

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF JUNE 25, 2024

Item 19, Report No. 25 of the Committee of the Whole, which was adopted without amendment by the Council of the City of Vaughan on June 25, 2024.

19. 2024-2026 LITTER REDUCTION ACTION PLAN AND UPDATE

The Committee of the Whole recommends approval of the recommendation contained in the following report of the Deputy City Manager, Public Works, dated June 18, 2024:

Recommendations

1. THAT this report be received.

Committee of the Whole (2) Report

DATE: Tuesday, June 18, 2024

WARD(S): ALL

TITLE: 2024-2026 LITTER REDUCTION ACTION PLAN AND UPDATE

FROM:

Zoran Postic, Deputy City Manager, Public Works

ACTION: FOR INFORMATION

Purpose

To provide an update following results from Vaughan's first litter audit, including details about a litter reduction action plan that has been developed.

Report Highlights

- Portfolio data indicates that littering is the top eighth call type received in Public Works according to the Customer Relationship Management (CRM) system.
- Vaughan's first litter audit was completed in three phases beginning in April 2023 and completed by August 2023.
- The audit results highlighted key findings, including common types of litter material, brands and significant hotspot areas in Vaughan.
- A Litter Reduction Action Plan (2024-2026) that includes four key commitments, was developed from the litter audit findings.
- Several strategies deriving from the framework are currently underway and are expected to continue throughout 2024 and beyond.

Recommendations

1. THAT this report be received.

Background

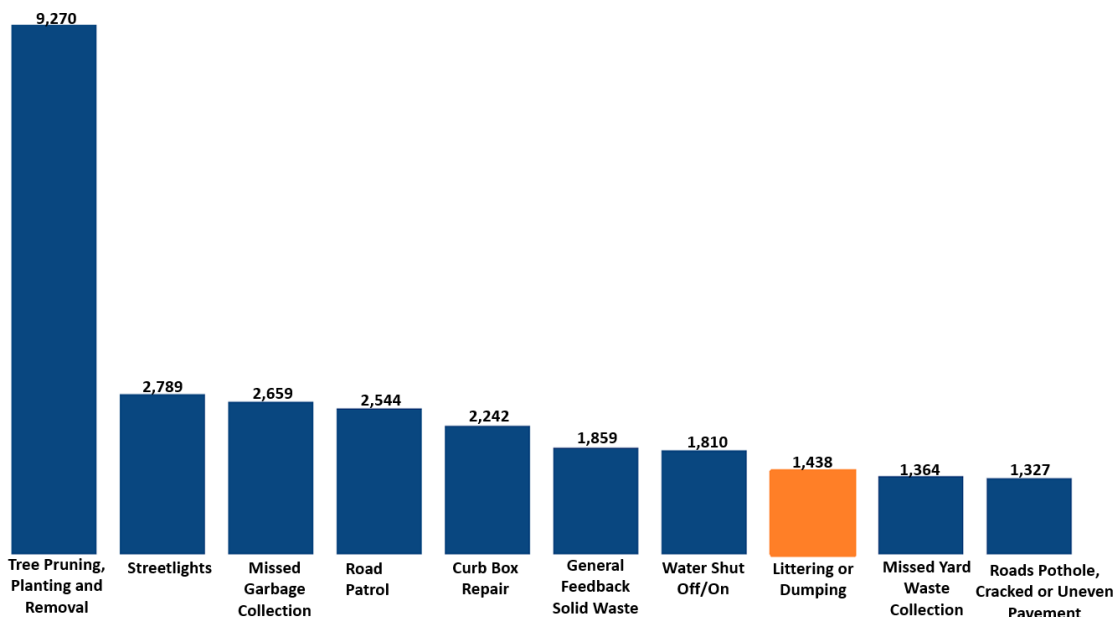
To proactively address litter concerns in the city, a jurisdictional scan was conducted to gain insights into strategies that have been adopted by neighbouring municipalities.

Litter poses significant concerns for municipalities, including costs for clean-up and maintenance and substantial environmental and wildlife issues. To proactively address these concerns, staff conducted a jurisdictional scan in 2022 and learned that a few municipalities, including the City of Toronto, have used litter audits to strategically approach this issue. Several effective initiatives have been launched in Toronto stemming from the audit findings, which inspired Vaughan staff to conduct the city's inaugural litter audit in June 2023. Staff aimed to adopt a data-driven approach to pinpoint hot spots in the city, implement targeted strategies, and most importantly, gain a better understanding of the litter problem in Vaughan.

Portfolio data for 2023 indicates that littering is the top eighth call type received in Public Works according to call volume data.

Data from the Customer Relationship Management (CRM) system has shown that litter calls are among the top ten call types received for Public Works, with a total of 1,438 calls in 2023 as indicated in Figure 1 below. These statistics highlight the problem litter poses on our community and the desire from our residents to keep our community safe, clean and beautiful.

Figure 1: 2023 Public Works Service-Related Calls from the CRM system



There are numerous benefits to conducting a litter audit as shown by research and results from other leading municipalities.

The City of Toronto has implemented several initiatives since implementing litter audits in 2002. This includes notable changes to infrastructure, through the addition of cigarette butt compartments on waste bins, as well as an increase in waste bins in hot spot areas throughout the city. Ongoing litter audits have shown a decrease in cigarette butts found strewn on city streets.

Similarly, the City of Edmonton has been proactive in addressing litter issues by conducting regular litter audits since 2009. Based on findings from these audits, it was found that cigarette butts, like Toronto, were among the top types of small litter found within the city throughout the years. Since initiating the audits, the city has effectively implemented 719 ashtrays, which has led to a decrease of 42.1 per cent in cigarette butt litter from 2018 to 2019.

Vaughan's first litter audit was conducted in three phases beginning in April 2023 and completed by August 2023.

In April 2023, the Public Works department engaged a consultant to conduct Vaughan's first comprehensive city-wide litter audit. This initiative reflects a commitment to proactively assess litter within the community and gain insights into its characteristics. The audit was conducted in three phases:

- **Phase 1 – Background Review and Analysis:** The project team provided the consultant, AET Group, with relevant documentation and information to develop a tailored plan and strategy based on multiple factors, including Vaughan's population size, key assets, topography and our five wards among other considerations. Through this process, 100 sites were randomly selected using a sample size software calculator to minimize skewing of data. The selected sites were of comparable size and equally distributed throughout the city's five wards.
- **Phase 2 – In- field Litter Audit:** In June 2023, the consultant team went into the field to conduct audits at the 100 pre-selected locations identified in Phase 1. These sites were located throughout the public realm in the city.
- **Phase 3 – Final Report and Recommendations:** The consultant prepared a final report with detailed findings and recommendations.

Previous Reports/Authority

N/A

Analysis and Options

The audit results highlighted key findings, including common types of litter material, brands and significant hotspot areas in Vaughan.

Out of the 100 audited sites, 346 pieces of small litter were identified. Small litter is described as equal to or smaller than four square inches. The average amount per site was four pieces and the site with the most small litter had 33 pieces. The most commonly occurring small litter items included cigarette butts and debris, which accounted for 35.3 per cent, followed by paper at 20.5 per cent. Other commonly found items include candy packaging, wrappers and plastic film. In addition, there were 21 sites with above-average counts of small litter and 69 sites with below-average counts. Exactly 10 sites had the average count of small litter, and there were 36 sites which were free of small litter. The findings are further highlighted in Table 1 below.

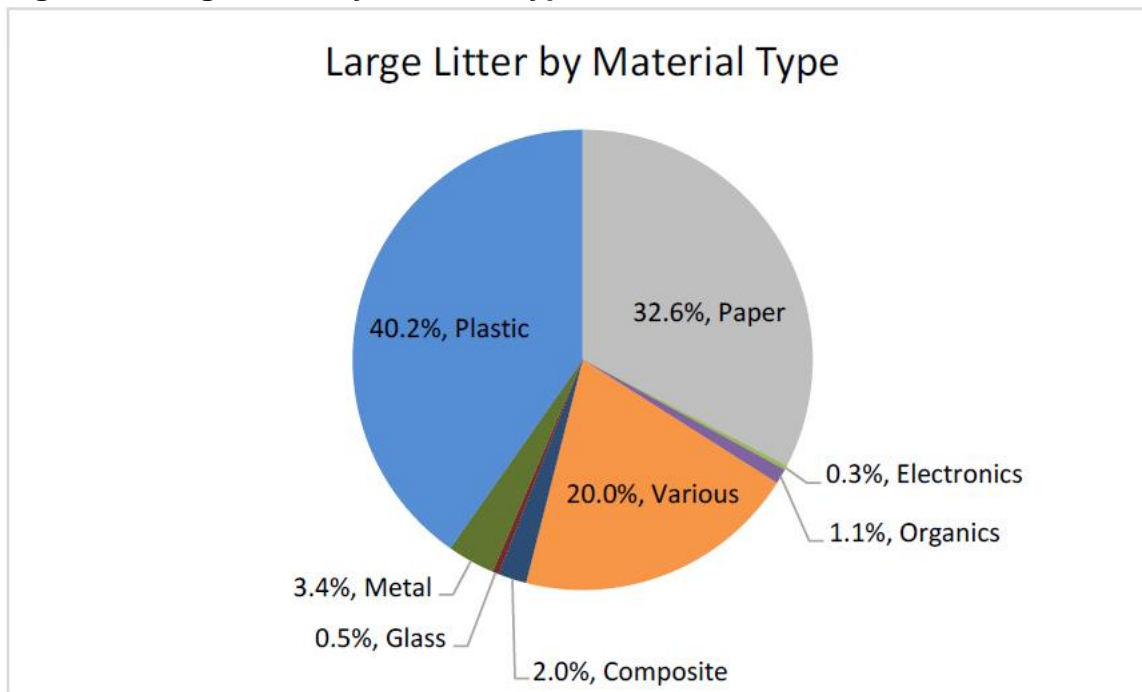
Table 1: Highest Ranking Sites for Small Litter

Rank	Site #	Site Id	Small Litter	Address	Ward
1	28	55	33	8899 Jane St.	4
2	42	3	33	3700 Steeles Ave.	3
3	21	68	15	331 Jacob Keefer Pkwy	4
4	61	85	14	41 Poetry Dr.	3
5	66	127	13	11399 Keele St.	1
6	12	13	12	208 Conley St.	5
7	27	35	12	668 Millway Ave.	4
8	41	78	12	66 Marathon Ave.	4
9	60	88	12	81 Sunset Terr.	3
10	25	18	11	315 Millway Ave.	4

The consultant team also measured large litter across the 100 sites, described as equal to or larger than four square inches. The total number of large litter identified across the audited sites was 656, with the average number of large litter being seven, and the

highest amount found at any one site, equating to 96 pieces. Out of all the large litter, miscellaneous plastic was the most common type, occurring at 9.6 per cent with a count of 63 items. The second most common item was plastic water bottles at 9.3 per cent. Towels, napkins and serviettes without a brand name and other materials followed closely at 8.5 per cent. Other top items included cup lids, lid pieces and straws. In terms of materials, plastic was the largest category found at 40.2 per cent, followed by paper at 32.6 per cent. Additional details on the material types found are listed in the figure below.

Figure 2: Large Litter by Material Type



While completing the audit on large litter items, our consultants also recorded any brand names that were visible. Out of the 656 large litter items recorded, 160 items had an identifiable brand, with a total of 73 different brands detected. The most prevalent brand was Tim Hortons, accounting for 20.6 per cent, followed by McDonald's at 6.9 per cent and Nestle at 5.6 per cent. Other top brand names identified include No Name, Belmont Cigarettes, Coca-Cola, Kirkland, Pepsi, President's Choice and Starbucks.

In addition, the following chart lists the top 10 sites with the highest number of combined litter (small and large):

Table 2: Site Ranking for All Litter (Combined Large and Small Litter)

<i>Rank</i>	<i>Site ID</i>	<i>Site #</i>	<i>Large Litter</i>	<i>Small Litter</i>	<i>All Litter</i>	<i>Street Name</i>
1	69	87	96	0	96	11050 Cold Creek Rd.
2	3	42	19	33	52	3700 Steeles Ave.
3	55	28	15	33	48	8899 Jane St.
4	127	66	32	13	45	11399 Keele St.
5	85	61	21	14	35	41 Poetry Dr.
6	68	21	18	16	34	331 Jacob Keefer Pkwy
7	101	72	23	6	29	1 Angel View Ct.
8	88	60	16	12	28	81 Sunset Terr.
9	35	27	15	12	27	668 Millway Ave.
10	18	25	11	11	22	315 Millway Ave.

In terms of area characteristics, 40 per cent of the top 10 sites were commercial or a combination of commercial residential, 30 per cent were residential and 30 per cent were industrial.

A Litter Reduction Action Plan (2024-2026) that includes four key commitments has been developed from the findings to create a holistic approach.

Since receiving the litter audit report, staff have developed a data-driven framework and strategy for 2024-2026 to address litter issues throughout the city. The strategy highlights four key pillars to combat litter in the community.

Commitment One: Enhance Education and Community Engagement

The first commitment is being implemented in partnership with the City’s Communications, Marketing and Engagement department. For several years, the team has leveraged all its channels to employ a year-long communications plan related to litter. This was enhanced in 2024 with the findings of the audit, which informed the approach to continue to educate residents about the consequences of litter and how to avoid it.

The department’s comprehensive communications campaigns provide key messages in plain language about the rules and related by-laws and how to file a complaint – whether with the City or another organization.

Public Works staff have also worked with the Office of the City Clerk to proclaim The Provincial Day of Action on Litter in May and will proclaim World Litter Day in September to raise community awareness. Additionally, in partnership with the Policy Planning and Special Programs department, staff will continue to explore more opportunities to increase the number of community-led clean-up days, events and initiatives. Staff will also consider school partnerships for litter pickups to fulfill community service hours. All efforts and opportunities are supported by the Communications, Marketing and Engagement department.

Staff have also collaborated with Canada Post to define maintenance responsibilities near community mailboxes and updated the city website with appropriate contact information.

Commitment Two: Continue Enforcement Efforts

The second commitment will be executed in partnership with the By-law and Compliance, Licensing and Permit Services department by reviewing existing enforcement processes to improve how property-related violations are handled. Further tactics involve ongoing monitoring of the effectiveness of existing penalties. To date, fines have effectively been doubled for repeat offenders.

Commitment Three: Modernize Litter Infrastructure

The third commitment involves an internal review and considerations regarding increasing the number of waste bins in high-traffic areas, hot spots and remote areas. Staff will continue to implement a garbage bin replacement program to combat illegal dumping in City parks. In May 2024, Public Works also successfully expanded the SmartParks initiative to include 10 additional City parks, for a total of 15 SmartParks across the five wards with revamped signage. The SmartParks initiative encourages community engagement and public responsibility in keeping the city clean and beautiful.

Commitment Four: Optimize the Operations Approach

Optimizing the Operations approach includes an internal review from Public Works of existing maintenance schedules through route-optimization software to enhance rotation efficiency. Staff will explore options to increase funding for seasonal staff to collect litter during peak community-gathering seasons and the project team will conduct regular litter audits for continuous improvement.

Several strategies deriving from the framework are currently underway and expected to continue throughout 2024 and beyond, with a focus on continuous improvement.

Looking ahead, the City intends to conduct regular litter audits every three years in keeping with continuous improvement efforts. The audits will provide insight into the effectiveness of implemented strategies and any blind spots that may require additional focus and attention.

Financial Impact

There are minimal financial impacts related to this report.

Operational Impact

Consultation has taken place with Communications, Marketing and Engagement and By-law and Compliance, Licensing and Permit Services departments to develop the 2024-2026 Litter Reduction Action Plan. Staff will work with Communications, Marketing and Engagement to implement Commitment One: Enhance Education and Community Engagement, and By-law and Compliance, Licensing and Permit Services to implement Commitment Two: Continue Enforcement Efforts.

Broader Regional Impacts/Considerations

There are no broader regional impacts/considerations as it relates to this report.

Conclusion

The City's first litter audit prompted the development of a comprehensive strategy to combat littering. Through various partnerships with internal City departments and leveraging data analysis, staff aim to continue to educate the community, enhance enforcement measures, modernize litter infrastructure and optimize operations. Implementation of these tactics includes ongoing targeted communication, enforcement reviews and improvements to infrastructure. Regular audits will ensure continuous improvement and ongoing progress to tackle litter, highlighting the City's commitment to a cleaner and more sustainable environment.

For more information, please contact: Shanon Kalra-Ramjoo, Director, Parks, Forestry and Horticulture Operations

Attachments

1. 2023 Litter Audit Report, AET Group Inc., August 2023
2. Litter Reduction Action Plan (2024-2026)

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City of Vaughan

2023 Litter Audit

Prepared for
City of Vaughan

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July 31, 2023

AET File No. VAU_WA2223_051





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APPENDIX A: Site Location Details

APPENDIX B: Site Distribution Map and Top Litter Hotspots

APPENDIX C: Methodology

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APPENDIX E: Large Litter Data

APPENDIX F: Small Litter Data

APPENDIX G: Ranking of Sites

APPENDIX H: Branded Litter Data

EXECUTIVE SUMMARY

The City of Vaughan (the City) contracted AET Group Inc. (AET) to conduct litter audits at 100 pre-selected locations within the public realm across the city. The audits were conducted from June 6th through June 13th, 2023, to assess the composition and amount of litter present on Vaughan streets. AET visually assessed the litter within these 100 locations and recorded the size, type, and brand of litter.

Key findings from the **large litter** audits:

- The average amount of large items per site was 7;
- The total number of large litter items identified was 656;
- The number of sites with no large litter recorded was 12;
- The most found item in the large litter audit was miscellaneous plastic, representing 9.6% of all large items audited. Other common litter items include plastic bottles, at 9.3%, un-branded towels /napkins/serviettes at 8.5%, and other materials, at 8.5%; and
- 73 different brands of litter were observed, with Tim Horton's items being the most common, accounting for 20.6% of all branded litter. Other frequently found brands included McDonald's at 6.9%, Nestle at 5.6%, No Name at 5.0% and Belmont at 4.0%;

Key findings from the **small litter** audits:

- The average amount of small litter items per site was 4;
- The total number of small litter items identified was 346;
- The most found small litter item was cigarette butts/debris, accounting for 35.3% of all small litter audited, followed by paper at 20.5%.

1.0 INTRODUCTION

1.1 Background

The City of Vaughan (the City) contracted AET Group Inc. (AET) to conduct litter audits at 100 pre-selected locations within the public realm across the city. These sites can be seen below in Figure 1.1. The audits took place from June 6th through June 13th, 2023, to assess the composition and amount of litter on Vaughan streets. The type of litter was classified into two size categories: large litter, which is equal to or larger than four square inches, and small litter, which is smaller than four square inches.

Figure 1.1 also shows the initial 127 sites that were determined by using the Raosoft sample size software calculator but then reduced to 100 locations to be visited. An in-depth explanation of site selection is written in Appendix C.

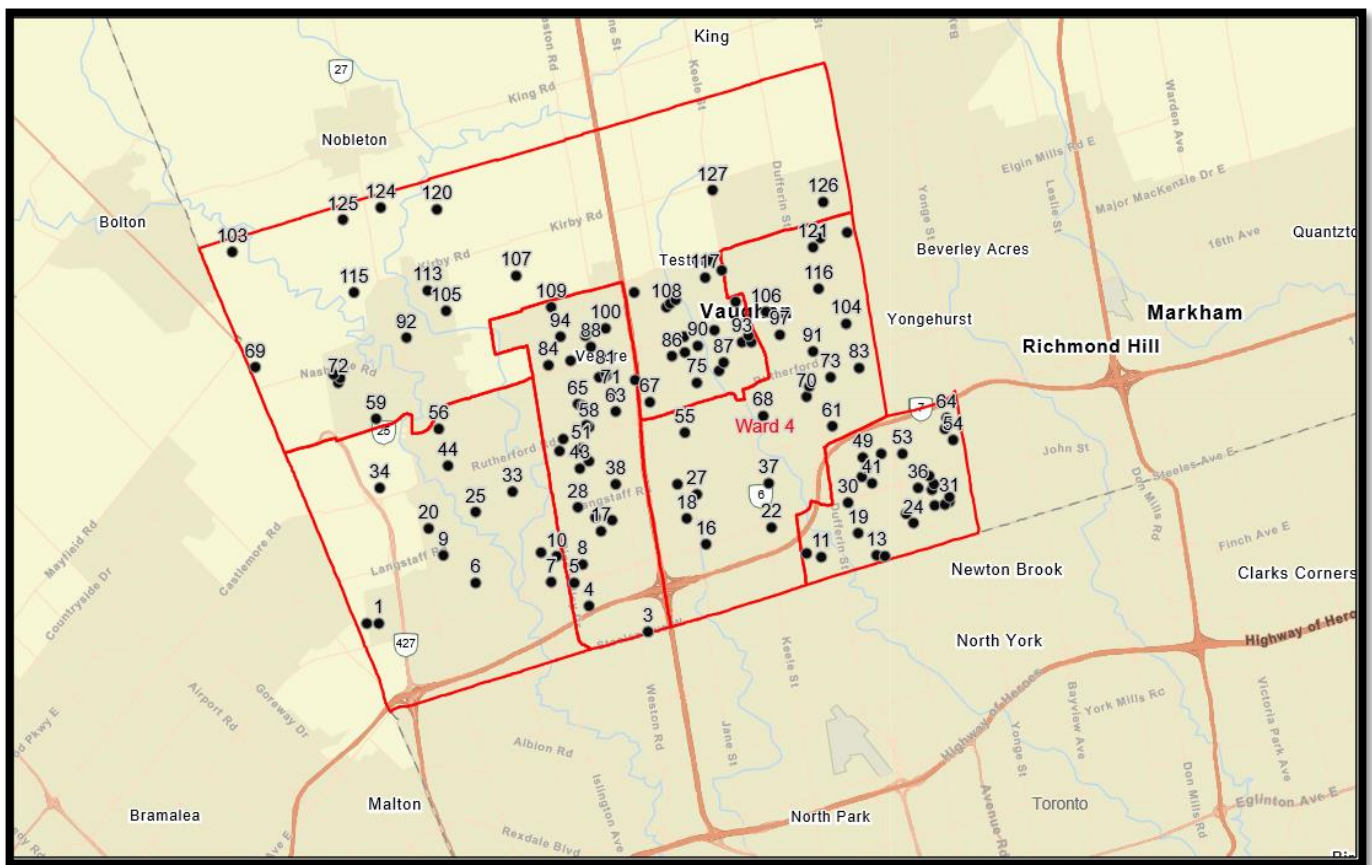


Figure 1.1 Vaughan Litter Audit Site Locations labelled by Site ID

1.2 Objectives

The litter audits were intended to accomplish the following:

- A detailed analysis of large litter items, as well as brands of materials that fall within the survey areas;
- A detailed analysis of small litter items that fall within the smaller subsections of the survey areas; and,
- Analysis and reporting of the results.

2.0 METHODOLOGY

2.1 Litter Audit Summary

The litter audit was conducted by surveying 100 pre-selected locations which were determined by the City. Two AET staff conducted the audits from June 6th through June 13th, 2023. AET staff was responsible for observing accumulated litter and recording data for the classification of large, small, and branded litter, and background information for each of the 100 sites. There are 90 large litter categories and 18 small litter categories. More information about the methodology can be found in Appendix C.

2.2 Survey Data Collection

AET staff completed the Site Surveyor Form provided by the City for each of the assigned 100 sites. The following information was recorded on these forms:

- Date and time
- Audit team
- Size of audit area
- Type and characteristics of the adjacent road
- General attributes of the area
- Visual analysis of the site

The forms can be found in Appendix D.

GPS coordinates were used to assist the team in getting to each site. Data from the *Site Surveyor Forms* were transferred to an Excel worksheet. Details about site location can be found in Appendix A.

2.3 Large Litter and Branded Litter Data Collection

After the site was measured and information about the site was recorded, an AET staff member completed the *Large Items and Branded Litter Count* form. After two passes of the site were completed, information about the type and brands of litter (where applicable) present within the study area was recorded. This data was then transferred to an Excel worksheet. The worksheet calculated the total amount of large litter at each site as the average of the two passes. Large litter collection data can be found in Appendix E, while branded litter collection data can be found in Appendix H.

2.4 Small Litter Data Collection

Results from the small litter audits were recorded on the Small Litter Count Sheet by AET staff after the site was measured, and information about the site was recorded. Data from each of the 100 sites were transferred into an Excel worksheet. Results can be found in Appendix F.

3.0 SUMMARY OF RESULTS

3.1 Survey Results

During the audits, AET staff collected information about the roads adjacent to the audit sites. As seen in Figure 3.1, 96% of the audit locations were on minor city streets, and 4% of the audit locations were on major city streets. Minor

city streets serve low traffic volumes and assist with directing traffic to the nearest collector street. Major city streets often have higher traffic volumes and connect various sections of the City.

The survey only looks at public spaces that are within 18 feet of the roadway. Due to this, the survey did not extend into parks and public space parkettes.

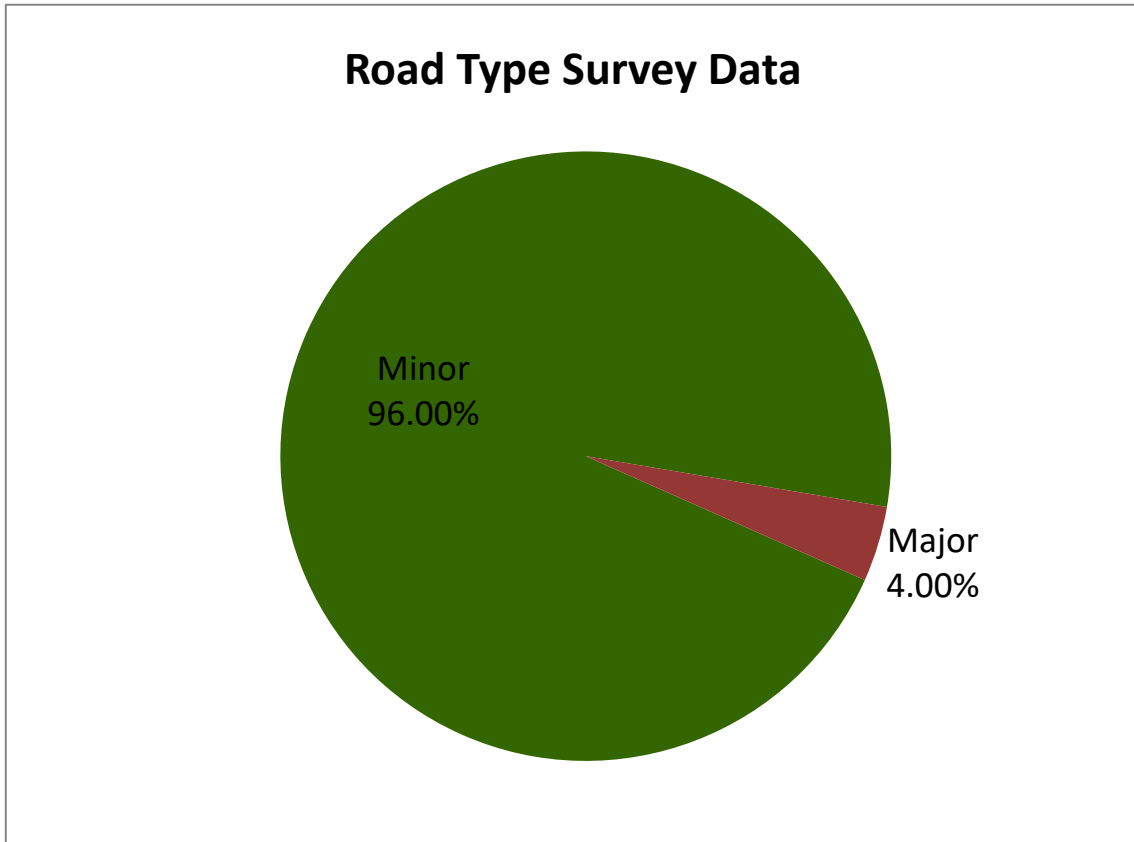


Figure 3.1 Road Type Results – Survey Data

AET staff completed a visual rating for each site based on the amount of litter visible. The sites were rated on a scale from 1-4, with 1 representing the cleanest sites with less than 5 pieces of litter visible, and 4 representing the dirtiest sites with greater than 20 pieces of litter visible. Figure 3.2 illustrates the visual ratings of all audit sites. A majority of sites surveyed were ranked in the cleanest possible category, while the dirtiest ranking had the least amount of sites.

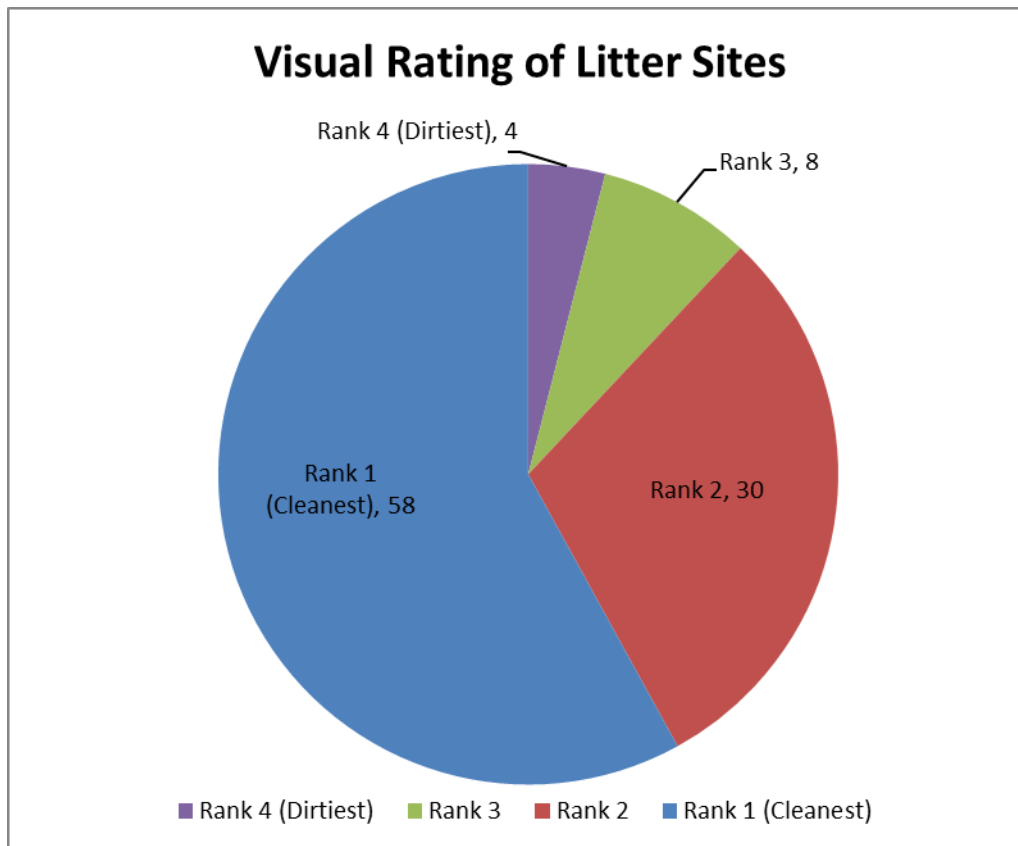


Figure 3.2 Visual Rating Litter Index

3.2 Large Litter Results

Large litter is any piece of litter within the site that is equal to or greater than 4 square inches. The average number of large litter items found at each site was 7 pieces, while the highest amount was 96 pieces.

Of all large litter, miscellaneous plastic was the most common type, occurring at 9.6% with a count of 63 items. These plastic items were not easily visually identifiable as a product. The second most common occurrence of large litter was plastic water bottles at 9.3%. Towels, napkins and serviettes without a brand name and other materials followed closely at 8.5% making them the third most common large litter items. Other top items included: cup lids, lid pieces, and straws (5.6%), miscellaneous paper (5.0%), other tobacco (3.0%) and plastic wrap (3.0%)

Table 3.1 illustrates the 20 most common items of large litter found during the audit. These items account for 78.2% of the large litter identified. The complete list of all the items identified during the large litter audit can be found in Appendix E.

Table 3.1 Top 20 Large Litter Items

#	Large Litter Items	Count	Percent
1	Misc. Plastic	63	9.6%
2	Water (Plastic)	61	9.3%
3	No Brand Name Towels / Napkins / Serviettes	56	8.5%
4	Other Materials	56	8.5%
5	Cup Lids, Lid Pieces, Straws	37	5.6%
6	Misc. Paper	33	5.0%
7	Tobacco Other (packs, matches, cellophane)	20	3.0%
8	Plastic Wrap	20	3.0%
9	Printed Material (newspapers, flyers, books etc.)	19	2.9%
10	Paper Cups (Hot)	17	2.6%
11	Paperboard (Cereal Type)	15	2.3%
12	Plastic Drink Cups	15	2.3%
13	Construction Debris	15	2.3%
14	Soft Drink (Cans)	14	2.1%
15	Other Plastic Shells/Boxes	14	2.1%
16	Receipts (business forms, bus transfers, etc)	13	2.0%
17	Candy Bar Wraps	13	2.0%
18	Misc. Paperboard	12	1.8%
19	Paper Packaging Other	10	1.5%
20	Plastic Bags - Not Retail	10	1.5%
Total Top 20		513	78.2%
Total - All Large Litter		656	100.0%

3.2.1 Large Litter by Material Type

Items within the large litter categories are composed of different material types. These items were categorized based on their known composition, including: paper, plastic, composite (made of multiple materials), metal, glass, various (could be multiple different types of materials), textiles, organics, electronics and rubber. Figure 3.3 illustrates the most common material types of the 656 large litter items audited. Plastic is the largest material category representing 40.2% of the litter. Paper is the second largest material category at 32.6%. Various is the third largest category representing 20.0% of the materials audited. No rubber or textiles were found on the surveyed sites.

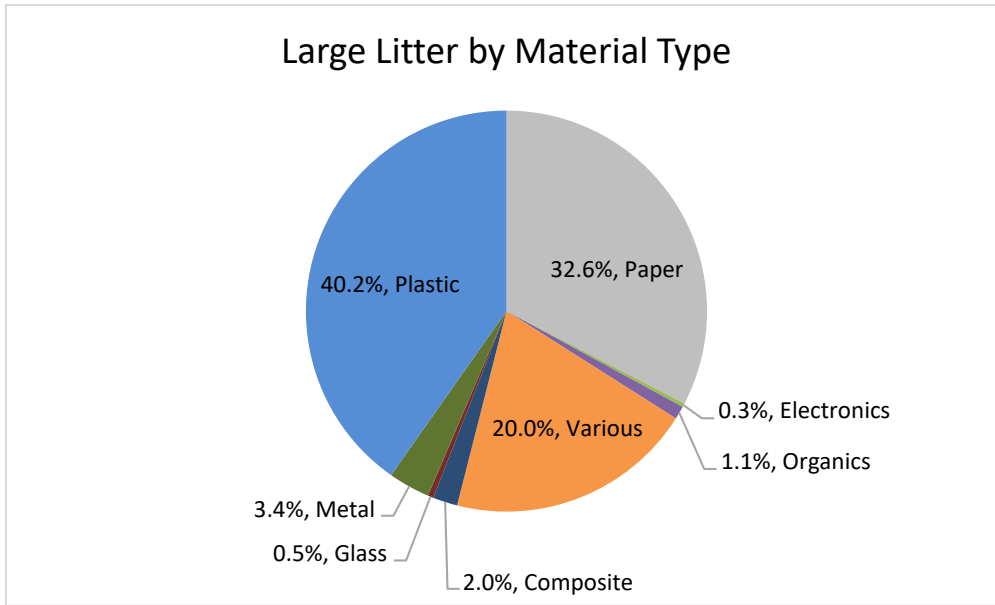


Figure 3.3 Large Litter by Material Type

3.2.2 Large Litter by Category

Figure 3.4 below provides a summary of the total amount of large litter audited by each of the 13 categories used for the analysis of the large litter items. The three most common categories of litter audited include other miscellaneous, paper/fibre material and beverage packaging. Other miscellaneous items include paper and plastic, as well as food, other organics, construction debris and vehicle/road debris and PPE. Trays, cloth, and other beverage packaging were the least common categories found. A full list of material categories and their definitions can be found in Appendix C.

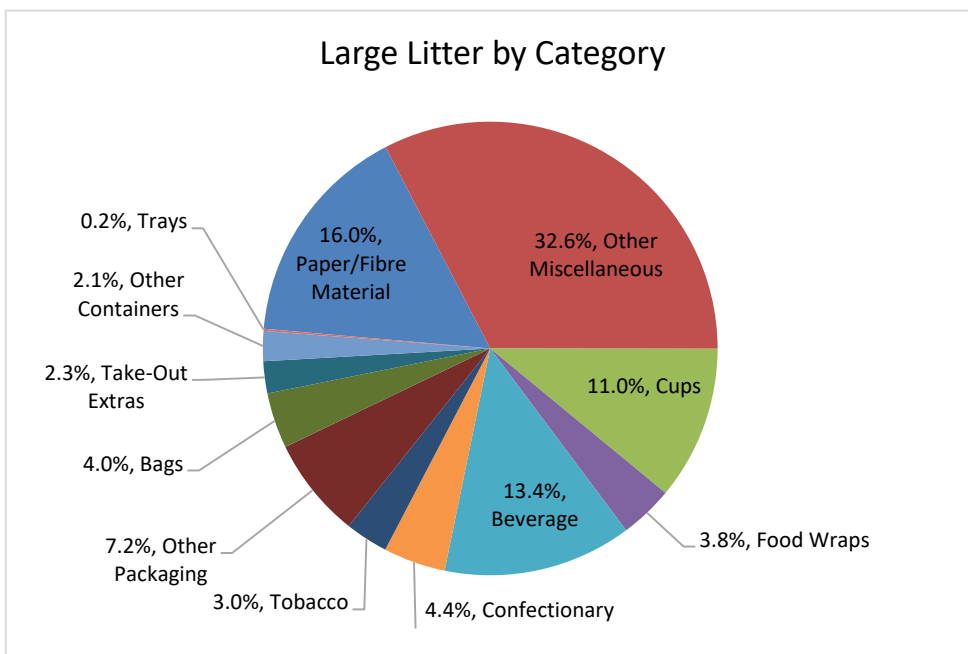


Figure 3.4 Large Litter by Category

3.2.3 Large Litter by Sites

Table 3.2 below illustrates the 10 sites with the highest item counts for large litter. Site #87 (11050 Gold Creek Rd) had the largest amount of large litter identified, amounting to 96 pieces. Site #66 (11399 Keele St.) had the second-greatest quantity of large litter at 32, followed by Site #72 (Angel View Ct.) with 23 pieces. Twelve of the surveyed sites had no large litter.

Table 3.2 Highest Ranking Sites for Large Litter

Rank	Site #	Site Id	Large Litter	Address	Ward
1	87	69	96	11050 Gold Creek Rd.	1
2	66	127	32	11399 Keele St.	1
3	72	101	23	1 Angel View Ct.	1
4	61	85	21	41 Poetry Dr.	3
5	42	3	19	3700 Steeles Ave.	3
6	21	68	18	331 Jacob Keefer Pkwy	4
7	60	88	16	81 Sunset Terr.	3
8	24	16	15	2920 Highway 7	4
9	27	35	15	668 Millway Ave.	4
10	28	55	15	8899 Jane St.	4

3.2.4 Large Litter Site Analysis

The average amount of large litter per site was 7 pieces (after rounding the statistical mean of 6.55). Out of the 100 sites, 70% had below-average counts of large litter, 2% of sites had the average amount of large litter and 28% of sites had above-average counts of large litter as detailed in Figure 3.5. Twelve of the sites sampled were free of large litter.

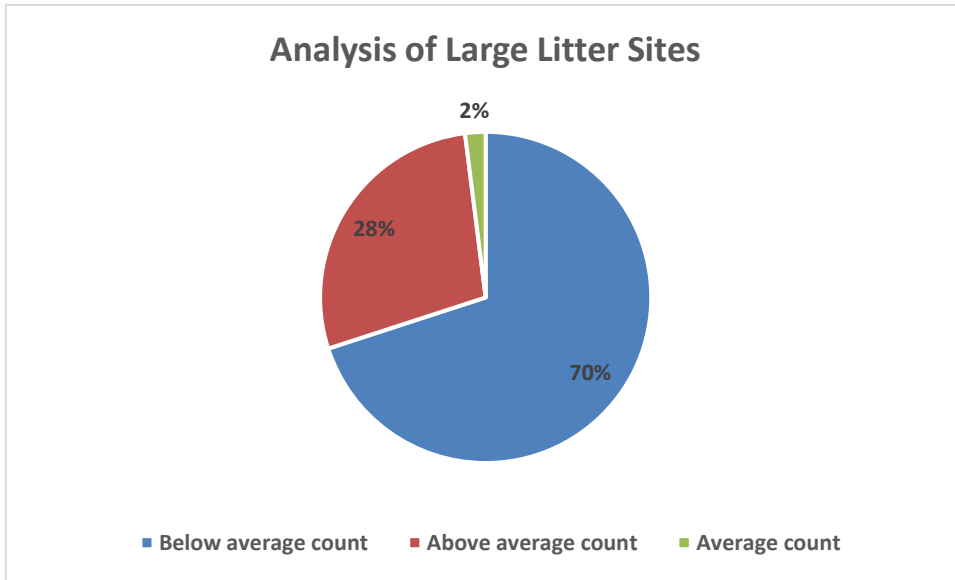


Figure 3.5 Large Litter Site Analysis

3.3 Branded Litter Results

While completing the large litter audit, the auditors recorded the brand name of any item where the brand was visible. In total, 656 individual large litter items were recorded of which 160 items had an identifiable brand. Seventy-three different brands of litter were identified.

Table 3.3 illustrates the brands that were identified most frequently. In addition, the total number of items identified is shown in Table 3.3. The most prevalent brand was Tim Horton’s, with 33 items (20.6% of all of the branded litter found). The brand with the second largest contribution was McDonald’s with 11 items recorded, representing 6.9% of the branded litter found. Nestle was the third most common brand name found with 9 items identified, representing 5.6% of the materials recorded. Other top brand names identified include No Name, Belmont Cigarettes, Coca-Cola, Kirkland, Pepsi, President’s Choice, and Starbucks. A complete list of brand names observed and recorded can be found in Appendix H.

Table 3.3 Brand Name Large Litter Results

Rank	Brand Name	Count	Percent
1	Tim Hortons	33	20.6%
2	McDonald's	11	6.9%
3	Nestlé	9	5.6%
4	No Name	8	5.0%
5	Belmont	7	4.4%
6	Coca Cola	5	3.1%
7	Kirkland	4	2.5%
8	Pepsi	4	2.5%
9	President's Choice	3	1.9%
10	Starbucks	3	1.9%

3.4 Small Litter Results

There was a total of 346 pieces of Small Litter (< 4 square inches) counted by AET staff across all survey areas. Table 3.4 outlines the most commonly occurring small litter items including cigarette butts and debris (35.3%), paper (20.5%), candy packaging and wrappers (14.7%) and plastic film (8.4%).

Table 3.4 Small Litter Results

Small Litter Item	Count	Percent
Cigarette butts/debris	122	35.3%
Paper	71	20.5%
Candy packaging and wrappers	51	14.7%
Plastic film	29	8.4%
Hard plastic	17	4.9%
Aluminum/foil debris	8	2.3%
Food & Other Organics	8	2.3%
Bottle caps	7	2.0%
Other polystyrene debris	7	2.0%
Polystyrene packing materials	6	1.7%
Rubber	5	1.4%
Glass	4	1.2%
Metal (not aluminum)	4	1.2%
Other material	3	0.9%
Other tobacco	2	0.6%
Chewing gum (stuck on pavement)	1	0.3%
E-waste	1	0.3%
Face Masks	0	0.0%
Total Small Litter	346	100%

3.4.1 Small Litter by Sites

Table 3.5 illustrates the 10 sites with the highest item counts for small litter. Site 28 (8899 Jane St.) and site 42 (3700 Steeles Ave.) had the highest amount of small litter with 33 pieces counted. The third highest amount of small litter was found at Site 21 (331 Jacob Keefer Pkwy).

Table 3.5 Highest Ranking Sites for Small Litter

Rank	Site #	Site Id	Small Litter	Address	Ward
1	28	55	33	8899 Jane St.	4
2	42	3	33	3700 Steeles Ave.	3
3	21	68	15	331 Jacob Keefer Pkwy	4
4	61	85	14	41 Poetry Dr.	3
5	66	127	13	11399 Keele St.	1
6	12	13	12	208 Conley St.	5
7	27	35	12	668 Millway Ave.	4
8	41	78	12	66 Marathon Ave.	4
9	60	88	12	81 Sunset Terr.	3
10	25	18	11	315 Millway Ave.	4

3.4.2 Small Litter Site Analysis

Small litter site analysis was conducted on the results of the small litter audit (Figure 3.6). The average amount of small litter found on the 100 surveyed sites was 4 items (after rounding the statistical mean of 3.5). There were 21 sites with above-average counts of large litter and 69 sites with below-average counts. Exactly 10 sites had the average count of small litter. There were 36 sites which were free of small litter.

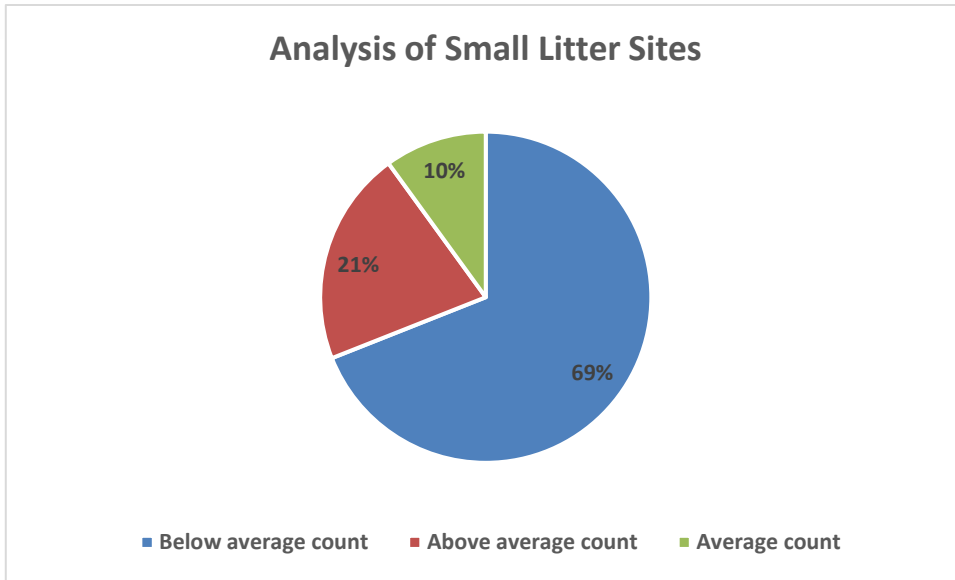


Figure 3.6 Small Litter Site Analysis

3.5 Heatmap and Litter Hotspots

Hotspots are areas considered to have more than normal interest, activity, or popularity; within the scope of this study, hotspots are defined as areas where higher than normal densities of litter may accumulate due to human behaviours like loitering or illegal household dumping, or environmental factors like catch points or high traffic areas. Hotspots were identified by the City based on records and service information, and provided to AET staff for reference, as sampling in or around these areas could impact the study results. Figure 3.7 shows the 100 sample sites and their designated litter densities, as well as the distribution of the hotspots identified by the City of Vaughan. Figures 3.8 to 3.12 show the sample sites and hotspots by ward.

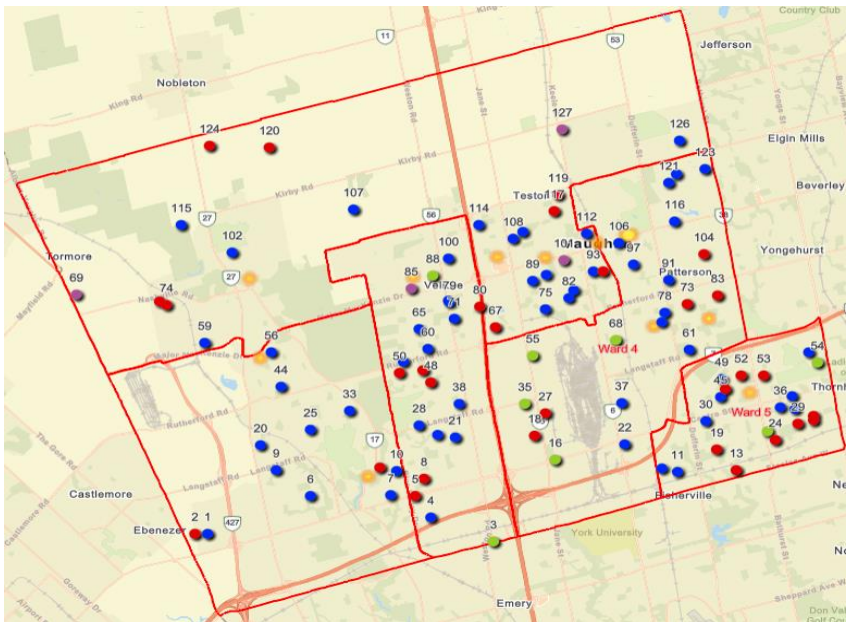


Figure 3.7 Heatmap and Hotspot by Litter Index

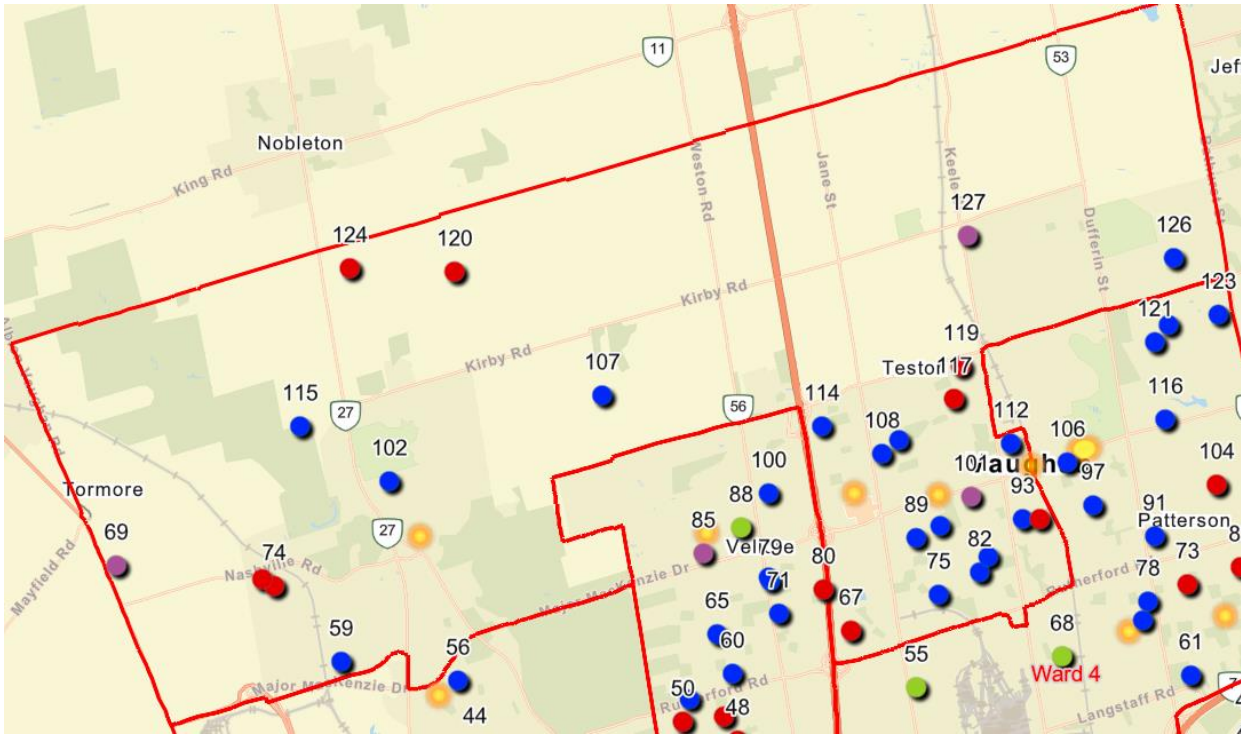


Figure 3.8 Heatmap and Hotspot by Litter Index - Ward 1

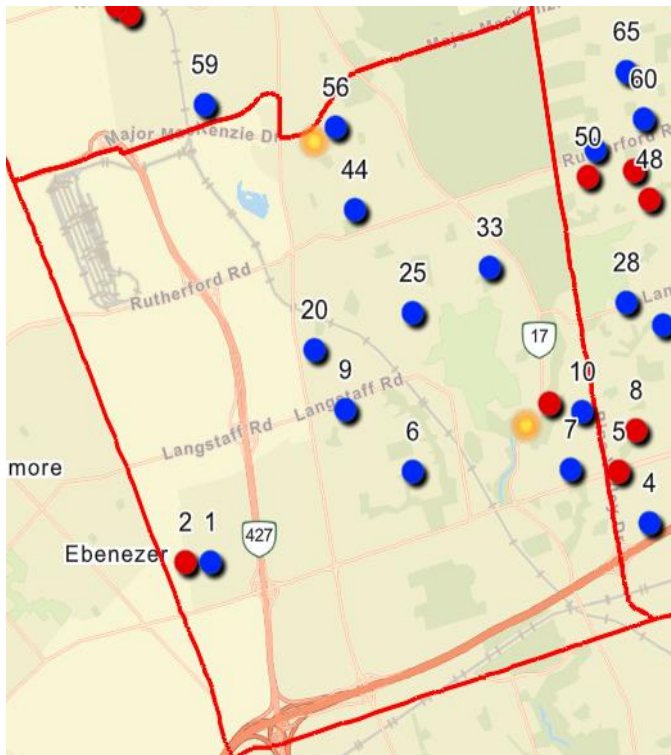


Figure 3.9 Heatmap and Hotspot by Litter Index - Ward 2

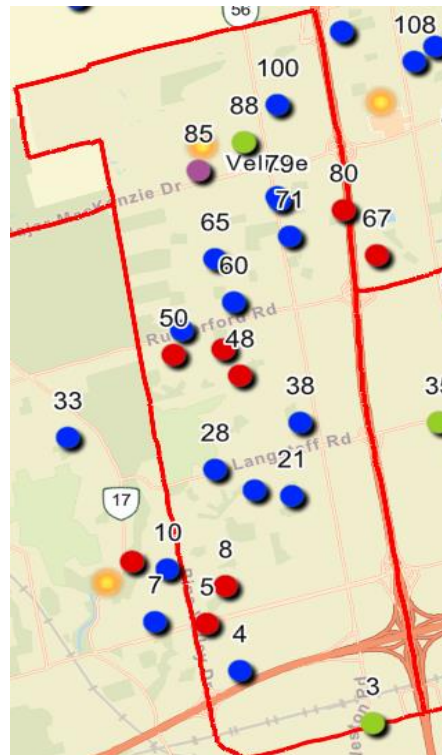


Figure 3.10 Heatmap and Hotspot by Litter Index - Ward 3

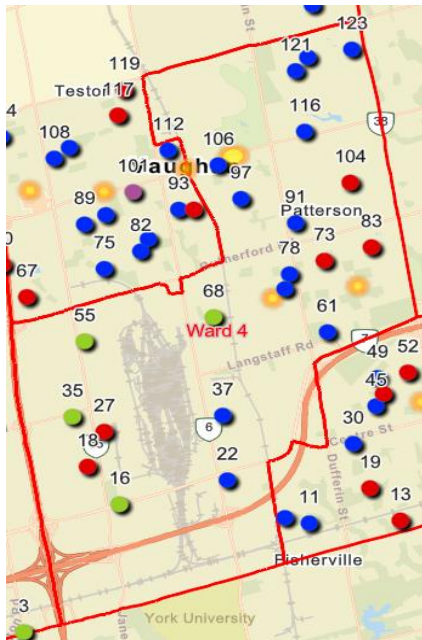


Figure 3.11 Heatmap and Hotspot by Litter Index - Ward 4

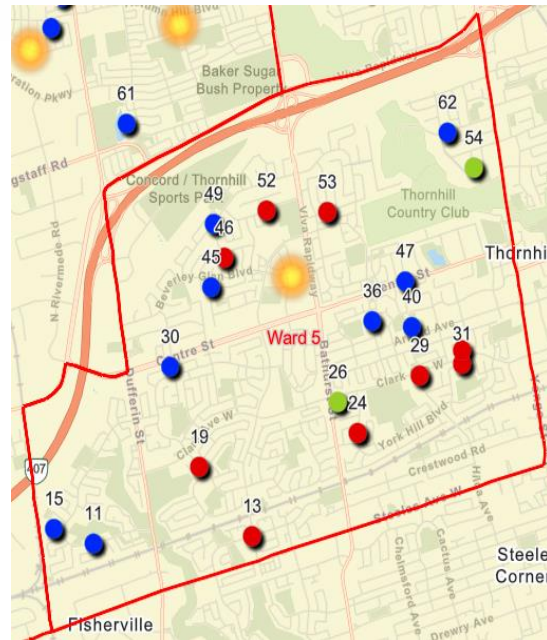


Figure 3.12 Heatmap and Hotspot by Litter Index - Ward 5

For a detailed view of the interactive map, the map can be accessed through the following link:

<https://www.arcgis.com/apps/mapviewer/index.html?webmap=3c338f26ecc944779aae277edc535c11>

Figure 3.7 also illustrates the litter density at each location based on the visual ranking scale described in Section 3.1 (Figure 3.2). The locations are represented by the colors associated with each rank in Figure 3.2, with blue representing the cleanest sites, red representing slightly dirty sites, green representing moderately dirty sites, and purple representing the dirtiest sites. Grey dots represent sites that were identified as potential sample sites during the initial planning phase but eliminated during the site selection process.

Note that the City considered all parks and parkettes as potential hotspots. All the potential hotspots provided were analyzed, but only those sites that could have impacted the study results were included on the map. Hotspot information provided by the City was cross-referenced with data collected during the litter study; 12 sample sites were identified that could have been impacted by their proximity to these potential hotspots. These site locations and their distances away from the closest potential hotspot are identified in the table below:

Table 3.6 Sample Sites in close proximity to Potential Hotspots.

Id	Litter Index	Ward	Potential Hotspots	Address	Distance from Potential Hotspot
29	2	5	York Hill District Park	51 Heatherton Way	50 m
13	2	5	Gilmore Park	208 Conley Street	100 m
46	2	5	Ventura Park	63 Mulholland Drive	50 m
73	2	4	Block 10 – Woodlot Entrance	108 Daphina Drive	900 m
83	2	4	Block 10 – Woodlot Entrance	118 Serene Way	1.2 km

51	2	3	Velmar Downs Park	27 Orr Avenue	100 m
96	2	3	Reeves Park	218 Barrhill Road	50 m
12	2	2	Maxey Park	181 Willis Road	450 m
68	3	4	Tudor Park	331 Jacob Keffer Parkway	50 m
88	3	3	Chatfield District Park	81 Sunset Terrace	400 m
85	4	3	Chatfield District Park	41 Poetry Drive	650 m
127	4	1	Vista Gate Parkette	11399 Keele Street	100 m

4.0 ADDITIONAL OBSERVATIONS

AET staff noted the presence of any City litter bins within the site boundary. Figures 4.1 and 4.2 are examples of bins that were present within or near some of the 100 audited sites. Figure 4.1 shows the City's single stream bin that was observed in a park. This type of bin was commonly observed in Vaughan Parks by AET staff. Figure 4.2 illustrates a recycling bin that residents added next to the mailbox to prevent littering. Figure 4.3 illustrates the large number of pallets disposed of in one residential area. AET staff drove by this street on multiple days and noted that these items were not collected, even after the garbage collection truck drove by. Of the 100 sites that were audited, 13 sites (13%) had litter bins present within a 200-meter radius, while the other 87 sites (87%) did not have litter bins present. When looking at cigarette butt litter specifically, sites with a litter bin present had an average of 2.6 cigarette butts per site while sites without a litter bin present had an average of 1.1 cigarette butts per site. Evidence of litter cleanup was noted by a resident but not observed by AET staff at Site 22 (46 Keeleview Ct.). No other instances of litter cleanups were seen or recorded by AET staff.



Figure 4.1 Litter Bin found in a park



Figure 4.2 Recycling Bin next to mailbox



Figure 4.3 Accumulated Litter

The areas with City litter bins nearby had on average 6.8 pieces of Large Litter within the site boundary, and the areas without a nearby City litter bin had an average of 6.5 pieces of large litter. The average pieces of litter found in each of these areas are very similar to each other due to the nature of the sites. Although litter bins were generally located in areas with higher foot traffic, it was observed that remote areas, such as Site 87 (11050 Gold Creek Rd.), tend to receive less maintenance, coupled with environmental factors such as high grass and the presence of a culvert, which presents an opportunity to accumulate a greater amount of litter.

AET staff also made note of any site characteristics that would affect the accumulation of litter on the site and assist the City in locating sites of concern. All details for each site are provided in Appendix A. Figures 4.4 and 4.5 illustrate examples of large and small litter and their common catch points.



Figure 4.4 Accumulated Large Litter along the curb at the sewer drain



Figure 4.5 Accumulated Large Litter in the culvert

5.0 SITE RANKING AND ATTRIBUTES

AET staff ranked each of the 100 audited sites in three different ways: 1) By the total number of large litter items that were audited within each site; 2) By the total number of small litter items that were audited within each site; and, 3) The total combined amount of large and small litter. Table 6.1 illustrates the sites that have the greatest amount of large and small litter combined. A full list of all 100 sites can be found in Appendix G.

Table 5.1 Site Ranking for All Litter (Combined Large and Small Litter)

Rank	Site ID	Site #	Large Litter	Small Litter	All Litter	Street Name
1	69	87	96	0	96	11050 Gold Creek Rd.
2	3	42	19	33	52	3700 Steels Ave.
3	55	28	15	33	48	8899 Jane St.
4	127	66	32	13	45	11399 Keele St.
5	85	61	21	14	35	41 Poetry Dr.
6	68	21	18	16	34	331 Jacob Keefer Pkwy
7	101	72	23	6	29	1 Angel View Ct.
8	88	60	16	12	28	81 Sunset Terr.
9	35	27	15	12	27	668 Millway Ave.
10	18	25	11	11	22	315 Millway Ave.

Attributes of the sites with the highest amount of combined All Litter (small and large litter) are provided in Table 6.2. Fast food restaurants, convenience stores and bus stops were present for 20% of the top ten sites, bench or resting structures were present for 50% of the top ten sites, street litter bins were present for 30% of the top ten sites, and traffic lights or stop signs were present for 90% of the top ten sites. Major streets accounted for 20% of the top ten sites, and minor streets accounted for 80% of the top ten sites.

Table 5.2 Top Ten Sites with the Highest Quantity of Large and Small Litter Items and Site Attributes

Rank	Site ID	Site #	Large Litter	Small Litter	All Litter	Street Name	Fast Food	Conv Store	Mobile Food	Bench or Resting Structure	Bus Stop	Traffic Light/ Stop	City/Street Litter Bin	Road Type	Area
1	69	87	96	0	96	11050 Gold Creek Rd.	N	N	N	N	N	N	N	Minor	Com
2	3	42	19	33	52	3700 Steels Ave.	Y	Y	N	Y	Y	Y	Y	Major	Com
3	55	28	15	33	48	8899 Jane St.	N	N	N	N	N	Y	N	Major	Com-Res
4	127	66	32	13	45	11399 Keele St.	N	Y	N	N	N	Y	N	Minor	Com-Res
5	85	61	21	14	35	41 Poetry Dr.	N	N	N	N	Y	Y	N	Minor	Res
6	68	21	18	16	34	331 Jacob Keefer Pkwy	N	N	N	Y	N	Y	Y	Minor	Ind
7	101	72	23	6	29	1 Angel View Ct.	Y	N	N	N	N	Y	N	Minor	Res
8	88	60	16	12	28	81 Sunset Terr.	N	N	N	N	N	Y	N	Minor	Res
9	35	27	15	12	27	668 Millway Ave.	N	N	N	N	N	Y	N	Minor	Ind
10	18	25	11	11	22	315 Millway Ave.	N	N	N	Y	N	Y	N	Minor	Ind

6.0 CONCLUSION

AET Group Inc. conducted litter audits at 100 pre-selected locations within the public realm across the City of Vaughan. The audits were conducted from June 6th through June 13th, 2023 to assess the composition and amount of litter on Vaughan streets. The type of litter was classified into two sizes: large litter, which is equal to or larger than four square inches, and small litter, which is smaller than four square inches.

6.1 Large Litter Conclusions

Over the two-week study period, 100 sites within the city were audited for large litter. The key findings include:

- The average amount of large items per site was 7;
- The total number of large litter items identified was 656;
- The number of sites with no large litter recorded was 12;
- The most commonly found item in the large litter audit was miscellaneous plastic, representing 9.6% of all large items audited. Other common littered items include plastic bottles, at 9.3%, un-branded towels /napkins/serviettes at 8.5%, and other materials, at 8.5%; and

6.2 Branded Litter Conclusions

While completing the Large Litter audit, the brand name of items was recorded when visible. The key findings include:

- Tim Horton’s items are the most common, accounting for 20.6% of all branded litter.
- Other frequently found brands included McDonald’s at 6.9%, Nestle at 5.6%, No Name at 5.0% and Belmont at 4.0%;
- In total, 73 different brands of litter were observed.

6.3 Small Litter Conclusions

- The average amount of small litter items per site was 4;
- The total number of small litter items identified was 346;
- The most commonly found small litter item was cigarette butts/debris, accounting for 35.3% of all small litter audited, followed by paper at 20.5%.

7.0 RECOMMENDATIONS

AET Group Inc. has completed reviews of litter abatement practices and policies for precious litter and illegal dumping work. Our team identifies the best practices to combat litter and illegal waste. These practices include:



Figure 7.1 Practices to combat litter.

More than these practices, it is also recommended that follow-up litter audits be completed to assess the success of litter abatement practices and other diversion programs as well as the monitor city’s improvement.

7.1 Enhancing Current Litter Abatement Practices

- Litter abatement efforts should be focused on the areas with the greatest amount of large litter and combined litter (large and small litter). The 2023 litter audit results will identify areas of concern and will also provide an outlook on the current areas that the City cleanup crews service.
- Consider including the remote regions in the city’s cleanup schedule to check for potential catch points. It can greatly reduce the amount of accumulated litter.

- Increasing the number of garbage and recycling bins in parks and modifying maintenance schedules to ensure bins are emptied on a consistent basis. Consider scheduling additional maintenance on a seasonal basis or after peak waste generating events like holidays to reduce the amount of litter dispersed in the City.
- Increase support for the current anti-cigarette butt and gum litter programs to reduce the amount of these litter items on Vaughan streets.
- Engage cigarette manufacturers to promote and distribute personal cigarette butt containers to smokers and to provide and install permanent cigarette butt receptacles in Business Improvement Areas

7.2 Look into Current Waste Management Practices and Policy

- Residential garbage or recycling carts could be a source of litter in residential areas; litter could be falling out of carts while being emptied during curbside collection or overflowing carts may allow litter to blow into the City streets.
- Overflowing street litter bins could be another source of litter in public spaces.
- Auditors noted the recycling bins that residents added next to mailboxes in some neighborhoods. Consider requesting service for these locations when waste haulers are collecting curbside household recycling.
- Consider the addition of cigarette butt disposal bins fixated on poles in the downtown core that are closer to eye level for pedestrians. Other cities have utilized these types of bins that have been accompanied by signage and a fine for littering.

7.3 Education and Awareness Campaigns

- Campaigns detailing proper cigarette butt disposal and notices regarding cigarette butt receptacle locations should be made available online and on signage/posters in high-traffic areas. A total of 122 cigarette butts were identified in the 2023 litter audit, representing 35.3% of small litter; if improperly disposed, these items pose a fire hazard
- It is recommended that the City maintain awareness surrounding proper PPE disposal (face masks and gloves) and add them to anti-litter campaigns and street litter bin signage. Although PPE is no longer required in most settings, some people still use them as a source of protection.
- Target commonly found litter items such as Cigarette Butts, Papers, Candy Packaging, Napkins, Tobacco and their contents, Cup lids, Plastic Bottles and Packaging and PPE
- Promote awareness by organizing an annual City-wide litter clean up during Earth Month or Waste Reduction Week



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Disclaimer

AET Group Inc. makes no warranty and assumes no liability for the information contained in this report outlining the litter audit results. These results reflect measurements made over a onetime "snapshot" time period, meaning they only represent the conditions for the period of time in which they were collected. Seasonal variability, holidays and weather, among other factors, can affect the amount of litter within an area.

APPENDIX A
SITE LOCATION DETAILS



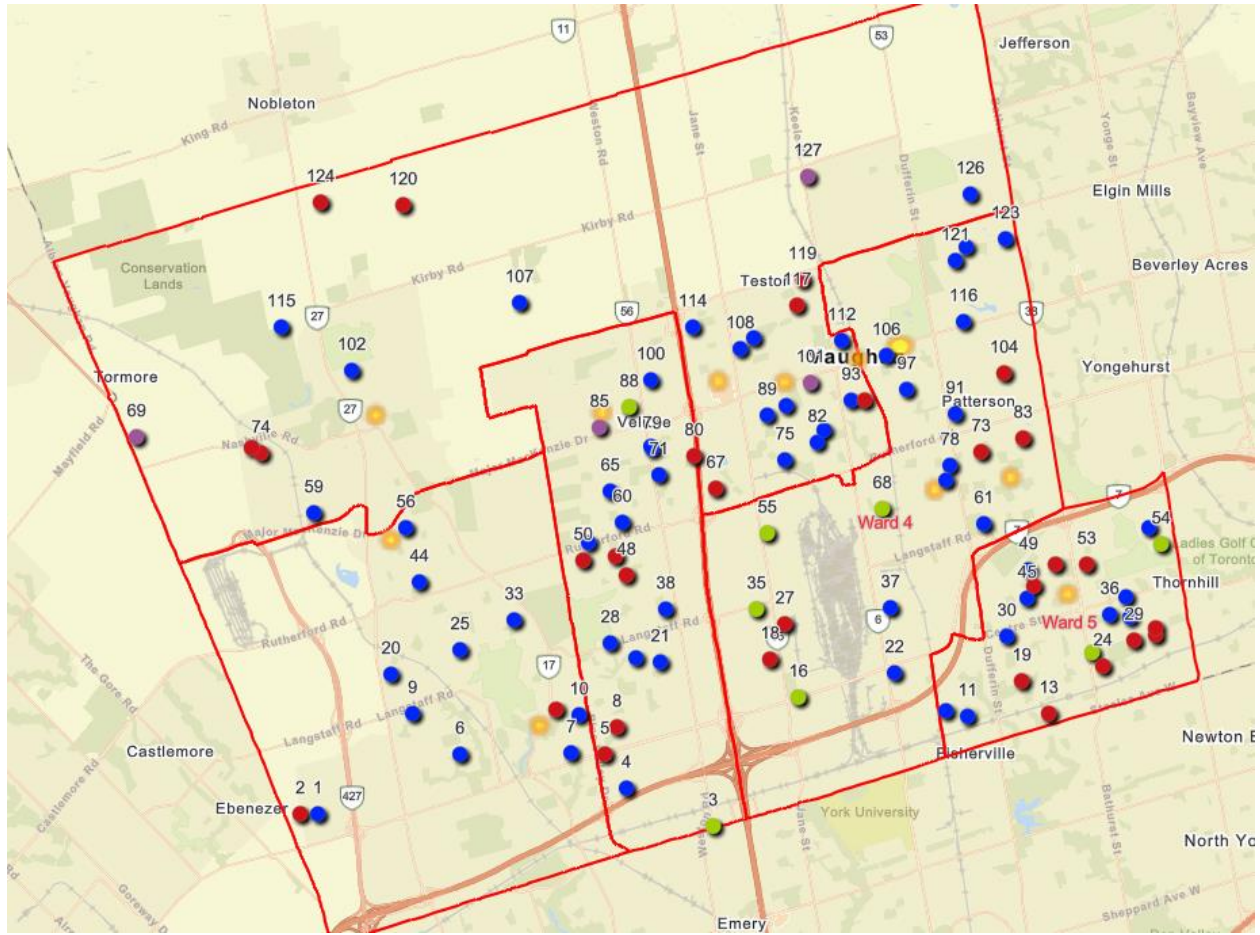
Site #	Site Id	Ward	Date	Start	Finish	Team	Fixed or Variable	Width 1	Width 2	Width 3	Address	St. Type	Lanes	Divided	Area	Grass Ht. (Inches)	Fast Food	Conv Store	Mobile Food	Bench or Resting Structure	Bus Stop	Traffic Light/ Stop sign	City/Street Litter Bin	Park within site	Distance to Park (ft)	Distance to Litter Bin (ft)	Large Litter Count	Small Litter Count	Catch Pt	Litter Index	Cleanup	Details	Street	Coordinates	Updated Coordinates from Previous Survey	Comments
1	62	5	6-Jun-23	10:39 AM	10:54 AM	A	Fixed	14	14	14	36 Upland Ave.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	Y	600	N/A	0	2	N/A	1	N		Ave	N:43.826048 W:79.432614		
2	54	5	6-Jun-23	11:01 AM	11:16 AM	A	Fixed	12	12	12	7 Riverside Blvd	Minor	2	N	Res	<3	N	N	N	N	N	N	Y	Y	100	100	14	0	N/A	3	N		Blvd	N:43.822586 W:79.428947		
3	53	5	6-Jun-23	11:32 AM	11:43 AM	A	Fixed	17	17	17	97 Downing Blvd	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	11	0	N/A	2	N		Blvd	N:43.819100 W:79.448300		
4	47	5	6-Jun-23	11:51 AM	12:01 AM	A	Fixed	17	17	17	90 Markwood Lane	Minor	2	Y	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	4	1	Curb	1	N		Lane	N:43.8129641 W:-79.4398595		
5	40	5	6-Jun-23	12:08 PM	12:14 PM	A	Fixed	1.5	1.5	1.5	18 Edward St.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	50	N/A	0	0	Curb	1	N		Street	N:43.809687 W:79.437627		
6	36	5	6-Jun-23	12:22 PM	12:29 PM	A	Fixed	14	14	14	108 Franklin Ave.	Minor	2	Y	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	4	1	Curb	1	N		Ave	N:43.8109761 W:-79.441653		
7	39	5	6-Jun-23	12:41 PM	12:49 PM	A	Fixed	14	14	14	104 Glenmanor Way	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	6	1	Curb	2	N		Way	N:43.808665 W:79.431318		
8	31	5	6-Jun-23	1:56 PM	2:06 PM	A	Fixed	14	14	14	141 Winding Lane	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	11	5	N/A	2	N		Lane	N: 43.804515 W:-79.409174		
9	29	5	6-Jun-23	2:12 PM	2:19 PM	A	Fixed	18	18	18	51 Heatherton Way	Minor	2	N	Res	<3	N	N	N	N	N	N	Y	Y	50	100	8	4	Curb-Grass Line	2	N	1 garbage bin at park	Way	N:43.805506 W:79.436811		
10	26	5	6-Jun-23	2:28 PM	2:37 PM	A	Fixed	17	17	17	133 Gailcrest Circle	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	13	2	Curb-Tree Line	3	N	Over grown plants	Circle	N:43.803462 W:79.447540		
11	24	5	6-Jun-23	2:42 PM	2:51 PM	A	Fixed	16	16	16	131 York Hill Blvd	Minor	2	Y	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	12	8	Curb-Tree Line	2	N		Blvd	N:43.800705 W:79.444708		
12	13	5	6-Jun-23	3:00 PM	3:11 PM	A	Fixed	18	18	18	208 Conley St.	Minor	2	Y	Res	3 to 6	N	N	N	N	Y	Y	N	N	N/A	N/A	6	12	Curb-Grass Line	2	N		Street	N:43.793039 W:79.435931		
13	19	5	6-Jun-23	3:17 PM	3:25 PM	A	Fixed	17	17	17	192 Joseph Aaron Blvd	Minor	2	Y	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	11	9	Curb-Grass Line	2	N		Blvd	N:43.799900 W:79.445501		
14	11	5	6-Jun-23	3:38 PM	3:46 PM	A	Fixed	18	18	18	1 Cog Hill Dr.	Minor	2	N	Res	<3	N	Y	N	N	N	Y	N	N	N/A	N/A	2	4	Curb-Grass Line	1	N		Drive	N:43.799683 W:79.508115		
15	15	5	6-Jun-23	3:55 PM	4:05 PM	A	Fixed	1.5	1.5	1.5	54 Prairie Dunes Pl.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	0	0	Curb	1	N		Place	N:43.813992 W:79.434558		
16	30	5	6-Jun-23	4:09 PM	4:15 PM	A	Fixed	17	17	17	5 Richbell St.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	Y	400	N/A	4	4	Curb	1	N		Street	N:43.806064 W:79.459277		
17	45	5	6-Jun-23	4:22 PM	4:27 PM	A	Fixed	16	16	16	25 MacArthur Dr.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	3	0	Curb-Grass Line	1	N		Drive	N:43.816741 W:79.462880		
18	46	5	6-Jun-23	4:32 PM	4:39 PM	A	Fixed	16	16	16	63 Mulholland Dr.	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	Y	Y	20	350	5	4	Curb	2	N	Garbage and recycling bin at park	Drive	N:43.815326 W:79.462005		
19	49	5	6-Jun-23	4:45 PM	4:50 PM	A	Fixed	17	17	17	177 Grenadier Cresc.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	4	3	Curb	1	N		Crescent	N:43.818187 W:79.463380		
20	52	5	6-Jun-23	4:55 PM	5:02 PM	A	Fixed	17	17	17	2 Miranda Ct.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	200	N/A	9	2	N/A	2	N		Court	N:43.819259 W:79.456492		
21	68	4	7-Jun-23	8:29 AM	8:41 AM	A	Fixed	16	16	16	331 Jacob Keefer Pkwy	Minor	4	Y	Ind	3 to 6	N	N	N	Y	N	Y	Y	Y	20	20	18	16	Curb	3	N	Three garbage bins at the park	Parkway	N:43.829277 W:79.500265		
22	37	4	7-Jun-23	8:59 AM	9:05 AM	A	Fixed	1.5	1.5	1.5	250 Rayette Rd.	Minor	2	N	Ind	<3	N	N	N	Y	N	Y	N	N	N/A	N/A	3	0	N/A	1	N		Road	N:43.811195 W:79.498363		
23	22	4	7-Jun-23	9:15 AM	9:21 AM	A	Fixed	2	2	2	46 Keeleview Ct.	Minor	2	N	Res	3 to 6	N	N	N	Y	N	N	N	N	N/A	N/A	0	0	N/A	1	Y	One resident talked about cleanup	Court	N:43.799242 W:79.496973		
24	16	4	7-Jun-23	9:40 AM	9:50 AM	A	Fixed	18	18	18	2920 Highway 7	Major	6	N	Res-Ind	N/A	N	N	N	N	Y	Y	N	N	N/A	N/A	15	0	Grass Line	3	N	Site sample is dirty but it is affected directly by construction site in front of it. Unmaintained lawn is the main catch-point	Highway	N:43.835554 W:79.599318		
25	18	4	7-Jun-23	10:10 AM	10:18 AM	A	Fixed	18	18	18	315 Millway Ave.	Minor	2	Y	Ind	<3	N	N	N	Y	N	Y	N	N	N/A	N/A	11	11	N/A	2	N		Ave	N:43.801823 W:79.528731		
26	27	4	7-Jun-23	10:43 AM	10:51 AM	A	Fixed	18	18	18	140 Snow Blvd	Minor	2	Y	Ind	<3	N	N	N	Y	N	N	N	N	N/A	N/A	5	3	N/A	2	N		Blvd	N:43.807623 W:79.525088		
27	35	4	7-Jun-23	11:00 AM	11:08 AM	A	Fixed	16	16	16	668 Millway Ave.	Minor	2	Y	Ind	<3	N	N	N	N	N	Y	N	N	N/A	N/A	15	12	Curb	3	N		Ave	N:43.810850 W:79.532234		
28	55	4	7-Jun-23	11:23 AM	11:35 AM	A	Fixed	18	18	18	8899 Jane St.	Major	4	Y	Com-Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	15	33	N/A	3	N		Street	N:43.823795 W:79.530804		
29	70	4	7-Jun-23	11:55 AM	11:59 AM	A	Fixed	1.5	1.5	1.5	2 Eminence Rd.	Minor	2	N	Res	N/A	N	N	N	N	N	Y	N	N	N/A	N/A	3	0	Curb	1	N		Road	N:43.834922 W:79.484769		
30	61	4	7-Jun-23	12:43 PM	12:49 PM	A	Fixed	1.5	1.5	1.5	42 Sagecrest Cresc.	Minor	2	N	Res	N/A	N	N	N	N	N	Y	N	N	N/A	N/A	4	0	Curb	1	N		Crescent	N:43.826749 W:43.826749		
31	73	4	7-Jun-23	12:55 PM	1:00 PM	A	Fixed	11	11	11	108 Daphnia Dr.	Minor	2	Y	Res	N/A	N	N	N	Y	N	Y	N	Y	200	N/A	7	2	N/A	2	N		Drive	N:43.839743 W:79.475528		Rita said this would be hotspot
32	83	4	7-Jun-23	1:22 PM	1:28 PM	A	Fixed	1.5	1.5	1.5	118 Serene Way	Minor	2	N	Res	N/A	N	N	N	N	N	Y	N	N	N/A	N/A	9	1	Curb	2	N		Way	N:43.842723 W:79.465028		
33	104	4	7-Jun-23	1:34 PM	1:41 PM	A	Fixed	16	16	16	30 Wallenberg Dr.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	5	0	Curb	2	N		Drive	N:43.854168 W:79.469517		
34	116	4	7-Jun-23	1:52 PM	1:56 PM	A	Fixed	1.5	1.5	1.5	38 Lady Karen Cresc.	Minor	2	N	Res	N/A	N	N	N	N	N	N	N	N	N/A	N/A	4	0	Curb	1	N		Crescent	N:43.863767 W:79.480477		
35	123	4	7-Jun-23	2:07 PM	2:15 PM	A	Fixed	16	16	16	212 Israel Zilber Dr.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	Y	600	N/A	2	2	Curb	1	N	Full toilet set out	Drive	N:43.879591 W:79.469545		
36	122	4	7-Jun-23	2:20 PM	2:26 PM	A	Fixed	15	15	15	2 Sir Francesco St.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	4	1	N/A	1	N		Street	N:43.876813 W:79.479375		
37	121	4	7-Jun-23	2:30 PM	2:36 PM	A	Fixed	16	16	16	100 Lady Fenryose Ave.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	Y	150	N/A	4	0	N/A	1	N		Ave	N:43.874966 W:79.482280		
38	106	4	7-Jun-23	2:49 PM	2:54 PM	A	Fixed	16	16	16	23 Black Maple Cresc.	Minor	2	N	Res	<3	Y	Y	N	N	Y	Y	N	N	N/A	N/A	2	0	Tree line	1	N		Crescent	N:43.857485 W:79.500090		
39	97	4	7-Jun-23	3:12 PM	3:19 PM	A	Fixed	17	17	17	391 Peter Rupert Ave.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	Y	400	N/A	3	1	N/A	1	N		Ave	N:43.851420 W:79.494940		
40	91	4	7-Jun-23	3:27 PM	3:34 PM	A	Variable	9	17	17	649 Marc Santi Blvd	Minor	2	Y	Res	3 to 6	N	N	N	N	N	N	N	Y	60	N/A	6	4	N/A	1	N		Blvd	N:43.847087 W:79.482065		

Site #	Site Id	Ward	Date	Start	Finish	Team	Fixed or Variable	Width 1	Width 2	Width 3	Address	St. Type	Lanes	Divided	Area	Grass Ht. (Inches)	Fast Food	Conv Store	Mobile Food	Bench or Resting Structure	Bus Stop	Traffic Light/ Stop sign	City/Street Litter Bin	Park within site	Distance to Park (ft)	Distance to Litter Bin (ft)	Large Litter Count	Small Litter Count	Catch Pt	Litter Index	Cleanup	Details	Street	Coordinates	Updated Coordinates from Previous Survey	Comments	
41	78	4	7-Jun-23	3:49 PM	3:56 PM	A	Fixed	11	11	11	66 Marathon Ave.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	0	12	N/A	1	N		Ave	N:43.865221 W:79.487215			
42	3	3	8-Jun-23	9:01 AM	9:11 AM	A	Fixed	18	18	18	3700 Steels Ave.	Major	4	Y	Com	<3	Y	Y	N	Y	Y	Y	Y	N	N/A	10	19	33	N/A	3	N	Recycling and garbage bin	Ave	N:43.771459 W:79.543434			
43	4	3	8-Jun-23	9:31 AM	9:37 AM	A	Fixed	18	18	18	625 Rowtree Dairy Rd.	Minor	2	Y	Ind	<3	N	N	N	N	N	N	N	N	N/A	N/A	3	4	N/A	1	N		Road	N:43.778379 W:79.565528			
44	5	3	8-Jun-23	9:44 AM	9:51 AM	A	Fixed	18	18	18	133 Torii St.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	Y	20	N/A	5	1	Curb	2	N		Street	N:43.844054 W:79.586521			
45	8	3	8-Jun-23	9:56 AM	10:05 AM	A	Variable	17	17	13	162 Embassy Dr.	Minor	2	Y	Res	3 to 6	N	N	N	N	N	Y	N	Y	200	N/A	9	0	N/A	2	N		Drive	N:43.793271 W:79.567952		Small plaza with some stores across the starting location	
46	21	3	8-Jun-23	10:14 AM	10:20 AM	A	Fixed	18	18	18	60 Belair Way	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	Y	300	N/A	3	0	N/A	1	N		Way	N:43.801696 W:79.556996		
47	23	3	8-Jun-23	10:26 AM	10:31 AM	A	Fixed	1.5	1.5	1.5	35 Lucky Ct.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	3	0	N/A	1	N		Court	N:43.838977 W:79.560257			
48	28	3	8-Jun-23	10:38 AM	10:44 AM	A	Fixed	1.5	1.5	1.5	11 Cowan Dr.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	1	0	Curb	1	N		Drive	N:43.805165 W:79.569698			
49	38	3	8-Jun-23	11:01 AM	11:08 AM	A	Fixed	18	18	18	178 Fifth Ave.	Minor	2	N	Res	<3	N	N	N	Y	N	Y	Y	Y	300	300	4	1	Curb	1	N	Garbage and recycling bin	Ave	N:43.800953 W:79.502751			
50	48	3	8-Jun-23	11:15 AM	11:23 AM	A	Fixed	17	17	17	282 Velmar Dr.	Minor	2	Y	Res	3 to 6	N	N	N	N	N	Y	N	Y	500	N/A	6	3	Curb	2	N		Drive	N:43.817243 W:79.565664			
51	51	3	8-Jun-23	11:18 AM	11:35 AM	A	Variable	17	17	1.5	27 Orr Ave.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	500	N/A	5	3	N/A	2	N		Ave	N:43.820587 W:79.568325			
52	50	3	8-Jun-23	11:40 AM	11:45 AM	A	Fixed	17	17	17	22 Pinemeadow Dr.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	5	2	N/A	2	N		Drive	N:43.819844 W:79.576619			
53	57	3	8-Jun-23	11:51 AM	11:56 AM	A	Fixed	1.5	1.5	1.5	98 Pieta Pl.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	0	0	N/A	1	N		Place	N:43.823188 W:79.575020			
54	60	3	8-Jun-23	12:58 PM	1:04 PM	A	Fixed	16	16	16	82 Fontebella Ave.	Major	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	3	4	Curb	1	N		Ave	N:43.826873 W:79.566437			
55	65	3	8-Jun-23	1:17 PM	1:10 PM	A	Variable	11	11	10	135 Vellore Ave.	Minor	2	Y	Res	3 to 6	N	N	N	Y	N	Y	Y	Y	200	300	1	2	N/A	1	N	Garbage and recycling bin	Ave	N:43.834705 W:79.568497			
56	71	3	8-Jun-23	1:28 PM	1:33 PM	A	Fixed	1.5	1.5	1.5	181 Fairlane Cresc.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	0	0	Curb	1	N		Crescent	N:43.835696 W:79.557296			
57	79	3	8-Jun-23	1:38 PM	1:42 PM	A	Fixed	1.5	1.5	1.5	106 Planter Cresc.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	1	0	Curb	1	N		Crescent	N:43.840184 W:79.559141			
58	80	3	8-Jun-23	1:48 PM	1:53 PM	A	Fixed	1.5	1.5	1.5	219 Wildberry Cresc.	Minor	2	N	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	6	2	Curb-Grass Line	2	N		Crescent	N:43.838977 W:79.548241			
59	81	3	8-Jun-23	1:58 PM	2:03 PM	A	Fixed	11	11	11	53 Destino Cresc.	Minor	2	N	Res	<3	N	N	N	Y	N	Y	Y	Y	300	350	1	0	N/A	1	N		Crescent	N:43.840803 W:79.559055			
60	88	3	8-Jun-23	2:15 PM	2:22 PM	A	Fixed	16	16	16	81 Sunset Terr.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	16	12	Grass Line-Tree line	3	N		Terrace	N:43.847822 W:79.564860			
61	85	3	8-Jun-23	2:31 PM	2:40 PM	A	Fixed	17	17	17	41 Poetry Dr.	Minor	2	Y	Res	3 to 6	N	N	N	N	Y	Y	N	N	N/A	N/A	21	14	Curb-Grass Line	4	N		Drive	N:43.844077 W:79.572252			
62	107	1	8-Jun-23	2:51 PM	2:57 PM	A	Fixed	5	5	5	11170 Pine Valley Dr.	Minor	2	Y	Res	N/A	N	N	N	N	N	N	N	N	N/A	N/A	1	0	N/A	1	N		Drive	N:43.868145 W:79.592958			
63	100	3	8-Jun-23	3:18 PM	3:24 PM	A	Variable	10	18	18	73 Lormel Gate	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	Y	10	N/A	4	0	Curb	1	N	Recycling bin next to mailbox.	Gate	N:43.853037 W:79.559270			
64	114	1	8-Jun-23	3:33 PM	3:58 PM	A	Fixed	1.5	1.5	1.5	128 Boom Rd.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	2	0	Curb	1	N		Road	N:43.862444 W:79.549314			
65	126	1	9-Jun-23	8:33 AM	8:42 AM	A	Fixed	2	2	2	63 Quail Run Blvd	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	0	0	Curb	1	N		Blvd	N:43.886425 W:79.478807			
66	127	1	9-Jun-23	8:53 AM	9:10 AM	A	Fixed	17	17	17	11399 Keele St.	Minor	2	N	Com-Res	3 to 6	N	Y	N	N	N	Y	N	Y	400	N/A	32	13	Curb	4	N		Street	N:43.889823 W:79.519456			
67	119	1	9-Jun-23	9:21 AM	9:27 AM	A	Fixed	17	17	17	279 Isaac Murray Ave.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	7	1	Curb-Grass Line	2	N		Ave	N:43.871478 W:79.520990			
68	117	1	9-Jun-23	9:32 AM	9:38 AM	A	Fixed	18	18	18	198 Drummond Dr.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	8	3	N/A	2	N		Drive	N:43.866559 W:79.522020			
69	111	1	9-Jun-23	9:44 AM	9:59 AM	A	Fixed	17	17	17	22 Lomond Ave.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	100	N/A	1	0	N/A	1	N		Ave	N:43.861082 W:79.533521			
70	108	1	9-Jun-23	9:53 AM	9:59 AM	A	Fixed	18	18	18	39 Gladstone Ave.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	0	0	N/A	1	N		Ave	N:43.858669 W:79.536611			
71	112	1	9-Jun-23	10:07 AM	10:15 AM	A	Fixed	17	17	17	82 Falvo St.	Minor	2	N	Res	<3	N	N	N	Y	N	N	Y	Y	50	250	3	7	N/A	1	N		Street	N:43.860185 W:79.510819			
72	101	1	9-Jun-23	1:04 PM	1:12 PM	A	Fixed	10	10	10	1 Angel View Ct.	Minor	2	N	Res	<3	Y	N	N	N	N	Y	N	N	N/A	N/A	23	6	Curb-Drainage Grate	4	N		Court	N:43.852464 W:79.518739			
73	90	1	9-Jun-23	1:15 PM	1:25 PM	A	Fixed	16	16	16	150 Avro Rd.	Minor	2	Y	Res	3 to 6	N	N	N	Y	N	Y	Y	Y	100	300	2	8	N/A	1	N		Road	N:43.848301 W:79.525109			
74	89	1	9-Jun-23	1:31 PM	1:36 PM	A	Fixed	17	17	17	254 Caproni Dr.	Minor	2	N	Res	<3	N	N	N	N	Y	Y	N	N	N/A	N/A	3	0	Curb-Grate	1	N		Drive	N:43.870828 W:79.522277			
75	67	1	9-Jun-23	1:44 PM	1:49 PM	A	Variable	8	10	10	79 Deepspring Cresc.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	Y	400	N/A	8	4	N/A	2	N		Crescent	N:43.8330301, W:-79.5449786			
76	75	1	9-Jun-23	1:56 PM	2:02 PM	A	Fixed	18	18	18	103 Elena Cresc.	Minor	2	N	Res	<3	N	N	N	N	Y	N	N	N	N/A	N/A	3	3	N/A	1	N		Crescent	N:43.8383882, W:-79.5277686			
77	82	1	9-Jun-23	2:32 PM	2:43 PM	A	Fixed	17	17	17	254 Greenock Dr.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	0	2	Grate	1	N		Drive	N:43.8413149, W:-79.5198629			
78	87	1	9-Jun-23	2:47 PM	2:57 PM	A	Fixed	17	17	17	53 Arisaig Dr.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	4	3	Curb	1	N		Drive	N:43.8438945, W:-79.5177985			
79	93	1	9-Jun-23	3:05 PM	3:12 PM	A	Fixed	17	17	17	4 Brydon Ct.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	2	1	N/A	1	N		Court	N:43.8494255, W:-79.510896			

Site #	Site Id	Ward	Date	Start	Finish	Team	Fixed or Variable	Width 1	Width 2	Width 3	Address	St. Type	Lanes	Divided	Area	Grass Ht. (Inches)	Fast Food	Conv Store	Mobile Food	Bench or Resting Structure	Bus Stop	Traffic Light/ Stop sign	City/Street Litter Bin	Park within site	Distance to Park (ft)	Distance to Litter Bin (ft)	Large Litter Count	Small Litter Count	Catch Pt	Litter Index	Cleanup	Details	Street	Coordinates	Updated Coordinates from Previous Survey	Comments
80	96	1	9-Jun-23	3:16 PM	3:23 PM	A	Fixed	17	17	17	218 Barhill Rd.	Minor	2	Y	Res	3 to 6	N	N	N	Y	N	Y	Y	Y	50	100	9	5	Curb	2	N		Road	N:43.8492641, W:-79.5071683		
81	1	2	12-Jun-23	8:22 AM	8:35 AM	A	Fixed	18	18	18	180 New Huntington Rd.	Minor	4	Y	Ind	<3	N	N	N	Y	N	Y	N	N	N/A	N/A	3	5	N/A	1	N		Road	N:43.7732653, W:-79.6473257		
82	2	2	12-Jun-23	8:40 AM	8:46 AM	A	Fixed	18	18	18	8000 Huntington Rd.	Minor	2	Y	Ind	<3	N	N	N	Y	Y	Y	N	N	N/A	N/A	9	8	N/A	2	N		Road	N:43.7737938, W:-79.6513649		
83	6	2	12-Jun-23	8:58 AM	9:10 AM	A	Fixed	16	16	16	28 Roxana Ave.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	300	N/A	1	4	Curb	1	N		Avenue	N:43.7847503, W:-79.6104333		
84	9	2	12-Jun-23	9:20 AM	9:28 AM	A	Fixed	17	17	17	8445 Martin Grove Rd.	Minor	4	Y	Res	<3	N	N	N	N	Y	Y	N	N	N/A	N/A	3	2	N/A	1	N		Road	N:43.7919662, W:-79.621825		
85	59	1	12-Jun-23	9:42 AM	9:55 AM	A	Fixed	17	17	17	1 Dunrobin Cresc.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	Y	500	N/A	3	4	N/A	1	N		Crescent	N:43.828375, W:-79.6475642		
86	20	2	12-Jun-23	10:52 AM	11:01 AM	A	Fixed	18	18	18	57 Dolores Cresc.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	1	1	Curb	1	N		Crescent	N:43.7992217, W:-79.6272343		
87	69	1	13-Jun-23	7:43 AM	8:12 AM	B	Variable	16	18	18	11050 Gold Creek Rd.	Minor	2	Y	Com	>6	N	N	N	N	N	N	N	N	N/A	N/A	96	0	Tree Line-Culvert	4	N	Grass is higher than one foot tall on the road side	Road	N:43.844481 W:-79.690298		Heavily littered with large items, the drainage ditch on the side of the road is the biggest catch point
88	74	1	13-Jun-23	8:28 AM	8:33 AM	B	Fixed	18	18	18	29 Stilton Ave.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	6	3	N/A	2	N		Avenue	N:43.8393829, W:-79.6610085		
89	76	1	13-Jun-23	8:38 AM	8:45 AM	B	Variable	18	18	14	640 Barons St.	Minor	2	N	Res	3 to 6	N	N	N	N	N	Y	N	N	N/A	N/A	12	5	N/A	2	N		Street	N:43.8403128 W:-79.6635082		
90	102	1	13-Jun-23	8:58 AM	9:03 AM	B	Fixed	1.5	1.5	1.5	1 Rosebud Ct.	Minor	2	N	Res	N/A	N	N	N	Y	N	Y	N	Y	100	N/A	1	3	N/A	1	N		Court	N:43.8548442 W:-79.637324		
91	115	1	13-Jun-23	9:08 AM	9:13 AM	B	Fixed	5	5	5	6345 Kirby Rd.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	Y	100	N/A	0	0	N/A	1	N		Road	N:43.8618009 W:-79.6552634		
92	124	1	13-Jun-23	9:19 AM	9:27 AM	B	Fixed	9	9	9	5800 King Vaughan Rd.	Minor	2	N	Res	>6	N	N	N	N	N	Y	N	N	N/A	N/A	10	0	Grass Line	2	N		Road	N:43.886604 W:-79.6436186		Tall grass is a potential catch point for more litter, farming area
93	120	1	13-Jun-23	10:10 AM	10:19 AM	B	Fixed	10	10	10	11975 Kipling Ave.	Minor	2	Y	Res	3 to 6	N	N	N	N	N	N	N	N	N/A	N/A	11	1	Grass Line	2	N		Avenue	N:43.882439 W:-79.621182		
94	56	2	13-Jun-23	10:34 AM	10:41 AM	B	Fixed	12	12	12	256 Silverado Trail	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	1	3	N/A	1	N		Trail	N:43.8259482 W:-79.6239653		
95	44	2	13-Jun-23	10:45 AM	10:52 AM	B	Fixed	14	14	14	30 Monte Carlo Dr.	Minor	2	N	Res	<3	N	Y	N	N	N	Y	Y	Y	250	250	3	3	N/A	1	N		Drive	N:43.815685 W:-79.617786		
96	25	2	13-Jun-23	10:59 AM	11:05 AM	B	Fixed	1.5	1.5	1.5	40 Longview Cresc.	Minor	2	N	Res	N/A	N	N	N	N	N	Y	N	N	N/A	N/A	2	0	N/A	1	N		Crescent	N:43.8033259 W:-79.6103748		
97	33	2	13-Jun-23	11:12 AM	11:20 AM	B	Fixed	17	17	17	4 Arnish St.	Minor	2	Y	Res	<3	N	N	N	N	N	Y	Y	Y	100	150	2	0	Curb	1	N		Street	N:43.808554 W:-79.593457		
98	12	2	13-Jun-23	11:25 AM	11:37 AM	B	Variable	12	10	6	181 Willis Rd.	Minor	2	Y	Res	3 to 6	N	N	N	N	N	Y	N	Y	40	N/A	5	7	N/A	2	N		Road	N:43.7929621 W:-79.5845599		
99	10	2	13-Jun-23	11:42 AM	11:47 AM	B	Fixed	17	17	17	172 Villa Park Dr.	Minor	2	N	Res	<3	N	N	N	N	N	N	N	N	N/A	N/A	0	0	Curb-Stormwater Grate	1	N		Drive	N:43.7916713 W:-79.5801707		
100	7	2	13-Jun-23	11:51 AM	11:58 AM	B	Fixed	6	6	6	1 Queen Mary Ct.	Minor	2	N	Res	<3	N	N	N	N	N	Y	N	N	N/A	N/A	1	0	N/A	1	N		Court	N:43.7846182 W:-79.5817601		

APPENDIX B
SITE DISTRIBUTION MAP
AND TOP LITTER HOTSPOTS





APPENDIX C
METHODOLOGY



SITE SELECTION

To select sites for the City Litter Audit, the City will provide a list of categories of typical sites for which a litter audit is to be conducted and a geographical information system (GIS) database that has a dedicated dataset for each of those categories with the boundaries of the City. Using GIS software, AET will use all of City's center-line coordinates for all potential public street locations within the boundary of the City. Inputting these data coordinates; AET will use a computer sample generator program to randomly select potential litter audit sites. These data points will then be plotted on computer generated maps using GIS software, and detailed locations identified. The ratio of sites selected from each category will be the same, unless the City requests a higher or lower ratio of sites from a particular category or categories. If the City decides to include in the litter audit a category of sites that do not have a GIS dataset, the City will provide a list of addresses for the category. A unique potential site number will be assigned to each and added to the list of potential litter audit sites.

AET is recommending that 97 litter locations be completed in this study based on the population and the area of the City. The population used was 340,874 (based on 2021 Census population at 323,103 with a population growth rate of 5.5% for 2022). This sample size was determined using the Raosoft sample size software calculator based off 10% margin of error, 95% confidence level and 50% response distribution. When completing site selection, approximately 125 sites will be used and then eliminated due to proximity and land use until 97 sites are selected. The sample size will vary when significant changes in population or area occur and/or changes in the margin of error.

The data points generated will be plotted on computer generated maps in GIS. The City may elect to request substitution of some of the sites or require restrictions as to when some of the sites are audited in order to ensure minimal disruption to daily or scheduled activities in those areas. Each of the final sites selected shall be assigned a unique sample site number.

CONDUCTING THE LITTER AUDIT

Audit area at the sites should be the same size. Audit Areas are to be 200 feet (61 meters) x 18 feet (5.5 metres). These full-sized audit areas are termed FIXED sites. The site width may be less than 18 feet in some cases, such as when in commercial areas the storefront is set back less than the prescribed distance. In these cases, each site should be 200 feet in length by the width available (<18 feet or 5.5 metres), which will be recorded. These sites are termed VARIABLE sites.

Beginning at the front of the parked car or the start of the site, the team shall use a measuring device to measure 50 feet ahead of the start of the site. Using street marking paint (water based to dissolve) or some other temporary marking method (e.g. chalk, pylons), a mark should be made on the pavement ahead to denote the starting point of the audit site. From this point the team will measure 100 feet, marking the roadway with another identifier to show the mid-point of the site. A final measurement of an additional 100 feet denotes the end of the audit site. As mentioned above, each site is to be 200 feet in length.

The width measurement shall be taken at the start, midpoint and end of the site. The width of the site should be measured 1.5 feet from inside the curb or the start of the pavement, towards the outer edge of the site, up to a maximum width of 18 feet and marked to indicate the boundary. This rule is set to include 1.5 feet into the street since curbs are normal catchment structures, for which the City is responsible for litter clean up. Refer to *Figure 1* below depicting the audit site setup.

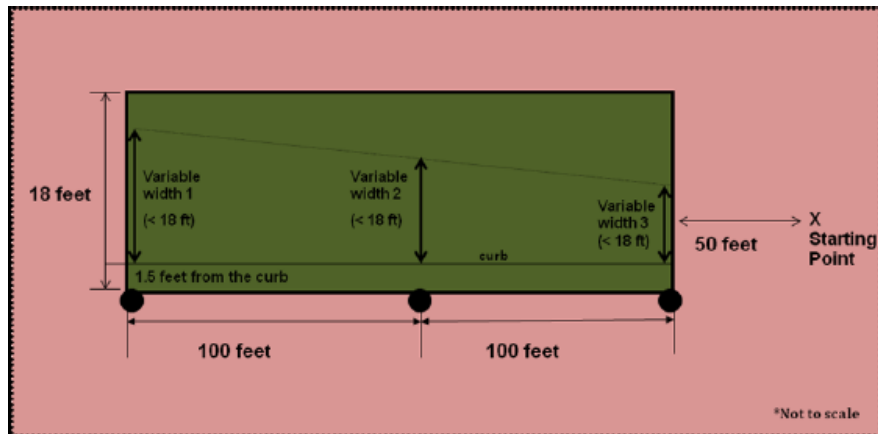


Figure 1: Schematic of Survey Site

CLASSIFICATION OF LARGE LITTER

For purposes of classifying litter, and in accordance with the methods used in previous litter surveys, large litter is defined as being greater than 4 square inches in size. To assist the field teams with determining the litter sizes, each audit team will be provided with three templates of 4 square inches in rectangle, square and round shape form. Refer to *Figure 2* depicting diagrams of the litter templates.

At each site location this litter audit will observe and document large litter in 14 sub-categories and 90 categories. See *Table 1* below for details of the classification of litter items. The Site Surveyor-Large Item and Branded Litter Count form will be used for recording large litter items found at each site.

LITTER TEMPLATES FOR 4 inch² (25 cm²)

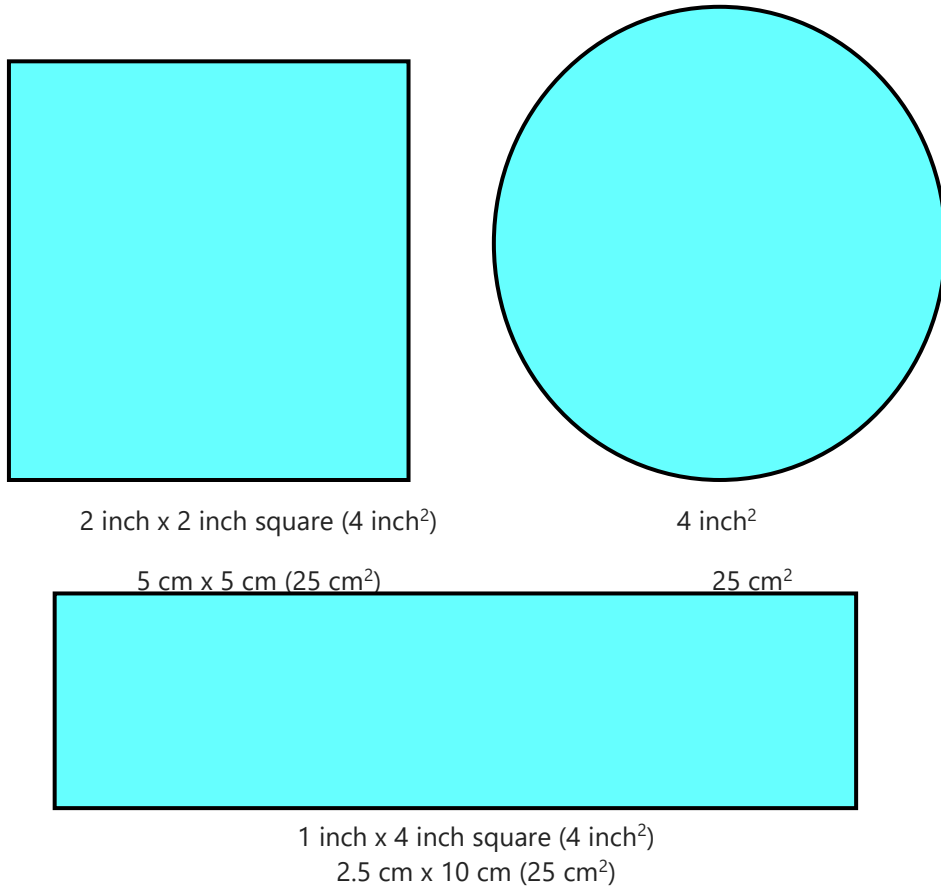


Figure 2: Litter Template

Table 1: Large Litter Categories

No	CATEGORY	Sub-Category	Material	Description
1	Beer Cans	Beverage	Metal	Consumer beer can containers
2	Beer Bottles (Glass)	Beverage	Glass	Refillable and non-refillable beer bottles
3	Soft Drink (Glass)	Beverage	Glass	Soft drinks in glass containers
4	Soft Drink (Cans)	Beverage	Metal	Soft drinks in metal can containers
5	Soft Drink (Plastic)	Beverage	Plastic	Soft drinks in plastic containers
6	Sport Drink (Glass)	Beverage	Glass	Sport drinks in glass containers
7	Sport Drink (Plastic)	Beverage	Plastic	Sport drinks in plastic containers
8	Water (Glass)	Beverage	Glass	Packaged water in glass containers
9	Water (Plastic)	Beverage	Plastic	Packaged water in plastic containers
10	Wine/ Liquor (Glass)	Beverage	Glass	Wine & liquor in glass
11	Wine/ Liquor (Plastic/Other)	Beverage	Plastic	Wine & liquor in plastic or other formats
12	Milk/Juice (Plastic)	Beverage	Plastic	Milk or juice containers in plastic
13	Milk/Juice (Glass)	Beverage	Glass	Milk or juice containers in glass
14	Milk/Juice (Gable Top)	Beverage	Paper	Milk/juice in gable top cartons
15	Foil Pouches	Other Pckg.	Composite	Packaged goods and pieces of foil pckg
16	Aseptic (Box)	Other Pckg.	Paper	Drink-in-box, juice, fluids, other
17	Broken Glass Container	Other Pckg.	Glass	Glass bottle fragments
18	Six Pack Plastic Rings	Other Pckg.	Plastic	Retainer plastic for carrying cans
19	Plastic Drink Cups	Cups	Plastic	Cups, all resin types
20	Paper Cups (Cold)	Cups	Paper	Cups, all paper types - cold drinks
21	Paper Cups (Hot)	Cups	Paper	Cups, all paper types - hot drinks
22	Polystyrene Cups (Foam)	Cups	Plastic	Cups, all polystyrene types - hot drinks
23	Other Paper Cups	Cups	Paper	Cups, other materials
24	Cup Lids, Pieces Lids	Cups	Plastic	Cups, lids, straws and pieces
25	Plastic Retail Bags	Bags	Plastic	Whole\pieces of retail plastic bags

26	Paper Retail Bags	Bags	Paper	Whole\pieces of retail paper bags
27	Paper Bags - Fast Food	Bags	Paper	Whole\pieces of fast food paper bags
28	Plastic Bags - Not Retail	Bags	Plastic	Whole\pieces of non-retail plastic bags
29	Paper Bags - Not Retail	Bags	Paper	Paper bags & sacks (e.g., leaf debris)
30	Zipper Bags/ Sandwich	Bags	Plastic	Plastic lunch bags and sacs
31	Cardboard Boxes & Material	Other Pckg.	Paper	All cardboard and box materials
32	Paperboard (Cereal Type)	Other Pckg.	Paper	Cereal, shoe boxes and pieces etc.
33	Paper Beverage Cases	Other Pckg.	Paper	Paper material outer packaging for beverage products
34	Polystyrene Clamshells	Other Pckg.	Plastic	Whole and pieces of expanded foam containers
35	Paper Clamshells	Other Pckg.	Paper	Whole and pieces of take-away or other paper containers
36	Other Plastic Shells/Boxes	Other Pckg.	Plastic	PET, PVC, HDPE, other material shells
37	Plastic Jars / Bottles/ Lids	Other Cntrs.	Plastic	Non-beverage plastic jars/bottles, (e.g., detergent bottles)
38	Glass Jars/ Bottles Misc.	Other Cntrs.	Glass	Glass jars/bottles not described above
39	Cans - Steel	Other Cntrs.	Metal	Steel food/non-food containers
40	Cans - Aluminum	Other Cntrs.	Metal	Aluminum food/non-food containers
41	Container Lids	Other Cntrs.	Metal	All lids, closures, and pieces > 4 sq. in.
42	Aerosol Cans (Paint, Oils, Etc.)	Other Cntrs.	Metal	Aerosol cans, tops, lids - all products
43	Paper Food Wrap	Food Wraps	Paper	Commercial/Non-commercial food wrap (e.g., meat wrap)
44	Paper / Foil Composite Wrap	Food Wraps	Various	Wrap for food/non-food (e.g., hamburger paper/foil)
45	Plastic Wrap	Food Wraps	Plastic	All plastic wrap types, food, non-food
46	Polystyrene Trays	Trays	Plastic	Take-out/non-take out, microwavable, display trays
47	Paper Trays	Trays	Paper	Take-out/non-take out, microwavable, display trays
48	Other Material Trays	Trays	Various	Take-out/non-take out, microwavable, display trays
49	Gum Wrappers	Confectionary/Snack	Paper	Packaging used to seal, sell gum products

50	Candy Bar Wraps	Confectionary/Snack	Composite	Packaging used to seal, sell candy products
51	Candy Pouches	Confectionary/Snack	Composite	Packaging used to seal, sell candy products
52	Sweet Packaging (Describe)	Confectionary/Snack	Various	Packaging used to seal confections (e.g., cakes)
53	Other confectionery (describe)	Confectionary/Snack	Various	All other packaging for confectionaries
54	Condiment Package (Salt, Etc.)	Take-Out Extras	Various	Pouches (e.g., ketchup, salt), containers, creamers
55	Plastic Eating Utensils	Take-Out Extras	Plastic	Forks, Knives, Chop Sticks, Spoons, Straws etc.
55	Chop sticks	Take-Out Extras	Plastic	#N/A
55	Forks	Take-Out Extras	Plastic	#N/A
55	Knives	Take-Out Extras	Plastic	#N/A
55	Spoons	Take-Out Extras	Plastic	#N/A
55	Straws	Take-Out Extras	Plastic	#N/A
55	Other	Take-Out Extras	Plastic	#N/A
56	Name Brand (Fast Food etc.) Towels / Napkins / Serviettes	Take-Out Extras	Paper	Towels & napkins with identifiable brand
57	Paper Fast Food Plates	Take-Out Extras	Paper	Paper Plates used to serve fast food
58	Poly Fast Food Plates	Take-Out Extras	Plastic	Polystyrene Plates used to serve fast food
59	Other Plastic Fast Food Plates	Take-Out Extras	Plastic	Other Material Plates used to serve fast food
60	Plates - Other Materials	Take-Out Extras	Various	Plates - not fast food (e.g., picnic plates)
61	Clothing Or Clothing Pieces	Cloth	Textiles	All cloth, clothing pieces, and clothing discarded on site
62	Other Cloth	Cloth	Textiles	Tarps, industrial fabrics etc.
63	Snack Food Packaging	Confectionary/Snack	Various	All snack food (e.g., chips)
64	Plastic Packaging - Other	Other Pckg.	Plastic	Plastic packaging otherwise not described
65	Paper Packaging - Other	Paper/Fibre Material	Paper	Paper packaging otherwise not described
66	Plastic/Composite - Other	Other Misc.	Various	All paper and composite debris not previously described
67	Foil Materials/Foil Pieces	Other Misc.	Various	Foils and pieces, aluminum food foils, industrial foils

68	No Brand Name Towels / Napkins / Serviettes	Paper/Fibre Material	Paper	Napkins and towels - no brand identification
69	Lottery Ticket Debris	Paper/Fibre Material	Paper	Tickets, and gaming items
70	Printed Material (Newspapers, Etc.)	Paper/Fibre Material	Paper	Commercially printed materials (newspapers, flyers, etc.)
71	Stationary (School, Business Etc.)	Paper/Fibre Material	Paper	School papers, business forms, etc.
72	Receipts (Business, Transfers, Etc.)	Paper/Fibre Material	Paper	Receipts, tickets, bus transfers, invoices, packing slips
73	Cigarette / Cigar Debris (>4")	Tobacco	Various	Tobacco items
74	Tobacco Pckg (Packs, Matches, Etc.)	Tobacco	Various	Tobacco packaging, matches, lighters, matchboxes
75	Foil Containers	Other Pckg.	Metal	Foil wraps (e.g., ice cream)
76	Misc. Paper	Other Misc.	Paper	All other paper whole or shredded, unidentifiable
77	Misc. Plastic	Other Misc.	Plastic	All other plastic whole or shredded, unidentifiable
78	Misc. Paperboard	Other Misc.	Paper	All other paperboard whole or shredded, unidentifiable
79	Misc. Cardboard	Other Misc.	Paper	All other cardboard whole or shredded, unidentifiable
80	Misc. Glass	Other Misc.	Glass	All other glass, whole or broken, unidentifiable
81	Vehicle & Metal Road Debris	Other Misc.	Various	Debris associated with transportation
82	Construction Debris	Other Misc.	Various	Debris associated with construction
83	Tire & Rubber Debris	Other Misc.	Various	Rubber sheets/pieces, tire pieces, shock absorbers
84	Home Articles	Other Misc.	Various	All non-described household items, (e.g., lamps, etc.)
85	Food & Other Organics	Other Misc.	Organics	
86	e-Waste (cables, USB keys, ear buds, batteries etc.	Other Misc.	Electronics	
87	Popsicle Sticks	Other Misc.	Various	
88	Face Masks	Other Misc.	Various	Nylon, cloth, various fabrics, plastic, etc.
89	Disposable Gloves	Other Misc.	Various	Latex, rubber, plastic, etc.
90	Other Materials	Other Misc.	Various	To be determined

BRANDED LITTER

Branded Litter is described as any large litter (i.e., over 4 square inches) that has a recognizable brand name affixed. Any large branded litter item observed during the audit will be recorded on the Site Surveyor-Large Item and Branded Litter Count form beside the appropriate category.

CLASSIFICATION OF SMALL LITTER

Small litter is defined as those pieces of debris that are less than 4 square inches in size. It is classified under 24 categories, as listed below. The small litter audit involves examining three segments, or slices taken through the audit site. The successful bidder shall construct a frame for each audit team, using ½ inch P.V.C. plastic tubing (or a similar material) to act as the template. This frame shall measure 1 foot wide and 6 feet long. Three successive “flips” of the frame will complete crossing the site to the 18-foot boundary of the site. The litter auditor will observe and count all the small litter contained within the frames at three locations within each site: at the start, mid-point and end of the site. At each segment three flips of the frame will be analyzed, thus surveying a total of 18 square feet segment for a total of 54 feet of the entire site. See *Figure 3* for a depiction of the site setup for the small litter survey. The Site Surveyor Form – Small Litter Count Sheet will be used to record the findings for each site.

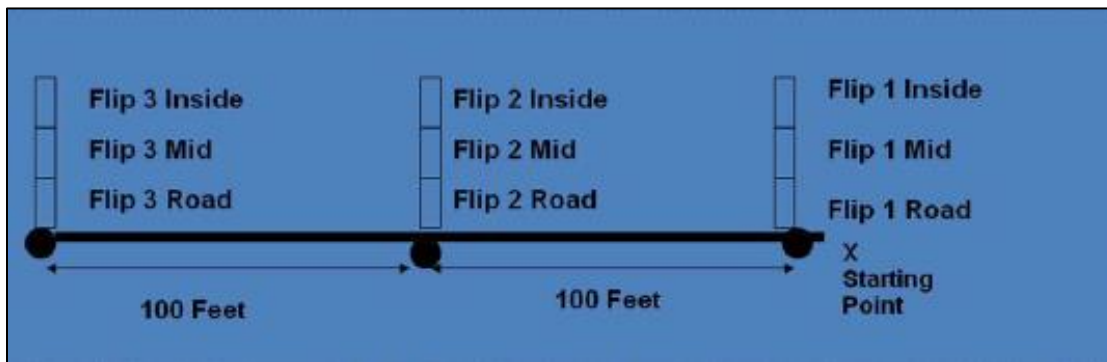


Figure 3: Site Set up Small Litter

SMALL LITTER CATEGORIES

1. Cigarette butts/debris
2. Other tobacco
3. Bottle caps
4. Plastic Eating Utensils
 - a. Forks
 - b. Knives
 - c. Spoons
 - d. Chop Sticks
 - e. Straws
 - f. Other
5. Candy packaging and wrappers
6. Polystyrene packing materials, ie. Foam peanuts
7. Other polystyrene debris, ie. Poly foam pieces
8. Glass
9. Paper
10. Plastic Film
11. Hard plastic
12. Aluminum/foil debris
13. Rubber
14. Metal (not aluminum)
15. Other material
16. Chewing gum (stuck on pavement)
17. Food & Other Organics
18. Face Masks
19. E-waste (cables, usb keys, earbuds, etc.)

DATA COLLECTION PROCEDURE

Arrival at Site

The audit team(s), consisting of two members, will approach their assigned sites according to the order on their daily schedule. Upon arriving at a site, the team will safely park their vehicle. They will be dressed in fluorescent orange traffic vests to increase visibility. If the audit involves a laneway for cars or bicycles, the team will place traffic cones for traffic control.

Recording Site Characteristics

The Audit Team Lead will fill the first page of the Site Surveyor Form – Large Items and Branded Litter Count. This page, partially filled before the audit with site ID number, GPS coordinates (to be confirmed when on site), and category of site, has fill-in-the blank sections as well as blank spaces for extra notes. The fill-in-the blank sections are for date, start time, digital photos taken, camera used, type of site (e.g., residential, industrial, commercial, parkland), type and characteristics of adjacent roadway (major city street, minor city street, laneway), whether road is divided, number of lanes, grass height, stop sign/traffic light visible, presence of fast food or convenience stores nearby, mobile food vendor within sight, bus stop within sight, city street/park litter bin within sight, evidence of litter cleanup, catch point (fence, hedge, curb, grass line, tree line, other), and visual rating of site.

Site Photographic Evidence

Once the boundaries of the site are set, at least five (5) photographs will be taken, one of the completed or partially completed first page of the Site Surveyor Form, one each from mid-points of both ends of the length looking toward the other end of length, one each from mid-points of both sides of the width looking toward the other side of width. These photographs will serve three functions:

1. Visual evidence for the cleanliness grade to be given to each site location.
2. Standard visual benchmarks for future site litter audits of cleanliness grades.
3. Visual reference for locating same sites in future audits.

Cleanliness grades will follow the established grades for street litter audits of 1 to 4, with 1 corresponding to “cleanest”, and 4 to dirtiest, within the extremes of no litter to significant accumulations of litter. Photographic records that back up the grades will provide information on both what the different levels of cleanliness in atypical sites look like and whether those correspond to the same levels of cleanliness on streets. Whether the dirtiest of sites are more dirty or less dirty than typical sites, similarly, whether the cleanest of sites are more clean or less clean than typical sites, will constitute valuable information upon which better decisions regarding cleaning and education fund allocations can be based.

During the first litter audit, that is to say, before the visual benchmarks for cleanliness grades have been established, cleanliness grades will be given to sites after data is collected, and will be based on comparison of photographs as well as on field notes taken during the collection. The team lead may record a rough estimate during the audit, based on experience of street litter audits (bearing in mind that “dirtiest” and “cleanest” might be very different from the same in typical sites) to be confirmed or

modified after photos of all audited sites have been compared. In future audits, the paradigm photos for the four grades of cleanliness will be used to grade the cleanliness of a site.

In addition to the four angles, close-ups of unusual items or unusual configurations of litter accumulations, as well as anomalies such as broken or overflowing trash or recycling bins, will be photographically recorded. The total number of photographs taken at each site will be recorded on the Site Surveyor Form – Large Items and Branded Litter Count. All photographs will be part of the archival record for this audit and will be part of the electronic database submitted to the City.

APPENDIX D
FIELD FORMS



Site Surveyor Form – Large Items and Branded Litter Count

Date: _____ (DD/MM/YYYY) Start Time: _____ (AM/PM) End Time: _____ (AM/PM)

Team ID _____ Surveyors Names: _____

Site #: _____ Site ID Number: _____ Site Name: _____

Site type: Fixed Variable Site length: **Always 200 feet long**

If variable:

Width 1 - Start: _____ ft. (up to 18ft.)

Width 2 - Middle: _____ ft. (up to 18ft.)

Width 3 - End: _____ ft. (up to 18ft.)

GPS Coordinates: (example: N: 43.758572, W: 79.58778)

N:

W:

Updated GPS coordinates only required if site is moved

Road type (check one): Major City Street Minor City Street Laneway

Is roadway divided: Y / N

Number of Lanes: 2 4 6 Other (explain): _____

Area Attributes:

Commercial Residential Industrial Parkland

Grass Height (Check one): N/A < 3 inches 3" – 6" over 6"

Fast food within sight: Y / N Name of fast food: _____

Convenience store within sight: Y / N

Mobile Food Vendor within sight: Y / N

Bench or other resting structure within sight: Y / N

Bus stop within sight: Y / N

Traffic light or stop sign within sight? Y / N

City street/park litter bin within sight: Y / N

City street/park litter bin details: _____

Evidence of litter cleanup? Y / N

Cleanup details: _____

Catch point: fence hedge curb grass line tree line other _____

Details: _____

Photos Taken: _____

Visual rating of site (1 = cleanest, ie. <5 large pieces of litter; 4 = dirtiest, ie. >20 large pieces of litter) _____

Additional comments: _____

Site Surveyor Form - Small Litter (<4") Count Sheet

Date (DD/MM/YY): _____

Start Time: _____

End Time: _____

Team ID: _____

Surveyors Names: _____

Site Number: _____

Site ID: _____

Site Name: _____

		Section #1*				Section #2				Section #3				
SMALL LITTER CATEGORY	Item	Flip 1	Flip 2	Flip 3	Total	Flip 1	Flip 2	Flip 3	Total	Flip 1	Flip 2	Flip 3	Total	Grand Total
Cigarette butts/debris	1													
Other tobacco	2													
Bottle caps	3													
Plastic Eating Utensils	4													
Forks	4													
Knives	4													
Spoons	4													
Chop Sticks	4													
Straws	4													
Other	4													
Candy packaging and wrappers	5													
Polystyrene packing materials, ie. foam peanuts	6													
Other polystyrene debris, ie. poly foam pieces	7													
Glass	8													
Paper	9													
Plastic film	10													
Hard plastic	11													
Aluminum/foil debris	12													
Rubber	13													
Metal (not aluminum)	14													
Other material	15													
Chewing gum (stuck on pavement)	16													
Food & Other Organics (without packaging)	17													
Face Masks	18													
E-waste (cables, usb keys, earbuds, etc)	19													

*closest to vehicle/starting point

Large Items and Branded Litter Count Form

No	CATEGORY	Pass 1	Total	Pass 2	Total	BRAND NAMES OBSERVED	Compostable/ Biodegradable Item Count
1	Beer Cans						
2	Beer Bottles (Glass)						
3	Soft Drink (Glass)						
4	Soft Drink (Cans)						
5	Soft Drink (Plastic)						
6	Sport Drink (Glass)						
7	Sport Drink (Plastic)						
8	Water (Glass)						
9	Water (Plastic)						
10	Wine/ Liquor (Glass)						
11	Wine/ Liquor (Plastic/Other)						
12	Milk/Juice (Plastic)						
13	Milk/Juice (Glass)						
14	Milk/Juice (Gable Top)						
15	Foil Pouches						
16	Aseptic (Box)						
17	Broken Glass Container						
18	Six Pack Plastic Rings						
19	Plastic Drink Cups						
20	Paper Cups (Cold)						
21	Paper Cups (Hot)						
22	Polystyrene Cups (Foam)						
23	Other Paper Cups						
24	Cup Lids, Pieces Lids						
25	Plastic Retail Bags						
26	Paper Retail Bags						
27	Paper Bags - Fast Food						
28	Plastic Bags - Not Retail						
29	Paper Bags - Not Retail						
30	Zipper Bags/ Sandwich						
31	Cardboard Boxes & Material						
32	Paperboard (Cereal Type)						
33	Paper Beverage Cases						
34	Polystyrene Clamshells						
35	Paper Clamshells						
36	Other Plastic Shells/Boxes						
37	Plastic Jars / Bottles/ Lids						
38	Glass Jars/ Bottles Misc.						
39	Cans - Steel						
40	Cans - Aluminum						
41	Container Lids						
42	Aerosol Cans (Paint, Oils, Etc.)						
43	Paper Food Wrap						
44	Paper / Foil Composite Wrap						
45	Plastic Wrap						
46	Polystyrene Trays						
47	Paper Trays						
48	Other Material Trays						
49	Gum Wrappers						
50	Candy Bar Wraps						
51	Candy Pouches						
52	Sweet Packaging (Describe)						

No	CATEGORY	Pass 1	Total	Pass 2	Total	BRAND NAMES OBSERVED	Compostable/ Biodegradable Item Count
53	Other confectionery (describe)						
54	Condiment Package (Salt, Etc.)						
55	Plastic Eating Utensils						
55	Chop sticks						
55	Forks						
55	Knives						
55	Spoons						
55	Straws						
55	Other						
56	Name Brand (Fast Food etc.) Towels / Napkins / Serviettes						
57	Paper Fast Food Plates						
58	Poly Fast Food Plates						
59	Other Plastic Fast Food Plates						
60	Plates - Other Materials						
61	Clothing Or Clothing Pieces						
62	Other Cloth						
63	Snack Food Packaging						
64	Plastic Packaging - Other						
65	Paper Packaging - Other						
66	Plastic/Composite - Other						
67	Foil Materials/Foil Pieces						
68	No Brand Name Towels / Napkins / Serviettes						
69	Lottery Ticket Debris						
70	Printed Material (Newspapers, Etc.)						
71	Stationary (School, Business Etc.)						
72	Receipts (Business, Transfers, Etc.)						
73	Cigarette / Cigar Debris (>4")						
74	Tobacco Pckg (Packs, Matches, Etc.)						
75	Foil Containers						
76	Misc. Paper						
77	Misc. Plastic						
78	Misc. Paperboard						
79	Misc. Cardboard						
80	Misc. Glass						
81	Vehicle & Metal Road Debris						
82	Construction Debris						
83	Tire & Rubber Debris						
84	Home Articles						
85	Food & Other Organics						
86	e-Waste (cables, USB keys, ear buds, batteries etc.						
87	Popsicle Sticks						
88	Face Masks						
89	Disposable Gloves						
90	Other Materials						

APPENDIX E
LARGE LITTER DATA



#	Large Litter Items	Count	Percent
1	Misc. Plastic	63	9.6%
2	Water (Plastic)	61	9.3%
3	No Brand Name Towels / Napkins / Serviettes	56	8.6%
4	Other Materials	56	8.6%
5	Cup Lids, Lid Pieces, Straws	37	5.7%
6	Misc. Paper	33	5.0%
7	Tobacco Other (packs, matches, cellophane)	20	3.1%
8	Plastic Wrap	20	3.1%
9	Printed Material (newspapers, flyers, books etc.)	19	2.9%
10	Paper Cups (Hot)	17	2.6%
11	Paperboard (Cereal Type)	15	2.3%
12	Plastic Drink Cups	15	2.3%
13	Construction Debris	15	2.3%
14	Soft Drink (Cans)	14	2.1%
15	Other Plastic Shells/Boxes	14	2.1%
16	Receipts (business forms, bus transfers, etc)	13	2.0%
17	Candy Bar Wraps	13	2.0%
18	Misc. Paperboard	12	1.8%
19	Paper Packaging Other	10	1.5%
20	Plastic Bags - Not Retail	10	1.5%
21	Plastic Jars / Bottles / Lids	10	1.5%
22	Plastic Packaging Other	9	1.4%
23	Face Masks	9	1.4%
24	Food / Other Organics	7	1.1%
25	Snack Food Packaging	7	1.1%
26	Foil Materials/Foil Pieces	6	0.9%
27	Other Confectionery (Describe)	6	0.9%
28	Name Brand FF Towels/Napkins	6	0.9%
29	Stationary (school, bus, etc.)	5	0.8%
30	Zipper Bags/ Sandwich	5	0.8%
31	Straws	4	0.6%
32	Cardboard Boxes/ Box Material	4	0.6%
33	Beer Cans	4	0.6%
34	Misc. Cardboard	4	0.6%
35	Paper Bags - Fast Food	4	0.6%
36	Paper Food Wrap	3	0.5%
37	Sweet Packaging (Describe)	3	0.5%
38	Disposable Gloves	3	0.5%
39	Paper Cups (Cold)	3	0.5%
40	Soft Drink (Plastic)	3	0.5%
41	Paper Bags - Not Retail	3	0.5%
42	Paper / Foil Composite Wrap	2	0.3%
43	Plastic Retail Bags	2	0.3%
44	Forks	2	0.3%
45	Lottery ticket debris	2	0.3%

#	Large Litter Items	Count	Percent
46	Aseptic (Box)	2	0.3%
47	e-Waste (cables, USB keys, ear buds, batteries etc.)	2	0.3%
48	Popsicle Sticks	2	0.3%
49	Sport Drink (Plastic)	2	0.3%
50	Polystyrene Clamshells	2	0.3%
51	Paper Retail Bags	2	0.3%
52	Cans - steel	2	0.3%
54	Vehicle & Metal Road Debris	1	0.2%
55	Polystyrene Trays	1	0.2%
56	Spoons	1	0.2%
57	Milk/Juice (Plastic)	1	0.2%
58	Broken Glass Container	1	0.2%
59	Milk/Juice (Gable Top)	1	0.2%
60	Aerosol cans (paint, oils, etc.)	1	0.2%
61	Plastic / composite other	1	0.2%
62	Milk/Juice (Glass)	1	0.2%
63	Container Lids	1	0.2%
64	Wine/ Liquor (Glass)	1	0.2%
	Total Top 20	513	78.4%
	Total - All Large Litter	654	100.0%

APPENDIX F
SMALL LITTER DATA



Small Litter Item	Count	Percent
Cigarette butts/debris	122	35.3%
Paper	71	20.5%
Candy packaging and wrappers	51	14.7%
Plastic film	29	8.4%
Hard plastic	17	4.9%
Aluminum/foil debris	8	2.3%
Food & Other Organics	8	2.3%
Bottle caps	7	2.0%
Other polystyrene debris	7	2.0%
Polystyrene packing materials	6	1.7%
Rubber	5	1.4%
Glass	4	1.2%
Metal (not aluminum)	4	1.2%
Other material	3	0.9%
Other tobacco	2	0.6%
Chewing gum (stuck on pavement)	1	0.3%
E-waste	1	0.3%
Face Masks	0	0.0%
Total Small Litter	346	100%

APPENDIX G
RANKING OF SITES



Site ID	Site #	Lg Litter
69	87	96
127	66	32
101	72	23
85	61	21
3	42	19
68	21	18
88	60	16
16	24	15
35	27	15
55	28	15
54	2	14
26	10	13
24	11	12
76	89	12
53	3	11
31	8	11
19	13	11
18	25	11
120	93	11
124	92	10
52	20	9
83	32	9
8	45	9
96	80	9
2	82	9
29	9	8
117	68	8
67	75	8
73	31	7
119	67	7
39	7	6
13	12	6
91	40	6
48	50	6

Site ID	Site #	Sm Litter
55	28	33
3	42	33
68	21	16
85	61	14
127	66	13
13	12	12
35	27	12
78	41	12
88	60	12
18	25	11
19	13	9
24	11	8
90	73	8
2	82	8
112	71	7
12	98	7
101	72	6
31	8	5
96	80	5
1	81	5
76	89	5
29	9	4
11	14	4
30	16	4
46	18	4
91	40	4
4	43	4
60	54	4
67	75	4
6	83	4
59	85	4
49	19	3
27	26	3
48	50	3

Site ID	Site #	All Litter
69	87	96
3	42	52
55	28	48
127	66	45
85	61	35
68	21	34
101	72	29
88	60	28
35	27	27
18	25	22
24	11	20
19	13	20
13	12	18
2	82	17
76	89	17
31	8	16
26	10	15
16	24	15
54	2	14
96	80	14
29	9	12
78	41	12
67	75	12
120	93	12
12	98	12
53	3	11
52	20	11
117	68	11
83	32	10
91	40	10
112	71	10
90	73	10
124	92	10
46	18	9

Site ID	Site #	Lg Litter
80	58	6
74	88	6
46	18	5
27	26	5
104	33	5
5	44	5
51	51	5
50	52	5
12	98	5
47	4	4
36	6	4
30	16	4
49	19	4
61	30	4
116	34	4
122	36	4
121	37	4
38	49	4
100	63	4
87	78	4
45	17	3
37	22	3
70	29	3
97	39	3
4	43	3
21	46	3
23	47	3
60	54	3
112	71	3
89	74	3
75	76	3
1	81	3
9	84	3
59	85	3
44	95	3
11	14	2

Site ID	Site #	Sm Litter
51	51	3
117	68	3
75	76	3
87	78	3
74	88	3
102	90	3
56	94	3
44	95	3
62	1	2
26	10	2
52	20	2
73	31	2
123	35	2
50	52	2
65	55	2
80	58	2
82	77	2
9	84	2
47	4	1
36	6	1
39	7	1
83	32	1
122	36	1
97	39	1
5	44	1
38	49	1
119	67	1
93	79	1
20	86	1
120	93	1
54	2	0
53	3	0
40	5	0
15	15	0
45	17	0
37	22	0

Site ID	Site #	All Litter
73	31	9
8	45	9
48	50	9
74	88	9
30	16	8
27	26	8
51	51	8
80	58	8
119	67	8
1	81	8
39	7	7
49	19	7
4	43	7
50	52	7
60	54	7
87	78	7
59	85	7
11	14	6
5	44	6
75	76	6
44	95	6
47	4	5
36	6	5
104	33	5
122	36	5
38	49	5
6	83	5
9	84	5
61	30	4
116	34	4
123	35	4
121	37	4
97	39	4
100	63	4
102	90	4
56	94	4

Site ID	Site #	Lg Litter
123	35	2
106	38	2
114	64	2
90	73	2
93	79	2
25	96	2
33	97	2
28	48	1
65	55	1
79	57	1
81	59	1
107	62	1
111	69	1
6	83	1
20	86	1
102	90	1
56	94	1
7	100	1
62	1	0
40	5	0
15	15	0
22	23	0
78	41	0
57	53	0
71	56	0
126	65	0
108	70	0
82	77	0
115	91	0
10	99	0
Total		656

Site ID	Site #	Sm Litter
22	23	0
16	24	0
70	29	0
61	30	0
104	33	0
116	34	0
121	37	0
106	38	0
8	45	0
21	46	0
23	47	0
28	48	0
57	53	0
71	56	0
79	57	0
81	59	0
107	62	0
100	63	0
114	64	0
126	65	0
111	69	0
108	70	0
89	74	0
69	87	0
115	91	0
124	92	0
25	96	0
33	97	0
10	99	0
7	100	0
Total		346

Site ID	Site #	All Litter
45	17	3
37	22	3
70	29	3
21	46	3
23	47	3
65	55	3
89	74	3
93	79	3
62	1	2
106	38	2
114	64	2
82	77	2
20	86	2
25	96	2
33	97	2
28	48	1
79	57	1
81	59	1
107	62	1
111	69	1
7	100	1
40	5	0
15	15	0
22	23	0
57	53	0
71	56	0
126	65	0
108	70	0
115	91	0
10	99	0
Total		1002

APPENDIX H
BRANDED LITTER DATA



<i>Rank</i>	<i>Brand Name</i>	<i>Count</i>	<i>Percent</i>
1	Tim Hortons	33	20.6%
2	McDonald's	11	6.9%
3	Nestlé	9	5.6%
4	No Name	8	5.0%
5	Belmont	7	4.4%
6	Coca Cola	5	3.1%
7	Kirkland	4	2.5%
8	Pepsi	4	2.5%
9	President's Choice	3	1.9%
10	Starbucks	3	1.9%
11	7 - Eleven	2	1.3%
12	A&W	2	1.3%
13	Allens	2	1.3%
14	Aquifina	2	1.3%
15	Campbell's	2	1.3%
16	Fine	2	1.3%
17	Hershey's	2	1.3%
18	Levis	2	1.3%
19	OLG	2	1.3%
20	Walmart	2	1.3%
21	5 Gum	1	0.6%
22	Astro Original	1	0.6%
23	Bell	1	0.6%
24	Bolts Plus	1	0.6%
25	Boosted	1	0.6%
26	Bubly	1	0.6%
27	Cadbury	1	0.6%
28	Canada Dry	1	0.6%
29	Canadian Lights	1	0.6%
30	Caruso Hair Club	1	0.6%
31	Chiclets	1	0.6%
32	Colgate	1	0.6%
33	DK Premium	1	0.6%
34	Dublife	1	0.6%
35	du Maurier	1	0.6%

<i>Rank</i>	<i>Brand Name</i>	<i>Count</i>	<i>Percent</i>
36	Evian	1	0.6%
37	Excel	1	0.6%
38	Flashman's	1	0.6%
39	Flying Monkeys Craft Brewery	1	0.6%
40	Fortino's	1	0.6%
41	Frechette Lawn care	1	0.6%
42	Good Supply	1	0.6%
43	Great Value	1	0.6%
44	Homeworks Landscaping	1	0.6%
45	IOGO	1	0.6%
46	KFC	1	0.6%
47	Kinder	1	0.6%
48	Kisko	1	0.6%
49	Kleenex	1	0.6%
50	Longos	1	0.6%
51	Mark's Work Warehouse	1	0.6%
52	Marlboro	1	0.6%
53	Macdonald (Cigarettes)	1	0.6%
54	Molson Canadian	1	0.6%
55	Mountain Dew	1	0.6%
56	Nature's Emporium	1	0.6%
57	Nestea	1	0.6%
58	OVNS	1	0.6%
59	Pall Mall Tobacco	1	0.6%
60	Pizza Nova	1	0.6%
61	Q-tip	1	0.6%
62	Royale	1	0.6%
63	Sealtest	1	0.6%
64	Starburst	1	0.6%
65	Sunchips	1	0.6%
66	Swiss Chalet	1	0.6%
67	The Topps Company Inc.	1	0.6%
68	Toblerone	1	0.6%
69	Unilever	1	0.6%
70	Vice	1	0.6%

<i>Rank</i>	<i>Brand Name</i>	<i>Count</i>	<i>Percent</i>
71	Weedman	1	0.6%
72	Wendy's	1	0.6%
73	Windows	1	0.6%
Total		160	100.0%

Litter Reduction Action Plan (2024-2026)

In 2023, the City of Vaughan conducted its first-ever litter audit. The findings from that report have informed the following action plan to reduce litter in the community using a data-driven approach.

COMMITMENT 1

Enhance Education and Community Engagement

- Tailor the annual year-long communications plan to emphasize findings from the audit¹
- Proclaim the Provincial Day of Action on Litter (May) and World Litter Day (September) to raise community awareness
- Explore opportunities to increase the number of community-led clean-up days, events and initiatives²
- Consider school partnerships for litter pickups to fulfill community service hours
- Collaborate with Canada Post to define maintenance responsibilities near community mailboxes and update City website with appropriate contact information



COMMITMENT 2

Continue Enforcement Efforts³

- Review existing enforcement processes to improve how property-related violations are handled
- Ongoing monitoring of the effectiveness of existing penalties to enhance deterrence
- Increase fines for repeat offenders



COMMITMENT 3

Modernize Litter Infrastructure

- Review and consider increasing the number of garbage bins in high-traffic areas, hot spots and remote locations
- Continue to implement the garbage bin replacement program to combat illegal dumping in City parks
- Expand the SmartParks initiative to additional City parks



COMMITMENT 4

Optimize the Operations Approach

- Review existing garbage can collection schedules in City parks and leverage route optimization software to further enhance rotation
- Explore options to increase funding for seasonal staff to collect litter
- Continue conducting litter audits for continuous improvement



¹in partnership with the Communications, Marketing and Engagement department

²in partnership with the Policy Planning and Special Programs department

³in partnership with the By-law and Compliance, Licensing and Permit Services department