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CONSULTING

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June 18, 2024

Mr. Steve Copp
Mirror Nova Scotia Limited
600 Otter Lake Drive
Lakeside, NS   B3T 2E2

Dear Mr. Copp,

Re: May 2024 Performance Audit
**   Otter Lake Waste Processing & Disposal Facility**

In May 2024, Strum Consulting was retained by Mirror Nova Scotia Limited (Mirror) to oversee a Performance Audit at the Otter Lake Waste Processing & Disposal Facility (Otter Lake) located at 600 Otter Lake Drive in Lakeside, NS.

The purpose of the Quarterly Performance Audit is to characterize the incoming residential waste stream and assess the percentage of compostable waste in this stream by mass. The audit also captures the incoming percentage of white goods and household hazardous waste (HHW). This letter report provides a summary of the Performance Audit completed on May 15, 2024.

SUMMARY

Based on 10 samples being collected during the May 2024 Performance Audit, the total compostable waste percentage per area ranged from a minimum of 6.51% to a maximum of 72.35%. The total weighted Compostable Waste Percentage for the May 2024 Audit is calculated to be 15.64%.

Using the calculated 95% confidence interval, the percentage of Estimated Annual Compostable Waste is calculated to be between 7.41% and 23.87%.

As additional sampling will be completed during future quarterly audits, it is expected that the statistical data will vary as more audit data becomes available.

BACKGROUND

In March 2022, Nova Scotia Environment & Climate Change (NSECC) issued an updated Municipal Approval for Otter Lake, allowing the Front End Processor and Waste Stabilization Facility (FEP/WSF) to be deactivated upon the submission and acceptance of a Compliance Plan in accordance with the Approval requirements.

As per the Approval, the Performance Targets for Otter Lake include (but are not limited to) a long-term goal of compostable waste not exceeding 10% of the total amount of municipal solid waste landfilled, by mass. In September 2023, NSECC approved the following timeline for working towards this long-term Performance Target of maximum per cent compostable waste in the garbage stream:

- March 31, 2024 - 11.61% Compostable Waste
- March 31, 2025 - 10.81% Compostable Waste
- March 31, 2026 - 10.0% Compostable Waste

The Compliance Plan outlines how Quarterly Performance Audits will be completed as a means to quantify the presence of compostable waste being received in the residential waste stream at Otter Lake. White goods and HHW were added to the audits based on comments received from NSECC after their review of the draft Compliance Plan.

METHODOLOGY

The methodology followed for the May 2024 Performance Audit reflects best practices identified in the Divert NS Waste Audit Manual and Field Procedures Guide (2017), as well as site specific processes established by Halifax Regional Municipality (HRM) and is summarized below.

Sample Load Identification

Residential curbside collection is divided into eight collection areas in HRM and condominium properties which are also considered to be residential. The geographic descriptions of the various areas are described in Table A, below.

Table A: Collection Area Descriptions

Waste Collection Area	Area Description
1	Halifax (former city limits); Spryfield
2	Dartmouth (former city limits)
3	Bedford; Hammonds Plains; Pockwock
4	Beechville-Timberlea; Herring Cove; Prospect; Peggy's Cove; St. Margaret's Bay to Hubbards
5	Sackville; Beaver Bank; Fall River; Waverley, Wellington; Dutch Settlement
6	Cole Harbour; Westphal; Cherry Brook; Eastern Passage; Cow Bay
7	Porters Lake; Lawrencetown; Chezzetcook; Lake Echo; Preston
8	Middle Musquodoboit; Musquodoboit Harbour; Elderbank; Sheet Harbour; Eastern Shore
Condos	Multi-residential style properties located in various communities

Based on residential curbside collection schedules for each specific collection area and the scheduled audit date and time, sample loads are selected ahead of time by HRM staff. A random number generator is used to choose which vehicle will be sampled.

The Alberta Provincial Waste Characterization Framework (2005) was reviewed and used to guide the number and weight of the samples to be collected. A minimum annual sample number of 40 samples is recommended, and as such, two samples from collection Area 1 and one sample from all other curbside collection areas (Areas 2-8, and Condos), for a total of 10 samples, were assessed as part of the May 2024 Performance Audit. To avoid skewing the annual data, any duplicate samples are averaged to give a single value per area for each audit.

The selected loads were visually inspected at the tip face upon arrival and photographs were taken as shown in the attached photo log (Attachment 1). The following information was recorded for each load:

- Collection vehicle and route numbers
- Date/Time of arrival
- Date/Time sample taken
- Gross and tare weight of truck
- Weight of sample
- Number/type of bulky items observed
- Names of persons taking the sample
- Date/Time of sorting

Sample Size

Photographs of the auditing process are provided as Attachment 1. Once emptied from the vehicle, multiple sections of the load were selected in order to draw a sample that was representative of the load. Each sample was to contain a mix of clear and black bags. Containers shown in Photo 5 (Attachment 1) were used to collect a sample between 90 and 135 kg.

Records documenting the identifying information of each vehicle sampled (scale tickets - Attachment 2) and the Performance Audit Record field data sheets (Attachment 3) are also attached to this report.

Material Categories

The categories that were used to define the different types of compostable waste are consistent with the Approval and are outlined below in Table B.

Table B: Compostable Waste Sorting Categories

Category	Sub-Category	Examples
Fibre	Newsprint/Paper	The Chronicle Herald, The Coast, Masthead News, The Cobequid/Dartmouth/Cole Harbour Wire, flyers
	Corrugated Cardboard/Boxboard	Consumer boxes (e.g., from appliances, storage, filing, and shipping)
Organics	Food Waste (Putrescible)	Whole vegetables, fruit, meat, fish, leftover food waste, eggshells, peels, oils, bones, fat, packaged food if most of if it consists of food
	Yard Waste	Grass, leaves, brush, branches, wood chips, soil

Materials which did not fall into one of the above noted categories were counted, weighed, and categorized as one of the following:

- Other garbage
- HHW including lead-acid (automotive) batteries, post-consumer paint products, ethylene glycol, used oil, used glycol, used oil filters, glycol containers, and oil containers.
- White goods (items such as toasters, microwaves, and coffee makers that would be mostly composed of metal materials that can be disposed of in garbage bags). It should be noted that the majority of white goods are not marketable from a recycling perspective.

Sorting Procedure

The sorting team consisted of several Mirror staff. All staff were briefed on the sorting protocols, including familiarity with example materials for each sorting category. Strum staff were designated as "Lead" and responsible for quality control and data collection.

The audit space consisted of an open area set up with tables for sorting waste materials, containers clearly labeled for each of the waste categories, and digital scales for weighing the waste materials. The containers used for sorting were weighed prior to commencing the audit and recorded on the data sheets to allow for net sample weights to be determined.

To maintain consistency, the Lead was responsible for weighing and recording the data on dedicated data sheets for each area, each time a container was filled. The process continued for each respective area until the full sample was properly sorted and weighed.

PREVIOUS ASSESSMENTS

A baseline was developed through previous Performance Audits that were completed for the 2022/23 fiscal year in May 2022 (report dated June 22, 2022), August 2022 (report dated November 4, 2022), November 2022 (report dated February 2, 2023), and February 2023 (report dated April 6, 2023). Using the combined data collected during the 2022/23 quarterly Performance Audits, the total weighted Compostable Waste Percentage value of 12.41% was found.

Performance Audits for the 2023/24 fiscal year began in May 2023 (report dated June 26, 2023), with additional audits completed in August 2023 (report dated October 30, 2023), November 2023 (report dated January 9, 2024), and February 2024 (report dated March 18, 2024). Using the combined data collected during the 2023/24 quarterly Performance Audits, the total weighted Compostable Waste Percentage value of 11.64% was found.

MAY 2024 PERFORMANCE AUDIT SUMMARY

A summary of the May 2024 Performance Audit completed at Otter Lake is provided below in Table C. The May 2024 Performance Audit field data sheets containing the data collected respective to each waste collection area during the audit are attached to this report as Attachment 3.

May 2024 Performance Audit, Otter Lake Waste Processing & Disposal Facility   *June 18, 2024*
Mr. Steve Copp
Mirror Nova Scotia Limited   *Project # 22-8641*

Table C: May 2024 Performance Audit Results

Waste Collection Area	Category Percentage (%)							
	Garbage/ Residue	HHW	White Goods	Fibre - Newsprint/ Paper	Fibre - Corrugated Cardboard	Organics - Food/ Putrescible Waste	Organics - Yard Waste	Total Compostable Waste
1A	74.73%	0.11%	4.95%	4.41%	4.19%	9.89%	1.18%	19.68%
1B	80.79%	0.00%	0.79%	9.94%	4.29%	3.50%	0.00%	17.74%
2	86.64%	0.09%	3.13%	2.58%	1.75%	5.53%	0.09%	9.95%
3	77.60%	0.00%	3.28%	0.77%	8.09%	9.51%	0.00%	18.36%
4	91.87%	0.00%	1.82%	2.11%	0.96%	3.44%	0.00%	6.51%
5	86.80%	0.20%	1.12%	3.05%	3.15%	5.48%	0.10%	11.78%
6	85.63%	0.24%	2.75%	1.80%	2.87%	6.59%	0.00%	11.26%
7	88.60%	0.00%	3.01%	1.45%	2.69%	4.77%	0.00%	8.91%
8	87.06%	0.12%	1.53%	2.71%	2.71%	6.35%	0.00%	11.76%
Condos	25.21%	0.08%	2.69%	3.70%	2.35%	62.94%	3.36%	72.35%

Notes:

1. Total compostable waste percentage based on aggregate of four compostable waste category percentages.

Using the data in Table C above, the total compostable waste percentage ranged from a minimum of 6.51% (Area 4) to a maximum of 72.35% (Condos), based on the 10 samples collected during the May 2024 Performance Audit.

OVERALL COMPOSTABLE WASTE

As shown in Table D below, given the May 2024 total compostable waste percentage per area and the three-year average of waste tonnage per area, the estimated compostable waste tonnage per year has been calculated. Using the total of the Estimated Annual Compostable Waste (7663.13 tonnes) and the three-year waste average total (48992.77 tonnes), the weighted Compostable Waste Percentage is calculated to be 15.64%. Supporting data is provided as Table 1 (Attachment 4).

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Table D: Estimated Annual Compostable Waste based on May 2024 Data

Waste Collection Area	Three Year Waste Average (Tonnes)	May 2024 Total Compostable Waste	Estimated Annual Compostable Waste (Tonnes)
1	10014.25	18.71%	1873.54
2	6841.50	9.95%	681.00
3	4433.34	18.36%	813.99
4	5334.37	6.51%	347.12
5	8637.86	11.78%	1017.25
6	5150.89	11.26%	579.86
7	2930.93	8.91%	261.20
8	3298.51	11.76%	388.06
Condos	2351.13	72.35%	1701.11
TOTAL	**48992.77**	**N/A**	**7663.13**
Weighted Compostable Waste Percentage = (7663.13/48992.77) *100% = 15.64%			

Notes:
1. Data used to calculate three-year average provided by Mirror and included tonnage from the fiscal years 2021/2022, 2022/2023, and 2023/2024.
2. *May 2024 Total Compostable Waste percentage for Area 1 is based on average of the two samples (1A and 1B) collected during the May 2024 waste audit.

Based on the data in Table D above, the Estimated Annual Compostable Waste per area ranges from a minimum of 261.20 tonnes (Area 7) to a maximum of 1873.54 tonnes (Area 1).

DESCRIPTIVE STATISTICS

A descriptive statistical analysis was completed on the Estimated Annual Compostable Waste tonnage and the Estimated Annual Food/Putrescible Waste calculated per area from the May 2024 Performance Audit. The statistical analysis was completed using the Microsoft Excel Analysis ToolPak Descriptive Statistics analysis tool. Supporting data for the statistical analysis is provided as Tables 1 – 4 (Attachment 4).

Compostable Waste
At 95% confidence interval, the Estimated Average Annual Compostable Waste tonnage per area is calculated to be between 403.60 tonnes (lower bound) and 1299.32 tonnes (upper bound). The confidence interval was calculated by subtracting/adding the calculated 95% confidence level (447.86) from the mean (851.46 tonnes).

By multiplying the lower bound (397.44 tonnes) and the upper bound (1342.36 tonnes) of the 95% confidence interval by nine (for each area), the Total Estimated Annual Compostable Waste would have a calculated range from 3632.40 tonnes to 11693.86 tonnes. By dividing the lower and upper range of the Total Estimated Annual Compostable Waste by the three-year waste average total (48992.77 tonnes), and multiplying the values by 100%, the percentage of Estimated Annual Compostable Waste is calculated to be between 7.41% and 23.87%.

Food/Putrescible Waste
At 95% confidence interval, the Estimated Average Annual Food/Putrescible Waste tonnage per area is calculated to be between 162.04 tonnes (lower bound) and 792.69 tonnes (upper bound). The confidence

May 2024 Performance Audit, Otter Lake Waste Processing & Disposal Facility   *June 18, 2024*
Mr. Steve Copp
Mirror Nova Scotia Limited   *Project # 22-8641*

interval was calculated by subtracting/adding the calculated 95% confidence level (315.32) from the mean (477.36 tonnes).

By multiplying the lower bound (162.04 tonnes) and the upper bound (792.69 tonnes) of the 95% confidence interval by nine (for each area), the Total Estimated Annual Food/Putrescible Waste would have a calculated range from 1458.35 tonnes to 7134.19 tonnes. By dividing the lower and upper range of the Total Estimated Annual Food/Putrescible Waste by the three-year waste average total (48992.77 tonnes), and multiplying the values by 100%, the percentage of Estimated Annual Food/Putrescible Waste is calculated to be between 2.98% and 14.56%. The estimated annual Food Waste percentage is calculated to be 8.77%. Supporting data is provided as Table 6 (Attachment 4).

The above noted statistical analyses are based on a total of 10 samples collected during the May 2024 Performance Audits. As additional sampling will be completed during future audits, it is expected that the statistical data will vary as more data becomes available.

CLOSURE

This report was prepared by ███████████████████████████████████████, and was reviewed by ███████████████████████████████████████. Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report.

This Report and any use of the Report is subject to the terms herein (see attached Statement of Qualifications and Limitations).

If you have any questions, please contact us.

Thank you,

STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of Mirror Nova Scotia Limited ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client
- as required by law
- for use by governmental reviewing agencies

Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

Attachment 1
Photograph Log

Photo 1: Waste pile from HRM collection Area 1A.
Photo taken on May 2, 2024.

Photo 2: HHW waste bin sorted from HRM collection Area 1A (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 3: Newsprint/paper waste bin of HRM collection Area 1A (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 4: OCC waste bin sorted from HRM collection Area 1A (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 5: Waste audit sample collected from HRM collection Area 1B.
Photo taken on May 2, 2024.

Photo 6: Waste audit sample from HRM collection Area 1B (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 7: White goods waste sample from HRM collection Area 1B (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 8: Food waste sample from HRM collection Area 1B (extra load).
Photo taken on May 15, 2024, during waste audit.

Photo 9: Waste load collected from HRM collection Area 2.
Photo taken on May 10, 2024.

Photo 10: Waste audit sample collected from HRM collection Area 2.
Photo taken on May 15, 2024, during waste audit.

Photo 11: Sorting process and white goods waste bin of HRM collection Area 2.
Photo taken on May 15, 2024, during waste audit.

Photo 12: Food waste bin sorted from HRM collection Area 2.
Photo taken on May 15, 2024, during waste audit.

Photo 13: Waste collection vehicle unloading waste collected from HRM Area 3. Photo collected May 9, 2024.

Photo 14: Waste audit sample from HRM collection Area 3. Photo taken on May 15, 2024, during waste audit.

Photo 15: Newspaper/paper waste bin sorted from HRM collection Area 3. Photo taken on May 15, 2024, during waste audit.

Photo 16: OCC waste bin sorted from HRM collection Area 3. Photo taken on May 15, 2024, during waste audit.
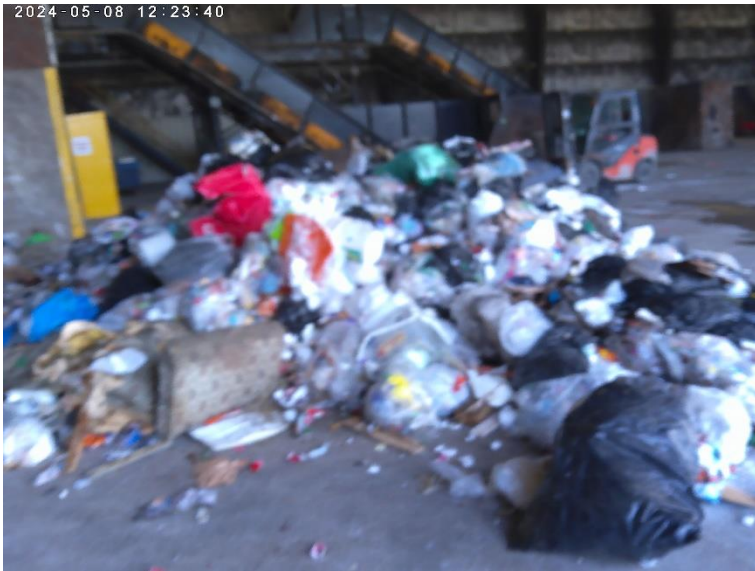
Photo 17: Waste pile from HRM collection Area 4.
Photo taken on May 8, 2024.

Photo 18: Waste audit sample from HRM collection Area 4.
Photo taken on May 15, 2024, during waste audit.

Photo 19: Food waste sorted from HRM collection Area 4.
Photo taken on May 15, 2024, during waste audit.

Photo 20: White goods waste sorted from HRM collection Area 4.
Photo taken on May 15, 2024, during waste audit.

Photo 21: Waste pile HRM collection Area 5.
Photo taken on May 1, 2024.

Photo 22: Waste audit sample from HRM collection Area 5.
Photo taken on May 15, 2024, during waste audit.

Photo 23: HHW waste bin sorted from HRM collection Area 5.
Photo taken on May 15, 2024, during waste audit.
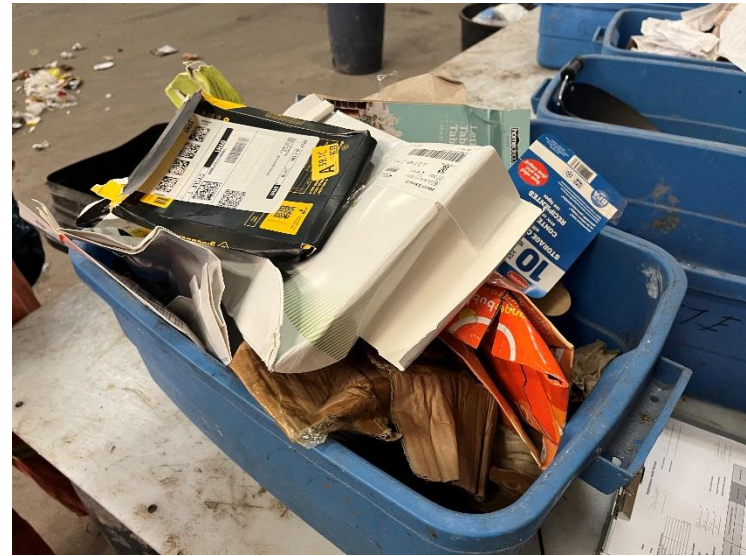

Photo 24: Food waste bin sorted from HRM collection Area 5.
Photo taken on May 15, 2024, during waste audit.
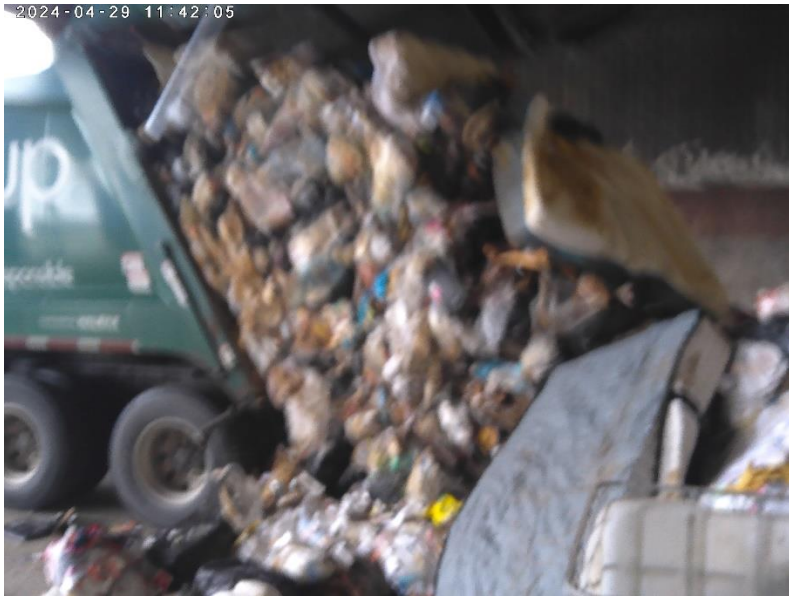
Photo 25: Waste collection vehicle unloading waste collected from HRM Area 6.
Photo taken on April 29, 2024.

Photo 26: Food waste bin separated from HRM collection Area 6.
Photo taken on May 15, 2024, during waste audit.

Photo 27: OCC waste bin separated from HRM collection Area 6.
Photo taken on May 15, 2024, during waste audit.

Photo 28: Newsprint/paper waste bin separated from HRM collection Area 6.
Photo taken on May 15, 2024, during waste audit.

Photo 29: Waste pile from HRM collection Area 7.
Photo taken on May 6, 2024.

Photo 30: Food waste from HRM collection Area 7.
Photo taken on May 15, 2024, during waste audit.
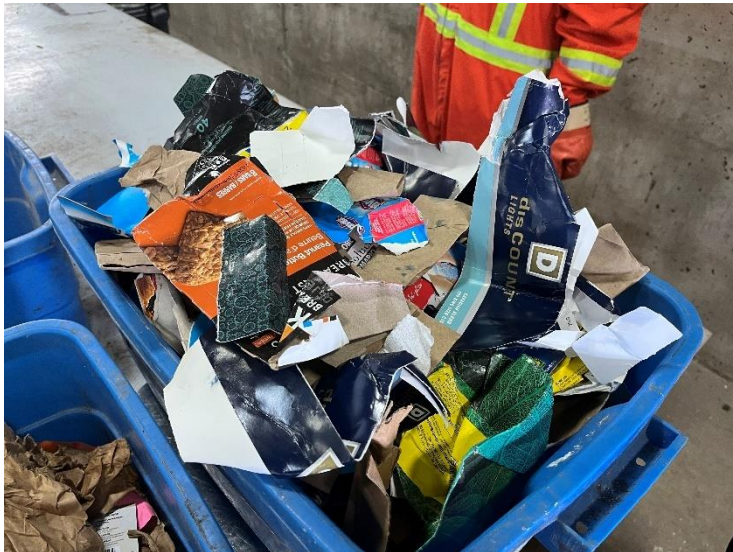
Photo 31: Food waste bin separated from HRM collection Area 7.
Photo taken on May 15, 2024, during waste audit.

Photo 32: White goods waste bin sample from HRM collection Area 7.
Photo taken on May 15, 2024, during waste audit.

Photo 33: Waste audit sample from HRM collection Area 8. Photo taken on May 7, 2024.
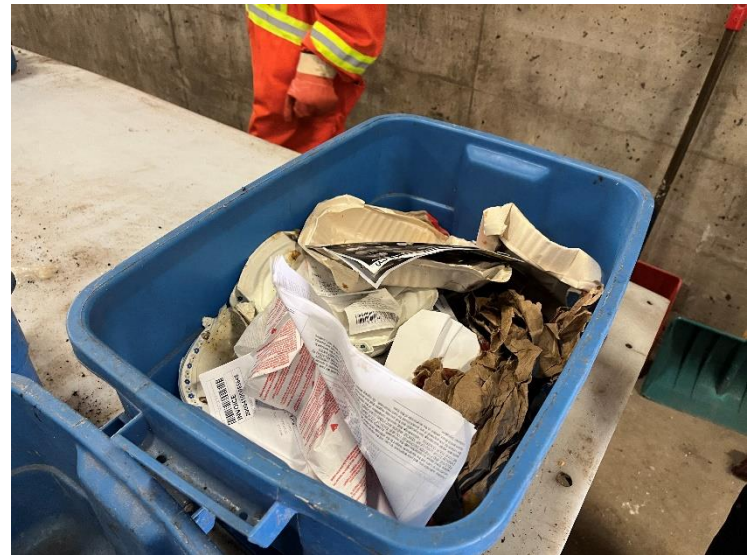
Photo 34: Paper waste sample from HRM collection Area 8 following sorting. Photo taken on May 15, 2024, during waste audit.

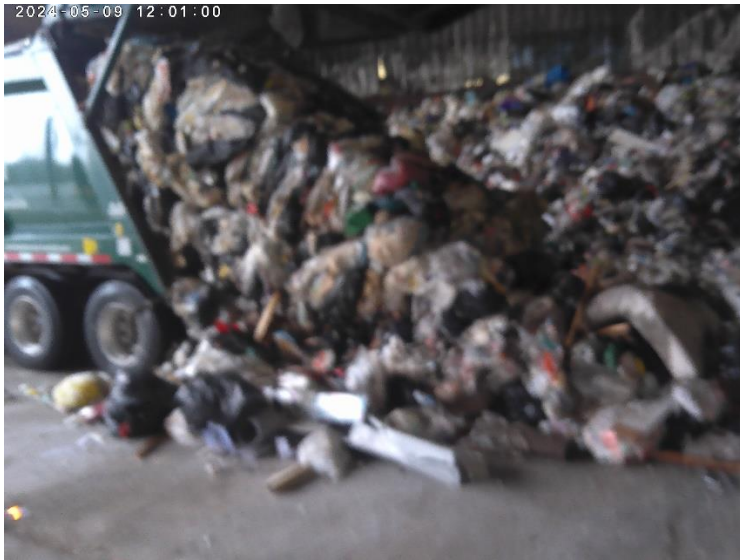Photo 35: Yard waste bin separated from HRM collection Area 8. Photo taken on May 15, 2024, during waste audit.

Photo 36: OCC waste sample from HRM collection Area 8 following sorting. Photo taken on May 15, 2024, during waste audit.
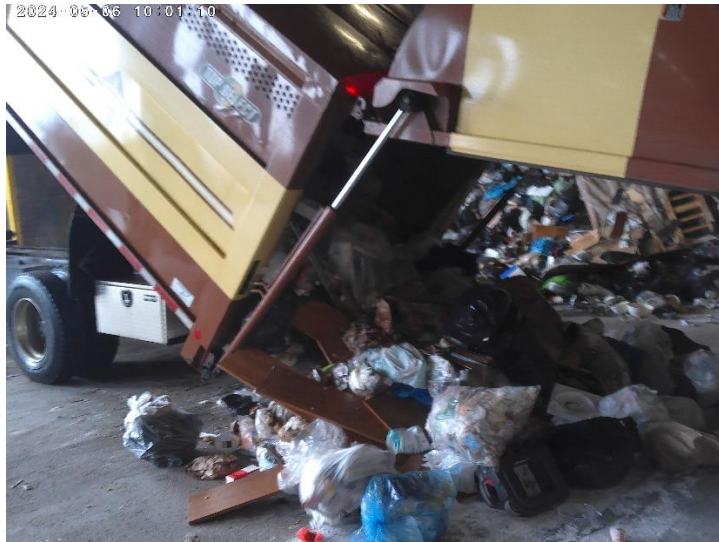
Photo 37: Waste audit sample from HRM collection Area 9 (Condos). Photo taken on May 6, 2024.

Photo 38: Food waste sample from HRM collection Area 9 (Condos) following sorting. Photo taken on May 15, 2024, during waste audit.

Photo 39: Yard waste sample from HRM collection Area 9 (Condos) following sorting. Photo taken on May 15, 2024, during waste audit.

Photo 40: OCC waste sample from HRM collection Area 9 (Condos) following sorting. Photo taken on May 15, 2024, during waste audit.

ATTACHMENT 2
SCALE TICKETS

Halifax Regional Municipality

Scale Slip:	094304	
	05/10/2024 18:20:06	
Clerk:	DMS	
Gross Weight:	23,330 (kg)	MAN WT
Tare Weight:	15,900 (kg)	
Net Weight:	7,430 (kg)	

Vehicle ID: RE2094
License Plate: 44-087-D
Waste Type: residential
Origin: 2 DARTMOUTH

Invoice: 0400927
Royal Environmental Group

Total: $0.00
$0.00

Halifax Regional Municipality

Scale Slip:	094249
	05/09/2024 12:04:07
Clerk:	DMS

Gross Weight:	25,480 (kg)
Tare Weight:	16,700 (kg)
Net Weight:	8,780 (kg)

Vehicle ID:	RE1035
License Plate:	55-579-D
Waste Type:	residential
Origin:	3 BEDFORD/HAMMONDS PLAINS
Invoice:	0400927
	Royal Environmental Group

Total:	$0.00
	$0.00

Halifax Regional Municipality

		Scale Slip:	094218
			05/08/2024 12:26:12
		Clerk:	Shelley

Vehicle ID: GFL359

License Plate: 45359D

Waste Type: residential

Origin: 4 WESTERN COUNTY

	Gross Weight:	23,820 (kg)
	Tare Weight:	18,670 (kg)
	Net Weight:	5,150 (kg)

Invoice: 0402150

GFL Environmental Inc

		$0.00
		$0.00

Total:

Halifax Regional Municipality

Scale Slip:	094184
	05/07/2024 12:53:39
Clerk:	Shelley

Gross Weight:	23,390 (kg)
Tare Weight:	16,470 (kg)
Net Weight:	6,920 (kg)

Vehicle ID:	RE2017
License Plate:	57-441-D
Waste Type:	residential
Origin:	8 EASTERN COUNTY
Invoice:	0400927
	Royal Environmental Group

Total:	$0.00
	$0.00

Halifax Regional Municipality

Scale Slip:	094149
	05/06/2024 13:50:09
Clerk:	Shelley

Gross Weight:	27,760 (kg)	MAN WT
Tare Weight:	17,260 (kg)	
Net Weight:	10,500 (kg)	

Vehicle ID:	MW9524
License Plate:	56246D
Waste Type:	residential
Origin:	7 PRESTON/LAWRENCETOWN/LK ECHO
Invoice:	0188466
	MILLER WASTE SYSTEMS

	$0.00
	$0.00
Total:	

Halifax Regional Municipality

Scale Slip:	094133
	05/06/2024 10:03:36
Clerk:	Shelley
Gross Weight:	14,810 (kg)
Tare Weight:	13,460 (kg)
Net Weight:	1,350 (kg)

Vehicle ID:	MW2422
License Plate:	43-098-D
Waste Type:	residential
Origin:	BEDFORD SACKVILLE CONDOS
Invoice:	0188466
	MILLER WASTE SYSTEMS

	$0.00
	$0.00
Total:	

Halifax Regional Municipality

Scale Slip:	094069
	05/02/2024 12:18:56
Clerk:	DMS
Gross Weight:	25,500 (kg)
Tare Weight:	16,460 (kg)
Net Weight:	9,040 (kg)

Vehicle ID:	RE1039
License Plate:	57-419-D
Waste Type:	residential
Origin:	1 HALIFAX
Invoice:	0400927
	Royal Environmental Group

Total:	$0.00
	$0.00

Halifax Regional Municipality

		Scale Slip:	094023
			05/01/2024 12:26:01
		Clerk:	Shelley
Vehicle ID:	RE1029	Gross Weight:	25,180 (kg)
License Plate:	55-318-D	Tare Weight:	16,550 (kg)
Waste Type:	residential	Net Weight:	8,630 (kg)
Origin:	5 SACKVILLE/FALL RIVER		
Invoice:	0400927		$0.00
	Royal Environmental Group	Total:	$0.00

Halifax Regional Municipality

Vehicle ID:	RE1032	Scale Slip:	093975
License Plate:	56-927-D		04/30/2024 11:11:23
Waste Type:	residential	Clerk:	Shelley
Origin:	1 HALIFAX		
		Gross Weight:	23,830 (kg)
Invoice:	0400927	Tare Weight:	16,600 (kg)
	Royal Environmental Group	Net Weight:	7,230 (kg)
		Total:	$0.00
			$0.00

Halifax Regional Municipality

Scale Slip:	093939
	04/29/2024 11:43:38
Clerk:	Shelley
Gross Weight:	24,070 (kg)
Tare Weight:	16,160 (kg)
Net Weight:	7,910 (kg)

Vehicle ID:	RE2093
License Plate:	44-064-D
Waste Type:	residential
Origin:	6 COLE HARBOUR/EASTERN PASSAGE
Invoice:	0400927
	Royal Environmental Group

	$0.00
Total:	$0.00

ATTACHMENT 3
FIELD DATA SHEETS

Performance Audit Record

Date May 15, 2024

Name of Supervisor ████████

Area Area 1A

Number of Sorters 4

Weighscale Ticket Information

Truck Number/ID	RE1032
Collection Area	Halifax
Date	30-Apr-24
Ticket Time	11:11:23
Gross Weight	23,830 KG
Tare Weight	16,600 KG
Net Weight	7,230 KG

Weigth of Gross Sample 143.0 KG

Weight of Tote Bin 50.0 KG

Date of Audit of Sample 15-May-24

Net Sample of Trash 93.0 KG

Sample Audit Time Started 8:45 AM

Number of Bulkies Observed 0

Sample Audit Time Completed 9:25 AM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)			Net Sample (KG)	Compostables (%)
		1	2	3		
Garbage/Residue	50.0	119.5	-	-	69.5	74.73%
Fibre - Newsprint/Paper	3.3	2.5	2.2	2.7	4.1	4.41%
Fibre - OCC	3.3	2.3	2.8	2.1	3.9	4.19%
Food/Putrescible Waste	1.1	10.3	-	-	9.2	9.89%
Yard Waste	1.1	2.2	-	-	1.1	1.18%
HHW	1.1	1.2	-	-	0.1	0.11%
White Goods	1.1	5.7	-	-	4.6	4.95%
Lost or Gained Mass	**Combined Weight Following Sorting**				0.00	
	143.0					

Notes:

Performance Audit Record

Date: May 15, 2024

Name of Supervisor: ██████████

Area: Area 1B

Number of Sorters: 5

Weighscale Ticket Information

Truck Number/ID	RE1039	
Collection Area	Halifax	
Date	02-May-24	
Ticket Time	12:18:56	
Gross Weight	25,500	KG
Tare Weight	16,460	KG
Net Weight	9,040	KG

Weigth of Gross Sample: 138.5 KG

Weight of Tote Bin: 50.0 KG

Date of Audit of Sample: 15-May-24

Net Sample of Trash: 88.5 KG

Sample Audit Time Started: 9:25 AM

Number of Bulkies Observed: 0

Sample Audit Time Completed: 10:00 AM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)				Net Sample (KG)	Compostables (%)
		1	2	3	4		
Garbage/Residue	50.0	121.5	-	-	-	71.5	80.79%
Fibre - Newsprint/Paper	4.4	5.3	1.4	3.9	2.6	8.8	9.94%
Fibre - OCC	3.3	2.8	1.3	3.0	-	3.8	4.29%
Food/Putrescible Waste	1.1	4.2	-	-	-	3.1	3.50%
Yard Waste	0.0	-	-	-	-	0.0	0.00%
HHW	0.0	-	-	-	-	0.0	0.00%
White Goods	1.1	1.8	-	-	-	0.7	0.79%
Lost or Gained Mass	Combined Weight Following Sorting					0.00	
	138.5						

Notes: Some medical waste (needles) not sorted and classified as garbage.

Performance Audit Record

Date May 15, 2024

Name of Supervisor ███████

Area Area 2

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	RE2094	
Collection Area	Dartmouth	
Date	10-May-24	
Ticket Time	18:20:06	
Gross Weight	23,330	KG
Tare Weight	15,900	KG
Net Weight	7,430	KG

Weigth of Gross Sample 159.5 KG

Weight of Tote Bin 51.0 KG

Date of Audit of Sample 15-May-24

Net Sample of Trash 108.5 KG

Sample Audit Time Started 10:15 AM

Number of Bulkies Observed 0

Sample Audit Time Completed 10:45 AM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)	Compostables (%)
		1	2		
Garbage/Residue	51.0	145.0	-	94.0	86.64%
Fibre - Newsprint/Paper	2.2	2.8	2.2	2.8	2.58%
Fibre - OCC	2.2	2.3	1.8	1.9	1.75%
Food/Putrescible Waste	1.1	7.1	-	6.0	5.53%
Yard Waste	1.1	1.2	-	0.1	0.09%
HHW	1.1	1.2	-	0.1	0.09%
White Goods	1.1	4.5	-	3.4	3.13%
Lost or Gained Mass	**Combined Weight Following Sorting**			0.00	
	159.5				

Notes:

Performance Audit Record

Date May 15, 2024

Area Area 3

Name of Supervisor ██████

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	RE1035
Collection Area	Bedford/Hammonds Plains
Date	09-May-24
Ticket Time	12:04:07
Gross Weight	25,480 KG
Tare Weight	16,700 KG
Net Weight	8,780 KG

Weigth of Gross Sample 142.5 KG

Weight of Tote Bin 51.0 KG

Net Sample of Trash 91.5 KG

Number of Bulkies Observed 0

Date of Audit of Sample 15-May-24

Sample Audit Time Started 10:45 AM

Sample Audit Time Completed 11:25 AM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)				Net Sample (KG)	Compostables (%)
		1	2	3	4		
Garbage/Residue	51.0	122.0	-	-	-	71.0	77.60%
Fibre - Newsprint/Paper	1.1	1.8	-	-	-	0.7	0.77%
Fibre - OCC	4.4	5.0	2.1	3.1	1.6	7.4	8.09%
Food/Putrescible Waste	2.2	4.1	6.8	-	-	8.7	9.51%
Yard Waste	1.1	1.1	-	-	-	0.0	0.00%
HHW	1.1	1.1	-	-	-	0.0	0.00%
White Goods	2.2	3.7	1.5	-	-	3.0	3.28%
Lost or Gained Mass	Combined Weight Following Sorting					-0.35	
	142.0						

Notes:

Performance Audit Record

Date	May 15, 2024	**Name of Supervisor**	▬
Area	Area 4	**Number of Sorters**	5

Weighscale Ticket Information

Truck Number/ID	GFL359
Collection Area	Western County
Date	08-May-24
Ticket Time	12:26:12
Gross Weight	23,820 KG
Tare Weight	18,670 KG
Net Weight	5,150 KG

Weigth of Gross Sample	155.5 KG		
Weight of Tote Bin	51.0 KG	**Date of Audit of Sample**	15-May-24
Net Sample of Trash	104.5 KG	**Sample Audit Time Started**	11:25 AM
Number of Bulkies Observed	0	**Sample Audit Time Completed**	11:45 AM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)	Compostables (%)
		1	2		
Garbage/Residue	51.0	147.0	-	96.0	91.87%
Fibre - Newsprint/Paper	2.2	2.3	2.1	2.2	2.11%
Fibre - OCC	1.1	2.1	-	1.0	0.96%
Food/Putrescible Waste	2.2	1.9	3.9	3.6	3.44%
Yard Waste	0.0	-	-	0.0	0.00%
HHW	0.0	-	-	0.0	0.00%
White Goods	1.1	3.0	-	1.9	1.82%
Lost or Gained Mass	Combined Weight Following Sorting			-0.32	
	155.0				

Notes:

Performance Audit Record

Date	May 15, 2024		**Name of Supervisor**	▮▮▮▮▮
Area	Area 5		**Number of Sorters**	5

Weighscale Ticket Information

Truck Number/ID	RE1029
Collection Area	Sackville/ Fall River
Date	01-May-24
Ticket Time	12:26:01
Gross Weight	25,180 KG
Tare Weight	16,550 KG
Net Weight	8,630 KG

Weigth of Gross Sample   148.0 KG

Weight of Tote Bin   49.5 KG   **Date of Audit of Sample**   15-May-24

Net Sample of Trash   98.5 KG   **Sample Audit Time Started**   11:50 AM

Number of Bulkies Observed   0   **Sample Audit Time Completed**   12:50 PM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)			Net Sample (KG)	Compostables (%)
		1	2	3		
Garbage/Residue	49.5	135.0	-	-	85.5	86.80%
Fibre - Newsprint/Paper	2.2	3.3	1.9	-	3.0	3.05%
Fibre - OCC	1.1	4.2	-	-	3.1	3.15%
Food/Putrescible Waste	1.1	6.5	-	-	5.4	5.48%
Yard Waste	1.1	1.2	-	-	0.1	0.10%
HHW	1.1	1.3	-	-	0.2	0.20%
White Goods	1.1	2.2	-	-	1.1	1.12%
Lost or Gained Mass	Combined Weight Following Sorting				-0.34	
	147.5					

Notes:

Performance Audit Record

Date May 15, 2024

Name of Supervisor ▮▮▮▮

Area Area 6

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	RE2093
Collection Area	Cole Harbour/ Eastern Passage
Date	29-Apr-24
Ticket Time	11:43:38
Gross Weight	24,070 KG
Tare Weight	16,160 KG
Net Weight	7,910 KG

Weigth of Gross Sample 133.5 KG

Weight of Tote Bin 50.0 KG

Date of Audit of Sample 15-May-24

Net Sample of Trash 83.5 KG

Sample Audit Time Started 1:00 PM

Number of Bulkies Observed 0

Sample Audit Time Completed 1:20 PM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)	Compostables (%)
		1	2		
Garbage/Residue	50.0	121.5	-	71.5	85.63%
Fibre - Newsprint/Paper	2.2	1.9	1.8	1.5	1.80%
Fibre - OCC	2.2	2.1	2.5	2.4	2.87%
Food/Putrescible Waste	1.1	6.6	-	5.5	6.59%
Yard Waste	0.0	-	-	0.0	0.00%
HHW	1.1	1.3	-	0.2	0.24%
White Goods	1.1	3.4	-	2.3	2.75%
Lost or Gained Mass	Combined Weight Following Sorting			-0.37	
	133.0				

Notes:

Performance Audit Record

Date May 15, 2024

Name of Supervisor ▬▬▬

Area Area 7

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	MW9524
Collection Area	Preston/Lawrencetown/Lake Echo
Date	06-May-24
Ticket Time	13:50:09
Gross Weight	27,760 KG
Tare Weight	17,260 KG
Net Weight	10,500 KG

Weigth of Gross Sample   146.0 KG

Weight of Tote Bin   49.5 KG

Date of Audit of Sample   15-May-24

Net Sample of Trash   96.5 KG

Sample Audit Time Started   1:25 PM

Number of Bulkies Observed   0

Sample Audit Time Completed   1:45 PM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)	Compostables (%)
		1	2		
Garbage/Residue	49.5	135.0	-	85.5	88.60%
Fibre - Newsprint/Paper	2.2	1.9	1.7	1.4	1.45%
Fibre - OCC	2.2	1.2	3.6	2.6	2.69%
Food/Putrescible Waste	1.1	5.7	-	4.6	4.77%
Yard Waste	0.0	-	-	0.0	0.00%
HHW	0.0	-	-	0.0	0.00%
White Goods	1.1	4.0	-	2.9	3.01%
Lost or Gained Mass	Combined Weight Following Sorting			0.00	
	146.0				

Notes:

Performance Audit Record

Date May 15, 2024

Name of Supervisor ████████

Area Area 8

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	RE2017	
Collection Area	Eastern County	
Date	07-May-24	
Ticket Time	12:53:39	
Gross Weight	23,390	KG
Tare Weight	16,470	KG
Net Weight	6,920	KG

Weigth of Gross Sample 135.0 KG

Weight of Tote Bin 50.0 KG

Date of Audit of Sample 15-May-24

Net Sample of Trash 85.0 KG

Sample Audit Time Started 1:50 PM

Number of Bulkies Observed 0

Sample Audit Time Completed 2:10 PM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)		Net Sample (KG)	Compostables (%)
		1	2		
Garbage/Residue	50.0	124.0	-	74.0	87.06%
Fibre - Newsprint/Paper	2.2	2.1	2.4	2.3	2.71%
Fibre - OCC	2.2	2.3	2.2	2.3	2.71%
Food/Putrescible Waste	1.1	6.5	-	5.4	6.35%
Yard Waste	1.1	1.1	-	0.0	0.00%
HHW	1.1	1.2	-	0.1	0.12%
White Goods	1.1	2.4	-	1.3	1.53%
Lost or Gained Mass	**Combined Weight Following Sorting**			0.00	
	135.0				

Notes:

Performance Audit Record

Date May 15, 2024

Name of Supervisor ████████

Area Area 9

Number of Sorters 5

Weighscale Ticket Information

Truck Number/ID	MW2422
Collection Area	Bedford/ Sackville Condos
Date	06-May-24
Ticket Time	10:03:36
Gross Weight	14,810 KG
Tare Weight	13,460 KG
Net Weight	1,350 KG

Weigth of Gross Sample 169.5 KG

Weight of Tote Bin 50.5 KG

Date of Audit of Sample 15-May-24

Net Sample of Trash 119.0 KG

Sample Audit Time Started 2:20 PM

Number of Bulkies Observed 0

Sample Audit Time Completed 2:50 PM

Material	Empty Bin Weight (KG)	Total Separated Sample Weights (KG)			Net Sample (KG)	Compostables (%)
		1	2	3		
Garbage/Residue	50.5	80.5	-	-	30.0	25.21%
Fibre - Newsprint/Paper	2.2	2.7	3.9	-	4.4	3.70%
Fibre - OCC	2.2	1.6	3.4	-	2.8	2.35%
Food/Putrescible Waste	52.2	117.5	3.3	6.3	74.9	62.94%
Yard Waste	6.6	9.5	1.1	-	4.0	3.36%
HHW	1.1	1.2	-	-	0.1	0.08%
White Goods	1.1	4.3	-	-	3.2	2.69%
Lost or Gained Mass	Combined Weight Following Sorting				-0.59	
	168.5					

Notes: Large yard and organic wastes were weighed out separately.

ATTACHMENT 4
SUPPORTING DATA

Waste Collection Area	% Organics From May 15, 2024 Waste Audit	Average Based On Previous Three Fiscal Years (Tonnes)	Estimated Annual Compostable Waste (Tonnes)
1	18.71%	10014.25	1873.54
2	9.95%	6841.50	681.00
3	18.36%	4433.34	813.99
4	6.51%	5334.37	347.12
5	11.78%	8637.86	1017.25
6	11.26%	5150.89	579.86
7	8.91%	2930.93	261.20
8	11.76%	3298.51	388.06
Condos	72.35%	2351.13	1701.11
TOTAL		48992.77	7663.13

Mean	18.84%	-	851.46
Min	6.51%	-	261.20
Max	72.35%	-	1873.54

Compostable Waste Percentage	(7663.13/48992.77)*100% = 15.64%

Notes: % Organic for Area 1 is based on average of the two samples (1A and 1B) collected during the May 2024 waste audit.

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Table 2: Compostable Waste Descriptive Statistics   Project 22-8641

Mean	851.4590788
Standard Error	194.214329
Median	680.997235
Mode	#N/A
Standard Deviation	582.6429871
Sample Variance	339472.8504
Kurtosis	-0.267511928
Skewness	0.997131857
Range	1612.341486
Minimum	261.2017547
Maximum	1873.54324
Sum	7663.131709
Count	9
Confidence Level(95.0%)	447.8590459
Upper Confidence Interval	1299.318125
Lower Confidence Interval	403.6000329

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Waste Collection Area	% Food Waste From May 15, 2024 Waste Audit	Average Based On Previous Three Fiscal Years (Tonnes)	Estimated Annual Food Waste (Tonnes)
1	6.70%	10014.25	670.72
2	5.53%	6841.50	378.33
3	9.51%	4433.34	421.53
4	3.44%	5334.37	183.77
5	5.48%	8637.86	473.55
6	6.59%	5150.89	339.28
7	4.77%	2930.93	139.71
8	6.35%	3298.51	209.55
Condos	62.94%	2351.13	1479.83
TOTAL		48992.77	4296.27

Mean	12.37%	-	477.36
Min	3.44%	-	139.71
Max	62.94%	-	1479.83

Food Waste Percentage	(4296.77/48992.77)*100% = 8.77%

Notes: % Food waste for Area 1 is based on average of the two samples (1A and 1B) collected during the May 2024 waste audit.

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Mean	477.3634643
Standard Error	136.740783
Median	378.3317972
Mode	#N/A
Standard Deviation	410.2223489
Sample Variance	168282.3756
Kurtosis	5.240312593
Skewness	2.160113029
Range	1340.116316
Minimum	139.7125665
Maximum	1479.828882
Sum	4296.271179
Count	9
Confidence Level(95.0%)	315.324811
Upper Confidence Interval	792.6882753
Lower Confidence Interval	162.0386533

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C O N S U L T I N G