



# PRAIRIE ROBOTICS

RECYCLING MADE SIMPLE



# Agenda

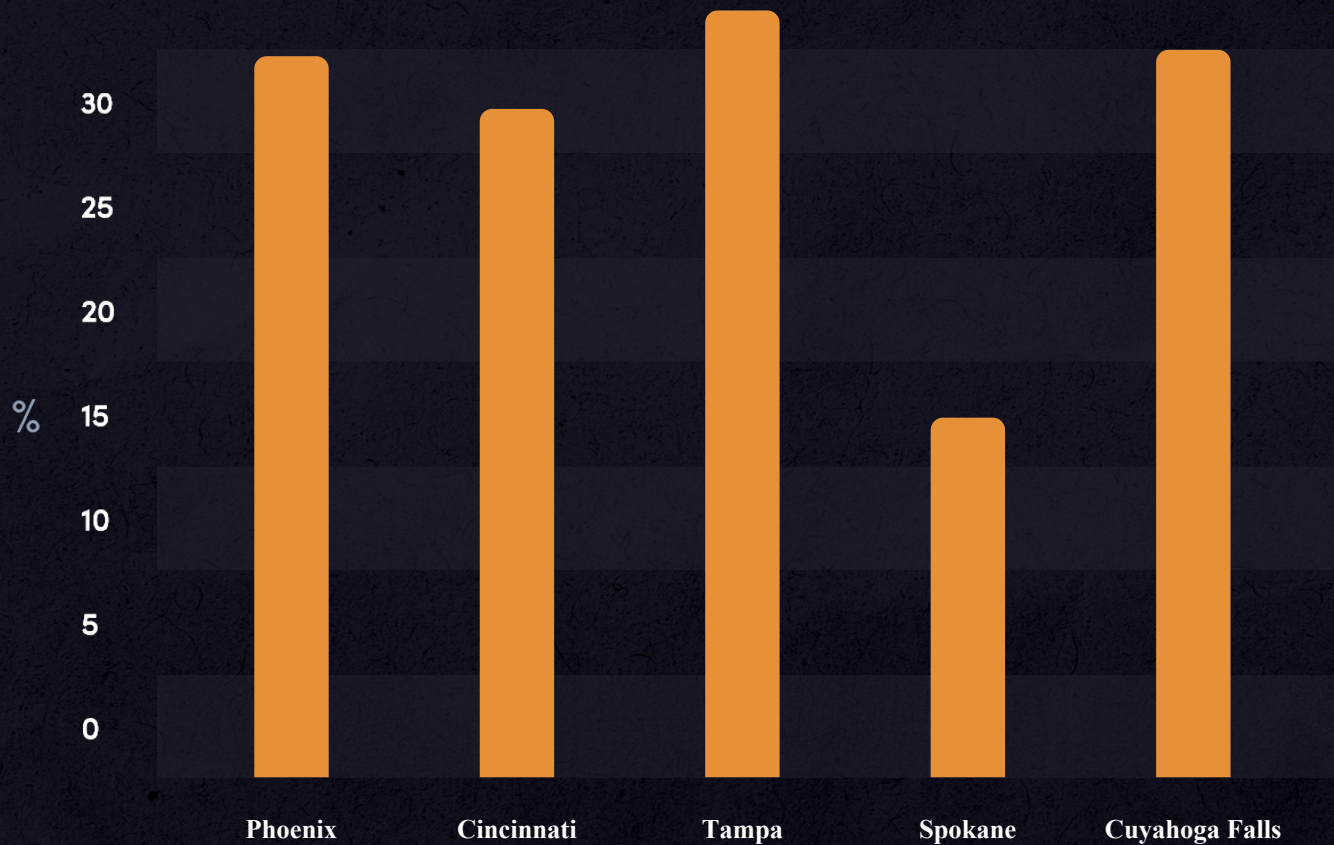
- **State of Contamination**
- **A.I. & Curbside Recycling**
- **Measuring Education Campaigns**



# National Sword has forever changed recycling



# Contamination





# Recycling Education Falls Short



**Residents Recycle**



**Collector Collects**

# Recycling Education Falls Short



**Residents Recycle**



**Collector Collects**

## Passive Feedback



**Blanket Education  
Campaigns**



**Generic Digital  
Tools**



# Recycling Education Falls Short



Residents Recycle



Collector Collects

## Passive Feedback



Blanket Education  
Campaigns



Generic Digital  
Tools

## Active Feedback



Small Scale  
Audits

# Feedback = Change

100

75

50

25

Before

Tag & Collect

Before

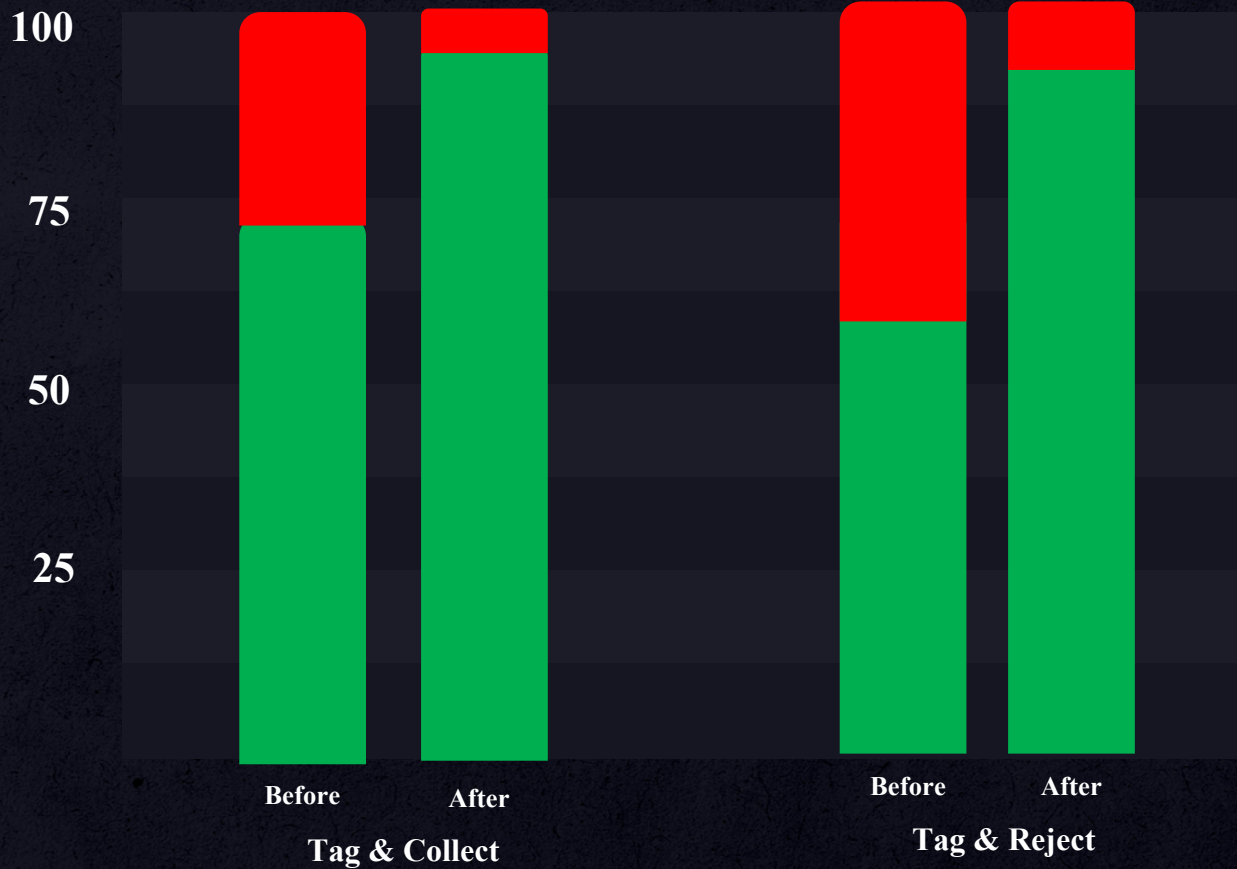
Tag & Reject

Region of Peel. (2020,  
October). Curbside and  
Multi-Residential  
Enforcement  
Programs to  
Reduce Blue Box  
Contamination.





# Feedback = Change

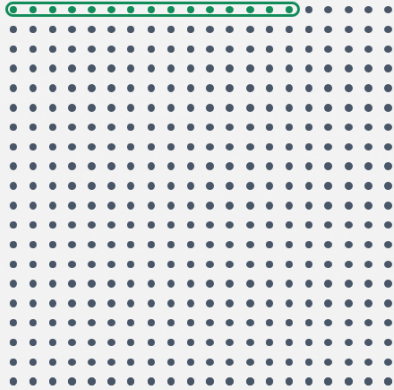


Region of Peel. (2020, October). Curbside and Multi-Residential Enforcement Programs to Reduce Blue Box Contamination.

## Common Strategy - Manual Cart Audits

**3.9%**

67,665 audits / year

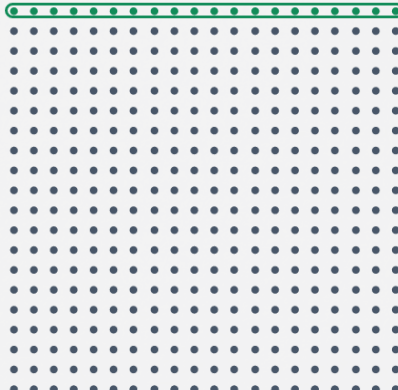


1,693,965 collections / year

**Spokane,  
Washington**

**5.3%**

55,000 audits / year

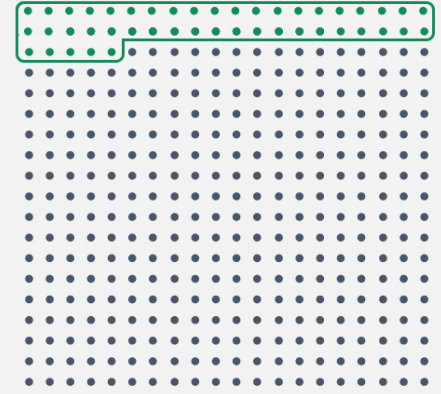


2,771,168 collections / year

**Washtenaw County,  
Michigan**

**13.7%**

148,000 audits / year



399,563 collections / year

**Cuyahoga Falls, Ohio**



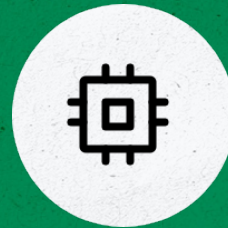
# Make Recycling Simple



**Residents Recycle**



**IOT  
Platform**



**Artificial  
Intelligence**



**Targeted  
Education**

# Make Recycling Simple

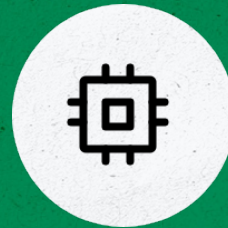


**Residents Recycle**

## Active Feedback



**IOT  
Platform**



**Artificial  
Intelligence**



**Targeted  
Education**



1

# Reduce time, money & resources spent on waste audits

Artificial Intelligence (A.I.) to detect contamination from each household



## Technology Approach



**Fully Automated = No Driver Input**

**RFID not required**

**Partnerships with existing camera solutions**



# Workflow



**Residents Recycle**



**IOT  
Platform**



**Artificial  
Intelligence**




**Review**  
*(optional)*



**Targeted  
Education**

# Review Workflow (optional)

**PRAIRIE ROBOTICS**  
RECYCLING MADE SIMPLE

Dashboard

Contamination

Jobs

Historic Reviews

Map

Contamination Rules

Carts

Outreach

Postcards

Digital Notifications

Reports

Contaminant Summary

Service Addresses

Service Events

Organization Management

Users

Truck Health Check

Search

Contamination

Hello, Prairie Robotics


Non-black garbage bag

11315 86A ST

Truck 1

Sequential: 119

05-04-2022 08:59:41 Tue



Note: A yellow box contains contamination that was previously audited

Active Job: August 3rd

Save to Job

Next Image

Confirmed Contaminants

CATEGORY	ID
Styrofoam	1
Non-black garbage bag	2
Styrofoam	3
-	-

< 1 >

Rejected Contaminants

CATEGORY	ID
-	-
-	-
-	-
-	-

< 1 >





## Be CartSmart

It's important to **ONLY** put acceptable recycling material in your blue cart. **The wrong items can reduce the quality of good recyclables and damage sorting equipment.**

*The City is randomly checking recycling carts throughout the community.*

**By checking blue carts, we hope to:**

- Encourage proper sorting
- Gather information on common mistakes



Current Resident  
1234 Main St  
Regina, SK  
S4S 1S9

Flip for your cart results.



## OOPS!

Avoid common recycling mistakes.  
Keep these items out of your cart:



Crinkly plastic packaging



Stretchy plastic bags and film



Styrofoam



Paper disposable cups



During your recent collection we found some wrong items in your blue cart.

**Thanks for recycling!**

For more information, visit [Regina.ca/waste](http://Regina.ca/waste) or call Service Regina at 306-777-7000.



**Feedback = Change**



**4  
WEEK  
GO LIVE**



**Feedback = Change**



**4  
WEEK  
GO LIVE**



**8X  
AUDIT  
COVERAGE**



**Feedback = Change**



**4  
WEEK  
GO LIVE**



**8X  
AUDIT  
COVERAGE**



**1,000  
WORK HOURS  
SAVED**



**Feedback = Change**



**4  
WEEK  
GO LIVE**



**8X  
AUDIT  
COVERAGE**



**1,000  
WORK HOURS  
SAVED**



**10,000+  
POSTCARDS  
SENT**



**Feedback = Change**



**4  
WEEK  
GO LIVE**



**8X  
AUDIT  
COVERAGE**



**1,000  
WORK HOURS  
SAVED**



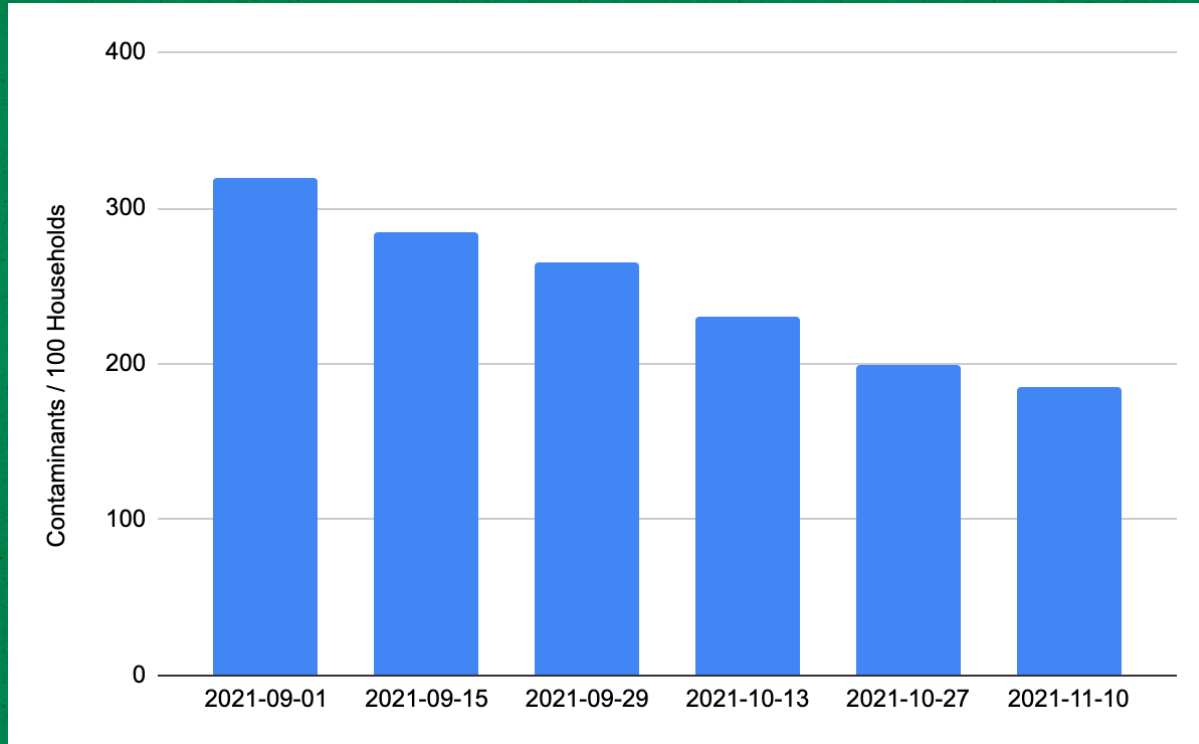
**10,000+  
POSTCARDS  
SENT**



**42%  
LESS  
CONTAMINANTS**



**Feedback = Change**



REGINA LEADER-POST

Local News

## City's CartSmart program adds cameras to catch improper recycling

Using new automated technology developed by Prairie Robotics, images of blue cart contents will be captured when the bin is emptied and then software will track items that don't belong.

Regina Leader-Post  
Aug 12, 2021 • August 12, 2021 • 1 minute read • [Join the conversation](#)



REGINA

Saskatchewan

## Regina introduces garbage robot to track proper recycling among residents



If 'unacceptable item' is spotted in blue cart, 'Oops' mail-out will be delivered.

By Laura Sciarpellotti • CBC News • Posted: Aug 11, 2021 9:29 AM CT | Last Updated: August 11



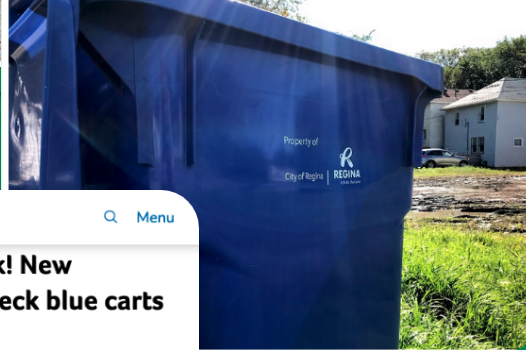
## City of Regina to use cameras to check recyclables

By Blaine Weyland

NEWS GOOD NEWS! SPORTS SHOWS PROMOTIONS ON DEMAND

## City of Regina making high-tech change to recycling program

Regina / 980 CJME  
CJME News  
Aug 9, 2021 | 12:46 PM



## The CartSmart Program is Back! New technology being piloted to check blue carts

August 9, 2021

Share: [Twitter](#) [Facebook](#) [LinkedIn](#) [Email](#)

The City of Regina is continuing the CartSmart Program to help encourage proper garbage and recycling sorting, and to gather information on common recycling mistakes.





\$100,000

Equivalent Advertising Spend



Saskatchewan

## Regina introduces garbage robot to track proper recycling among residents

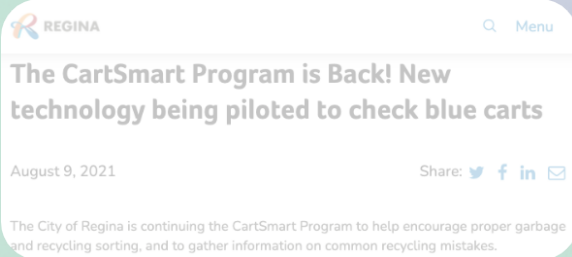


If 'unacceptable item' is spotted in blue cart, 'Oops' mail-out will be delivered.

Laura Sclafani | Regina Leader-Post | August 12, 2021 | 12:29 AM CT | Last Updated: August 11

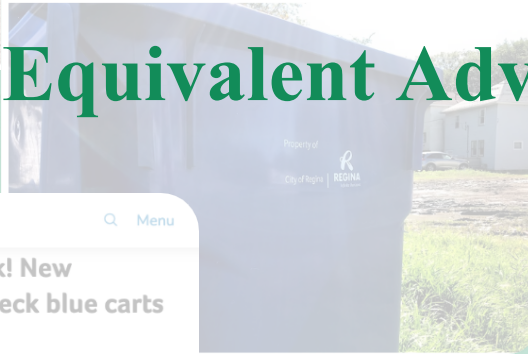
## City of Regina making high-tech change to recycling program

Regina / 980 CJME  
CJME News  
Aug 9, 2021 | 12:46 PM



## City of Regina to use cameras to check recyclables

By Blaine Weyland



# Data Driven Education



+



THE OHIO STATE UNIVERSITY



## Be CartSmart

It's important to **put acceptable recycling material in your blue cart. The wrong items can reduce the quality of good recyclables and damage sorting equipment.**

The City is randomly checking recycling carts throughout the community.

**By checking blue carts, we hope to:**

- Encourage proper sorting
- Gather information on customer mistakes.

Current Resident  
1000 Main St  
Regina, SK  
S4S 0A9

## OOPS!

Avoid common recycling mistakes. Keep these items out of your cart.

During your recent collection we found some wrong items in your blue cart.

**Thanks for recycling!**

For more information, visit [Regina.ca/waste](http://Regina.ca/waste) or call Service Regina at 306-777-7000.

**REGINA**

## When in doubt, don't throw it out.

The City of Regina is asking you to make recycling the norm by following the following guidelines:

Download the **Sort'nGo** app to find out what goes where.

For more information, please contact:  
City of Regina  
300-1000 Main St  
Regina, SK S4S 0A9  
Monday to Friday 8:30 am - 4:30 pm  
[recycling@cityofregina.ca](mailto:recycling@cityofregina.ca) • [Regina.ca/recycling](http://Regina.ca/recycling) • [Regina.ca/recycling](http://Regina.ca/recycling)

## What the heck happened?

We found **contaminated items** in your recycle cart.

Putting your materials in the proper bin is important. The wrong items can reduce the quality of good recyclables and damage sorting equipment.

Download the **Sort'nGo** app to find out what goes where.

**Sort'nGo**  
Live Smarter. Sort Smarter.  
300-1000 Main St, Regina, SK S4S 0A9

## What stays out of the organics cart?

Reduce your waste recycling.

Download the **Sort'nGo** app to find out what goes where.

**Sort'nGo**  
Live Smarter. Sort Smarter.  
300-1000 Main St, Regina, SK S4S 0A9

## How can I improve?

We know that you're composting with a passion. On February 15, we visited you placed the following items in your green bin:

**CITY OF LEDUC**  
**Acceptable Compost Items**

- Asides (cooked)
- Branches 1cm dia. or less
- Yard Waste
- Coffee Grounds & Filters
- Dairy Products & Eggs
- Fruit & Vegetables
- Meat & Bones
- Stems & Sprouts
- Shredded Paper
- Grass & Straw Bales
- Solid Paper Plates

For more information, contact the Eco-Smart hotline at 780-960-7101 or email us at [ecosmart@leduc.ca](mailto:ecosmart@leduc.ca)

NO: NO: NO:  
PLASTIC BAGS: PLASTIC BAGS: PLASTIC BAGS

## ARE YOU WISHCYCLING?

Scan the QR code to make sure you are recycling the right things and to help us keep recyclables out of the landfill.

517-337-9459  
[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle)

**EAST LANSING**  
City of East Lansing  
300-1000 Main St  
East Lansing, MI 48824

Download our **Recycle Check! App!**  
Reminders, alerts, and tips on what can be recycled. Learn more online or download in the app store.

FLIP OVER to see a photo of your recycling.

## OOPS!

When we emptied your recycling into the truck—our team noticed these "NO" items in your cart.

Please leave these items out of your recycling cart!

- No Non-Recyclables
- No Landfills
- No Flammable, Volatile or Plastic Waste (except for household)
- No Styrofoam® (except for household)
- No Fluids or Gases (except for household)
- No Yard Waste

[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle) 517-337-9459

**PRAIRIE BOTANICALS** **EGLE** **The Recycling Partnership**



## Sort'nGo Live Smarter. Sort Smarter.

300-1000 Main St, Regina, SK S4S 0A9

Wondering what goes where? Get the **Sort'nGo** app.

**Sort'nGo**  
Live Smarter. Sort Smarter.  
300-1000 Main St, Regina, SK S4S 0A9

## OOPS!

During our recent collection... we found items in your cart that are **NOT** compostable with collection.

Please be cart smart.

For more information, visit [waste.ca/vergo](http://waste.ca/vergo) or get in touch at 250-736-SORT (7376)

NO: NO: NO:  
PLASTIC BAGS: PLASTIC BAGS: PLASTIC BAGS

## DO YOU KNOW WHAT TO THROW?

We need to recycle the YES things and keep the NO things out.

Scan to find out what's recyclable in East Lansing.

517-337-9459  
[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle)

**EAST LANSING**  
City of East Lansing  
300-1000 Main St  
East Lansing, MI 48824

Download our **Recycle Check! App!**  
Reminders, alerts, and tips on what can be recycled. Learn more online or download in the app store.

FLIP OVER to see a photo of your recycling.

## OOPS!

When we emptied your recycling into the truck—our team noticed these "NO" items in your cart.

Please leave these items out of your recycling cart!

- No Non-Recyclables
- No Landfills
- No Flammable, Volatile or Plastic Waste (except for household)
- No Styrofoam® (except for household)
- No Fluids or Gases (except for household)
- No Yard Waste

[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle) 517-337-9459

**PRAIRIE BOTANICALS** **EGLE** **The Recycling Partnership**

## Sort Roll

We've noticed the wrong material in your recycling cart.

ENGINEERING & REGIONAL UTILITIES  
5404 864-5645 • [enr@yourwastecanada.com](mailto:enr@yourwastecanada.com) • [WasteCanada.ca](http://WasteCanada.ca)

## KEEP THESE OUT:

On January 26th we found items in your cart that are **NOT** recyclable!

NO: NO: NO:  
PLASTIC BAGS: PLASTIC BAGS: PLASTIC BAGS

**Recycle Right!**

For more information, visit [waste.ca/vergo](http://waste.ca/vergo) or get in touch at 250-736-SORT (7376)

## Sort Roll

We've noticed the wrong material in your recycling cart.


ENGINEERING & REGIONAL UTILITIES  
5404 864-5645 • [enr@yourwastecanada.com](mailto:enr@yourwastecanada.com) • [WasteCanada.ca](http://WasteCanada.ca)

## KEEP THESE IN:


On January 26th we found items in your cart that are **NOT** recyclable!

**Recycle Right!**

For more information, visit [waste.ca/vergo](http://waste.ca/vergo) or get in touch at 250-736-SORT (7376)



**We've noticed the  
wrong material in  
your recycling cart.**




CANADA POST	POSTES CANADA
Postage paid Lettre-poste	Port paid Poste aux lettres
41684016	

Current Resident

REDACTED

ABBOTSFORD, BC

**TURN OVER**  
for more information

**ENGINEERING & REGIONAL UTILITIES**  
 ☎ 604-864-5640 ✉ [sortyourwaste@abbotsford.ca](mailto:sortyourwaste@abbotsford.ca) @abbotsford.ca/CRP
 

**On January 25th  
we found items in your cart that are  
NOT recyclable!**



✗ **KEEP THESE OUT:**

  
**NO GLASS**

  
**NO STYROFOAM**  
(or foam packaging)

  
**NO PLASTIC BAGS**  
or stretchy plastic

  
**NO PLASTIC PRODUCTS  
NOT PACKAGING**  
(toys, toys, storage containers etc.)

  
**NO METAL PRODUCTS  
NOT PACKAGING**  
(saucepans, automotive parts, pots and pans etc.)

  
**NO CHIP BAGS**  
(or crinkly wrappers)

  
**NO BATTERIES**  
(or hazardous containers)

  
**NO BOOKS**  
soft or hardcover

  
**NO MIXED MATERIALS**  
(bags of garbage, mixed recycling, dirty material)



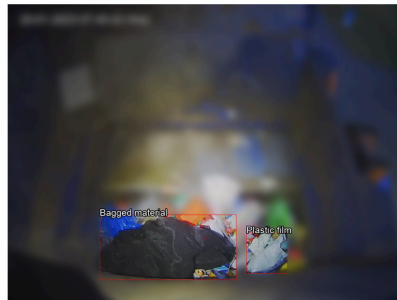


If you are unsure about what goes in your cart check the Waste Wizard. The online look-up tool is available [abbotsford.ca/wastewizard](http://abbotsford.ca/wastewizard) OR scan the code.



**ENGINEERING & REGIONAL UTILITIES**  
 ☎ 604-864-5640 @abbotsford.ca/CRP  
 ✉ [sortyourwaste@abbotsford.ca](mailto:sortyourwaste@abbotsford.ca)

**On January 25th  
we found items in your cart that are  
NOT recyclable!**



✓ **KEEP THESE IN:**

  
**PLASTIC CONTAINERS**  
(jars, pails, pots, clamshells & takeout food containers, etc.)

  
**TAKEOUT DRINK CUPS & LIDS**

  
**PAPER PRODUCTS**  
(party decor, gift bags, gift wrap, boxes, office paper, newspaper, flyers, magazines etc.)

  
**DISPOSABLE HANGERS**

  
**ALUMINUM FOIL & PIE PLATES**

  
**BOX BOARD PACKAGING**

  
**PLASTIC CUTLERY & STRAWS**





If you are unsure about what goes in your cart check the Waste Wizard. The online look-up tool is available [abbotsford.ca/wastewizard](http://abbotsford.ca/wastewizard) OR scan the code.



**ENGINEERING & REGIONAL UTILITIES**  
 ☎ 604-864-5640 @abbotsford.ca/CRP  
 ✉ [sortyourwaste@abbotsford.ca](mailto:sortyourwaste@abbotsford.ca)



## DO YOU KNOW WHAT TO THROW?

We need to **recycle the YES things**  
and **keep the NO things out.**



Scan to find out what's  
recyclable in East Lansing.

**517-337-9459**

[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle)



City of  
**EAST LANSING**  
Home of Michigan State University  
City of East Lansing DPW  
1800 E State Rd  
East Lansing, MI 48823



**Download our  
'Recycle Coach' App!**  
Reminders, alerts, and tips  
on what can be recycled.  
Learn more online or  
download in the app store.



**FLIP OVER  
to see a photo of  
your recycling**



\*\*\*\*\*AUTO\*\*5-DIGIT 23060

Resident Recycler  
12 MAIN ST  
Beverly Hills, CA 90210

## ARE YOU WISHCYCLING?



Scan this **QR code** to make  
sure you are recycling the right  
things and are helping to keep  
recyclables out of the landfill.

**517-337-9459**

[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle)



City of  
**EAST LANSING**  
Home of Michigan State University  
City of East Lansing DPW  
1800 E State Rd  
East Lansing, MI 48823



**Download our  
'Recycle Coach' App!**  
Reminders, alerts, and tips  
on what can be recycled.  
Learn more online or  
download in the app store.



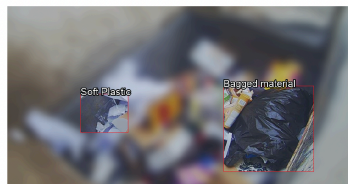
**FLIP OVER  
to see a photo of  
your recycling**



\*\*\*\*\*AUTO\*\*5-DIGIT 23060

Resident Recycler  
10 MAIN ST  
Beverly Hills, CA 90210

**When we emptied your  
recycling into the truck—  
our team noticed these  
“NO” items in your cart.**



## OOPS!

**Please leave these items out  
of your recycling cart!**



**Do Not Bag  
Recyclables**



**No Garbage**



**No Plastic Bags  
or Plastic Wrap  
(return to retailers)**



**No Styrofoam™  
(DPW drop-off  
site only)**



**No Food  
or Liquid  
(empty all containers)**



**No Yard Waste**



[cityofeastlansing.com/recycle](http://cityofeastlansing.com/recycle)  
**517-337-9459**



Digital Education



**PRAIRIE  
ROBOTICS**  
RECYCLING MADE SIMPLE

+

**ReCollect**



# Digital Education



Residents Recycle



IOT  
Platform



Artificial  
Intelligence



Postcards



# Digital Education



Text



Email



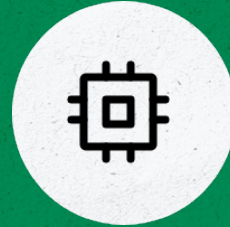
App Notification



Residents Recycle



IOT  
Platform



Artificial  
Intelligence



Postcards



# Digital Education



FORT ST. JOHN  
*The Energetic City*



**32,000+**  
**AUDITS**



# Digital Education



**FORT ST. JOHN**  
*The Energetic City*



**32,000+**  
**AUDITS**



**3,200**  
**WORK HOURS**  
**SAVED**



# Digital Education



**FORT ST. JOHN**  
*The Energetic City*



**32,000+  
AUDITS**



**3,200  
WORK HOURS  
SAVED**



**2,500+  
NOTIFICATIONS  
SENT**



# Digital Education



**FORT ST. JOHN**  
*The Energetic City*



**32,000+  
AUDITS**



**3,200  
WORK HOURS  
SAVED**



**2,500+  
NOTIFICATIONS  
SENT**



**2.9%  
RECYCLE BC  
AUDIT**

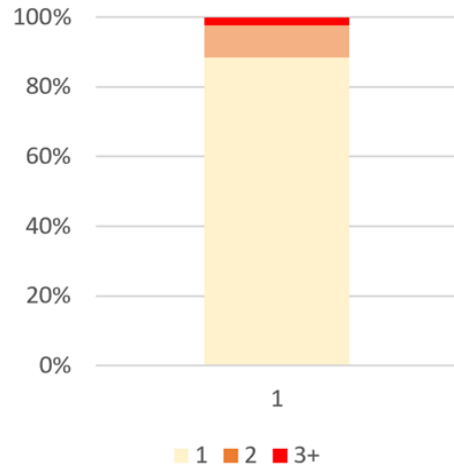


# Digital Education

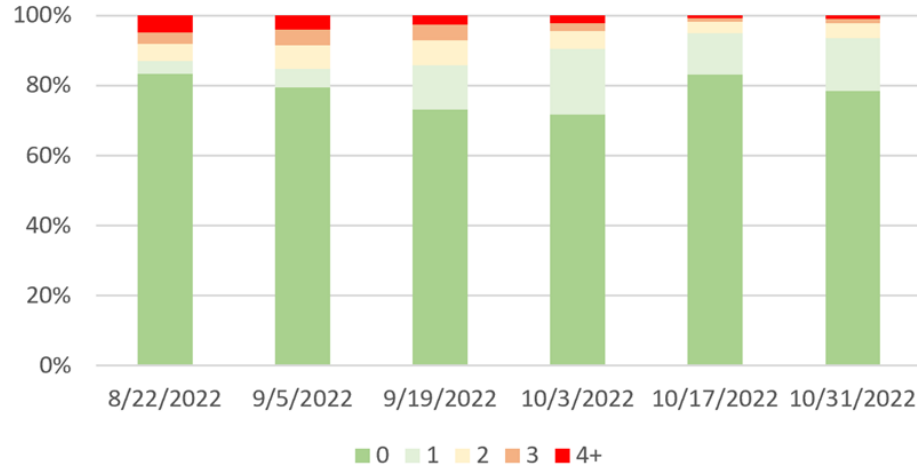


FORT ST. JOHN  
*The Energetic City*

## Repeat Offenders



## Households by Contamination Amount



2.9%  
**RECYCLE BC  
AUDIT**

# Takeaways

**Feedback = Change**



# Takeaways

**Feedback = Change**

**Automation = Personalized Feedback at Scale**



# Takeaways

**Feedback = Change**

**Automation = Personalized Feedback at Scale**

**Personalized Feedback at Scale = High Quality Recycling**





# PRAIRIE ROBOTICS

RECYCLING MADE SIMPLE



Sam Dietrich  
Chief Executive Officer  
[Sam@PrairieRobotics.com](mailto:Sam@PrairieRobotics.com)



# Maximize Citizen Engagement

Peer  
Comparison

1

Neighbourhood  
Impact

2

## What's my impact?

### Your household

Your household had **twice** the amount of contaminants of similar homes.



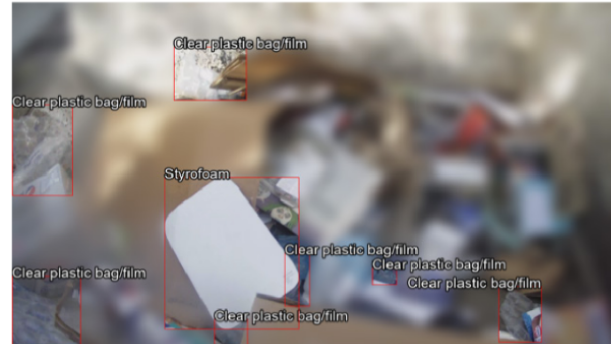
### Your neighbourhood

**200** households in your neighbourhood had perfect audits this collection. The recycling collected is equivalent to saving **1 olympic sized** pool of water!



## How can I improve?

We love that you're recycling! However, on February 15 we noticed some items in your blue cart that don't belong there, they are highlighted them below:



For more information please visit [city.ca/recycling](http://city.ca/recycling), call the Service hotline at 306-777-7000 or scan the QR Code



Online  
Portal

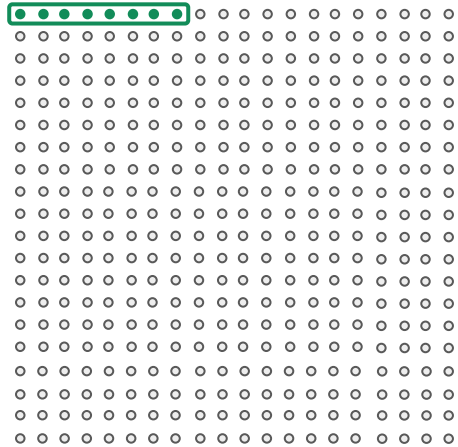
3



## Common Strategy - Manual Cart Audits

1.7%

205,000 audits / year

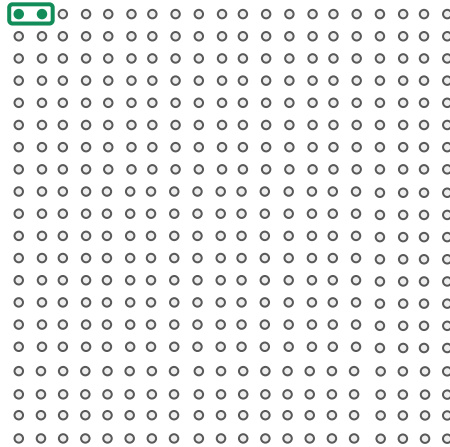


12,110,280 collections / year

Calgary

0.2%

2,000 audits / year

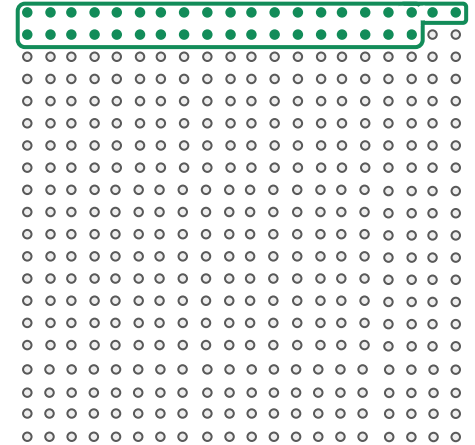


1,019,200 collections / year

Regina

9.5%

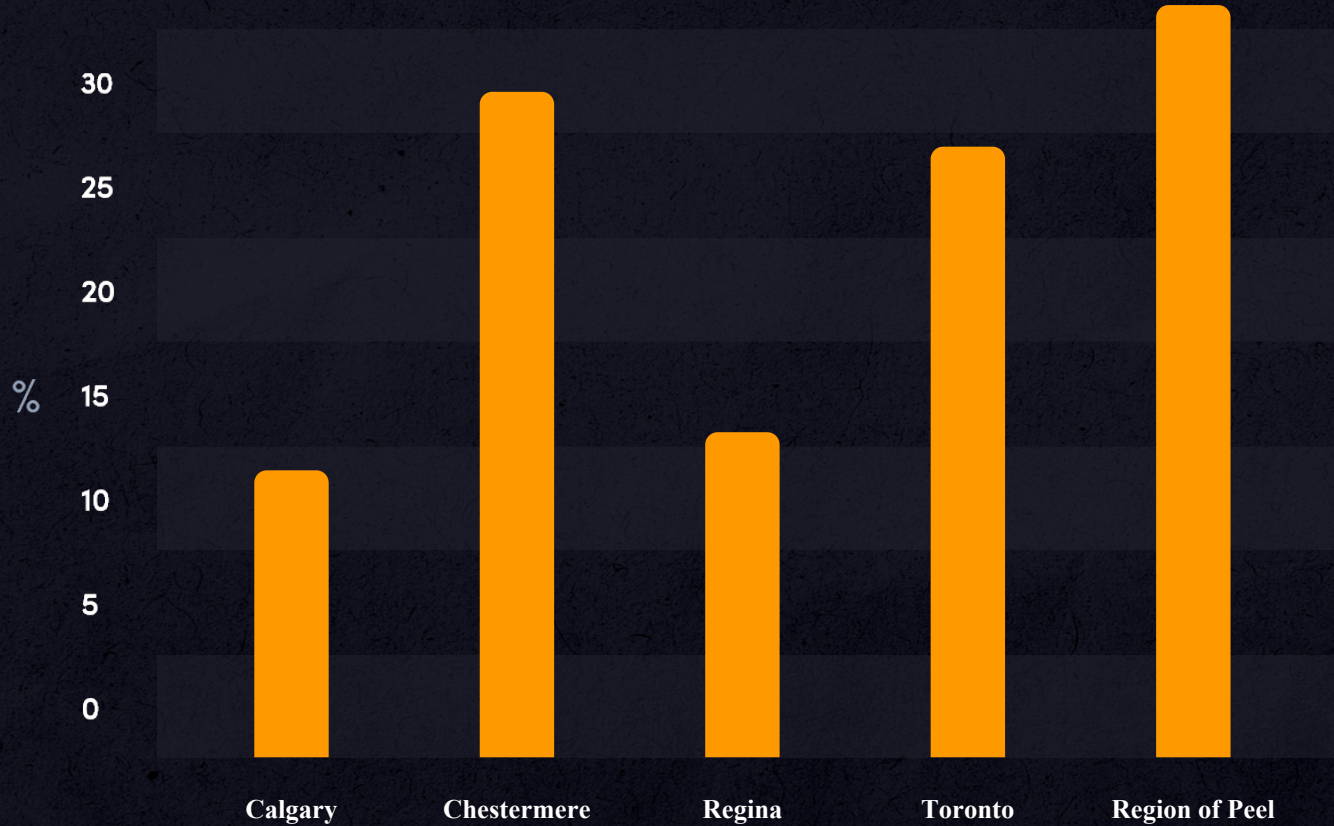
520,000 audits / year



5,460,000 collections / year

Region of Peel

# Contamination

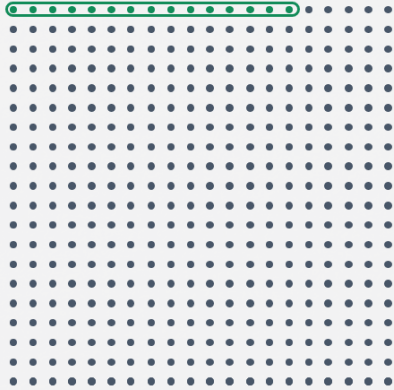




## Common Strategy - Manual Cart Audits

**3.9%**

67,665 audits / year

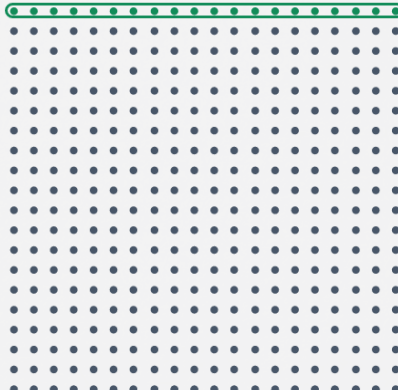


1,693,965 collections / year

**Spokane,  
Washington**

**5.3%**

55,000 audits / year

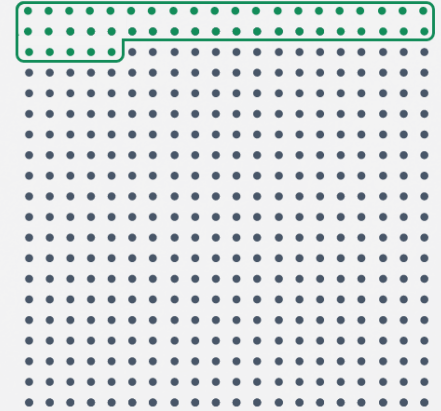


2,771,168 collections / year

**Washtenaw County,  
Michigan**

**13.7%**

148,000 audits / year



399,563 collections / year

**Cuyahoga Falls, Ohio**