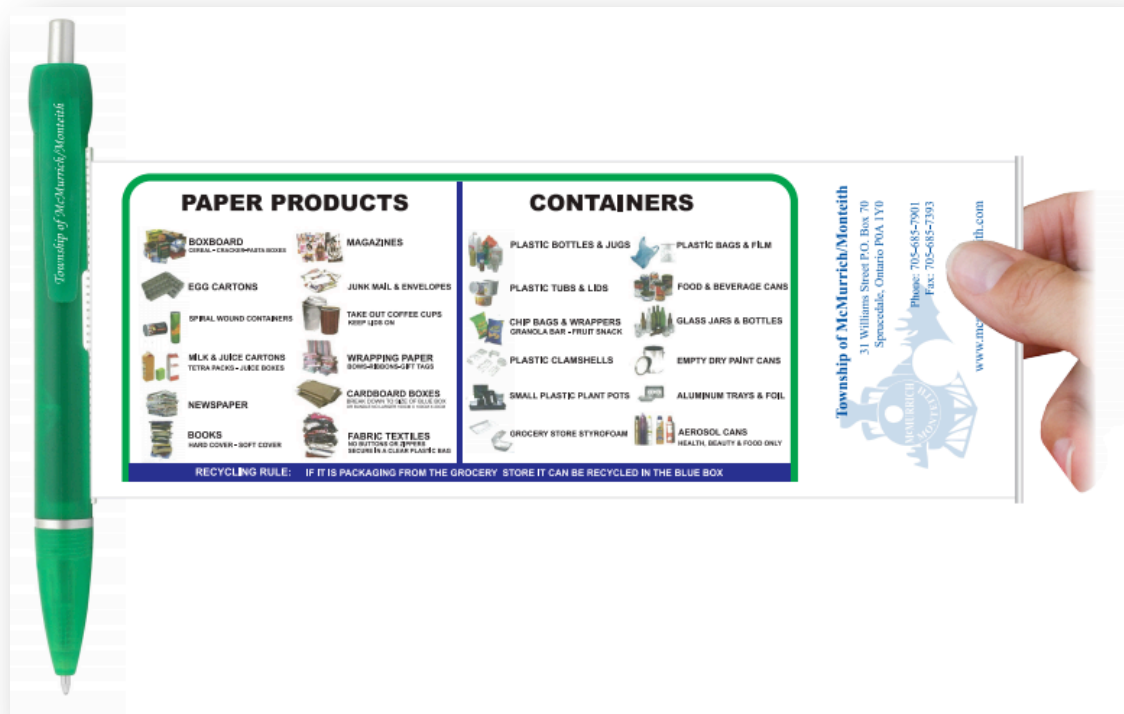
Step 2: Demonstrate Sorting & Build Relationships

- First time offenders
 - Get dirty
 - Demonstrate how/what to sort
- Explain infractions
 - This is the bylaw
 - These are your resources
- Develop the relationship
 - Always here for questions
 - P&E for home



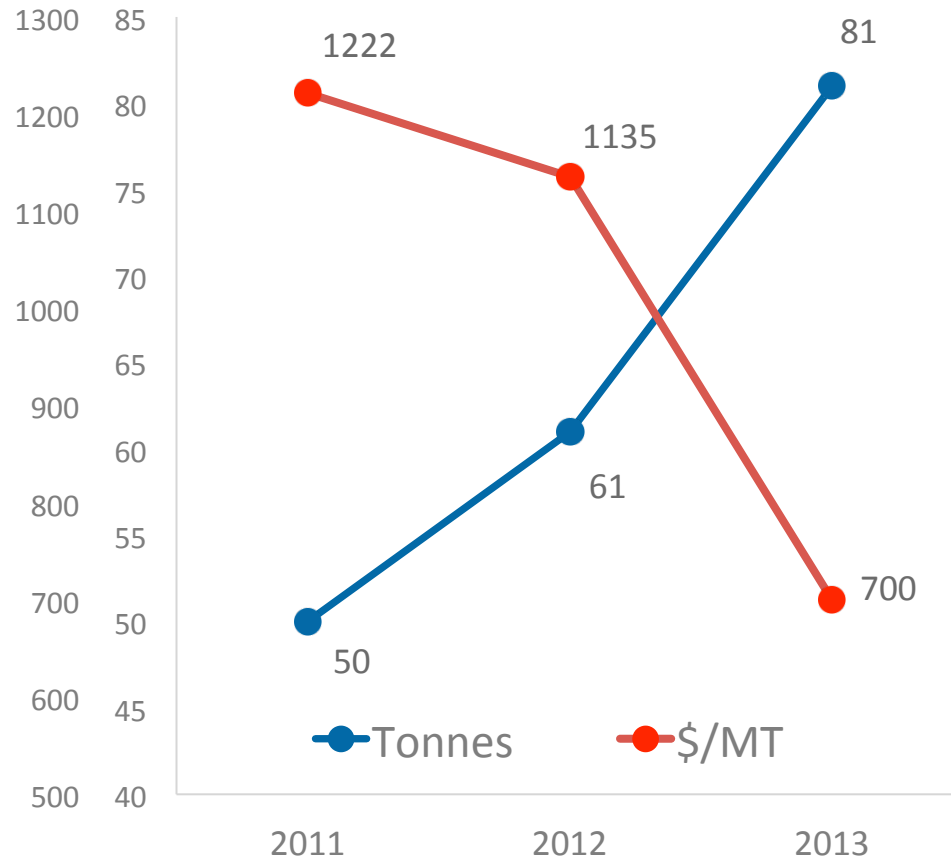
Step 3: Reinforce the Message at Home – P&E

- Promotional packages
 - Clear bag
 - Information on sorting
 - Magnet
 - Pen



Our Customer Service Model Works...

\$/MT MT



- More **material** is being diverted
- Program costs have remained constant, &
- Relative **costs** are improving
- Why else is April happy?

Key Learnings

- Plan to have additional staff for transition
 - Permanent residents: 3-4 months notice
 - This was really big change for community
 - Needed the summer assistant (as backup)
- Implementation
 - Create comprehensive plan
 - Plan for enforcement
- P&E – repeating the message
 - At depot
 - At homestead

6 Things that Make our Program Successful



1. Control of waste disposal site
2. Strong bylaws allow enforcement
3. Clear bags work
4. Signage reinforces expectations
5. P&E reinforces messaging at home
6. Professional staff dedicated to
 - A. Customer service
 - B. Meeting recycling objectives



Opportunities for Depot Improvements

CIF Project # 739

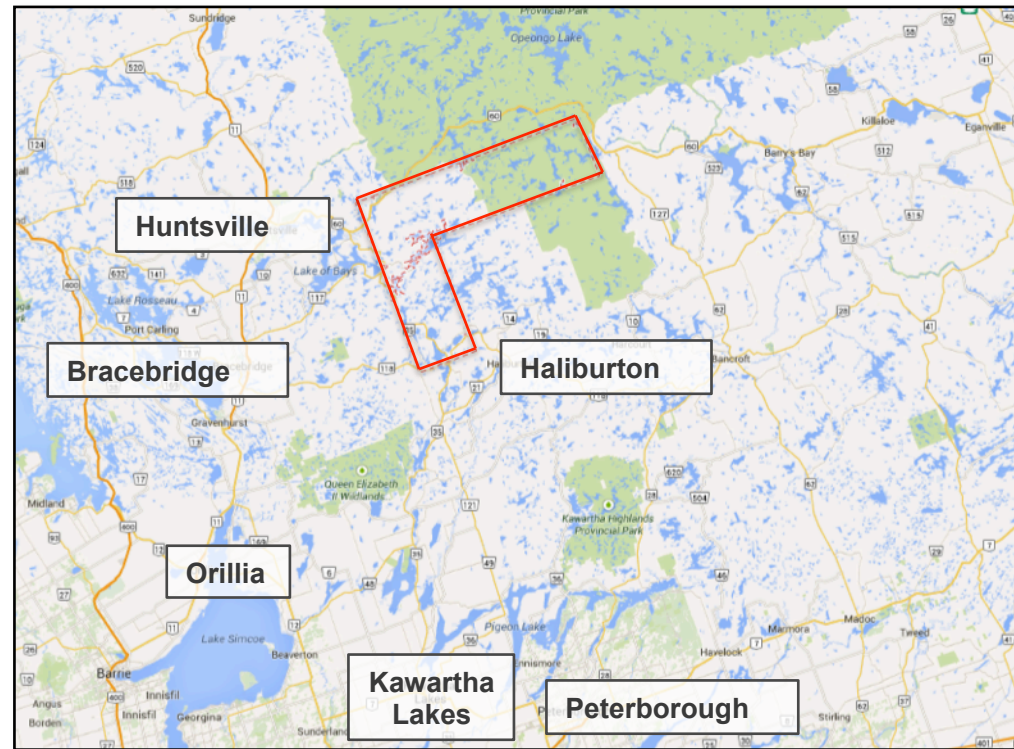
Gayle Short
Township of Algonquin Highlands

Project Highlights

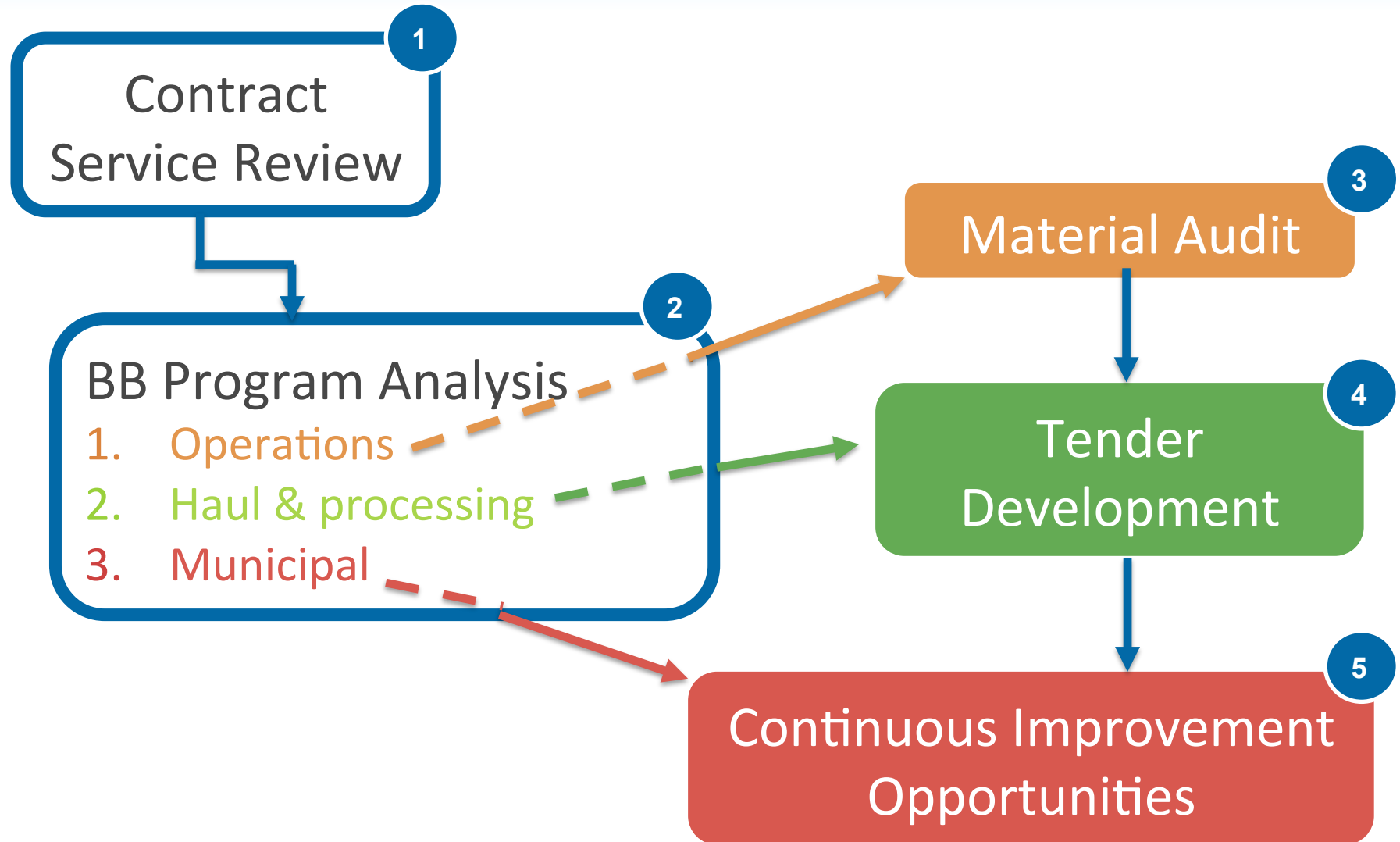
- Project goal: Improve depot service & procurement practices
- Impacts: Anticipated improved diversion & decreased operating cost
- More information:
 - gshort@algonquinhighlands.ca
 - www.algonquinhighlands.ca

Township of Algonquin Highlands

- HH 4,439
 - 992 HH permanent
 - 3447 HH seasonal
- Depot based program
 - 5 sites
 - Staffed
 - 2-stream system
 - Clear bag policy
 - ~400 tpy
 - 6,200 hours of depot service



5-Step Review

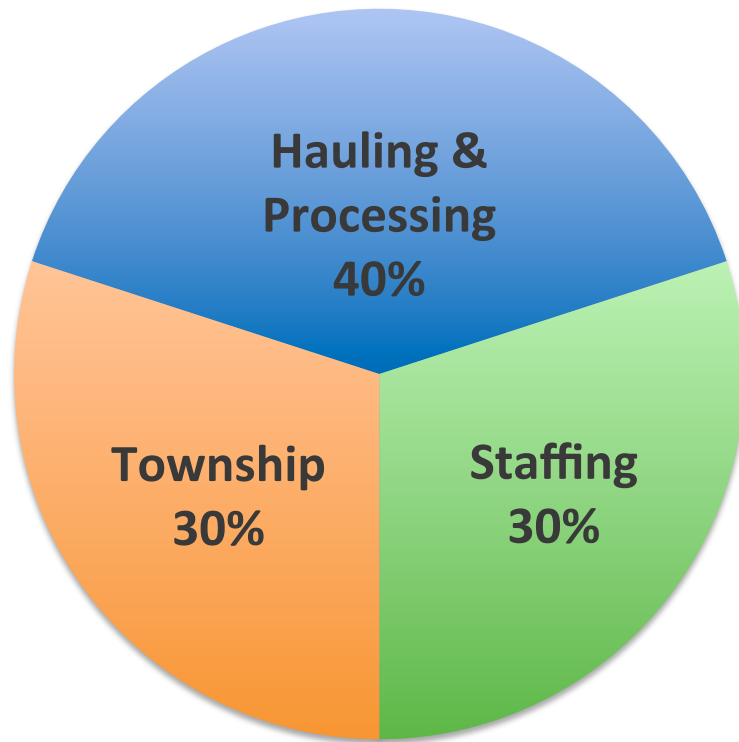


Step 1: Contract Service Level Review

- Operation (Staffing)
 - Interaction with residents
 - Enforcement of clear bag policy
- Haul & processing
 - Set lift rate/ bin
 - Includes a residual fee
 - Weight of each lift
- Township
 - Contractor oversight
 - Site maintenance & utilities
 - Provides roll-off bins
 - P&E for residents



Step 2: Current Costs & Diversion Rate Review



■ Cost/Tonne \$369.13

1. ~ 30% staffing
2. ~ 40% hauling & processing
3. ~ 30% township



Hauling & Processing Structure

- 11.08% residual fee built in
- 4% of our overall budget

Step 3: Material Audit (1)

- Material composition
 - 62.38% fibres
 - 30.74% containers
 - 6.87% residue
- Residue rate is lower than contract rate 4.28%
- Improper sorting is an issue
- Recyclables have a annual value of roughly \$37,700

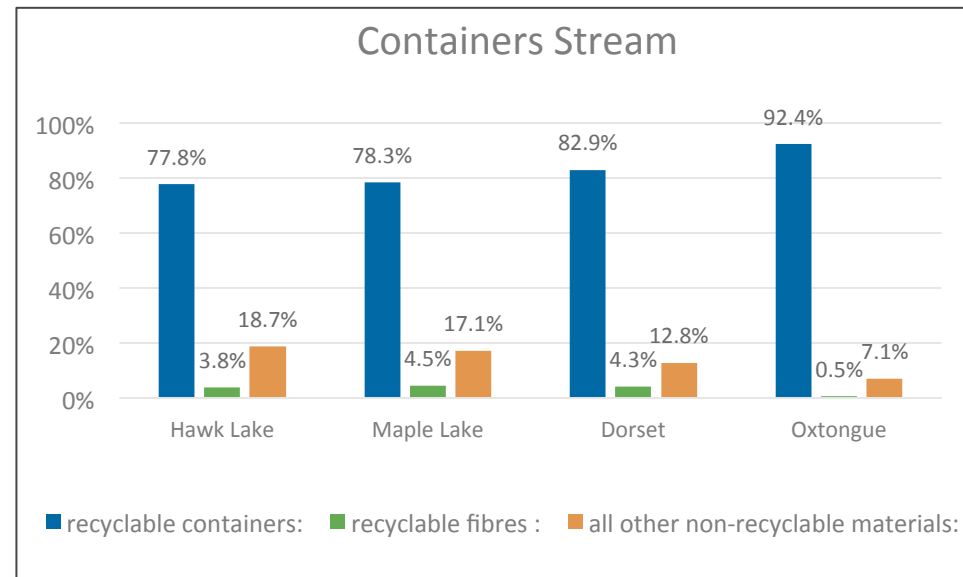
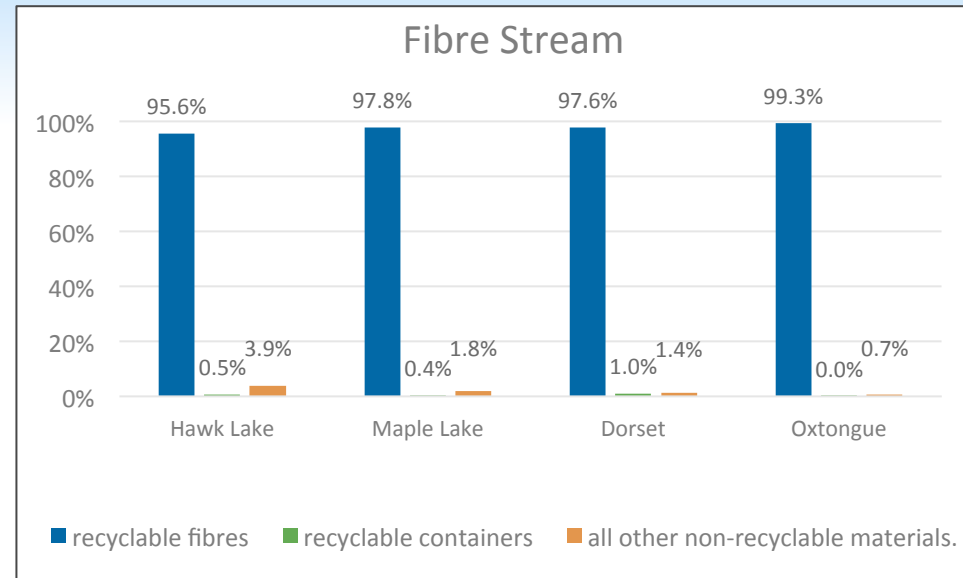


Step 3: Material Audit (2)

Contamination

- Fibre stream
 - Great performance
 - Little to no contamination

- Container stream
 - Contamination = ~17.2%
 - Performance differs between depot sites, why?



Step 4: Ensure Competitive Pricing

- Developed Tender that incorporated best practices
 - Separate hauling & processing rates
 - Liquidated damages
- Circulated Tender widely
- Tender – 7 weeks
 - Release date: Nov. 3, 2014
 - Bidders questions: Dec. 5, 2014
 - Closing date: Dec. 19, 2014



TENDER NO. PW-2014-003

**CONTAINER HAULAGE & PROCESSING
Blue Box Recycling Program**

Issue Date: Monday, November 3, 2014
 Questions from Bidders Due on or Before: Friday, December 5, 2014 at 4:00 p.m. local time
 Closing Date & Time: Friday, December 19, 2014 at 2:00 p.m. local time
 Address: Township of Algonquin Highlands
 1123 North Shore Rd.
 Algonquin Highlands, ON K0M 1J1
 Attention: Mike Thomas, CRS-I
 Operations Manager

**LATE TENDERS WILL NOT BE ACCEPTED.
 THE LOWEST OR ANY TENDER NOT NECESSARILY ACCEPTED.**

Township of Algonquin Highlands
 1123 North Shore Rd.
 Algonquin Highlands, ON K0M 1J1
www.algonquinhighlands.ca

What's Next for Algonquin Highlands?

Using the 5-step framework, we'll consider:

- P&E efforts to address the contamination issues
 - Staff training
 - Signage & sorting guides
- Improved clear bag policy enforcement

Operating Efficient Depot Programs

Rick Vandersluis
TRY Recycling

About TRY Recycling

- Depot Operator
 - Renovation waste, household rubbish, yard & garden materials
- Product Development
 - Compost, garden mulch, TRYpave, aggregate products
- Contractor
 - Municipal depot operation
 - 20 locations, London, Strathroy & others



Overarching Principles of Efficient Depot Operation

- Site design
- Site operation
- Signage
- Safety
- Customer Service
- Advertisement



Site Design Considerations

- Traffic Flow
 - Entrance, exit
- Container selection
 - Roll off, carts
- Container placement
 - Saw tooth
- Signage
 - Directional; instructional



Site Operation Considerations

- Minimize material handling
- Use largest haulage vehicle possible
- Maximize payload
- Know your costs!



Signage Consideration

- Size
 - Large, must be visible to the driver who will be several feet away
- Wording
 - Keep it simple – few words
- Placement
 - On the container or a post
- Quantity
 - Don't post too many signs



Safety Considerations

- How to identify
- How to prevent
- How to avoid
- How to minimize harm



Customer Service

Ensuring the resident has a good experience is critical:

- Ensures on-going participation
- Promotes proper sorting

Aspects of good customer service

- Easy to identify
- Knowledgeable
- Friendly
- Prioritizes customer interactions



Advertising

KISS Rule

- Location
- Hours
- Accepted materials

Drop-Off Locations



NORTH London Community Environmental Recycling Centre

21463 Clarke Road, London, Ontario

Tel: 519.457.1566

Hours of Operation: Monday-Friday 7am-5pm, Saturday 8am-noon, Sunday – Closed

Materials Accepted

Top five things we focus on?

1. Tracking
2. Issue resolution
3. Site cleanliness
4. Staffing
5. Service



**CIF Center of Excellence
Density Study
CIF Project # 737**

Gary Everett, CIF

Project Highlights

Purpose:

- Update density info by (8) material types
- Allow comparison local density with multi-municipal avg.
- Compare bin/truck sizes with density/payload
- Compare bin/truck sizes with/without compaction



Thank You to 17 Munis that Provided Initial Info!

**Admaston Bromley
Algonquin Highlands
Bancroft
Brantford
Chatham
EWSWA
Goderich
Grey Highlands
Kingston**

**London
Muskoka
North Grenville
Oliver Paipoonge
Orillia
Peel
Peterborough (City)
Wellington**

Spreadsheet Format

Scroll right for bin sizes →
 Scroll down for material types ↓

Click Cells for Notes

Densities of Recyclable Materials for Bins and Trucks

Material Type	Bin Size				Truck Size			
Fibre with OCC	38 (yd ³)				40 (yd ³)			
Compaction	yes	no	yes	no	yes	no	yes	no
Average (kg/m ³)			174.9	44.5	166.9	106.9		
Average (t/m ³)			0.17	0.04	0.17	0.11		
Average (t/load)	0.00	0.00	4.94	1.16	5.20	3.36	0.00	0.00
Standard Deviation (kg/m ³)				13.1	21.2	28.3		
Material Type	Bin Size				Truck Size			
Fibre with no OCC	38 (yd ³)				40 (yd ³)			
Compaction	yes	no	yes	no	yes	no	yes	no
Average (kg/m ³)					160.0			
Average (t/m ³)					0.16			
Average (t/load)	0.00	0.00	0.00	0.00	4.89		0.00	0.00
Standard Deviation (kg/m ³)					29.4	74.4		
Material Type	Bin Size				Truck Size			

Pop Up Notes

2	Click Cells for Notes						
3		Material Type Fibre with OCC	Bin Size		Truck Size		
4			40 (yd ³)				
5			Compaction	yes	no	yes	no
11			Average (kg/m ³)	166.9	106.9		
12			Average (t/m ³)	0.17	0.11		
13	>	Average (t/load)	5.20	3.36	0.00	0.00	
14		Standard Dev (kg/m ³)	Average tonnes per cubic meter x bin size in cubic meters converted to cubic yds. May be used to compare to local average load weight.		28.3		
15							
16		Material Type Fibre with no OCC	Bin Size		Truck Size		
17			40 (yd ³)				

How it Works

Material Type	Bin Size		Truck Size		Bin Size		Truck
	20 (yd ³)				30 (yd ³)		
Glass							
Compaction	yes	no	yes	no	yes	no	yes
Average (kg/m ³)		392				343.4	
Average (t/m ³)		0.39				0.34	
Average (t/load)	0.00	5.97	0.00	0.00	0.00	7.80	0.00

What's it For?

- Planning
- Efficiency
- Training, P&E, policy
- Monitoring & measurement
- Justification to get some help

Next Steps (1)

- Check for anomalies
- Send it out for peer review
- Verify, repair & improve results
- Release – Winter 2015

Next Steps (2)

- We need your help!
- Send us your comments & wish list
- Let us know if you want to peer review
- Send us more data:
 - Avg. bin/truck weights over 1 yr.
 - Type of material collected
 - Size of bin/truck, open or closed, compacted or not

Questions



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