THE CORPORATION OF THE TOWNSHIP OF HORTON

TRANSPORTATION & ENVIRONMENTAL SERVICES

June 5th, 2024
8:30 a.m.
Horton Council Chambers
2253 Johnston Rd.

1. Call to Order
2. Declaration of Pecuniary Interest
3. Minutes from Previous Meeting:
   i. April 3rd, 2024 **PG.2**
4. Private Road Grading/Grant Program – Verbal discussion
5. Food Cycler – Information **PG.5**
6. Thompsonhill Cemetery Maintenance – Per Council
7. Re-Use Program at Landfill **PG.34**
8. Landfill Expansion Feasibility Update **PG.36**
9. New/Other Business
10. Next Meeting:
    i. July 3rd, 2024 @ 8:30 a.m.
11. Adjournment

RETURN TO AGENDA

THE CORPORATION OF THE TOWNSHIP OF HORTON

TES Committee Meeting

APRIL 3RD, 2024
8:30 a.m.

There was a meeting of the Transportation and Environmental Services Committee held in the Municipal Chambers on Wednesday April 3rd, 2024. Present was Chair Doug Humphries, Mayor David Bennett and Councillor Tom Webster, and Public Advisory Member Tyler Anderson. Staff present was Public Works Manager, Adam Knapp, and Executive Assistant Nichole Dubeau– Recording Secretary.

1. CALL TO ORDER

Chair Humphries called the meeting to order at 8:30 a.m.

2. DECLARATION OF PECUNIARY INTEREST

There was no declaration of pecuniary interest.

3. MINUTES FROM PREVIOUS MEETING:

- January 15th, 2024

Moved by Tyler Anderson
Seconded by Councillor Webster
THAT the Committee approve the January 15th, 2024 Minutes.

Carried

4. COMMITTEE MEMBER RESIGNATION

Chair Humphries reviewed the report. There was Committee agreeance to keep TES as its own committee and advertise and recruit a new member, or two. Mayor Bennett requested that Chair Humphries reach out to past Committee Member Rick Lester to see if he would be interested in joining again. The Committee thanked Bob Kingsbury for the input and knowledge over the last two years.

Moved by Councillor Webster
Seconded by Tyler Anderson
THAT the TES Committee accept the resignation of Robert Kingsbury effective March 26th, 2024.

Carried

5. MILLENIUM TRAIL STONE DUST

Public Works Manager Adam Knapp reviewed the report.

Moved by Tyler Anderson
Seconded by Councillor Webster
THAT the TES Committee recommend to Council that an upset amount of $3,039.46 be purchased for stone dust as spot repairs on Horton Township's portion of the Millennium Trail;

AND THAT this be funded from the Recreation Reserves.

Carried

6. GICB GRANT APPLICATION

Public Works Manager Adam Knapp reviewed the report. Councillor Webster stated that the Ontario Building Code is being updated and all of the requirements made for Covid-19 are included in the updated version.

7. CURRENT GRANT APPLICATIONS SUBMITTED

Public Works Manager Adam Knapp reviewed the report.

RETURN TO AGENDA

8. 2024 PW PROJECTS & ANNUAL REQUIREMENTS FOR SUSTAINABILITY
Public Works Manager Adam Knapp reviewed the report.

9. AWARD PW 2024-01 SUPPLY OF SCREENED WINTER SAND
Public Works Manager Adam Knapp reviewed the report.

Moved by Tyler Anderson
Seconded by Councillor Webster
THAT the TES Committee recommend to Council to award PW 2024-01, Supply of Screened Winter Sand to McCrea Excavating for the total upset limit of $40,900.00 including HST;

AND THAT this be funded from the 2024 Operating Budget.

Carried

10. AWARD PW 2024-02 SUPPLY AND HAUL OF GRANULAR "M"
Public Works Manager Adam Knapp reviewed the report.

Moved by Councillor Webster
Seconded by Tyler Anderson
THAT the TES Committee recommend to Council to award PW 2024-02, Supply and Haul of Granular "M" to B.R. Fulton Construction Limited for the total upset limit of $55,000 including HST;

AND THAT this be funded from the 2024 Capital Budget.

Carried

11. AWARD PW 2024-03 SURFACE TREATMENT OF VARIOUS ROADS
Public Works Manager Adam Knapp reviewed the report.

Moved by Councillor Webster
Seconded by Tyler Anderson
THAT the TES Committee recommend to Council to award PW 2024-03 Surface Treatment of Various Roads to Greenwood Paving Limited for the total upset limit of $170,000.00 including HST;

AND THAT this be funded from the 2024 Capital Budget.

Carried

12. AWARD PW 2024-04 STREET SWEEPING
Public Works Manager Adam Knapp reviewed the report.

Moved by Tyler Anderson
Seconded by Councillor Webster
THAT the TES Committee recommend to Council to award PW 2024-04, Street Sweeping Services to B.R. Fulton Construction Limited for the total upset limit of $8,000 including HST;

AND THAT this be funded from the 2024 Operating Budget.

Carried

13. STOLEN SPEED SIGN
Public Works Manager Adam Knapp reviewed the report.

Moved by Councillor Webster
Seconded by Tyler Anderson
THAT the TES Committee recommend to Council to purchase a replacement EV-11 Digital Radar Speed Sign and 4 Apple Air Tag Trackers for an upset limit of $5,000 including HST;

AND THAT this be funded from the Roads Equipment Reserve.

Carried

RETURN TO AGENDA

14. NEW/OTHER BUSINESS

Public Works Manager Adam Knapp stated the excavator delivery date has been pushed back to June. He also summarized the purpose and benefits of the Private Road Grant Program. There was committee discussion regarding who in the area would be available to do the work on the roads for residents. Mr. Knapp is to contact local contractor's to see who could be hired by resident's and compile a list for information purposes and inquiries.

15. NEXT MEETING:

i. May 1st, 2024 @ 8:30 a.m.

16. ADJOURNMENT

Chair Humphries declared the meeting adjourned at 9:17 a.m.

CHAIR Doug Humphries

PUBLIC WORKS MGR Adam Knapp

RETURN TO AGENDA

FOODCYCLE SCIENCE

F O O D C Y C L E R ™

MUNICIPAL FOOD WASTE DIVERSION PILOT PROGRAM

Horton Township

RETURN TO AGENDA

Township of Horton
2253 Johnston Road
Renfrew, ON K7V 3Z8
613-432-6271

Thursday, April 18, 2024

The FoodCycler™ Food Waste Diversion Municipal Pilot Program

Dear Township of Horton Staff and Council,

Thank you for your interest in food waste diversion in your community. Food Cycle Science (FCS) is an organization born from the alarming fact that 63% of food waste is avoidable and responsible for about 10% of the world's greenhouse gas emissions. FCS has developed an innovative solution that reduces food waste in landfills, takes more trucks off the road, reduces infrastructure and collection costs, and contributes to a 95% reduction in CO2E compared to sending food to landfills. We deploy our patented technology to households around the world, helping them take ownership of their food waste and environmental impact.

In partnering with municipalities, we are committed to creating accessible food waste solutions for all people and changing the way the world thinks about food waste. The purpose of the FoodCycler™ Pilot Program is to measure the viability of on-site food waste processing technology as a method of waste diversion. By reducing food waste at home, you can support your environmental goals, reduce residential waste, reduce your community's carbon footprint, and extend the life of your community's landfill(s).

Based on several factors, we believe the Township of Horton would be a great fit for the benefits of this program, and we are proposing a study involving 50 households in the Township of Horton.

The **FoodCycler FC-30** and **Eco 5** devices can process 2.5 L and 5 L (respectively) of food waste per cycle and converts it into a nutrient-rich by-product that can be used to enrich your soil. Power consumption per cycle is ~0.8 kWh (FC-30) / ~1.3 kWh (Eco 5) and takes less than 8 hours to complete (overnight).

Every FoodCycler deployed is estimated to divert at least 2 tonnes of food over its expected lifetime. Based on market rates of $100 per tonne of waste (fully burdened), 50 households participating would divert 100 tonnes of food waste and save the municipality an estimated $10,000.00 in costs. Please note that this analysis is based on market rates and depending on remaining landfill lifespan and closure costs, local rates for waste disposal may vary.

Every tonne of food waste diverted from landfill is estimated to reduce greenhouse gas emissions by 1.5 tonnes of CO2e before transportation emissions. Based on this, 50 households could divert approximately 150 tonnes of greenhouse gas emissions.

Food Cycle Science is excited to have you on board for this exciting and revolutionary program. The FoodCycler™ Municipal Solutions Team is always available to answer any questions you might have.

Warm regards,

The FoodCycler™ Municipal Team

RETURN TO AGENDA

Impact Canada/AAFC Food Waste Reduction Challenge

Food Cycle Science is a finalist of Impact Canada's Food Waste Reduction Challenge, which is a three-stage initiative from the Government of Canada through Agriculture and Agri-Food Canada to support business model solutions that prevent or divert food waste at any point from farm to plate. FoodCycler has been chosen as a finalist for our project titled: "Residential On-Site Food Waste Diversion for Northern, Rural, and Remote Communities".

The challenge objectives and assessment criteria are for solutions that:

1. **Can measurably reduce food waste** – in dollars and metric tonnes;
2. **Are innovative and disruptive to the status quo** – the old way of doing business is out;
3. **Are ready to scale up** – it is time to deploy high-impact and wide-reaching solutions across the Canadian food supply chain;
4. **Have a strong business case** – there is a demand for your solution;
5. **Make a difference to our communities** – creating jobs and increasing access to safe, nutritious, and high-quality food is a priority; and,
6. **Improve our environment** – reducing food waste means shrinking our GHG footprint and conserving natural resources.

As a finalist, Food Cycle Science is the recipient of a $400,000 grant that is being 100% redistributed to our Canadian municipal partners in support of their FoodCycler initiatives and pilot programs. Based on several factors, FoodCycler believes the Township of Horton would be an ideal *"Implementation Partner"* for this stage of the challenge and we are proposing a study involving 50 households in the Township of Horton, wherein Food Cycle Science will contribute a portion of this grant money towards offsetting the costs of your program.

More information can be found here: https://impact.canada.ca/en/challenges/food-waste-reduction-challenge

As of the date of this proposal, there are a total of 130 Canadian municipalities who have signed on to participate in a FoodCycler program. Through this partnership, the Township of Horton can achieve immediate and impactful benefits, acquire valuable insight about food waste diversion in your region, and showcase itself as an environmental leader and innovator in Canada.

Food Cycle Science is looking to achieve the following through this proposed partnership:

- Receive high-quality data from pilot program participants regarding food waste diversion
- Receive high-quality feedback from residents, staff, and council regarding the feasibility of a FoodCycler food waste diversion program for the Township of Horton and similar communities
- Demonstrate the viability of our technology and solutions in a municipal setting so the model can be re-deployed in other similar communities in Canada
- Demonstration of a program regarding food waste diversion in small/rural Canada to support Phase 3 of Impact Canada's Food Waste Reduction Challenge

The Township of Horton would receive several benefits through this partnership:

- Opportunity to trial a food waste diversion solution at a cost well below market prices utilizing federal funding intended for food waste reduction in our country
- Reduced residential waste generation thus increasing diversion rates
- Reduced costs associated with waste management (collection, transfer, disposal, and landfill operations)
- The reduction of greenhouse gas (GHG) emissions from transportation and decomposition of food waste in landfills
- Extend the life of your landfill(s)
- Opportunity to support Canadian innovation and clean tech
- Opportunity to provide residents with an innovative solution that reduces waste and fights climate change, at an affordable price
- Obtaining data that could be used to develop a future organic waste diversion program

Residents of the Township of Horton would receive several benefits through this partnership:

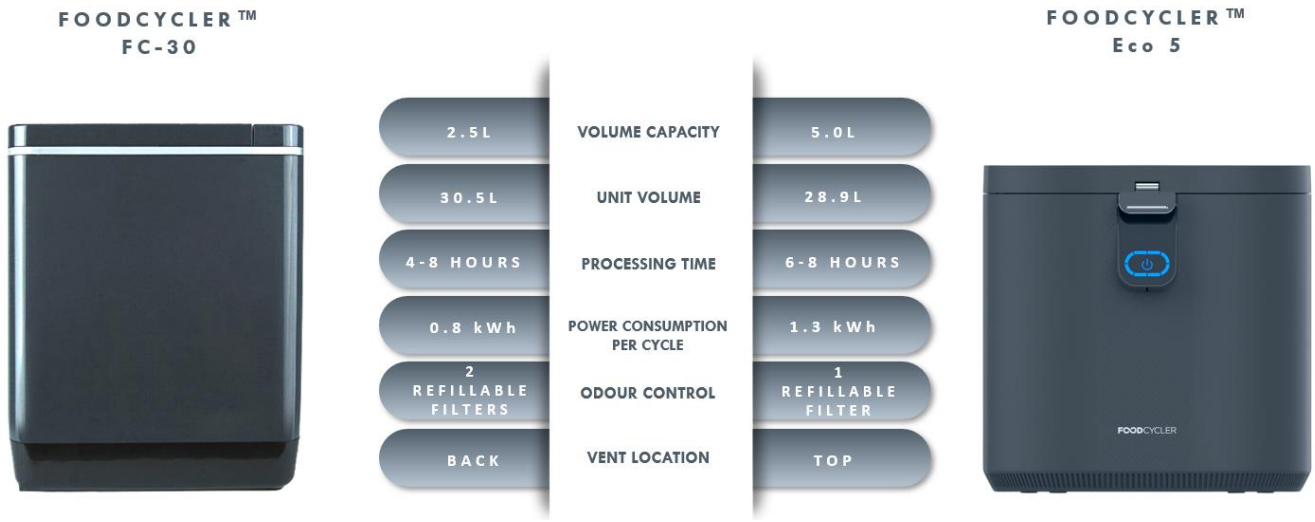
- Opportunity to own an at-home food waste diversion solution at a cost well below market prices
- Support climate change goals by reducing waste going to landfill
- Ability to fertilize their garden soil by generating a nutrient-rich soil amendment
- Reduce the "ick factor" of garbage to keep animals and vermin away
- Reduce trips to the waste site and save on excess waste fees where applicable

In the pages that follow, we will offer a pilot program recommendation for consideration.



The FoodCycler Product Family

The FoodCycler product family offers closed-loop solutions to food waste, with zero emissions or odours. This sustainable process reduces your organic waste to a tenth of its original volume. Small and compact, FoodCycler products can fit anywhere. They operate quietly and efficiently, using little energy.



Recycle Your Food Waste in 3 Easy Steps

Step 1:

Place your food waste into the FoodCycler™ bucket. The FoodCycler™ can take almost any type of food waste, including fruit and vegetable scraps, meat, fish, dairy, bones, shells, pits, coffee grinds and filters, and even paper towels.

Step 2:

Place the FoodCycler™ bucket into your FoodCycler™ machine. The FoodCycler™ machine can be used anywhere with a plug such as a kitchen countertop, basement, laundry room, heated garage, etc.

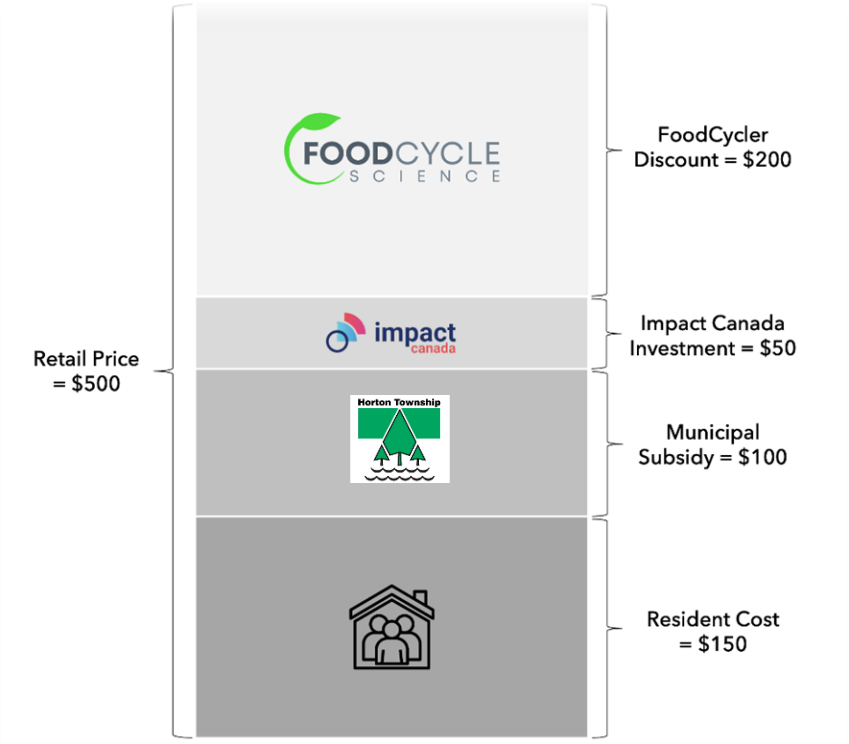
Step 3:

Press Start. In 8 hours or less, your food waste will be transformed into a nutrient rich soil amendment that can integrated back into your soil. The cycle runs quietly and with no odours or GHG emissions.

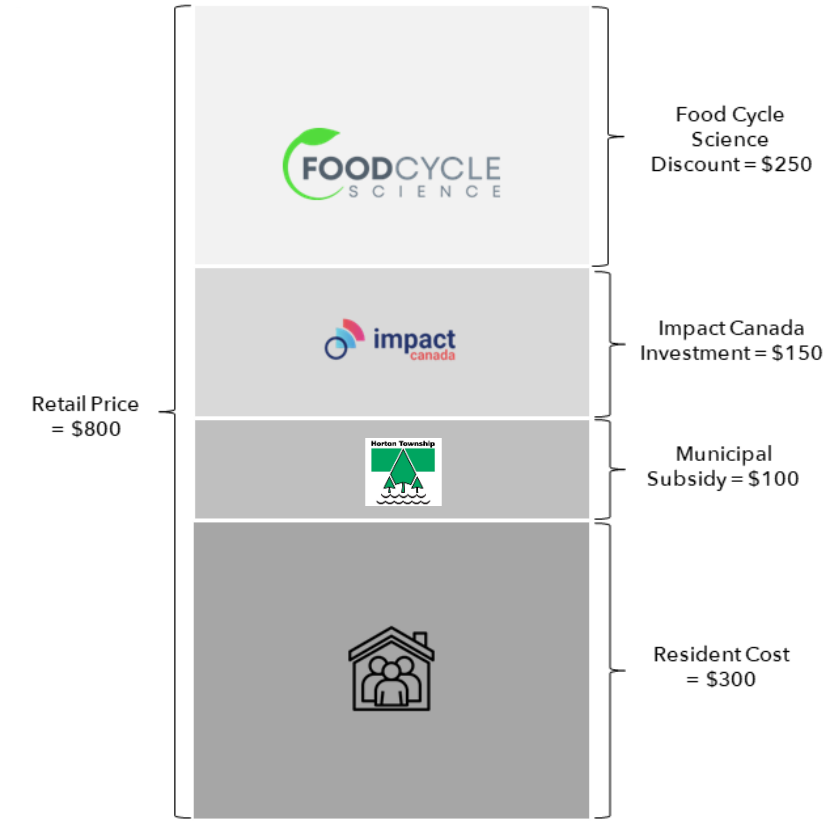
RETURN TO AGENDA

FoodCycler Funded Pilot Program – Subsidy Model

FoodCycler FC-30



FoodCycler Eco 5



RETURN TO AGENDA

FoodCycler Funded Pilot Program

Recommendation and Details

Based on the demographics and current waste management system in place at the Township of Horton, Food Cycle Science is recommending a pilot program involving 50 households.

The funded pilot program is based on a cost subsidy model where Food Cycle Science provides an initial discount, we contribute an investment from AAFC/Impact Canada, the Township of Horton provides a subsidy, and the resident provides the remaining contribution. The purpose of this model is to make this technology accessible to more Canadians at an affordable price.

The total investment from AAFC/Impact Canada for a 50 household pilot would amount to **$5,000.00**[1]. The funding period for AAFC/Impact Canada ends when all funding has been fully allocated, or by December 31st 2024.

Through this partnership-based program, the **municipal investment for Township of Horton is $100.00 per household**, regardless of which device is selected. Residents will then have the option to choose the FoodCycler™ model that best suits their household and budget.

Each FoodCycler™ is estimated to divert at least 2 tonnes of food over its expected lifetime. Based on average market rates of $100 per tonne of waste (fully burdened), 50 households participating would divert 100 tonnes of food waste and save the municipality an estimated **$10,000.00** in costs.

Total Invoiced Amount

	Price	Quantity	Total
FoodCycler FC-30 Municipal Rate	$250	25	$6,250
FoodCycler Eco 5 Municipal Rate	$400	25	$10,000
Shipping Estimate			$425
Total Invoice Amount			**$16,675**

Plus applicable taxes.

Net Municipal Cost:

	Price	Quantity	Total
Total Invoice Amount			$16,675
Less Resident Resale: FC-30	$150	25	$-3,750
Less Resident Resale: Eco 5	$300	25	$7,500
Net Municipal Cost			**$5,425**

Plus applicable taxes.

Volume Discount: Orders of 500 total units or more are eligible to receive an additional $50.00 per unit discount on the FoodCycler Eco 5. If applicable, this discount is automatically calculated in the pricing shown above. The Municipality shall maintain a minimum of $100.00 per household subsidy, thus passing on these savings directly to residents, reducing the resident contribution on the Eco 5 to $250.00.

[1] Based on an estimated 50/50 split between FC-30 and Eco 5s. Will vary depending on the quantity of FoodCyclers purchased and the model ultimately selected by residents.

Purchase and Program Terms

Confirmation Deadline: Confirmation of order (Council resolution and/or signed partnership agreement) to be received no later than June 1, 2024.

Price Guarantee: Food Cycle Science will honour these rates on subsequent orders of 50 units or more, placed within the 2024 calendar year.

Shipping: Shipping estimates to your location may range from $350.00 – $500.00 and the $425.00 quoted is an estimated average based on today's shipping rates. The Municipality may choose the shipping option that best suits their budget and needs. The higher cost shipping options will generally provide superior shipping accuracy.

FoodCycler Model Selection: During a registration period, residents will be given the option to indicate their preferred FoodCycler model. The total allotment of each FoodCycler model can be either predetermined or determined by resident selection.

Payment Terms: Payment is 100% due upon receipt of goods.

Accessories: Additional filters and other accessories may be purchased from FoodCycler at wholesale rates for resale to residents under the pilot program with no additional freight cost provided they are included in the initial order.

- **RF-35 Replacement Filter Pack (Refillable)**: Includes 2 refillable filter cartridges with carbon included, good for 1 filter change. One-time purchase only to convert to the refillable system. May be purchased at a price of $22.12 + tax in increments of 18.
- **RC-35 Carbon Filter Packs**: Includes 8 carbon packets, good for 4 filter changes. Compatible only with RF-35 refillable filter system. May be purchased at a price of $50.00 + tax in increments of 9.
- **RC-104 Carbon Filter Packs**: Includes 4 carbon packets, good for 4 filter changes. Compatible only with the Eco 5 refillable filter system. May be purchased at a price of $50.00 + tax in increments of 9.
- **BK-30 Spare Buckets:** May be purchased at a price of $50.00 + tax in increments of 6.
- **BK-100 Spare Buckets for Eco 5:** May be purchased at a price of $80.00 + tax in increments of 4.
- **RF-30 Replacement Filter Pack**: Includes 2 disposable filter cartridges with carbon included, good for 1 filter change. May be purchased at a price of $22.12 + tax and must be purchased in increments of 20.

Warranty: 1-year standard manufacturer's warranty starting on date of delivery of all FoodCycler units to the Township of Horton. We will repair or replace any defects during that time. Extended warranties may be purchased at additional cost of $25.00 per year for up to 5 years.

Buyback Guarantee: Food Cycle Science will buy back any unsold units after a period of 1 year from the delivery date. All units must be in new and unopened condition. The municipality is responsible for return shipping to our warehouse in Ottawa, ON plus a $25.00/unit restocking fee.

Marketing and Promotion: The Township of Horton and Food Cycle Science mutually grant permission to use the name and/or logo or any other identifying marks for purposes of marketing, sales, case studies, public relations materials, and other communications solely to recognize the partnership between Food Cycle Science and the Township of Horton. The Township of Horton staff may be asked to provide a quote / video testimonial regarding the program.

Surveys / Tracking:

- The trial / survey period will be for 12 weeks starting on or before July 1, 2024.
- Residents will be asked to track weekly usage of the FoodCycler during each week of the trial. Tracking sheets will be provided as part of a Resident Package prepared by Food Cycle Science.
- At the end of the 12 weeks, residents must report their usage and answer a number of survey questions. Survey is to be provided by Food Cycle Science and approved by the Township of Horton.
- The survey is to be administered either by the Township of Horton or by Food Cycle Science, by request and with permission. All survey results are to be shared between the Township of Horton and Food Cycle Science. The Township of Horton shall ensure all personal information of participants is removed from any data ahead of sharing with Food Cycle Science.
- The Township of Horton may administer additional touchpoints with participants at their discretion.

Final Report and Feasibility Study: Food Cycle Science will prepare a final report summarizing program performance including waste diversion, potential for expansion, and other factors deemed relevant by the Township of Horton. To facilitate this, the Township of Horton may be called upon to provide data regarding disposal and transportation costs, landfill capacity, and other region-specific variables crucial for evaluating the viability of implementing FoodCyclers within the municipality.

Customer Support / Replacement Units:

- Food Cycle Science has a dedicated municipal support team that is available to assist residents directly with any troubleshooting, repairs, or replacement when required.
- Food Cycle Science may provide a small number of spare FoodCycler units with the initial order to be used for replacements if/when required. The Township of Horton would be tasked with assisting residents with replacements where necessary. Replacement units will be supplied at no cost to the municipality and may represent up to 2% of the total initial order. This represents our anticipated/accepted failure rates.
    - Any unused spare units remaining after the warranty period shall be donated to a local school, with priority given to schools participating in EcoSchools Canada programs.

Summary and Acceptance of Terms

We respectfully ask that you confirm your participation no later than June 1, 2024 in order to respect the timeline of the Impact Canada Food Waste Reduction Challenge.

Summary of pilot program costs:

Program Recommendation	Invoice Amount	→	Net Municipal Cost
50 Households	$16,675	→	$5,425

Terms Accepted and Agreed by Township of Horton:

_____	_____
Name / Title	Name / Title
_____ _____	_____ _____
Signature Date	Signature Date

Food Cycle Science looks forward to working with the Township of Horton to reduce the amount of food waste going to landfill in a manner that is convenient and cost-effective.

Sincerely,

Jacob Hanlon
Municipal Solutions Manager
jacobh@foodcycler.com | +1 613-316-4094

Food Cycle Science Corporation
371A Richmond Road, Suite #4
Ottawa, ON K2A 0E7
www.foodcycler.com

FOODCYCLE SCIENCE

FOODCYCLER™

MUNICIPAL SOLUTIONS

The Future of Food Waste.

RETURN TO AGENDA

ABOUT US
Food Cycle Science

- **Canadian company** based out of Ottawa, ON
- Founded in Cornwall in 2011 – Company is 100% focused on **Food Waste Diversion Solutions**
- Products available in North America through **FoodCycler Municipal** / **Vitamix** and internationally through network of distributors & OEM partners
- **Finalists** in Impact Canada/AAFC's **Food Waste Reduction Challenge**
- **Globe & Mail** Canada's **Top Growing Companies** (2021 & 2022)
- **Deloitte Fast 50 CleanTech** award winners (2021)
- **Approved supplier** with Canoe Procurement Group of Canada

OEM
SOLUTIONS
MUNICIPAL
SCHOOLS

130
Municipal Partnerships Across Canada

canoe APPROVED SUPPLIER
Deloitte. Technology Fast50
Canada
impact canada
Sobeys
fieldless
BGIS
THE OUTDOOR LEARNING STORE
OUTDOORLEARNINGSTORE.COM
ecoschools écoécoles CANADA

RETURN TO AGENDA

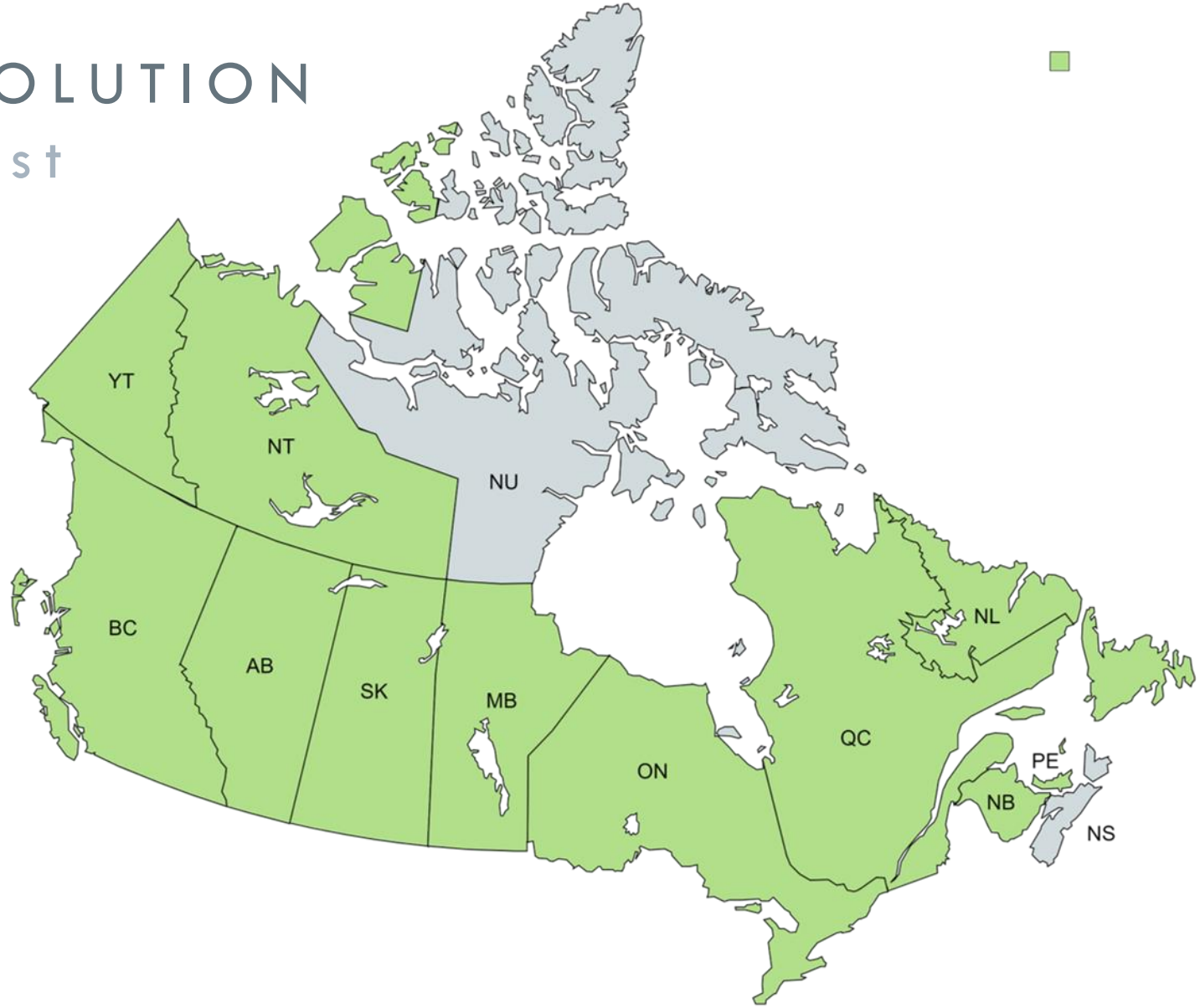
TRUSTED CANADIAN SOLUTION

Coast to Coast to Coast

130

Canadian Municipal Partnerships

- 9 Provinces
- 2 Territory



RETURN TO AGENDA

THE PROBLEM – FOOD WASTE

- **63%** of food waste is avoidable
- Household waste is composed of **25-50%** organic waste
- Food waste weight is up to **90%** liquid mass (which is heavy)
- The average Canadian household spends **$1,766** on food that is wasted each year
- Each year food waste in Canada is responsible for **56.6 Million tonnes of CO2** equivalent of GHG

RETURN TO AGENDA

MUNICIPAL IMPACT

Waste is a municipal responsibility

LANDFILL + WASTE COSTS

- ~**25-50%** of household waste is organic waste
- Landfills are filling up fast, creating cost and environmental issues
- Hauling, transfer, and disposal services are a major cost factor and environmental contributor

ENVIRONMENT

- Landfilled organic waste produces methane, which is **25 times** more harmful than CO2
- 1 tonne of food waste is equivalent to 1 car on the road for one year

COMMUNITY

Food in the garbage:

- More frequent collection or trips to the disposal site
- Unpleasant odours
- Animals, pests & other visitors

Removing food waste from garbage:

- Volume is reduced by up to 50%
- Less frequent collection, fewer trips to disposal site, save on bag tags
- Keeps odours out, makes garbage much less “interesting” for animals

RETURN TO AGENDA

HAVEN'T WE SOLVED THIS ALREADY?

GREEN BINS

- Major **capital expenditure** to invest in **processing & collection infrastructure**
- **Contamination** is an ongoing challenge
- **GHG emissions** and **safety concerns** from collection vehicles
- **Participation rates** are often lower than desired, particularly in **multi-residential dwellings**

BACKYARD COMPOST

- **Space, ability,** and **know-how** are limiting factors
- Most users **do not compost in winter** or inclement weather
- May **attract pests/animals** or create unpleasant **odors**
- **Participation rates** are relatively low and stagnant
- Can produce **methane** if done incorrectly

LANDFILL

- **Easiest solution** and often perceived as the most cost-effective in the short term
- Waste is typically **out of sight and out of mind** for consumers
- High levels of GHG emissions, particularly **methane**
- Long-term **environmental hazard** requires monitoring / maintenance
- **Landfill capacity** is quickly running out

RETURN TO AGENDA

THE SOLUTION? THE FOODCYCLER

RETURN TO AGENDA

THE FOODCYCLER PRODUCT FAMILY

FOODCYCLER ™ FC-30		FOODCYCLER ™ Eco 5
2.5L	VOLUME CAPACITY	5.0L
30.5L	UNIT VOLUME	28.9L
4-8 HOURS	PROCESSING TIME	6-8 HOURS
0.8 kWh	POWER CONSUMPTION PER CYCLE	1.3 kWh
2 REFILLABLE FILTERS	ODOUR CONTROL	1 REFILLABLE FILTER
BACK	VENT LOCATION	TOP

RETURN TO AGENDA

90% FOOD WASTE REDUCTION

Full bucket of wet,
smelly food waste

2.5L / 5L

4-8 HOURS
(Overnight)

0.8-1.5 kWh
(Equivalent to a laptop)

$0.10-$0.15 per cycle
($2-4 per month)

Handful of dry, sterile, odourless
& nutrient-rich by-product

100 g / 200 g

RETURN TO AGENDA

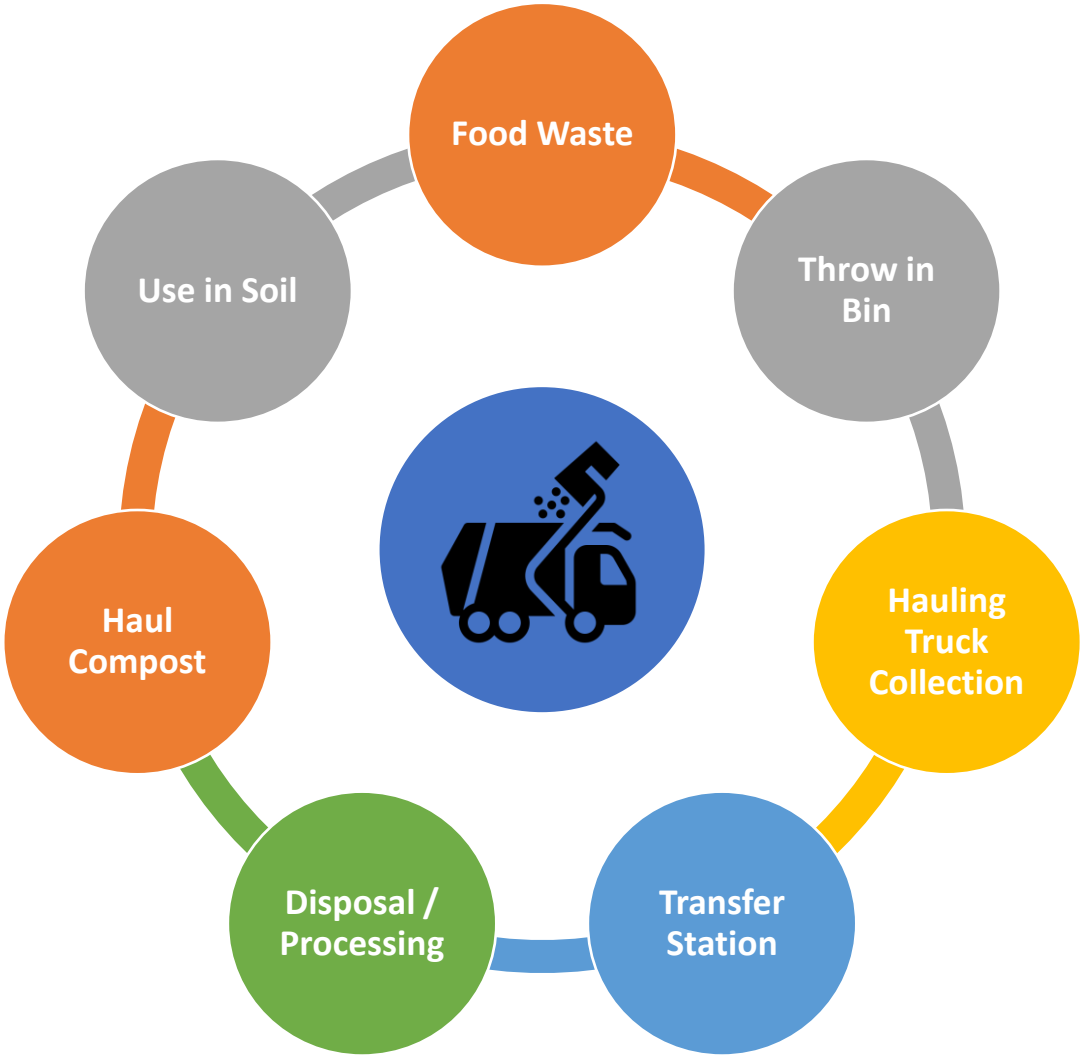
FOODILIZER™: BENEFICIAL USES

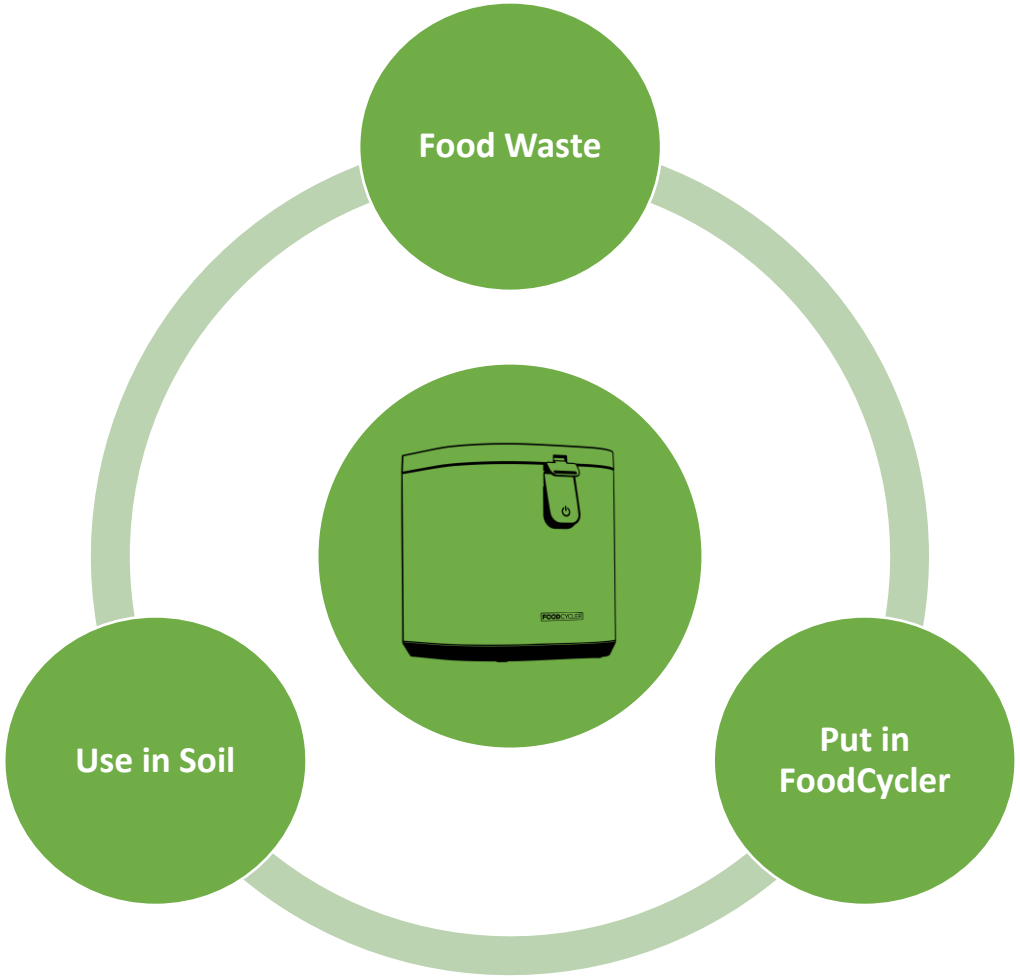
The FoodCycler by-product is a dry, sterile, odourless and nutrient-rich biomass with many beneficial uses and practical applications:

- Add to garden soil
- Add to backyard composter/tumbler/green cone
- Integrate to existing Leaf & Yard waste systems
- Pelletize/briquette as home heating alternative
- Drop off at compost site
- Drop off to a local farm
- Drop off to a community garden
- Add to Green Bin (where available)

RETURN TO AGENDA

IMPACT: ECONOMIC





Traditional Waste Management

RETURN TO AGENDA

FoodCycler

IMPACT: PRESSURE
Regulatory + Social

THE TIME IS NOW

- Constituents want **solutions** to reduce their environmental impact
- Waste is perceived as a government problem and **regulations** are coming
- Food waste is "low-hanging fruit" to achieving higher **diversion** and addressing the environmental impact of waste

"I've received a number of positive messages from residents saying, "sign me up, where can I get mine." I'm 100 per cent in favor of it."

Deputy Mayor Lyle Warden, (South Glengarry ON)

"We were extremely happy with this program and loved that it made us aware of our daily waste."

Pilot participant in South Glengarry

"It's a great tool to reduce household waste. Appreciate that the municipality is being innovative and piloting different solutions."

Pilot participant in Hornepayne

"It alleviates a lot of the concerns that people might have with backyard composting. The time commitment, the location, pests and animals..."

Kylie Hissa, Strategic Initiatives Officer (Kenora, ON)

RETURN TO AGENDA

THE FOODCYCLER PILOTS

The results are in.

Completed pilots in:

10,000+
Households

100+
Municipalities

Participation Rate **98%**

- 98% of pilot participants will continue using the FoodCycler after the pilot period

Recommendation Rate **96%**

- 96% of users would recommend the FoodCycler to friends/family/neighbours

User Experience Rating **4.6/5**

- 4.6 out of 5 star rating for the overall user experience of the FoodCycler

Net New Diversion **300 kg**

- Each participating household is estimated to divert approximately 300 kg of food waste per year

Awareness + Prevention **77%**

- 77% of pilot participants resolved to waste less food as a result of increased awareness

RETURN TO AGENDA

PILOT PROGRAM

12 Weeks from Start to Finish

PILOT TIMELINE

START	12 WEEKS	END	NEXT STEPS
Residents purchase FoodCycler at a subsidized rate from Municipal Office (or other designated location)	Participants use the unit for a period of 12 weeks. Number of cycles per week are tracked to estimate total diversion achieved.	Participants fill out an exit survey, providing their review of the program and any other feedback. Survey results used to evaluate program success.	Tailored program design and implementation. Grants may be available, with support from Food Cycle Science.

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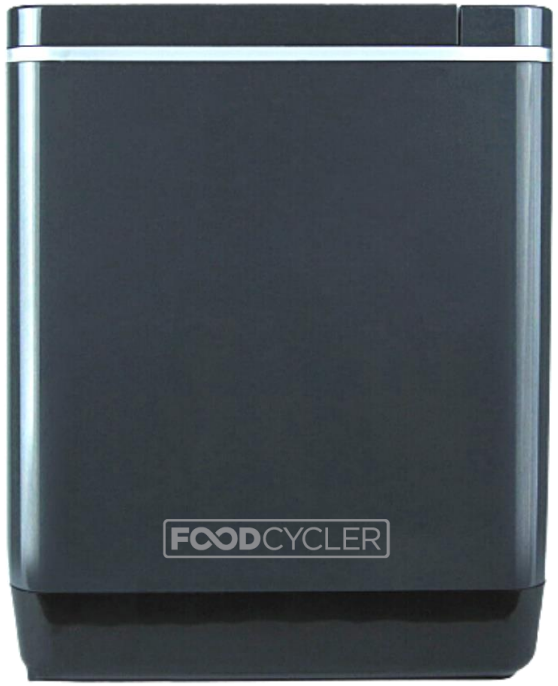
FUNDED PILOT PROGRAM OPTIONS

Municipal Subsidy Model



FOODCYCLER ™
FC-30

$500	RETAIL PRICE	$800
-$200	MUNICIPAL DISCOUNT	-$250
-$50	FEDERAL FUNDING	-$150
$100 *	MUNICIPAL SUBSIDY	* $100
$150	RESIDENT COST	$300

FOODCYCLER ™
Eco 5

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FUNDED PILOT PROGRAM OPTIONS

Pilot Scope Recommendations

Municipality Population	Pilot Scope	Municipal Investment
< 2,500 Residents	50 Households	$5,000
2,500 – 10,000 Residents	100 Households	$10,000
10,000 – 20,000 Residents	200 Households	$20,000
> 20,000 Residents	250+ Households	$25,000+

- **Plus shipping costs and applicable taxes**

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PARTNERSHIP BENEFITS

Why pilot with us?

- Opportunity to trial a food waste diversion solution at a **cost well below market prices**
- Immediate impact of reduced residential waste volumes thus **increasing diversion rates**
- **Reduced costs** associated with waste management (collection, transfer, disposal, and landfill operations)
- The **reduction of greenhouse gas** (GHG) emissions from transportation and decomposition of food waste in landfills
- Extend the **life of your landfill**(s)
- Opportunity to support **Canadian innovation** and clean tech
- Opportunity to provide **residents** with an innovative solution that reduces waste and fights climate change, at an affordable price
- Obtaining **data** that could be used to develop a **future organic waste diversion program**

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Next Steps:

- Receive presentation as information.
- If interested in partnering, refer to Staff for a recommendation to Council.

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FOODCYCLE SCIENCE

THANK YOU!

ANY QUESTIONS?

Jacob Hanlon

Municipal Solutions Manager

Email: jacobh@foodcycler.com

Phone: 613-316-4094

The Municipal Solutions Team

municipal@foodcycler.com

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Horton Township

Township of Horton
COUNCIL / COMMITTEE REPORT

Title: Re-Use Program at the Landfill	**Date:**	**June 5th 2024**
	Council/Committee:	**TES**
	Author:	**Adam Knapp, Public Works Manager**
	Department:	**Environmental Services**

RECOMMENDATIONS:

THAT the TES committee recommend that Council direct Staff to explore what is required for the Township to implement a donation and re-use program at the Township's Landfill site (LFS).

AND THAT if the Ministry of Environment Conservation and Parks will allow the Township to implement this program under the current ECA that the program be implemented as soon as practicable.

FURTHER THAT if the Ministry of Environment Conservation and Parks will not allow the Township to implement this program under the current ECA that the program be implemented included in the revised ECA for the landfill expansion and be implemented as soon as practicable afterward.

BACKGROUND:

The City of Cornwall has implemented a similar program that allows Cornwall residents to drop off and pick up gently used items like furniture, tools, reusable renovation materials, etc. These items are set up in a sea-can container depot at the landfill and are free for anyone to take and re-use. The city's program encourages residents to donate their used items, where possible, to local thrift stores, many of which support non-profit organizations. Staff believe that any diversion and re-use program that can extend the lifecycle of the LFS must be explored. Any minimal amount diverted is beneficial and if residents can re-use items it is a win – win situation. Staff propose using the old cardboard storage building as the staging area for the re-use items, making it the first stop for users to donate or explore.

Below are links to the City of Cornwall's Facebook page and Waste management website for more details on their program.

https://www.facebook.com/groups/cornwallfreestore/

https://www.cornwall.ca/en/live-here/waste-management-facilities.aspx

ALTERNATIVES:

N/A

FINANCIAL IMPLICATIONS:

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N/A

ATTACHMENTS:

N/A

CONSULTATIONS:

N/A

Prepared by: Adam Knapp, Public Works Manager

Reviewed by: Hope Dillabough, CAO/Clerk

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Township of Horton
COUNCIL / COMMITTEE REPORT

Title:	Date:	June 5th 2024
Landfill Expansion Feasibility Study Update	Council/Committee:	TES
	Author:	Adam Knapp, Public Works Manager
	Department:	Environmental Services

RECOMMENDATIONS:

THAT the TES committee receive this report as information pertaining to the current status of the expansion feasibility study.

BACKGROUND:

The Township has been in the process of applying for an expansion of the current landfill site since 2020. The attached report is the Ministry of Environment Conservation and Parks response to the submitted Biennial Operations Report and Feasibility Study Update Letter submitted by JP2G on the Township's behalf. There is no current timeline on approval of the application although all indicators are positive that the expansion shall move forward as proposed.

ALTERNATIVES:

N/A

FINANCIAL IMPLICATIONS:

Unknown at this time.

ATTACHMENTS:

TS GW Memo 2021-2022 BMR and Feasibility Study

CONSULTATIONS:

Kevin Mooder MCIP, RPP – JP2G Consultants Inc.

Prepared by: Adam Knapp, Public Works Manager

Reviewed by: Hope Dillabough, CAO/Clerk

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Ministry of the Environment, Conservation and Parks
Eastern Region
1259 Gardiners Road, Unit 3
Kingston ON K7P 3J6
Phone: 613.549.4000
or 1.800.267.0974

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Région de l'Est
1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974

Ontario

M E M O R A N D U M

April 12, 2024

TO: Thandeka Ponalo
Senior Environmental Officer
Ottawa District Office
Eastern Region

FROM: Nick Battye
Hydrogeologist
Technical Support Section
Eastern Region

RE: Biennial Operations Report and Feasibility Study Update Letter, Horton WDS, 2082 Eady Road, Township of Horton, Ontario

I have reviewed the following documents:

- 2021-2022 Biennial Operations Report, Horton Landfill Site – ECA No. A412505, Township of Horton. Jp2g Consultants Inc. April 25, 2023.
- Horton Landfill Site, Expansion Feasibility Study, ECA No. A412505. Jp2g Consultants Inc. August 8, 2023.

A summary of the pertinent information is provided below, along with my comments and recommendations on the groundwater aspects.

Environmental Compliance Approval

The Horton Waste Disposal Site (WDS) is located approximately 5 km north of the Town of Renfrew at 2082 Eady Road on Lot 17, Concession 6, in the Geographic Township of Horton. It is owned and operated by the Corporation of the Township of Horton under ECA No. A412505, which approves a 2.5 ha landfilling area on a total Site area of 20.24 ha. The Site has been licensed for non-hazardous solid municipal waste disposal since 1976 as a natural attenuation WDS. Landfilling is currently conducted using the "area fill" method; however, up until 1998 the "trench and fill" method was used. Previous volumetric expansions of the Site were approved in 1998 and 2011, which allowed increases of 36,100 m^3 and 39,900 m^3, respectively. The currently approved volumetric capacity of the Site is 120,020 m^3, excluding final cover. Based on a November 4, 2022, survey, the remaining capacity was estimated at approximately 15,000 m^3, which is expected to be reached in roughly 7.5 years (~2030). It was reported that final cover has been applied to the western portion of the waste mound; however, this area was not identified in the provided figures.

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Physical Setting

The Site is in a rural area, bordered by Eady Road to the southwest, a large wetland complex to the northeast, and wooded lands to the southeast and northwest. In the northern part of the Site, topography slopes toward the northeast, but in the southern part of the Site, it slopes southeast. The wetlands, located east of the Site, are reported to form the head waters of Barr Creek. Coupled with an unnamed tributary to the south, both water bodies flow east and discharge to the Ottawa River, approximately 2 km to the east. In the surrounding area, aggregate pits are common, with some residential and agricultural land use.

Geology

Overburden at the Site is reported to consist of fill, topsoil, silty sand, sandy silt, sand, and sand and gravel, overlying a clay layer (consisting of silty clay and clayey silt). A till unit underlies the clay and overlies bedrock. The thickness of the overburden is greatest on the northwest portion of the Site and thins towards the east. The top of the clay layer also slopes from west to east. Bedrock outcrops are reported to exist on the southeast side of the Site, with the surface sloping towards the north-northwest. Bedrock has not been investigated at the Site and its composition was not reported; however, Ontario Geological Survey mapping indicates mafic to felsic metavolcanic rocks consisting of flows, tuffs, breccias, minor iron formation, and/or minor metasedimentary rocks, as well as reworked pyroclastic units and amphibolite.

Hydrogeology

The hydrogeological characteristics of the Site are generally reported as follows:

- The surficial granular layer is the primary aquifer.
- Groundwater flow within the surficial granular layer is expected to be controlled by topography and the top of the clay layer and is generally towards the east.
- The hydraulic conductivity of the surficial granular layer was found to range from approximately 2.6 $x10^{-5}$ to 1.5$x10^{-3}$ cm/s, with a horizontal hydraulic gradient of 0.025 m/m, and a groundwater velocity of approximately 0.18 to 11 cm/day, corresponding to a travel time from the landfill to the downgradient Site boundary (approximately 325 metres) ranging from 10 to 500 years; time based on monitoring data was between 35 and 50 years.
- Vertical gradients were not discussed in the current report, but previous assessments have found the waste fill area to be a recharge zone and the downgradient (eastern) portion of the Site a discharge zone.

Existing Groundwater Monitoring Program

The current groundwater monitoring network consists of 21 wells, 4 of which are bi-level and 2 are tri-level, completed in the shallow, intermediate, and deep overburden, which are divided into either routine or surveillance monitors. Routine monitors (18) are sampled for a robust list of parameters as outlined in the ECA, and surveillance monitors (3) are sampled for a limited list of parameters. The ECA was amended in

2015 (Notice 2) to allow for a reduction in the monitoring and reporting frequency. Groundwater level measurement and sampling is currently required to be completed every 2 years in the spring, with associated report production at the same frequency.

Background Groundwater Quality

Background groundwater quality is assessed using G93-1, located west of Eady Road and upgradient of the WDS. Background concentrations of all parameters analysed are typically low and meet the Ontario Drinking Water Standards (ODWS).

Leachate

Leachate quality is currently assessed at G93-7B, located immediately downgradient (east) of the waste mound. Despite meeting the ODWS for chloride (250 mg/L), this parameter is considered the primary leachate indicator, historically ranging from 62-130 mg/L, being that it is significantly elevated above background (~5 mg/L) and is readily mobile in groundwater. Alkalinity, Dissolved Organic Carbon (DOC), iron, manganese, and Total Dissolved Solids (TDS) all exceeded the ODWS at this location in 2021 and 2022 (except for alkalinity in 2022). Barium, boron, hardness, potassium, and strontium were also reported to be elevated in comparison to background but did not exceed the ODWS. Trend analysis indicates most parameters to be generally stable at this location. Based on these results, Leachate Indicator Parameters (LIPs) have been set and include barium, boron, chloride, hardness, manganese, potassium, strontium, and TDS. Notably, this list doesn't include alkalinity, DOC, or iron.

Downgradient Groundwater Quality

Downgradient groundwater quality is summarized as follows:

- 91-A4: downgradient of the WDS on east side; DOC, iron, and manganese exceed the ODWS.
- G93-5A (deep) and G93-5B (shallow): northeast of the WDS at the Site boundary; concentrations similar to background with no ODWS exceedances.
- G96-8A (deep) and G96-8B (shallow): east of the WDS at the Contaminant Attenuation Zone (CAZ) boundary; concentrations interpreted to be similar to background with no exceedances of the ODWS.
- G96-10A (deep), G96-10B (intermediate), and G96-10C (shallow): northeast of the WDS, assumed downgradient area of the CAZ; concentrations have been interpreted to be similar to background with no exceedances of the ODWS, except manganese at G96-10C. It was stated that G96-10 reveals slightly higher values than the background well, but on balance does not appear to be impacted by landfill leachate.
- G96-12: southeast side of the CAZ boundary; concentrations comparable to background, except for manganese, which started exceeding the ODWS regularly after 2006, along with iron. Despite this, it was stated that G96-12 does not appear to be impacted by landfill leachate.

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- G96-13: southeast side of the CAZ boundary; concentrations comparable to background with the last ODWS exceedance in 2007 (iron).

Monitoring wells 91-A2, G93-6A, G96-11A/B, and G96-14A/B are part of the routine groundwater sampling and are not used for compliance assessment. It was reported that some level of leachate impact was evident at all these locations, with exceedances of the ODWS occurring for DOC, TDS, manganese, alkalinity, and/or iron.

BTEX was analyzed in 2021 for samples collected from G93-1, G93-5B, G93-7B, G96-8B, G96-9B, G96-10C, G96-12, and G96-13 in support of the proposed expansion, and in 2022, VOCs were analysed at G93-7B. Results were all below the ODWS, except for benzene (1.6 ug/L) at G93-7B.

Overall, monitoring wells G93-1, G93-5A, G93-5B, G96-8A, G96-8B, G96-10A, G96-10B, G96-10C, G96-12, and G96-13 were not considered to be impacted by the WDS, and G93-7B, 91-A4, 91-A2, G93-6A, G96-9A, G96-9B, G96-9C, G96-11A, G96-11B, G96-14A, and G96-14B were. Based on that, it was stated that the results continue to show a diffuse plume to the east of the WDS that decreases in concentration with distance.

Guideline B-7

Reasonable Use Guideline B-7 applies to all operating WDS and those WDS closed after 1986; thus, Guideline B-7 applies to the Horton WDS. Reasonable Use Guidelines (RUGs) were calculated and compared to concentrations at G93-5A, G93-5B, G96-8A, G96-8B, G96-10A, G96-10B, G96-10C, G96-12, and/or G96-13 (year-dependent). Manganese exceeded the RUG (0.035 mg/L) and the ODWS (0.05 mg/L) at the following locations:

- G96-10C: 0.26 mg/L (2021), and 0.31 mg/L (2022).
- G96-12: 0.07 mg/L (2021), and 0.06 mg/L (2022).

These exceedances follow historical trends. As a result of the generally low values of other LIPs at these locations, it was stated that these values may be naturally occurring. Based on this, the Site was interpreted to be compliant with Guideline B-7.

Trigger Mechanisms and Contingency Action Plan

Groundwater trigger mechanisms have been established and are included in the ECA as condition 78. Trigger locations include the compliance monitoring wells G93-5A/B, G96-8A/B, G96-12, and G96-13, as well as “early warning monitoring wells” G96-10A/B/C. Trigger values are set at 75 percent of the RUG at compliance monitoring wells and 100 percent of the RUG at the “early warning” monitoring wells. All leachate indicator parameters are included in the assessment. Contingency actions required in the event of an exceedance are outlined in condition 79 of the ECA and generally consist of confirmatory sampling, investigation of the cause, and development and implementation of a contingency action plan.

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The 2021 Groundwater Trigger Assessment for Perimeter Wells (75th percentile) revealed the following exceedances:

- TDS: G96-8B, G96-12, and G96-13 (255 mg/L, 240 mg/L, 279 mg/L, respectively)
- DOC: G96-12 (4.5 mg/L)
- Manganese: G96-12 (0.07 mg/L)

The 2022 Groundwater Trigger Assessment for Early Warning Wells (75th percentile) revealed the following exceedances:

- TDS: G96-8A and G96-12 (289 mg/L)
- Manganese: G96-12 (0.06 mg/L)

Groundwater Trigger Assessment for Early Warning Wells (100th percentile) revealed the following exceedances:

- Manganese: G96-10C (0.26 mg/L in 2021 and 0.31 mg/L in 2022)

The following rationale was provided:

- A historical review of TDS values from G96-8A/B did not reveal any appreciable increasing trends over time and that there has been little to no increasing trend for chloride. From this, it was interpreted that the WDS is not adversely influencing the TDS values.
- Manganese values at G96-12 revealed a slight increasing trend beginning around 2007; however, since then, concentrations generally fluctuated along a stable average.
- The associated chloride values were low and remained relatively stable during this time suggesting that the elevated manganese may be naturally occurring, and due to the stagnant wetland. This conclusion was also applied to G96-12.

Groundwater-Surface Water Interaction

Leachate impacted groundwater is expected to migrate within the shallow granular layer toward the wetland feature located at the Site's northeastern boundary where it has the potential to discharge and impair surface water. Shallow groundwater monitors located in proximity to this surface water are used in addition to conventional surface water monitoring, to assess leachate impacts. Only minor leachate impacts haven been identified to date; however, if leachate impacts increase through WDS expansion there is a potential that leachate impacts will increase.

Potable Supply Wells

The Barr Residence supply well, which was stated be located over 1,000 m upgradient of the WDS, was sampled in the spring and fall of 2021 and 2022. Results indicated no exceedances of the ODWS, and it was interpreted that the WDS is not causing any

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impacts. While I acknowledge the results, it appears to me that the well is located approximately 200 m *downgradient* of the Site boundary, roughly 600 m from the waste fill area.

Landfill Gas

Landfill Gas (LFG) related requirements are outlined in conditions 80 and 81 of the ECA with the monitoring requirements outlined in Schedule D of the ECA. Monitoring was completed six times in 2021 at GW11-1, GW11-2, as well as at the Attendant Shelter and Storage Garage. In 2022, monitoring was completed six times at GW11-1 and GW11-2 only. Methane was not detected from any the readings; therefore, the WDS was concluded to be compliant with the requirements of the ECA.

Ongoing Groundwater Monitoring and Reporting

No changes to the environmental monitoring program were proposed.

Expansion Feasibility Study Letter

Jp2g provided responses to the six main issues highlighted in the groundwater memorandum dated September 15, 2022. They have been reproduced here (italicized), followed by my comments.

Monitoring Well 91-5

Jp2G comment: *To assess leachate migration towards the easterly property limit monitoring well 91-5 will be included in the monitoring program. As part of the 2020, 2021, and 2022 monitoring programs, Jp2g measured the water levels at this location. A copy of compiled water levels is included in Attachment 2. The ground elevation at monitoring well 91-5 is 159.2m. Water levels have ranged from 158.64m (April 2020) to 157.91m (June 2021).*

Monitoring well 91-5 is located cross gradient from the north-easterly flow towards Barr Creek. The well consists of a 1 ½ inch PVC screen and riser with a 5" diameter steel protective casing. We will review the Township records for old hydrogeological reports to hopefully obtain the borehole log to confirm the depth of the well and length of the screen. This location will be included in the 2023 monitoring program. We acknowledge that pending the results of the groundwater flow patterns, and water quality at 91-5, the Ministry may require another well located further upgradient between the expanded landfilling area and the southeast property limit. As noted in Drawings 1 and 2, three (3) standpipes have been installed in this location to monitor groundwater elevations.

MECP response: Acknowledged. No further comment.

Expansion Base Elevation

Jp2G comment: *The ground elevation at TP1 is 160.79m, and the water level was 159.86m in August 2020. The highest water level measured was at TP5 159.31m. We have reviewed the Provincial Groundwater Monitoring Network website. The closest PGMN well ID W000015-2 with regular monitoring data is located near Eganville and is*

a bedrock well completed to a depth of 24.91m into the limestone. This data is not representative of a local shallow groundwater table.

In response to a Thandeka Ponalo email dated May 19, 2022, which provided comments from the Surface Water Unit, additional information was provided on the August 2020 precipitation indicating it to be the wettest in recent history. Regardless, to confirm the proposed base elevation to ensure that waste is placed 1m above the high groundwater table, three (3) standpipes were installed in spring of 2023 to determine actual peak groundwater levels for the final design. Drawings 1 and 2 illustrate the 2020 test pits and 2023 standpipes.

MECP response: The clarification regarding depths to groundwater is appreciated and the collection of additional water level data is acknowledged. No further comment.

New Source Leachate Well

Jp2G comment: *Monitoring well 93-7B (screen depth 1.5 – 3m below ground surface) is the current leachate well which exhibits elevated concentrations of DOC, hardness, TDS, iron, and manganese above ODWS. A new leachate well can be installed between the expanded fill area and monitoring wells G96-14A and G96-14B as a condition of the ECA amendment.*

MECP response: I recommend the new leachate well be installed at the toe of the proposed expansion area, off the northeastern corner.

Impact Assessment

Jp2G comment: *It is acknowledged that the Ministry requires an impact assessment to support the expansion. Our proposal does not include predictive modelling but a review of historical trends of Reasonable Use Policy Objectives (RUPO) exceedances as waste disposal progressed within the landfilling area. The proposed expansion of the landfilling area of approximately 0.63 ha (with approximately one-half of that over historical landfilling) is located no closer to the downgradient CAZ boundary wells. Under the current ECA, the Reasonable Use Criteria (RUC) include TDS, Cl, hardness, Mn, Ba and B, which are applied at nine (9) downgradient wells close to the CAZ boundaries. In reference to the MECP comments regarding elevated manganese (Mn) concentrations exceeding the RUPO and the ODWS/OG limit of 0.05 mg/L for monitoring wells G96-10C and G96-12, as noted this analysis was presented in the 2019-2020 and more recently in the 2021-2022 Biennial Monitoring Report. Graphs of historical Mn concentrations for the monitoring wells are provided in Attachment 3 for a more detailed assessment:*

- *Table 4.1 illustrates manganese concentrations for monitoring well 93-7B (leachate) and leachate impacted monitoring wells 91-A4, 91-A2 and 93-6A.*
- *Table 4.2 and 4.3 illustrates manganese concentrations for monitoring wells located further from the landfilling area.*
- *Table 4.4 and 4.5 illustrates the manganese concentrations for monitoring wells located near the CAZ boundary.*

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Waste disposal at the site involved a trench and cover operation within the proposed 2.5 ha landfilling area between 1977and 1997. An area disposal method was then conducted in the northwest section (1.0 ha) of the landfilling area up to approximately 2010, when the easterly expansion was approved. Over the past 13 years, waste disposal has occurred in the subsequent 1.0 ha portion of the landfilling area generally progressing from west to east.

The background well (G93-1) has consistently shown low concentrations of manganese except for the initial monitoring period between 1993-1998, where the values ranged from <0.01 to 0.12 mg/L.

The following are observations provided about the attached graphs.

Table 4.1
- Manganese concentrations from the leachate well (93-7B) have decreased since 2007 (i.e., from 2.5 mg/L to 0.5 mg/L).

- Monitoring well 91-A4 located downgradient of monitoring well 93-7B exhibits manganese concentrations between 0.1 to 1.0 mg/L.

- Monitoring wells 91-A2 and 93-6A show manganese concentration increases, which reflects the recent upgradient landfilling activity since approximately 2015.

Table 4.2
- Manganese concentrations from monitoring well G96-14A show a slight upward trend, while concentrations from monitoring well G96-14B show a decreasing trend.

- Monitoring ells G96-11A/B illustrate a decreasing trend in manganese concentrations. Although decreasing, monitoring well 96-11B still reveals a manganese concentration greater than 0.05mg/L.

Table 4.3
- Monitoring nest G96-9 (i.e., 3 levels) shows the highest manganese concentrations in the shallow setting. Concentrations from deep and shallow settings reveal values that vary between 0.09 mg/L to 0.30 mg/L and are increasing.

Table 4.4
- The manganese concentrations at monitoring well G96-10C have constantly ranged from 0.1 to 0.2 mg/L over the past 20 years. However, the concentrations show a slightly increasing trend over the past few years. The manganese levels at Monitoring wells G96-10A and G96-10B have rarely exceeded the ODWS/OG.

Table 4.5
- The manganese concentrations at Monitoring well B96-12 have consistently been low except for 2007. The 2009-2012, 2014 and current levels are around 0.06 mg/L.

- The manganese concentration at Monitoring wells G96-13 and G96-8A/B are typically less than the ODWS/OG, with the exception of small spikes that are not considered to be related to landfill impact.

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The interpretation of manganese concentrations at wells G96-10C and G96-1A not being related to the landfill site is consistent with previous Golder reports. Based on the current assessment, the manganese concentrations at Monitoring wells G96-10C and G96-12 are a result of leachate impact and will be further evaluated in future reports in comparison to the results shown in Figure 2.

MECP response: The additional detailed assessment for manganese is appreciated. The graphs are insightful; to be clear, the implications are that the Site is not in compliance with respect to Guideline B7 at G96-12 (an increasing trend was noted, and further, this is the side of the Site where the WDS expansion is being proposed). The graphs confirm compliance at G96-8. While there are issues at G96-10, expected groundwater discharge to the wetland would satisfy the intent of Guideline B7, but a MECP surface water specialist should be consulted on how to address this moving forward.

Groundwater Monitoring Program

Jp2G comment: *The current analysis of the parameters listed in Schedule 5, Column 1, (Landfill Standards, 1993) with the addition of strontium and hardness for all the Monitoring wells, will allow for a comprehensive assessment of the monitoring network and associated landfill site impacts. We acknowledge that the Ministry would consider a change to Schedule 5, Column 2 if trends support it.*

MECP response: Acknowledged. No further comment.

ECA Considerations

Jp2G comment: *We recommend that the soak pit option remain in the ECA. Under ECA Condition 79, if contingency measures are needed, a detailed plan and schedule are to be submitted to the Director for approval.*

MECP response: Acknowledged. No further comment.

Conclusions and Recommendations

I offer the following conclusions and recommendations:

1. LIPs were stated to include barium, boron, chloride, hardness, manganese, potassium, strontium, and TDS; however, alkalinity, DOC, and iron also exceeded the ODWS at the leachate well (G93-7) and should be considered LIPs moving forward.
2. Based on the flow lines presented in Figure 3, I recommend that G96-11A/B be considered and evaluated as a compliance assessment well because there is no further downgradient well available before groundwater would discharge to the wetland.
3. I acknowledge the results for the Barr Residence supply well (no exceedances of the ODWS), but it appears to me that the well is located approximately 600 m *downgradient* (i.e., to the northeast) of the WDS, not 1,000 m *upgradient*, as stated in the report.

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4. As per the trend analysis of manganese in the Expansion Feasibility Study Letter, the concentrations at G96-10 are clearly related to the WDS. Groundwater discharge is expected to the wetland immediately downgradient and on-Site, which would satisfy the intent of Guideline B-7 for this location. A MECP surface water specialist should be consulted on the risks. The concentrations at G96-12 were also shown to be WDS related, and an increasing trend was noted. Here, the Site is not in compliance with Guideline B-7. Further, this is the side of the Site where the WDS expansion is being proposed. This will need to be addressed.
5. I recommend the new leachate well be installed at the toe of the proposed expansion area, off the northeastern corner.

Should you have any questions regarding these comments, please feel free to contact me.

Nick Battye, MSc, PGeo

ec: Emily Tieu
Victor Castro
Christina Klein
Sarah Baxter

c: ECHO Ref # 1-225205002 and 1-276564002