SOLID NON-HAZARDOUS WASTE AUDIT

LEED Volume - USGBC MRc6 Solid Waste Management: Waste Stream Audit.

WORLD EXCHANGE PLAZA 45 O'CONNOR STREET OTTAWA, ONTARIO





PREPARED BY:



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EXECUTIVE SUMMARY

Quadreal Property Group (Quadreal) engaged the services of Viridis Environmental Inc. to conduct a solid non-hazardous waste audit on November 6, 2021 at the World Exchange Plaza in Ottawa. The base scope of work was to complete a waste audit whose process would comply with the requirements of LEED Volume - USGBC MRc6 Solid Waste Management: Waste Stream Audit. This report presents the results of the November 6, 2021 solid non-hazardous waste audit in response to the LEED requirements.

The World Exchange Plaza is a 674,000 ft² multi-tenant complex consisting of 2 office towers (45 O'Connor Street and 100 Queen Street), a multilevel concourse, outdoor amphitheatre, and underground parking for 1,100 vehicles. The complex is owned by bcIMC Realty Corporation and managed by Quadreal. It must be understood that the waste audit was conducted while the World Exchange Plaza had only about 10% occupancy due to COVID-19 as well as greatly reduced food court activity. Consequently, the waste totals in this report are much less than in previous years and are not directly comparable due to very different operating conditions.

A total of 346.090 kg of material was generated of which 5.780 kg were Containers diverted from landfill; 122.825 kg were Paper Fibres also diverted from landfill; and 99.115 kg were Leaf Litter/Plant Debris, Organic Food Waste and Paper Towels and compostable paper fibres diverted from landfill. Therefore, a total of 227.720 kg of target recyclable material were diverted. The total weight to landfill, adjusted for 45.030 kg of contamination in the recycling programs, was 118.370 kg. Consequently, the **waste diversion rate from the 24-hour sample was 66% (227.720 kg diverted / 346.090 kg generated * 100%).**

Landfilled wastes comprised **34%** of all material generated. The top 10 material categories of the Landfill Waste stream are listed below and collectively account for about **88%** of the weight of landfill waste:

- Organics (Front of Counter and Behind Counter and Leaf Litter/Plant Debris) collectively accounting for 28% of the adjusted landfill weight.
- Other Recyclable Paper (17.3%)
- Paper Towels (10.0%)
- Newsprint/Magazines (8.5%)
- Coffee Cups (6.1%)
- Film Plastic (4.9%)
- Boxboard (3.7%)
- Polystyrene (3.6%)
- Hazardous Waste (3.3%) (Biohazard bags from dental operations likely solid nonhazardous waste but not in a black garbage bag)
- Other Glass (2.2%)

To increase the waste diversion rate at the World Exchange Plaza, the following actions are recommended but it is understood that their effect will be limited until after COVID-19 conditions have ended.

- Notifying tenants at the World Exchange Plaza about the results of the waste audit and posting the results so they are accessible as per Ontario Regulation 102/94. Posting results could include having a physical copy available in the building and/or posting a copy electronically to a website to which the tenants have access.
- **Meeting with tenants** to discuss their experience with the current waste diversion programs and obtaining their suggestions for improvement. Tenant engagement should be an on-going activity to ensure tenants know what they can and cannot divert from landfill and any procedures to be followed.
- Reviewing existing recycling and composting container placement and signage within the building to ensure enough containers are available and in optimum locations. The cleaning staff should also be consulted regarding their own experiences during waste collection within the building and any improvements they would suggest.
- **Restart the waste sorting program** performed by Domus when feasible because it is a significant factor in increasing waste diversion efforts.
- **Consulting with existing waste service providers** to examine the potential to expand certain waste diversion programs. For example, polystyrene is currently landfilled but perhaps there may be a future diversion option. There may be other opportunities that the waste service provider can assist with.

1.0 BACKGROUND

Quadreal Property Group (Quadreal) engaged the services of Viridis Environmental Inc. to conduct a solid non-hazardous waste audit on November 6, 2021 at the World Exchange Plaza in Ottawa. The base scope of work was to complete a waste audit whose process would comply with the requirements of LEED Volume - USGBC MRc6 Solid Waste Management: Waste Stream Audit. This report presents the results of the November 6, 2021 solid non-hazardous waste audit in response to the LEED requirements.

2.0 FACILITY PROFILE

The World Exchange Plaza is a 674,000 ft² multi-tenant complex consisting of 2 office towers (45 O'Connor Street and 100 Queen Street), a multilevel concourse, outdoor amphitheatre, and underground parking for 1,100 vehicles. The complex is owned by bcIMC Realty Corporation and managed by Quadreal. The **current waste management collection procedures** are as follows:

- Progressive Waste Solutions collects the solid non-hazardous non-recyclable waste materials in a roll-off 30 yd³ compactor twice per month on average.
- Cascades Recovery Inc. (Cascades) collects the organic food waste and paper towels in 95 gallon carts weekly.
- Cascades collects the baled corrugated cardboard 3 times per week.
- Cascades collects the paper recycling in 95 gallon containers 5 days per week.
- Cascades collects cans, glass, plastics and milk/juice cartons & tetra-paks co-mingled in 95 gallon carts 5 days per week.
- Cascades collects shrink wrap monthly.
- E-Waste is collected by Evolutic.
- Off-site shredding is used by the majority of tenants.
- Wood pallets are reused.
- Fluorescent tubes are collected by Evolutic.
- Toner cartridges are collected by GreenTec.
- Batteries are collected by Raw Materials Inc.
- Eye glasses are collected in mail rooms and donated to 3rd World Countries.
- Shoes are collected and donated to Sole Responsibility.
- Three-compartment collection recycling centres are placed strategically on the ground to third floor to accommodate the collection of paper, co-mingled containers, and garbage.
- All office tenants have provided separate blue deskside containers to their staff for the collection of recyclable mixed paper. The tenants also use their black mini clip-on garbage containers which attach to the blue deskside container.
- Domus Building Cleaning (Domus) collects all recyclable paper from the blue deskside containers and all co-mingled containers from the recycling centres. They dispose of these materials in the appropriate collection containers.
- Domus collects the plastic milk, pop, bread crates and fruit baskets for reuse.
- Furniture is collected and reused on site.
- Tenant kitchens are equipped with three-compartment recycling stations to accommodate the collection of organic food waste and co-mingled containers.

World Exchange Plaza Waste Audit - LEED - November 6, 2021

3.0 METHODOLOGY

The audit at the World Exchange Plaza was conducted on November 6, 2021. The required 24hour sample of all garbage and recycling generated by the building tenants was collected by the cleaning staff during the day and evening of November 5, 2021. The integrity of the 24-hour sample was assured by having all garbage and recycling/composting collected on November 4, 2021 (the day before) to "zero" the waste containers and ensure that there was not accumulation of material from beyond the 24-hour sample. The garbage compactor and recycling room were also locked prior to the audit to prevent the inadvertent disposal of the waste sample.

From 8 a.m. onwards, the waste audit crew sorted and weighed the waste and disposed of the garbage and recycling in the appropriate containers. The waste sample sorted on November 6, 2021 was considered by Quadreal Property Group staff to be representative of a 24-hour cycle of building operations in terms of both the day collected and the quantities received and was not compromised by any special events, construction or other intermittent activities. According to facility staff, the sample period could be reasonably assumed to be typical of facility operations and waste generation under the COVID-19 environment. In terms of miscellaneous wastes, neither construction materials nor durable goods (e.g., furniture, appliances, etc.) were encountered or included in the data. For any locations not generating waste during the sample period, this was either the result of the space being vacant or the tenant operations not being open that day.

All of the waste was sorted into 32 pre-determined categories which are described in

Appendix A and weighed on a digital scale that resolved to 0.005 kg with a 50 kg capacity. Contaminants identified in each of the waste diversion streams (Paper Fibres, Containers, Organics) were allocated to the landfill waste stream for the sake of diversion rate. There were no visual estimations or volume to weight conversions used for any of the data collected.

The weight for each category was entered into a waste audit spreadsheet. Photographs were taken during the audit to show the various waste streams generated at the World Exchange Plaza and are shown in **Appendix B**.

4.0 AUDIT RESULTS

Table 1 presents the weights of the material measured during the 24-hour sample across all waste streams. A total of 346.090 kg of material was generated of which 5.780 kg were Containers diverted from landfill; 122.825 kg were Paper Fibres also diverted from landfill; and 99.115 kg were Organic Food Waste and Paper Towels and compostable paper fibres diverted from landfill. Therefore, a total of 227.720 kg of target recyclable material were diverted. The total weight to landfill, adjusted for 45.030 kg of contamination in the recycling programs, was 118.370 kg. Consequently, the **waste diversion rate from the 24-hour sample was 66% (227.720 kg diverted / 346.090 kg generated * 100%).**

The numbers in red refer to material that were contaminants in the various waste diversion programs and thus are more correctly accounted for as landfilled and add up to the 45.030 kg of contamination identified above. In the **Containers Recycling stream**, the contaminants included various paper fibres (26.270 kg), Food Waste (8.465 kg), Other Glass (2.160 kg), Polystyrene (1.920 kg), Film Plastic (3.610 kg), Other Plastic (0.425 kg), Wood (0.020 kg), Multicomposite (1.010 kg), Textiles (0.065 kg) and Other Miscellaneous (0.860 kg). In the **Paper Recycling stream**, the contaminants included Coffee Cups (0.050 kg), Aluminum (0.070 kg), various plastic resins (0.070 kg), Wood (0.005 kg) and Multicomposite (0.030 kg). In the **Organics Composting stream**, there were no contaminants in the sample of 99.115 kg. Overall, the **contamination level in the diversion programs was 16.5% (45.030 kg contamination** / (227.720 kg target material + 45.030 kg contamination). However, virtually all of this contamination was found in the Mixed Containers Stream (44.805 kg and a contamination rate of 89%)

Landfilled wastes comprised **34%** of all material generated. The top 10 material categories of the Landfill Waste stream are listed below and collectively account for about **88%** of the weight of landfill waste:

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- Other Recyclable Paper (17.3%)
- Paper Towels (10.0%)
- Newsprint/Magazines (8.5%)
- Coffee Cups (6.1%)
- Film Plastic (4.9%)
- Boxboard (3.7%)
- Polystyrene (3.6%)
- Hazardous Waste (3.3%) (Biohazard bags from dental operations)
- Other Glass (2.2%)

The Paper Recycling stream comprised 35.5% of the total weight generated (excluding contamination). The main materials included:

- Cardboard (38.715 kg and a capture rate of 95%)
- Newsprint/Magazines (77.635 kg and a capture rate of 89%)
- Other Recyclable Paper (5.790 kg and a capture rate of 22%)
- Boxboard (0.680 kg and a capture rate of 14%)

The Containers Recycling stream comprised about 1.7% of the total waste generated (excluding contamination). The main materials included:

- Glass (1.355 kg and a capture rate of 100%)
- Steel (0.170 kg and a capture rate of 64%)
- Aluminum (1.240 kg and a capture rate of 61%)
- Recyclable #1 PET plastic (1.295 kg and a capture rate of 44%)
- Recyclable #2 HDPE plastic (0.195 kg and a capture rate of 71%)
- Recyclable #5 PP plastic (1.235 kg and a capture rate of 52%)
- Milk/Juice Cartons & Tetra-Paks (0.290 kg and a capture rate of 73%)

The Organics Composting stream comprised about 28.6% of the total waste generated (excluding contamination). The main materials included:

- Paper Towels (9.385 kg and a capture rate of 44%)
- Behind Counter Organics (5.350 kg and a capture rate of 93%)
- Leaf Litter/Plant Debris (84.380 kg and a capture rate of 93%)

Containers Paper Organics Waste Type Product 3R's Group Landfill (kg) Recycling Recycling Composting Total (kg) % of Total % Diverted (kg) (kg) (kg) Old corrugated cardboard (OCC) Recyclable 0.825 38.715 0.000 40.640 95.3% Paper 1.100 11.7% Newsprint/Magazines 8.960 77.635 0.000 25.3% Paper Recyclable 1.065 87.660 88.6% Paper Boxboard Recyclable 1.335 3.025 0.680 0.000 5.040 1.5% 13.5% Recyclable 8.295 12.210 5.790 0.000 7.6% 22.0% Paper Other recyclable paper 26.295 Paper towels Compostable 6.965 0.005 9.385 21.170 44.4% Paper 4.815 6.1% Paper Coffee Cups Compostable 4.375 2.835 0.050 0.000 7.260 2.1% 0.0% Compostable Paper 1.635 1.415 0.000 0.000 3.050 0.9% 0.0% Paper Compostable Waste 1.055 0.080 0.3% 0.0% Paper Other non recyclable paper 0.000 0.000 1.135 33.720 9.385 68.8% Paper 26.270 122.875 192.250 55.5% Organics Front of counter organics Compostable 18.120 8.465 0.000 0.000 26.585 7.7% 0.0% Compostable 0.395 0.000 0.000 5.350 5.745 1.7% 93.1% Organics Behind counter organics Leaf Litter/Plant Debris Compostable 0.000 0.000 84.380 90.630 26.2% 93.1% Organics 6.250 24,765 8.465 0.000 89.730 122.960 35.5% 73.0% Organics Glass Recyclable 0.000 1.355 0.000 0.000 1.355 0.4% 100.0% Glass Waste 0.430 2.160 0.7% 83.4% Glass Other Glass 0.000 0.000 2.590 100.0% Glass 0.430 3.515 0.000 0.000 3.945 1.1% 0.095 64.2% 0.170 0.000 0.000 0.265 0.1% Metal Steel Recyclable Metal Aluminum Recvclable 0.740 1.240 0.070 0.000 2.050 0.6% 60.5% Waste 0.000 0.000 0.000 0.000 0.000 0.0% Metal Other metal n/a 0.835 0.7% Metal 1.410 0.070 0.000 2.315 60.9% Plastic Polvstvrene Waste 2.375 1.920 0.005 0.000 4.300 1.2% 0.0% Recyclable 1.570 1.295 0.065 2.930 44.2% Plastic Recyclable #1 - PET 0.000 0.8% Plastic Recyclable #2 - HDPE Recvclable 0.080 0.195 0.000 0.000 0.275 0.1% 70.9% Recyclable #4 - LDPE 0.030 0.000 0.000 0.0% Plastic Recyclable 0.000 0.030 0.0% Plastic Recyclable #5 - PP Recyclable 1.165 1.235 0.000 0.000 2.400 0.7% 51.5% Waste 2.185 3.610 Plastic Film Plastic 0.000 0.000 5.795 1.7% 0.0% Waste Other Plastic 0.090 0.425 0.000 0.000 0.515 0.1% 0.0% Plastic Plastic Compostable Plastic Compostable 0.000 0.000 0.000 0.000 0.000 0.0% n/a 7.495 16.245 Plastic 8.680 0.070 0.000 4.7% 16.8% 0.035 Wood General Waste 0.020 0.005 0.000 0.060 0.0% 0.0% 0.000 0.000 Wood Pallets Reusable 0.000 0.000 0.000 0.0% n/a 0.035 0.005 0.000 0.060 0.0% Wood 0.020 n/a Miscellaneous **Reusable Office Supplies** Reusable 0.050 0.000 0.000 0.000 0.050 0.0% 0.0% Hazardous Waste Hazardous 0.000 0.000 0.000 Miscellaneous 3.870 3.870 1.1% n/a Miscellaneous Multi-Composite Waste 0.570 1.010 0.030 0.000 1.610 0.5% 0.0% 0.290 Miscellaneous Milk/Juice Cartons & Tetra Paks Recyclable 0.110 0.000 0.000 0.400 0.1% 72.5% Miscellaneous Textiles Waste 0.180 0.065 0.000 0.000 0.245 0.1% 0.0% Other Miscellaneous 1.280 0.000 0.000 2.140 0.6% 0.0% Miscellaneous Waste 0.860 Miscellaneous 6.060 2.225 0.030 0.000 8.315 2.4% 3.5% Sample Total 73.340 50.585 123.050 99.115 346.090 100.0% Contamination 44.805 0.225 0.000 45.030 n/a Contamination Rate 88.6% 0.2% 0.0% 16.5% 122.825 99.115 118.370 5.780 346.090 Adjusted Total % of Adjusted Total 35.5% 28.6% 65.8% 1.7% 100.0% 34.2%

TABLE 1 – OVERALL WASTE GENERATION AT WORLD EXCHANGE PLAZA – 24 HOUR SAMPLE(Nov 6, 2021)

World Exchange Plaza Waste Audit - LEED - November 6, 2021

Figure 1 illustrates the proportions of landfill waste, including contamination in recycling programs, comprised of materials that could be diverted to existing waste diversion programs. The primary component of divertible landfill waste was compostable Leaf Litter/Plant Debris, Food Waste, Paper Towels, Non-Recyclable Paper and Compostable Paper/Plastics at 47% of the landfill waste stream. Paper fibres comprised 31% and Containers (glass, metal, plastics, milk/juice cartons/tetra-paks) made up 3% of the landfill waste. Therefore, 81% of the waste observed in the landfill stream could have been diverted to an existing recycling/composting program.

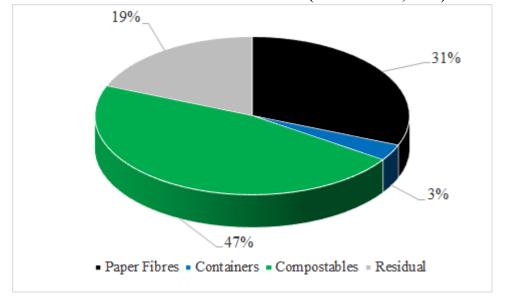


FIGURE 1: DIVERTIBLE MATERIAL COMPOSITION OF LANDFILL WASTE AT THE WORLD EXCHANGE PLAZA (NOVEMBER 6, 2021)

World Exchange Plaza Waste Audit - LEED - November 6, 2021

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the November 6, 2021 waste audit at the World Exchange Plaza show a 24-hour sample of 346.090 kg of material was generated of which 5.780 kg were Containers diverted from landfill; 122.825 kg were Paper Fibres also diverted from landfill; and 99.115 kg were Leaf Litter/Plant Debris, Organic Food Waste and Paper Towels and compostable paper fibres diverted from landfill. Therefore, a total of 227.720 kg of target recyclable material were diverted. The total weight to landfill, adjusted for 45.030 kg of contamination in the recycling programs, was 118.370 kg. Consequently, the **waste diversion rate from the 24-hour sample was 66% (227.720 kg diverted / 346.090 kg generated * 100%).** To increase the waste diversion rate at the World Exchange Plaza, the following actions are recommended but it is understood that their effect will be limited until after COVID-19 conditions have ended.

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APPENDIX A

MATERIAL CATEGORY DEFINITIONS

Waste	Product	3Rs Group	Detailed
Туре			Description
Paper	Old corrugated cardboard (OCC)	Recyclable	All corrugated cardboard except for waxed.
Paper	Newsprint/Magazines	Recyclable	Newspapers and magazines/glossy paper
Paper	Boxboard	Recyclable	Thin cardboard-style paper stock typically found as packaging around coffee cups, tissue boxes, cigarette packages, etc.
Paper	Other Recyclable paper	Reusable	Mixed office paper fibre, mostly consisting of fine white paper, including shredded and non-shredded paper.
Paper	Paper Towels	Compostable	From washrooms primarly but also found in quantity in other locations.
Paper	Compostable paper	Compostable	Specific coffee cup brands that use disposable paper cups that are compostable as per the eco-log on the cup.
Paper	Non recyclable paper	Waste	Coffee cups, waxy paper, and other non-recyclable papers. Some of these paper products may be compostable.
Food	Front of counter organics	Compostable	Food from plate scrapings and lunch bags.
Food	Behind counter organics	Compostable	Coffee grinds and cafeteria preparation area waste.
Glass	Glass	Recyclable	Clear and coloured glass food and beverage containers.
Glass	Other Glass	Waste	Ceramic mugs, wine and water glasses, lightbulbs, etc.
Metal	Steel	Recyclable	Food and beverage cans (e.g. soups cans, tomato cans, etc.)
Metal	Aluminum	Recyclable	Pop cans, other aluminum beverage cans, aluminum foil
Metal	Other metal	Waste	Miscellaneous metal items typically not accepted in standard recycling programs (e.g. pipe parts, coat hangar, etc.)
Plastic	Polystyrene	Waste	Styrofoam cups, certain yogurt containers, take-out food containers, utensils, straws, packaging, etc.
Plastic	Recyclable #1 - PET	Recyclable	Food and beverage containers (bottles typically) made of the plastic resin polyethylene terephthalate (PET)
Plastic	Recyclable #2 - HDPE	Recyclable	Food and beverage containers, jugs and other plastic containers made of the plastic resin high density polyethylene (HDPE).
Plastic	Recyclable #4 - LDPE	Recyclable	Certain squeezable bottles and film plastics stamped as low density polyethylene (LDPE).
Plastic	Recyclable #5 - PP	Recyclable	Certain yogurt containers, margarine tubs, and other food packaging consisting of the plastic resin polypropylene (PP).
Plastic	Film Plastic	Waste	Thin plastic packaging, garbage bags, shrink wrap.
Plastic	Other Plastic	Waste	Plastics without codes and/or typically not recyclable (e.g. #3 polyvinyl chloride).
Plastic	Compostable plastic	Compostable	Plastic lids or packages with labels that certify the plastic is compostable.
Wood	General	Waste	Example include chopsticks, popsicle sticks, tongue depressors and other small wooden objects.
Wood	Pallets	Recyclable	Wooden skids tyically used in shipping and receiving.
Miscellaneous	Reusable Office Supplies	Reusable	Reusable pens, pencils, scissors, file folders, binders, etc.
Hazardous	Hazardous Wastes	Waste	Paints, aerosol cans, batteries, etc.
Miscellaneous	Multi - Composite	Waste	All items that are composites of several waste types. (eg. Compact discs, wire, etc.)
Miscellaneous	Milk/Juice Cartons & Tetrapaks	Recyclable	Gable-top cartons and other packaging typically used as milk and juice containers.
Miscellaneous	Other Miscellaneous	Waste	Other waste that is not included in the above categories and not present in significant quantities.(eg. tetrapaks and shoes)
Miscellaneous	E-waste and Toner Cartridges	Recyclable	Computer components and toner cartridges accepted in recycling programs.

APPENDIX B

PHOTOGRAPHS FROM NOVEMBER 6, 2021 WASTE AUDIT

Photo 1: Garbage Bags – 100 Queen Street Building –Landfill garbage is collected in clear bags from the office towers to help the Domus staff identify recyclable/compostable materials in the garbage. However, in 2021, Domus was not performing the quality control sorting. Note that garbage levels were greatly reduced due to COVID-19. Signs were also posted throughout the loading dock regarding mask-wearing and keeping physical distance as part of public health measures.



Photo 2: Cardboard Recycling





Photo 3: Clear Bags of Paper Towels diverted to composting

Photo 4: Clear Bags of Mixed Containers Recycling. Note that this recycling was heavily contaminated and had not been decontaminated.

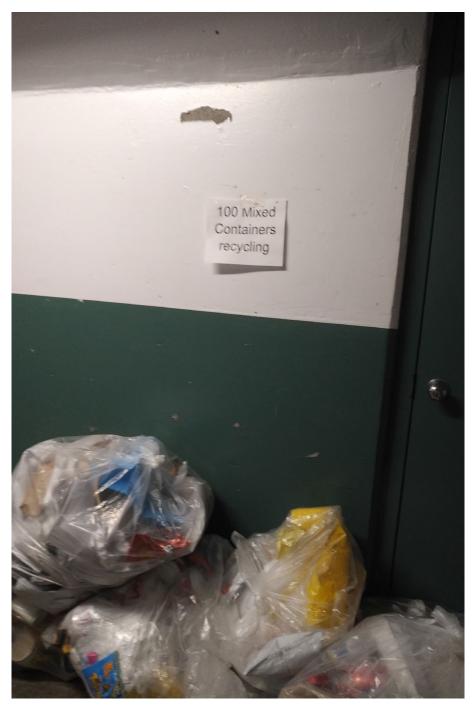




Photo 5: Outside Organics diverted to composting

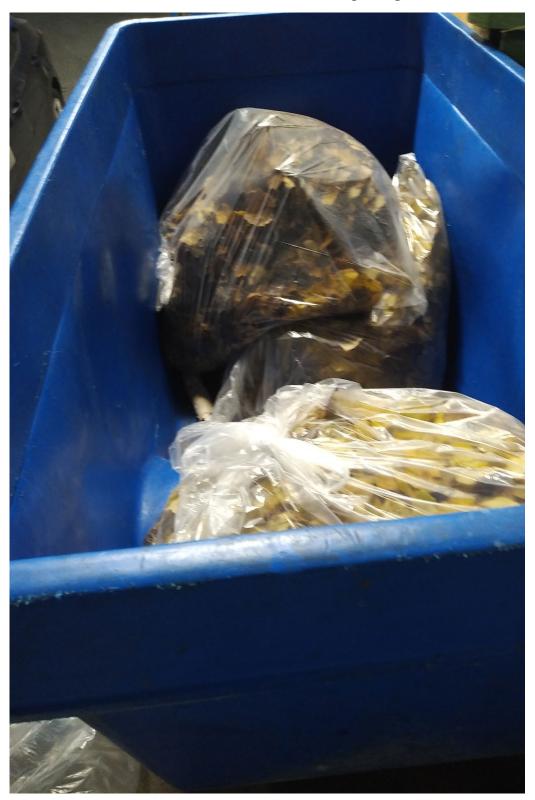


Photo 6: Leaves diverted to composting



Photo 7: Paper from 45 O'Connor diverted to recycling

Photo 8: Sorting Station for Domus to remove recyclables/compostables from garbage and contamination from recyclables/compostables. Note that this station is not currently in use.

