metrovancouver

2022 Biennial Report (Draft)

Integrated Solid Waste and Resource Management Plan

March 27, 2024

Note: This document was revised on November 1, 2024 to correct the following:

- Footnotes updated for Table 1, "Construction and Demolition Waste Disposal by Facility", providing further explanation for the added C&D residual waste column.
- Footnotes updated for Table 3, "Vancouver Landfill Waste Tonnages ", clarifying MSW tonnages at the Vancouver Landfill included construction and demolition processing residual waste.
- Updated Section 3.6.1, Calculation, to include clarification on the construction and demolition processing residual waste which was counted as disposed for the construction and demolition sector.

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1.0 SUMMARY

As part of the implementation of the Integrated Solid Waste and Resource Management Plan (ISWRMP), Metro Vancouver reports once every two years on ISWRMP progress. The biennial report supplements an annual recycling and solid waste management summary. The biennial report includes a summary of ISWRMP strategies, a summary of performance measures, and progress on the detailed actions in the ISWRMP. This year's report combines the 2021-2022 implementation status of initiatives in the *Integrated Solid Waste and Resource Management Plan* with the 2022 annual summary of recycling and solid waste statistics.

As of the end of 2022 with a 65% recycling rate and 0.44 tonnes per capita municipal solid waste disposal rate, Metro Vancouver is among the most successful jurisdictions in North America in reducing waste. While continuing to work towards improving recycling and reducing generation, Metro Vancouver has initiated a solid waste management plan update. An updated solid waste management plan will build on the strengths of the current plan and identify opportunities for accelerated waste reduction and recycling while reducing greenhouse gases and promoting a circular economy.

The following initiatives undertaken since the prior biennial progress report have helped to further the goals of the *Integrated Solid Waste and Resource Management Plan* while reflecting the public's expectations of environmental stewardship, affordability and accessibility:

- **Solid waste management plan update:** Metro Vancouver convened two advisory committees which continue to shape the ongoing solid waste management plan update: the Solid Waste and Recycling Industry Advisory Committee, and the Solid Waste Management Plan Public and Technical Advisory Committee. Both committees provide invaluable input on both the solid waste management plan update and ongoing waste reduction initiatives.
- **Waste prevention and re-use:** Metro Vancouver prioritized initiatives to prevent waste in 2021 and 2022, including contracting with FoodMesh to develop a regional food recovery network to help rescue and redistribute surplus food, developing a funding program for member jurisdictions to host repair café events, and piloting 'Reuse Days' at the North Shore Recycling and Waste Centre to collect items from customers that can be reused.

  The National Zero Waste Council, an initiative of Metro Vancouver, works on a national scale to lead Canada's transition to a circular economy. In 2021 and 2022, the National Zero Waste Council worked with governments, businesses, and NGOs to further understand and explore solutions to food waste, plastics pollution, product design and packaging, construction and demolition waste, and reuse.

- **Recycling and waste centres**: United Boulevard and Central Surrey Recycling and Waste Centres opened to the public in 2022. These facilities demonstrate Metro Vancouver’s commitment to maximizing waste reduction and recycling, and providing excellent customer service. Both facilities include dedicated recycling depots where a wide range of recyclable materials can be dropped off for free.

  In late 2022, Metro Vancouver initiated recycling depot development projects at the Langley and North Surrey Recycling and Waste Centres. Metro Vancouver has purchased land adjacent to the North Surrey Recycling and Waste Centre, to be developed into the recycling depot, which is critical to achieving Metro Vancouver’s goal of providing consistent services that maximize reuse and recycling opportunities at all Metro Vancouver recycling and waste centres.

- **Waste-to-Energy Facility:** Metro Vancouver engaged a consultant to complete detailed design of Phase 1 of the District Energy project, which will include an energy centre adjacent to the Waste-to-

Energy Facility, and approximately 6 km of hot water piping. Once complete, the project will provide heat and hot water to over 50,000 homes and more than 500,000 sq. ft. of office and commercial space, which will reduce greenhouse gas emissions by up to 70,000 tonnes per year of carbon dioxide equivalents.

2.0 SUMMARY OF ISWRMP STRATEGIES

Strategy 1.1 Advocate that senior governments transfer additional waste management responsibilities to producers and consumers

In 2021 and 2022, Metro Vancouver participated in consultation events for, and provided comments on, the Ministry of Environment and Climate Change Strategy 2021-2026 *Extended Producer Responsibility Action Plan.* This plan identifies priority product categories and estimates implementation timelines for future Extended Producer Responsibility items, including: mattresses, single-use canisters, medical sharps, and others.

Strategy 1.2 Reduce or eliminate materials entering the solid waste system which hinder or limit the opportunities to achieve reuse, recycling, or energy recovery, or that may exacerbate environmental impacts of disposed residuals

The National Zero Waste Council (NZWC), an initiative of Metro Vancouver, is leading Canada's transition to a circular economy by bringing together governments, businesses, and NGOs to advance a waste prevention agenda that maximizes economic opportunities for the benefit of all Canadians. The Council acts collaboratively with business, government, and the community, at the national and international level, as an agent of change for waste prevention and reduction in the design, production and use of goods.

The Council was invited by Agriculture and Agri-foods Canada (AAFC) to engage in two separate and distinct ways. The Council was asked to chair, and be a member of, the jury for AAFC's/Impact Canada Food Waste Reduction Challenge. This challenge supports business innovation that reduces food waste while also addressing climate change. NZWC was also offered a seat at the Canadian Food Policy Advisory Council, supporting through strategic advice and guidance the development of *A Food Policy for Canada*. Both offer important opportunities to engage food, community, and agriculture leaders on how we can collectively build a more sustainable, circular, equitable, and resilient food system for all Canadians in addition to providing advice to the AAFC Minister on current and emerging issues. Through both of these opportunities, the Council has ensured that food waste has continued attention federally, with attending policy, financing, and innovation support; that climate change and circularity are included aspects of food waste prevention; and that federal government policy and innovation support carries knock-on impacts to policy and innovation at the provincial and regional level. Support for measuring and monitoring food waste, and addressing the challenges of best before dates were among the recommendations to AAFC.

Metro Vancouver continues to administer and enhance its disposal ban program. Beginning in 2022, a comprehensive consulting review of the Metro Vancouver Disposal Ban Program was initiated which included interviews with site inspectors, a review of the visual audit process, interviews with stakeholders, and research into disposal ban exemptions. The project is expected to be completed in 2023.

All disposal bans continue to be supported with behaviour change campaigns, ban enforcement, and educational materials. Challenges in the local availability of processing capacity and markets for materials such as organics, clean wood, and waxed cardboard have required occasional temporary relaxation of disposal ban surcharges.

Strategy 1.3 Provide information and education on options to reduce waste

2021-2022 activities included:

- Through the National Zero Waste Council, Metro Vancouver has led and coordinated Love Food Hate Waste (LFHW) Canada alongside campaign partners. Originally developed by The Waste and
- Resources Action Programme (WRAP) in the UK, LFHW is now a globally recognized and proven behaviour change campaign with a network of stakeholders working together to address household

food waste. Through LFHW Canada, national and local activations work together to enable citizens to hear consistent messaging through a variety of outreach, communications, and media efforts driving behaviour change over the long term. This collaborative approach helps to align messaging and reduce consumer confusion in the marketplace and enables campaign partners to realize economies of scale by working together.

- Through the Circular Cities and Regions Initiative, Metro Vancouver is bringing local governments across the country together to prioritize waste prevention and circular economy approaches with the greatest potential for impact.

- Continued support by Metro Vancouver for the National Zero Waste Council's broad efforts to advance a circular economy in Canada through the Circular Economy Leadership Canada.

- The National Zero Waste Council in collaboration with Circular Economy Leadership Canada and the Smart Prosperity Institute, released the *Circular Food Solutions in Canada: A Coast to Coast Landscape Scan*. This 2021 report identified circular solutions being implemented in indigenous, coastal, and rural communities, and explored the opportunities and challenges behind scaling circular food solutions in regions across Canada.

- Upon completion of *Less Food Loss and Waste, Less Packaging Waste*, three national forums were hosted in French and English in 2020, targeting decision-makers in government and industry in Western Canada, Eastern Canada, and Quebec. In 2021, the national forums shared report findings and facilitated decision-making around five key areas of the report's recommendations: prevent food loss and waste, including optimizing the sale of loose/bulk vs. prepackaged; address problematic and unnecessary packaging; improve recycling infrastructure; improve composting/anaerobic digestion infrastructure and; accelerate the development of new packaging materials and solutions. National forum results and the research report were shared with the newly established Canada Plastics Pact.

- Continued support by Metro Vancouver for the National Zero Waste Council's efforts to stimulate the development of new solutions and approaches through its two active working groups on reuse and the built environment.

    - In 2021, the Reuse Working Group released *Opportunities for Reusables in Retail Settings During the COVID-19 Pandemic in Canada*, providing guidance on the use of reusable products and services. This report stimulated further attention on reuse in retail settings.

    - In 2021, the Built Environment working group, in collaboration with Lafarge and the City of Richmond, published an online toolkit promoting a betting understanding and utilization of recycled asphalt paving.

    - 2020-2021 saw the production of webinars and knowledge-sharing videos, in collaboration with BCIT, on material innovation and the importance of deconstruction in addressing wood waste.

- Metro Vancouver and member municipalities worked collaboratively on a Metro Vancouver Board Approved Regionally Harmonized Approach to Municipal Single-Use Item Reduction Bylaws.

- Continued behaviour changes and social media campaigns for Christmas "Create Memories Not Garbage", Organics "Food Scraps Aren't Garbage", and Textiles "Think Thrice".

- Published a report in 2021 on Waste Prevention: Then Environmental and Economic Benefits for Canada, and followed up with webinars and videos that addressed the potential economic and

environmental benefits of waste prevention interventions in six important Canadian sectors: construction, manufacturing, healthcare, agriculture, plastics, retail.

Strategy 2.1 Increase the opportunities for reuse

2021-2022 activities included:

- Expanding re-use day events at the North Shore Recycling and Waste Centre to provide opportunities for customers to reuse materials intended for disposal.
- Launching a program to support members for their hosting of municipal and non-profit repair cafes.
- Awarding a three-year contract to Food Mesh to increase a regional food recovery network, starting in 2021.

Strategy 2.2 Increase the effectiveness of existing recycling programs

2021-2022 activities included:

- Opening the United Boulevard and Central Surrey Recycling and Waste Centers in March and September 2022, respectively, both of which provide significantly improved access and expanded recycling services.
- Working with Encorp Pacific, implemented Return-it Express & Go beverage container drop-off at the United Boulevard Recycling and Waste Centre.
- Working with Interchange Recycling (Extended Producer Responsibility for used motor oil and antifreeze products), implemented used oil and antifreeze drop-off at the North Shore, United Boulevard, and Central Surrey Recycling and Waste Centres.
- Working with the Recycling Council of British Columbia (RCBC) to improve regional online where to recycle resources to ensure consistent and reliable recommendations on where residents can drop-off materials for recycling.
- Continuing input into and monitoring of provincial Extended Producer Responsibility programs.

Strategy 2.3 Provide opportunities to increase private sector recycling

Ongoing activities include periodic review and revision of solid waste regulatory bylaws, studies of recycling market opportunities, and liaison/input into all of BC's various Extended Producer Responsibility programs.

Strategy 2.4 Target construction and demolition sector for increased reuse and recycling

2021-2022 activities included:

- Updating a construction and demolition waste reduction and recycling toolkit to increase awareness of reuse and recycling of building materials and provide a centralized source of information for contractors, designers, and homeowners.
- Continuing acceptance of gypsum at regional recycling and waste centres: used residential gypsum is sent for disposal and new gypsum off-cuts for recycling.

Strategy 2.5 Reduce paper and paperboard being disposed

The 2014 Extended Producer Responsibility Program for Packaging and Printed Paper (operated by Recycle BC) essentially removed local governments from a direct role in managing these materials from residential sources.

2021-2022 activities included:

- Continuing enforcement of the cardboard disposal ban at regional facilities for the commercial/institutional sector.
- Continuing support for the Binners' Project Coffee Cup Revolution to bring attention to the large number of single-use plastic-lined paper coffee cups going to disposal in the commercial/institutional sector.

Strategy 2.6 Target organics for recycling and energy recovery

2021-2022 activities included:

- Provided expanded opportunities for residents to drop off yard waste with the opening of Central Surrey and United Boulevard Recycling and Waste Centres.
- Started collection of commercial food waste for composting at the North Shore Recycling and Waste Centre.
- Continuation of the regional "Food Scraps Aren't Garbage" campaign, the Love Food Hate Waste Canada program for residential food waste prevention, and work with the Food Working Group of the National Zero Waste Council.

Strategy 2.7 Target wood for reuse, recycling and energy recovery

2021-2022 activities included:

- Working on a pilot study to potentially process engineered wood products to create an alternative fuel product and recover recyclables from small load waste, which contains a high percentage of wood.
- Updated construction and demolition recycling toolkit to focus on reuse through adaptive reuse, house moving, deconstruction, and salvage.
- Continued enforcement of a clean wood disposal ban, and provision of clean wood recycling at regional facilities

Strategy 2.8 Target plastics for increased recycling

The 2014 EPR program for Packaging and Paper Product (operated by Recycle BC) essentially removed the local governments from a direct role in managing plastic packaging materials from residential sources.

2021-2022 activities included:

- Continued input to Recycle BC and other EPR programs. In 2022, additional plastic packaging, including single-use items and packaging-like products, was rolled into the Recycle BC program.

- Metro Vancouver participated in various working groups and the Advisory Council of the Canada Plastics Pact.

- Metro Vancouver provided feedback on provincial and federal work around the reduction of plastics.

- Metro Vancouver worked with member municipalities to develop a harmonized approach to reducing single-use items, many of which are plastic.

Strategy 2.9 Target multi-family and commercial/institutional sectors to improve diversion rates

Metro Vancouver continues to work with its members, and other stakeholders to provide technical specifications and educational resources, behaviour change campaigns, update building requirements for storage and access, and encourage increased recycling in multi-family and commercial/institutional sectors.

Strategy 2.10 Develop contingency plans for the loss of recycling markets

In 2021 and 2022, Metro Vancouver worked with municipalities to develop an option for organics drop-off at the North Shore Recycling and Waste Centre, to provide another option for organics recycling

Strategy 2.11 Integrated Utility Management Advisory Committee

As approved by the Province in 2015, the ISWRMP implementation is now reviewed and critiqued by the Metro Vancouver Zero Waste Committee, including any resulting public input.

Strategy 3.1 Use Waste-to-Energy to provide electricity and district heating

Metro Vancouver is developing a Waste-to-Energy Facility District Energy System to supply heat and hot water to up to 50,000 homes in Vancouver, Burnaby and potentially New Westminster. When completed this project will triple the energy efficiency of the Waste-to-Energy Facility and reduce greenhouse gas emissions by up to 70,000 tonnes per year. Metro Vancouver is currently advancing to detailed design for the first phase of the Waste-to-Energy Facility District Energy System, which includes construction of an energy centre adjacent to the Waste-to-Energy Facility as well as a 6 km hot water pipe system from the Waste-to-Energy Facility to the River District Energy System located immediately west of Boundary Road at Marine Way in Vancouver. Phase 1 construction is expected to start in 2025. Phase 2 of the district energy system involves extending the hot water pipe system from the Phase 1 infrastructure to Metrotown and Edmonds where the City of Burnaby is developing a district energy utility. In 2021-22 Metro Vancouver completed the business case for the project, and signed an agreement with River District Energy to use heat from the District Energy System.

Strategy 3.2 Recover energy from other solid waste management facilities

New opportunities for expanded beneficial use are being pursued for landfill gas generated at the Vancouver Landfill.

Surrey continues to recovery natural gas from the Surrey Biofuel system

Strategy 3.3 Utilize non-recyclable material as fuel

Metro Vancouver is working on a pilot study to potentially process engineered wood products to create an alternative fuel product and recover recyclables from small load waste, which typically contains a high percentage of wood.

Strategy 4.1 Utilize the Vancouver Landfill as a disposal site

Metro Vancouver continues to use the Vancouver Landfill under the existing agreements.

Strategy 4.2 Ensure a disposal site is available for construction and demolition waste

Metro Vancouver continues to monitor the regional disposal capacity for construction and demolition waste which is largely provided by the private sector.

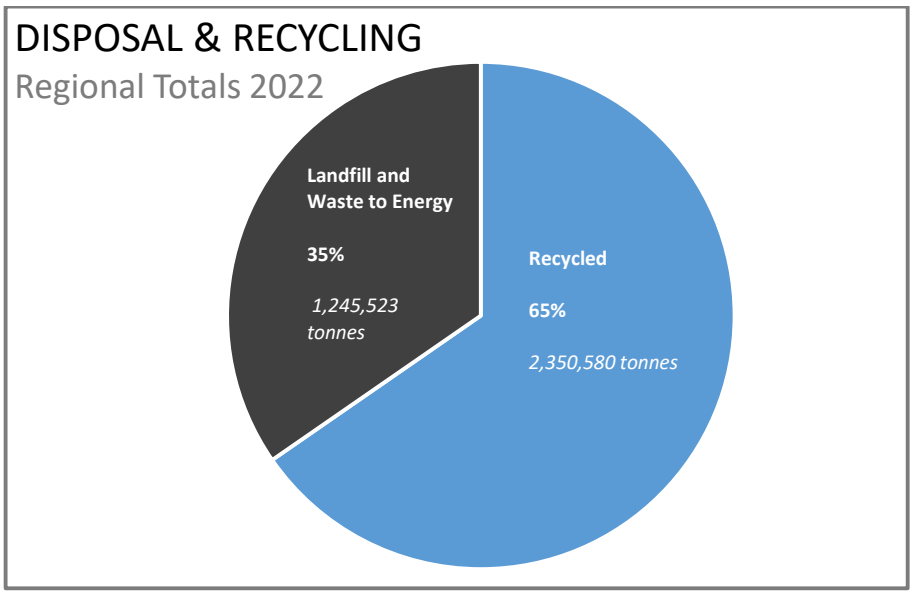
Strategy 4.3 Establish contingency disposal sites

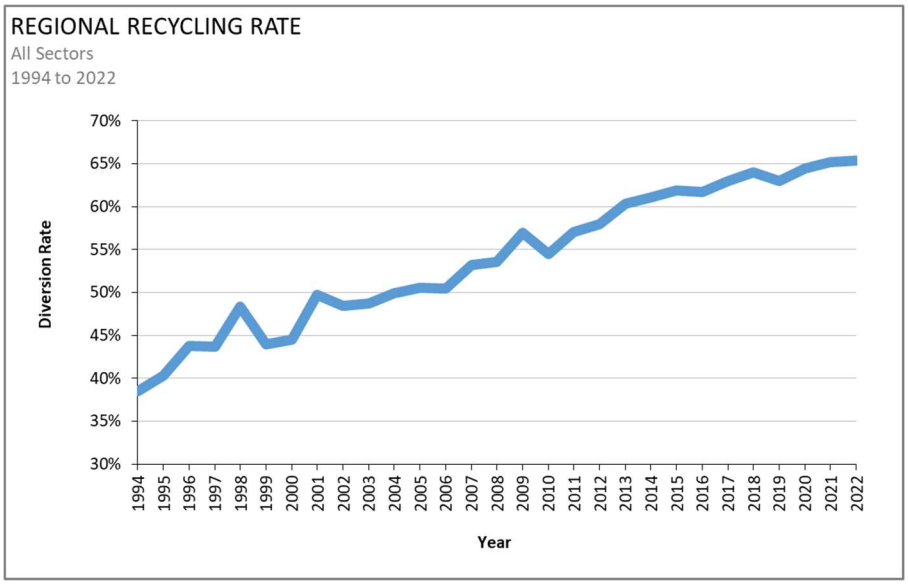
Metro Vancouver established and makes use of contingency disposal through three contracts. Contingency disposal waste quantities equaled 63,794 tonnes in 2021, and 144,603 tonnes in 2022.

3.0 DETAILED ISWRMP PERFORMANCE MEASURES

Note: Metro Vancouver uses the term "recycling rate" over "diversion rate". The term diversion rate has no clear definition and is inconsistently applied from jurisdiction to jurisdiction. The term "recycling rate" can be linked to the BC Environmental Management Act definition of "recyclable material", which provides a basis for consistent measurement. Although the Integrated Solid Waste Management Plan uses the term "diversion rate" with respect to goals, "Recycling rate" will be used for all statistics presented.

For calendar 2022 [(1)], overall recycling in the region was estimated to be 65%.



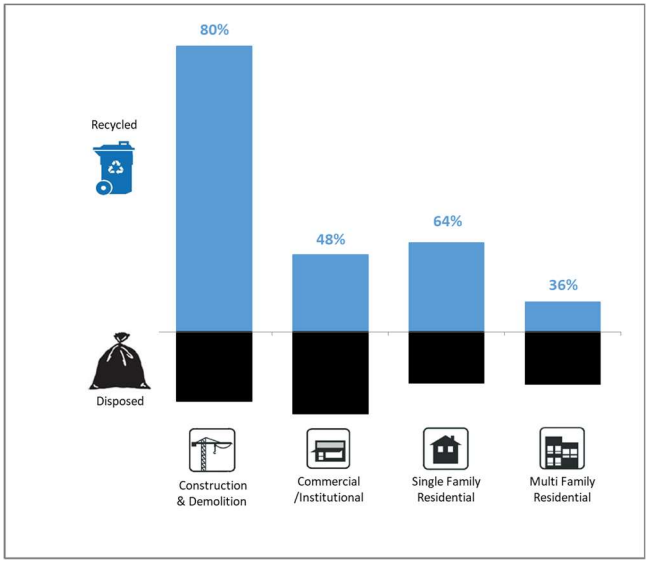


The regional recycling rate does not include reuse which does not have weight and measurement records of the same type as recycling and disposal. It is estimated that about 78,500 tonnes of materials were reused in the region in 2022.

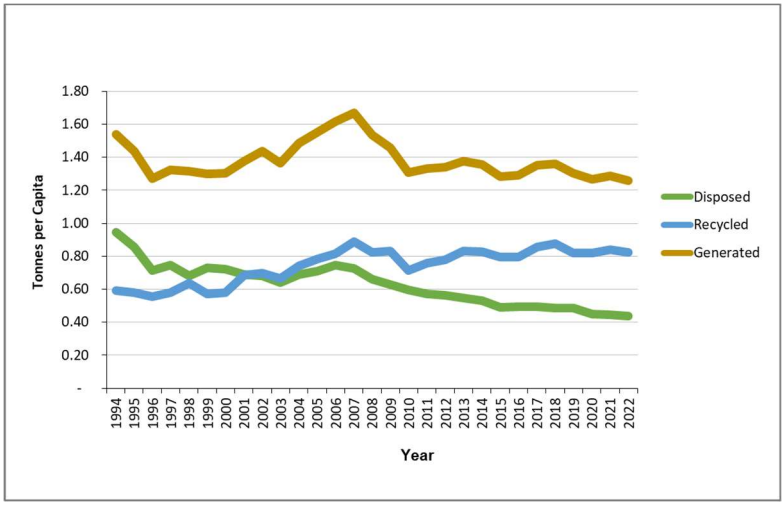
(1) *At the time of writing, calendar 2022 was the most recent year for which finalized data was available.*

Disposal includes waste disposed of in the Metro Vancouver and City of Vancouver regional solid waste system along with construction and demolition (C&D) waste disposed through private facilities.

The 2022 recycling and disposal by individual sectors is illustrated below:

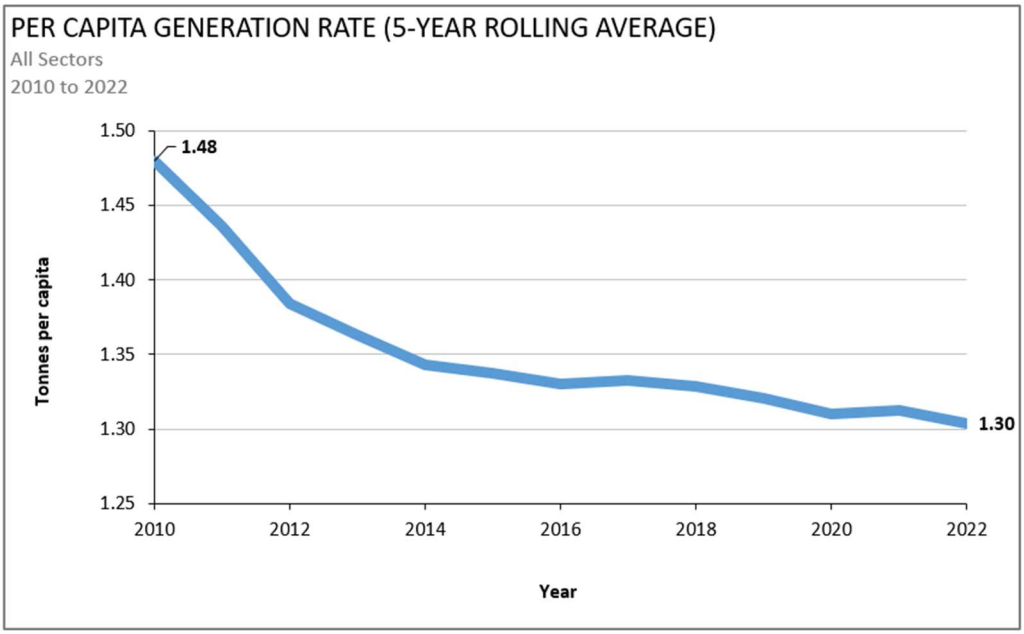


The following chart illustrates historical progress in per capita waste generation, recycling and disposal:



With respect to the region's waste reduction and recycling goals:

- The amount of waste generated per capita fluctuates, but from its high of 1.67 tonnes per capita in 2007, it has dropped to 1.26 tonnes per capita in 2022.
- From 2011 to 2022, the overall recycling rate increased from 57% to 65%.
- In 2022, an estimated 1.25 million tonnes of waste or 0.44 tonnes per capita was disposed, which is a 2.4% decrease in tonnage per capita from 2021, and 23% decrease from the per capita disposal rate when the current solid waste management plan was approved in 2011.



The following table outlines the amount of construction and demolition waste disposed to the Vancouver Landfill and to private C&D landfills since 2010:

Table 1. Construction and Demolition Waste Disposal by Facility (Tonnes)[1]

YEAR	VANCOUVER LANDFILL CONSTRUCTION AND DEMOLITION [2]	VANCOUVER LANDFILL CONSTRUCTION AND DEMOLITION PROCESSING RESIDUAL WASTE [3]	PRIVATE FACILITIES LOCAL AND OUT-OF-REGION	TOTAL
2010	140,734	Not reported separately	165,331	306,065
2011	196,498	Not reported separately	169,961	366,459
2012	185,317	Not reported separately	173,374	358,691
2013	159,303	Not reported separately	233,039	392,342
2014	132,721	Not reported separately	260,951	393,672
2015	124,044	Not reported separately	266,338	390,382
2016	118,168	71,073	232,908	422,149
2017	126,513	28,444	245,008	399,965
2018	86,663	27,110	277,909	391,683
2019	61,178	48,871	315,664	425,713
2020	44,138	11,215	326,654	382,007
2021	29,635	88,411	241,250	359,296
2022	52,969	96,173	189,813	338,955

(1) *Construction and demolition processing residual waste, which is considered part of the construction and demolition waste, was added to this table in 2022 and updated for prior years. As such, the totals for this version differ from previous biennial reports.*
(2) *Construction and demolition reported in the Vancouver Landfill Annual Report refers to demolition material that is mainly wood waste with small amounts of soft construction material, which has to meet the minimum criteria for wood content of 80 percent.*
(3) *Construction and demolition processing residual waste consists of materials that remain after construction and demolition waste has been processed to remove recyclable materials.*

The following table outlines the amount of residential and commercial waste disposed to regional disposal sites, and outside of the regional system since 2010:

Table 2. Residential & Commercial Waste Disposal by Facility (Tonnes)

YEAR	CACHE CREEK LANDFILL	VANCOUVER LANDFILL	WASTE-TO-ENERGY	CONTINGENCY DISPOSAL	OUT OF REGION (ESTIMATED)
2010	396,384	427,083	284,458		
2011	280,249	456,229	281,139		
2012	242,902	469,273	281,260		50,000
2013	217,072	395,253	280,138		60,000
2014	207,191	355,594	275,260		100,000
2015	206,198	366,123	256,402		30,000
2016	134,866	518,324	254,256		
2017		569,126	259,748	85,779	
2018		611,798	253,126	58,679	
2019		639,474	253,184	55,689	
2020		615,596	244,362	35,340	
2021		669,920	241,530	63,974	
2022		638,114	233,051	144,603	

The following table outlines the amount of waste of different types (municipal solid wastes, construction & demolition wastes, wastewater treatment plant residuals, water treatment residuals, bottom ash from the Waste-to-Energy facility, and industrial waste (e.g., pulp and paper wastes)) disposed at the Vancouver Landfill since 2010:

Table 3. Vancouver Landfill Waste Tonnages (Tonnes)

YEAR	MSW [4]	C&D	WWTP RESIDUALS	WT RESIDUALS	BOTTOM ASH	INDUSTRIAL	TOTAL
2010	427,083	140,734	6,545	6,037	46,410		580,399
2011	456,229	196,498	5,775	6,542	46,027		665,044
2012	469,273	185,317	6,050	7,295	44,925	48,347	716,282
2013	395,253	159,303	7,346	6,731	32,538		601,171
2014	355,594	132,721	7,377	7,595	44,861	599	548,747
2015	366,123	124,044	7,312	9,280	43,413		550,172
2016	518,324	118,168	8,028	3,944	43,068		691,532
2017	569,126	126,513	4,399	1,652	35,013		736,703
2018	611,798	86,663	18,737 [1]	710	0 [2]		717,908
2019	639,474	61,178	20,854 [1]	0	16,755 [2]		738,261
2020	615,596	44,138	37,403 [1]	1,417	41,478		740,032
2021	669,920	29,635	19,339 [1]	1,812	35,326		756,032 [3]
2022	638,114	52,969	2,858	3,258	37,281		734,480

(1) Includes approximately 15,000 tonnes Iona Grit Dump in addition to typical WWTP Residuals
(2) About 76,000 tonnes of bottom ash from the Waste-to-Energy Facility was used as part of the construction of the new United Boulevard Recycling and Waste Centre from October 2017 until August 2019.
(3) The Vancouver Landfill operational certificate limit was increased temporarily to account for additional debris from the flooding emergency in November 2021.
(4) MSW tonnages at the Vancouver Landfill include construction and demolition processing residual waste.

The following table outlines the amount of fly ash disposed from the Waste-to-Energy Facility since 2010. Fly ash has been managed under contract at a private landfill in Oregon since mid-2017:

Table 4. Fly Ash Disposal (Out of Region[(1)]) (Tonnes)

YEAR	FLY ASH DISPOSAL
2010	12,265
2011	11,964
2012	11,841
2013	11,710
2014	10,720
2015	9,657
2016	10,268
2017	10,450
2018	10,479
2019	9,888
2020	8,658
2021	10,699
2022	10,044

(1) Fly ash has sent to a private landfill in Oregon since July 2017

The following table outlines cover and beneficial use materials used at the Vancouver Landfill, as reported by the City of Vancouver in each year's Vancouver Landfill Annual Report. These materials are not counted as either disposal or recycling in Metro Vancouver's statistics, but are provided here for reference.

Table 5. Landfill Beneficial Use Materials (Tonnes)[1]

YEAR	COVER SOIL [2]	GROUND CONSTRUCTION WOOD WASTE	AGGREGATE [3]
2010	494,625	47,505	40,359
2011	488,462	46,953	44,180
2012	444,549	46,489	67,609
2013	407,282	47,240	96,288
2014	340,816	52,467	42,871
2015	324,094	78,241	60,890
2016	316,869	104,003	69,296
2017	418,339	94,981	107,720
2018	558,856	109,135	139,774
2019	516,712	70,524	104,228
2020	490,582	77,500	71,645
2021	357,783	103,542	109,022
2022	437,493	91,295	91,764

(1) Data taken from Vancouver Annual Landfill Reports. Other materials marked as 'used beneficially' are Closure Materials: Aggregate, Sand and Soil, quantities not included in this table.
(2) "Cover soil" incorporates quantities from cover soil and cover sand.
(3) "Aggregate" incorporates quantities from crushed concrete & asphalt grindings and purchased aggregate.

3.1. Annual Summary

Metro Vancouver collects municipal solid waste, recycling, and disposal data in four categories: single-family residential, multi-family residential, commercial/institutional, and construction and demolition.

Following an anomalous year in 2020 due to the COVID-19 pandemic and a subsequent shift toward pre-pandemic waste and recycling generation habits in 2021, Metro Vancouver's 2022 solid waste system tonnages continued to reflect less overall material generated by the residential sector and more generated by the commercial/institutional sector. These impacts may be attributed to the continued pandemic recovery with many businesses and institutions resuming pre-pandemic in-person operations, and residents spending more time outside of the home. In 2022, 2,350,580 tonnes of material were recycled and diverted from disposal in Metro Vancouver. This amounts to 65% of the waste generated in the region.

The remaining 1,245,523 tonnes of solid waste were sent for disposal at the Vancouver Landfill, the Metro Vancouver Waste-to-Energy Facility, and three remote landfills under contract to Metro Vancouver. Metro Vancouver continues to be among the most successful communities in North America with respect to waste reduction and recycling. Metro Vancouver is also currently updating its solid waste management plan, building

on the strengths of the current plan, and identifying opportunities for accelerated waste reduction and diversion while reducing greenhouse gases and promoting a circular economy.

Table 6 below presents recycling and solid waste disposal quantities for each sector. In 2022, Metro Vancouver allocated the distribution of EPR recycling tonnages to the single-family, multi-family, and commercial/institutional sectors (see note 3 in ***Table 6***). **Appendix 1** includes a similar table with a comparison to the previous year.

Table 6. Metro Vancouver Recycling and Solid Waste Quantities in 2022

WASTE SECTOR	DISPOSED (tonnes)	RECYCLED (tonnes)	RECYCLING RATE [3] (%)	DISPOSED (tonnes/capita)	DISPOSED (tonnes/ household)
Residential	**505,592**	**579,754**	**53%**	**0.18**	**0.45**
Single Family [1] Population [4] = 1,636,112	248,750	434,495	64%	0.15	0.48
Multi-Family [2] Population [4] = 1,218,263	256,842	145,259	36%	0.21	0.43
Commercial/Institutional [2] Employees [4] = 1,451,828	**400,976**	**375,466**	**48%**	**0.14**	**0.36**
Construction & Demolition [5]	**338,955**	**1,395,360**	**80%**	**0.12**	**0.30**
TOTAL	**1,245,523**	**2,350,580**	**65%**	**0.44**	**1.11**

(1) Reported tonnes of disposed and recycled waste are obtained from member jurisdiction reports, private recycling and processing facility records, landfill records, or product stewardship association records. This includes residential drop-off tonnages.

(2) Estimated tonnes of disposed waste are based on per capita multi-family disposal rates and the total recycling and waste centre weigh scale reports for commercial waste, which includes multi-family and commercial/institutional tonnages. A calculated portion of that total is then attributed to each sector. Multi-family recycling is reported by member jurisdictions and combined with estimated residential drop-off tonnages.

(3) The total recycling rate includes EPR tonnages. The recycling rates for individual sectors also include EPR tonnages, based on estimates of the relative contributions to EPR tonnages from single-family homes (54%), multi-family homes (36%), and businesses (10%) with the exception of Recycle BC tonnages that are allocated 60% to the single-family sector and 40% to the multi-family sector.

(4) Population, employment, and housing figures are based on 2022 estimates provided by Metro Vancouver's Regional Planning Department.

(5) Reported tonnes of recyclable materials and disposed waste are obtained from private licensed brokers, composters and transfer stations, and from unlicensed recycling facilities. As Metro Vancouver becomes aware of new facilities and other facilities close, the total number of facilities and the resultant tonnages may change.

3.2. Metro Vancouver's Recycling and Solid Waste Management System

Metro Vancouver's integrated recycling and solid waste management system provides service to the residents and businesses of 21 member jurisdictions, one Electoral Area and one Treaty First Nation.

Metro Vancouver currently operates six recycling and waste centres where residents and businesses drop off garbage, yard trimmings, and a variety of other recyclable materials. In addition to the Metro Vancouver facilities, some member jurisdictions operate their own recycling depots. Waste remaining after recycling is managed at the Metro Vancouver Waste to-Energy Facility and the Vancouver Landfill. The Vancouver Landfill and Vancouver Transfer Station are owned and operated by the City of Vancouver. Garbage in excess of what can be managed at local facilities is shipped to remote landfills for disposal. Metro Vancouver also created the National Zero Waste Council in 2013 and runs a number of behaviour change campaigns such as Love Food Hate Waste, Food Scraps Recycling, Create Memories not Garbage, and Think Thrice About Your Clothes.

Below is an overview of Metro Vancouver's solid waste system. A more detailed description of each of Metro Vancouver's six recycling and waste centres can be found in **Appendix 2**.

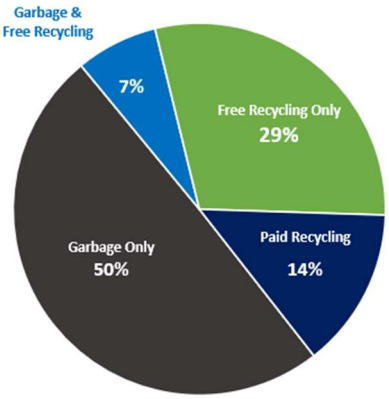
Annual customers: 1,116,693
Regional Garbage: 1,002,276 tonnes(1)
Paid Recycling: 55,522 tonnes
Free Recycling: 11,712 tonnes (includes 103 tonnes of textiles and 120 tonnes of books collected through charities for reuse)

(1) Regional garbage received at Metro Vancouver and City of Vancouver facilities (from residential and commercial/institutional sources) totaled 1,002,276 tonnes in 2022. In addition, the Waste-to-Energy Facility received 13,968 tonnes of residuals from the operations of liquid waste services and water services, and international waste. The Vancouver Landfill received 52,970 tonnes of construction and demotion waste, 6,117 tonnes of residuals from the operations of liquid waste services and water services, and 37,281 tonnes of bottom ash.

Table 7. Metro Vancouver Facilities in 2022

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	625,550	696,816
Clean Wood, Organics & Other Paid Recycling	144,582	51,428
Gypsum	13,606	2,164
Mattresses	61,898	1,930
Free Recycling	413,852	11,712

FIGURE 1: OVERALL CUSTOMER USE OF SOLID WASTE FACILITIES 2022



3.3. Reuse

In 2017, Metro Vancouver added the reuse metric, which quantifies the amount of material reused rather than recycled or disposed. Reuse is defined as a material that is reused mostly in its original form without processing that significantly changes its structure. In contrast, recycling involves processes that alter the structure of materials and allows them to be remanufactured into new products. Examples of reused materials include clothing donated and/or resold, certain minimally-processed EPR materials, donated foods, reused furniture and office equipment, salvaged building materials, and other items kept out of waste and recycling streams. The data used to estimate reuse include registered charities' financial statements, EPR annual reports, statistics from Statistics Canada, published information from reuse program web pages, and communication with key organizations in the second-hand clothing industry, hospitality sector, food rescue organizations, online marketplace, etc.

Reuse activity is reported separately from the recycling rate calculation because the reuse estimate is still new and has a substantial degree of uncertainty. Also, historical estimates of the recycling rate did not include reuse,

so including it now would preclude comparisons with prior years. The methodology used to estimate reuse continues to be refined.

Table 8 below shows the estimate of reuse in Metro Vancouver in 2022. In 2022, it is estimated that about 78,500 tonnes of material were reused in the Metro Vancouver region. Metro Vancouver is exploring ways to improve this methodology and provided expanded statistics in this area for the updated solid waste management plan.

Table 8. Estimate of Reuse in Metro Vancouver in 2022

MATERIAL CATEGORY	ANNUAL REUSE (tonnes) ROUNDED VALUE (to nearest 100 tonnes)
Textiles and Accessories - Sold	11,900
Textiles and Accessories - Industrial Wipes	5,500
EPR Programs	18,000
Food	7,000
Hotels and Hospitality Sector	400
Office Furniture	1,400
IT Equipment	1,600
Construction/Demolition Materials	4,900
On-Line for Selected Materials (1)	27,800
TOTAL	**78,500**

(1) Refers to materials bought and sold in the online marketplace i.e., Kijiji, Craigslist etc.

3.4. Recycling

Member jurisdictions historically provided recycling collection services for the single-family residential sector, some parts of the multi-family residential, and some parts of the commercial/institutional sector. Since 2015, Recycle BC, an Extended Producer Responsibility agency, has been responsible for curbside recycling of packaging and paper from single-family and multi-family homes. Additionally, member jurisdiction and private recycling depots and return to retail locations offer the collection of many recyclable materials not accepted in Recycle BC's curbside recycling program, such as film plastics, batteries, and beverage containers. Private facilities primarily manage recyclables from the commercial/institutional and construction and demolition sectors.

Materials with the highest recycling quantities were concrete, yard and food waste, and paper. **Appendix 1** shows recycling rates by sector for 2021 and 2022. In 2022, the recycling rates in the commercial/institutional and construction and demolition sectors increased by 2% and 1%, respectively, while residential sector decreased by 1%.

An increase in commercial activity with COVID-19 pandemic recovery correlates with an increase in recycling in the commercial/institutional sector; however, the residential sector experienced a comparable decrease in recyclable material, particularly yard and food waste. However, while yard and food waste recycling in the residential sector has decreased, it also increased in the commercial and institutional sector, pointing towards a continued return to pre-pandemic business operations in typical food waste generating sectors such as restaurants whose operations were initially heavily impacted by the COVID-19 pandemic.

Asphalt and concrete generated by construction and demolition activity are typically considered municipal solid waste, while material originating from road construction is excluded. It is challenging to determine the origin of the material as asphalt and concrete recyclers are not currently licensed by Metro Vancouver and staff rely on voluntary reporting. Concrete and asphalt tonnages reported by private facilities increased substantially in 2022, however Metro Vancouver was unable to verify these increases. In order to maintain a conservative estimate of recycling, Metro Vancouver chose to use 2021 concrete and asphalt numbers for 2022 reporting. More detail on how this material is obtained, and how the tonnage of heavy materials such as concrete and asphalt impacts the overall recycling rate is provided in the methodology section.

Table 9 below presents the quantities and types of recyclables collected in 2022.

Table 9. Quantities of Materials Recycled in Metro Vancouver in 2022

MATERIAL TYPE	TOTAL (1) (tonnes)
Asphalt (2)	295,300
Batteries	13,838
Concrete (2)	866,363
Electronic & Electrical Equipment	10,812
Paper	340,386
Glass	55,582
Gypsum	58,512
Household Hazardous Waste	24,339
Metal	58,515
Plastic	54,037
Textiles	372
Tires	19,237
Wood	161,242
Yard & Food	392,044
TOTAL	**2,350,580**

(1) Starting in 2019, the Major Appliance Recycling Roundtable started reporting the tonnages of material recovered through their stewardship program report instead of the estimated number of units. This new methodology is much more accurate than the previous methodology.

(2) Data is from 2021. Unverified increases in 2022 were not reported.

3.4.1. Materials Recycled through EPR Programs

Extended Producer Responsibility (EPR) programs, also called product stewardship programs, are industry-managed programs designed to shift the costs and responsibilities for managing regulated products and packaging, throughout their lifecycles, from local governments to producers and consumers. EPR holds producers and consumers accountable for the costs and management of regulated products at its end-of-life. Most items

managed through EPR programs are banned from disposal at Metro Vancouver recycling and waste centres, and are recycled before they enter the region's solid waste management system.

In 2022, eighteen stewardship agencies reported recycling tonnages for Metro Vancouver for a total of 237,731 tonnes. This total is added to Metro Vancouver's recycling tonnage. See ***Table 10*** for a breakdown of materials collected by each stewardship agency.

Table 10. Quantities of Materials Recycled through EPR Programs in 2022

EPR PROGRAM	TOTAL (tonnes)	MATERIAL TYPES
BC Used Oil Management Association (BCUOMA)	20,192	Oil, Antifreeze, Filters, Containers
Call2Recycle	423	Consumer Batteries <5 kg
Canadian Battery Association (CBA)	13,415	Lead Batteries
Canadian Beverage Association	296	Beverage Refrigeration Units
Major Appliance Recycling Roundtable (MARR)	10,973	Major Appliances
Recycle BC	100,006	Packaging and Paper Products
BC Brewers Recycled Container Collection Council (BRCCC)	9,965	Alcohol Containers and Packaging
Encorp Pacific (Canada)	42,102	Beverage Containers
Canadian Electrical Stewardship Association (CESA)	2,590	Portable Electrical Appliances
Electronic Products Recycling Association (EPRA)	6,617	Electronics
Health Products Stewardship Association (HPSA)	52	Medication
AlarmRecycle - Product Care	10	Smoke and Carbon Monoxide Alarms
BC Paint & HHW - Product Care	6,566	Paint, Household Hazardous Waste
BC Lights Program - Product Care	1,159	Lighting and Light Fixtures
Thermostat Recovery Program	0.03	Thermostats
TELUS Communications Inc.	436	Electronics
Tire Stewardship BC	19,230	Tires
News Media Canada	3,699	Newsprint
TOTAL	**237,731**	

3.5. Disposed Waste

Residential and commercial/institutional waste disposal is handled through the regional solid waste management system. In 2022, the Regional Facilities consisted of:

- Seven recycling and waste centres, including the Vancouver South Transfer Station
- Vancouver Landfill

- Waste-to-Energy Facility in Burnaby
- Contracted contingency disposal at remote landfills (as of mid-2017)

The use of the Cache Creek Landfill by Metro Vancouver ceased in 2016. In mid-2017, Metro Vancouver began using alternative remote disposal facilities for waste in excess of what can be handled by in-region disposal facilities. All municipal solid waste delivered to the regional disposal facilities (landfills and Waste-to-Energy facility), as well as waste disposed out-of-region from Regional Facilities, is accounted in Metro Vancouver's disposal calculations. Construction and demolition waste is primarily handled separately from the regional solid waste management system and is disposed at either licensed private landfills or the Vancouver Landfill. In 2022, the residential, commercial/institutional, and construction and demolition sectors in Metro Vancouver disposed of a total 1,245,523 tonnes of waste to the regional system and private disposal facilities. The current per capita disposal rate in the region is 0.44 tonnes per person.

In 2022, Metro Vancouver residents, businesses, and institutions achieved an overall recycling rate of 65%. ***Figures 2 and 3***, below, show changes in the regional recycling rate from all waste sectors, and the total per capita generation, disposal and recycling rates for the region since 1994. ***Table 11*** shows Metro Vancouver's regional waste and recycling figures. ***Table* 12** highlights the single-family residential recycling and solid waste figures.

FIGURE 2: REGIONAL RECYCLING RATE FOR WASTE FROM ALL SECTORS

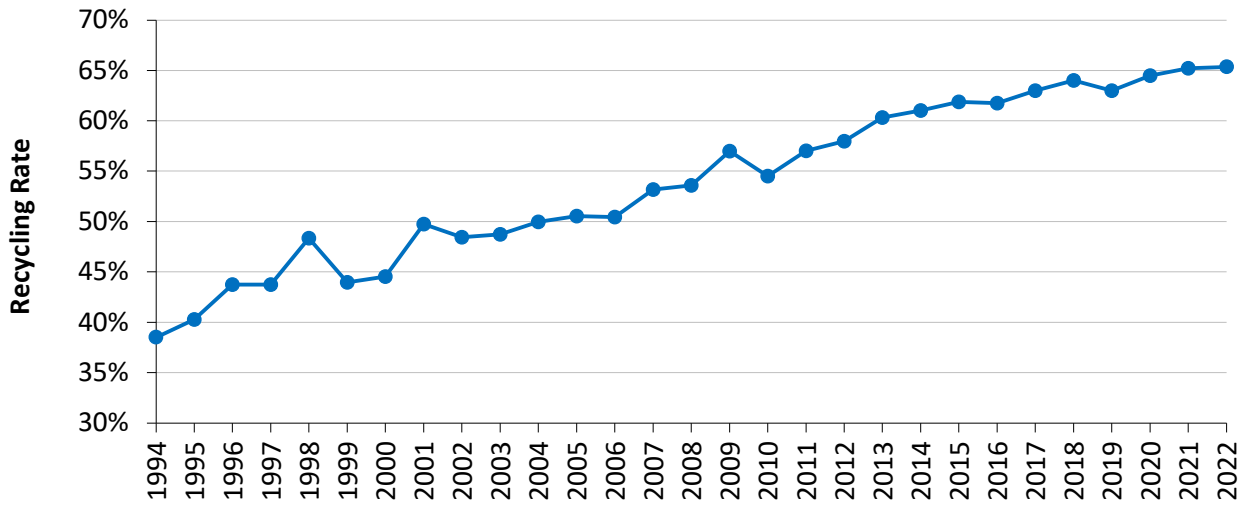


FIGURE 3: TOTAL WASTE GENERATION, DISPOSAL AND RECYCLING RATES PER CAPITA

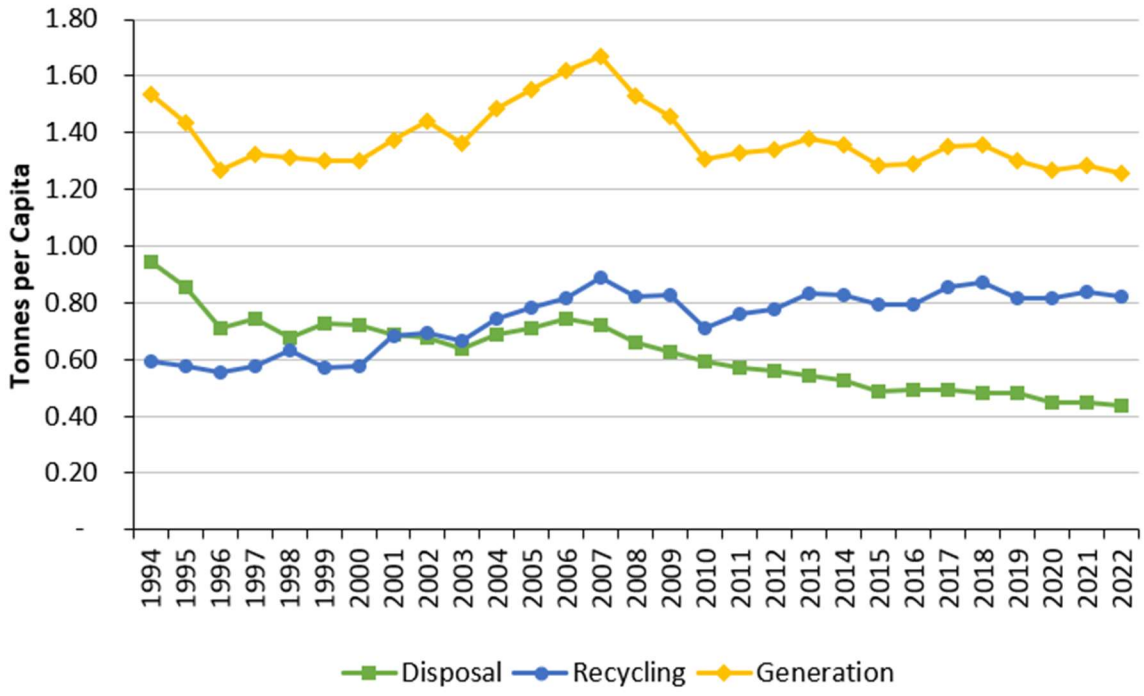


Table 11. Metro Vancouver Regional Solid Waste and Recycling Figures

YEAR	REGIONAL POPULATION	REGIONAL HOUSEHOLDS	TOTAL GENERATED (tonnes)	TOTAL RECYCLED (tonnes)	TOTAL DISPOSED (tonnes)	RECYCLING RATE (%)	GENERATION RATE (tonnes/capita)	DISPOSAL RATE (tonnes/capita)	DISPOSAL RATE (tonnes/ household)
1994	1,732,567		2,663,581	1,025,921	1,680,750	39%	1.54	0.97	
1995	1,784,656		2,561,858	1,032,095	1,529,763	40%	1.44	0.86	
1996	1,906,492		2,419,323	1,058,441	1,360,882	44%	1.27	0.71	
1997	1,954,523		2,589,044	1,131,958	1,457,086	44%	1.32	0.75	
1998	1,984,743		2,609,913	1,261,680	1,348,233	48%	1.31	0.68	
1999	2,013,201		2,618,538	1,151,130	1,467,408	44%	1.30	0.73	
2000	2,041,399		2,657,076	1,183,611	1,473,465	45%	1.30	0.72	
2001	2,073,662		2,851,208	1,418,489	1,432,719	50%	1.37	0.69	
2002	2,102,244		2,903,894	1,470,445	1,433,449	51%	1.38	0.68	
2003	2,128,965		2,775,455	1,414,390	1,361,065	51%	1.30	0.64	
2004	2,153,998		3,072,702	1,595,999	1,476,703	52%	1.43	0.69	
2005	2,188,573		3,245,796	1,701,414	1,544,382	52%	1.48	0.71	
2006	2,218,026	817,040	3,434,617	1,794,613	1,640,004	52%	1.55	0.74	2.01
2007	2,251,887	831,909	3,598,142	1,980,751	1,617,391	55%	1.60	0.72	1.94
2008	2,273,095	836,304	3,366,123	1,866,892	1,499,231	55%	1.48	0.66	1.79
2009	2,314,163	865,017	3,374,840	1,922,840	1,452,001	57%	1.46	0.63	1.68
2010	2,351,496	879,874	3,075,392	1,676,117	1,399,275	55%	1.31	0.60	1.59
2011	2,395,520	898,273	3,188,348	1,817,446	1,370,902	57%	1.33	0.57	1.53
2012	2,408,559	909,994	3,228,305	1,871,339	1,356,966	58%	1.34	0.56	1.49
2013	2,430,305	920,375	3,348,498	2,020,114	1,328,384	60%	1.38	0.55	1.44
2014	2,465,031	939,212	3,343,471	2,040,280	1,303,191	61%	1.36	0.53	1.39
2015	2,497,052	943,072	3,202,979	1,982,137	1,220,842	62%	1.28	0.49	1.29
2016	2,546,595	943,072	3,295,830	2,039,569	1,256,261	62%	1.29	0.49	1.33
2017	2,610,929	984,640	3,525,224	2,234,055	1,291,169	63%	1.35	0.49	1.31
2018	2,648,493	998,930	3,599,801	2,317,050	1,282,752	64%	1.36	0.48	1.28
2019	2,681,878	1,019,526	3,490,425	2,191,421	1,299,005	63%	1.30	0.48	1.27
2020	2,766,953	1,075,454	3,506,352	2,261,038	1,245,314	64%	1.27	0.45	1.16
2021	2,807,469	1,096,151	3,607,018	2,351,848	1,255,169	65%	1.28	0.45	1.15
2022	**2,854,375**	**1,118,668**	**3,596,103**	**2,350,580**	**1,245,523**	**65%**	**1.26**	**0.436**	**1.11**

Table 12. Single-family Residential Solid Waste and Recycling Figures

YEAR	SINGLE FAMILY RESIDENTIAL POPULATION	SINGLE FAMILY RESIDENTIAL HOUSEHOLDS	SECTOR GENERATED (tonnes)	SECTOR RECYCLED (tonnes)[1]	SECTOR DISPOSED (tonnes)	SECTOR RECYCLING RATE (%)	SECTOR GENERATION RATE (tonnes/capita)	SECTOR DISPOSAL RATE (tonnes/capita)	SECTOR DISPOSAL RATE (tonnes/ household)
2006	1,389,809	428,045	778,629	336,577	442,052	43%	0.56	0.32	1.03
2007	1,399,185	434,163	783,878	352,455	431,423	45%	0.56	0.31	0.99
2008	1,409,040	428,045	741,783	324,093	417,690	44%	0.53	0.30	0.98
2009	1,419,442	443,894	749,536	330,294	419,242	44%	0.53	0.30	0.94
2010	1,429,495	447,932	721,746	344,450	377,296	48%	0.50	0.26	0.84
2011	1,440,334	454,662	732,112	363,594	368,518	50%	0.51	0.26	0.81
2012	1,476,411	456,259	784,196	439,077	345,118	56%	0.53	0.23	0.76
2013	1,484,766	462,170	761,169	456,822	304,347	60%	0.51	0.20	0.66
2014	1,494,336	464,955	774,877	482,090	292,787	62%	0.52	0.20	0.63
2015	1,511,428	471,157	809,500	533,861	275,639	66%	0.54	0.18	0.59
2016	1,533,062	476,559	764,037	491,190	272,848	64%	0.50	0.18	0.57
2017	1,535,480	472,530	748,410	477,832	270,578	64%	0.49	0.18	0.57
2018	1,557,308	476,600	704,462	447,639	256,824	64%	0.45	0.16	0.54
2019	1,571,441	481,304	694,246	439,730	254,516	63%	0.44	0.16	0.53
2020	1,634,477	504,527	754,903	485,419	269,485	64%	0.46	0.16	0.53
2021	1,656,892	508,764	722,722	455,723	266,999	63%	0.44	0.16	0.52
2022	**1,636,112**	**516,377**	**683,245**	**434,495**	**248,750**	**64%**	**0.42**	**0.15**	**0.48**

(1) Includes distributed EPR Recyclables from 2012 onward.

3.6. Methodology and Sources of Error

Data Sources

Preparing Metro Vancouver's annual summary report is a multi-month process that incorporates information from various sources. *Table 8* below outlines the sources and their usage:

Table 13. Sources and Usage of Various Information

SOURCE	USAGE
Metro Vancouver Solid Waste Management Facility Scale Data	• Disposal quantities • Recycling quantities • Distribution by sector
City of Vancouver Solid Waste Management Facility Scale Data	• Disposal quantities • Distribution by sector
Licensed Private Facilities	• Recycled material quantities • Construction and demolition disposal quantities
Unlicensed Private Facilities	• Recycled material quantities
Extended Producer Responsibility Organization Reports	• Recycled material quantities
Reuse and Repair Organizations (annual reports and financial statements)	• Re-use quantities
Municipal Surveys	• Distribution by sector

The data from each source varies in reliability and potential for error, with the measured Metro Vancouver-owned data (e.g., scale data) least likely to be subject to error. Third-party reported data (e.g., unlicensed private facilities) provided to Metro Vancouver for the purpose of annual reporting is assumed accurate, but may include inaccuracies. Figure 4 below indicates the relative proportion of each type of data, with darker shades indicating sources with more detailed data available to Metro Vancouver.

FIGURE 4: PROPORTION OF TONNAGE FROM EACH INFORMATION SOURCE

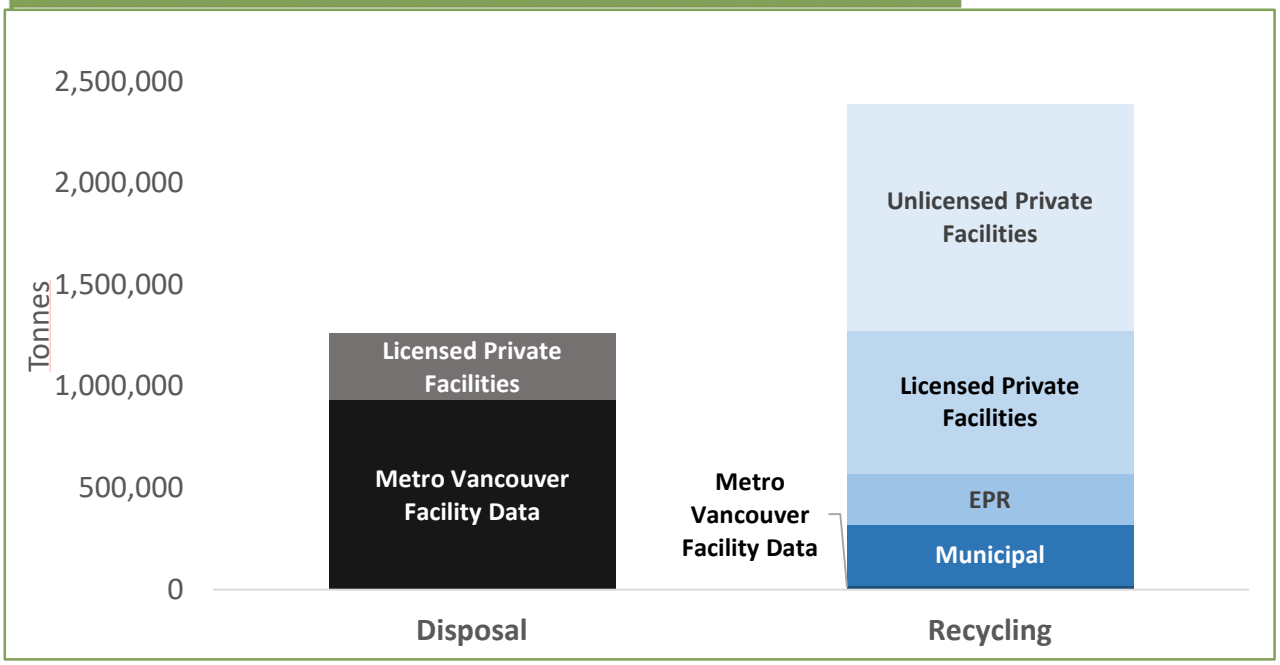


Table 14 below shows the guidelines used when determining what types of materials and which material management methods are counted as recycling vs. disposal.

Table 14. Assigned Categories for Facilities and Material Types

FACILITY OR MATERIAL TYPE	CATEGORIZATION
Waste-to-Energy Facility	All inbound material considered disposed except for metals recovered for recycling
EPR Materials	Residuals counted as disposed where reported by producer responsibility organizations
Composting Facilities	Inbound organics minus residuals disposed counted as recycling for facilities within Metro Vancouver
Material Recovery Facilities	Residuals counted as disposed, outbound materials sent for processing counted as recycling, including biomass and plastics used as fuel
Processing Facilities	Accounted for as outputs from above, residuals counted as disposed for facilities within Metro Vancouver

3.6.1. Calculation

Total Disposal

To calculate the tonnage of garbage disposed in the region, Metro Vancouver relies on waste tonnages from regional facilities including all operating recycling and waste centres, the Waste-to-Energy Facility, the Vancouver South Transfer Station, and the Vancouver Landfill. Disposal at private licensed construction and demolition facilities are added to this total, including an estimate of any construction and demolition material disposed out-of-region. Metro Vancouver annually estimates whether a significant tonnage of residential and commercial garbage is leaving the region, and that is added when suspected. In 2022, no significant tonnage of residential and commercial garbage was suspected to be leaving the regional system.

Disposal By Sector

Metro Vancouver uses scale data to determine the tonnage of material that is municipal (hauled by, or on behalf of, a municipality or member jurisdiction), commercial (hauled by a commercial hauler not on behalf of a municipality or member jurisdiction), and small loads (customers without a scale system account bringing in less than 1 tonne of material). Municipal account data, reported by member jurisdictions, is used to allocate the municipal data between single-family and multi-family residential sectors. Multi-family waste generation estimates obtained from periodic multi-family waste composition studies are used to split the commercial tonnage between multi-family and commercial/institutional. Small loads are assumed to be 90% single-family residential, 5% multi-family residential, and 5% commercial/institutional as determined from customer surveys.

All material disposed at private construction & demolition facilities, as well as the portion of Vancouver Landfill tonnage indicated as construction & demolition or construction & demolition processing residual waste is counted as disposed for the construction & demolition sector. This differs from the Vancouver Landfill Annual report where construction & demolition processing residual waste is counted as municipal solid waste, not construction and demolition material.

Total Recycling

The total material recycled is calculated from Extended Producer Responsibility organization reports for materials that are managed under a provincially mandated program, and from licensed and unlicensed private facility tonnage summaries for materials that are not. Materials that are collected at recycling depots or by member jurisdictions are also added to the recycling total if they are not covered by an Extended Producer Responsibility program and do not typically go to licensed or unlicensed private facilities contracted by Metro Vancouver (e.g., scrap metals).

Recycling By Sector

Extended Producer Responsibility organization tonnage is split by organization depending on the type of material collected. For example, Recycle BC provides the approximate split of single-family vs. multi-family collection sites, which is applied to their overall tonnage. Most organizations with a drop-off model are estimated to encompass 90% residential to 10% commercial where source information is not provided.

Depot tonnage is split 90% single-family, 5% multi-family, and 5% commercial/institutional based on surveys completed at facilities. Private and unlicensed facility data is considered to be commercial/institutional or construction & demolition depending on the material and facility type. Material originating from construction & demolition transfer stations assumed materials to originate from that sector. Material not covered by a residential EPR program are assumed to be from the commercial/institutional sector unless otherwise indicated by municipal surveys or facility processing contracts.

Reuse

Reuse estimates are obtained using the methodology outlined in a 2018 reuse estimate report completed by Kelleher Environmental. Estimates typically involve obtaining representative metrics publicly available or by calling organizations, and applying factors which are then used to estimate total reuse. Reuse is not included in recycling tonnages and the overall recycling rate, and is instead considered separately. Reuse data is not presented by sector. This methodology is still relatively new and continues to be refined as better information sources become available.

Construction & Demolition

Much of the construction & demolition recycling tonnage reported comes from unlicensed private facilities. Metro Vancouver calls a list of known unlicensed facilities in the region to obtain tonnages and relies upon those tonnages for recycling data provided in this report. In 2022, increases could not be verified so Metro Vancouver chose to continue reporting 2021 tonnages.

Due to the relatively high weight and relative ease of recycling of concrete and asphalt, these materials tend to be present in higher quantities in the construction & demolition sector, contributing to a high recycling rate which may obscure some of the challenges that still exist in this sector, such as recycling wood**.** ***Table 15*** below shows the two calculated recycling rates to highlight the difference.

Table 15. Tonnage of C&D Materials and Associated Recycling Rates

MATERIAL	TONNES
Asphalt	295,300
Concrete	866,363
Fibre	5,446
Gypsum	58,512
Metal	8,911
Wood	160,825
Recycling Subtotal (Asphalt and Concrete)	1,161,663

Recycling Subtotal (Other Materials)	233,696
MATERIAL	**TONNES**
Recycling Total	1,395,360
Disposal	338,955
CONSTRUCTION AND DEMOLITION RECYCLING RATE (Including Concrete and Asphalt)	**80%**
CONSTRUCTION & DEMOLITION RECYCLING RATE (Excluding Concrete and Asphalt)	**41%**

Recycling Rates

The recycling rate is calculated by (total recycling)/ (total recycling + total disposal) for each sector and overall.

Assumptions

Assumptions are provided as footnotes to the tables in which the relevant data is reported.

3.7. Acknowledgements

Metro Vancouver acknowledges the contributions of its member jurisdictions, EPR Product Stewardship Associations, and the many private recycling and processing facilities for the data used to complete this report.

4.0 DETAILED ISWRMP ACTIONS

Strategy 1.1: Advocate that senior governments transfer additional waste management responsibilities to producers and consumers	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
1.1.1 MV Will: Advocate that senior governments progressively move towards the prohibition of the manufacture and distribution of non- essential, non-recyclable materials and products. **1.1.2 MV Will:** Advocate that senior governments prohibit the manufacture and distribution of non-recyclable packaging.	The National Zero Waste Council was launched in 2013, and its membership has grown. Advocacy work continues through the Council's working groups and sector-specific work, most notably in food. The Secretariat also plays a key role in shaping national circular economy policies through an active role in Circular Economy Leadership Canada (CELC). In 2019, the National Zero Waste Council worked through the CELC to form the Canada Plastics Pact which launched in 2021. Currently, Metro Vancouver through the Council holds a seat on the CPP Advisory Council and co-leads the Rapid Action Group on problematic and unnecessary plastics – directly advocating for upstream changes to design plastic waste out of the system. The Canada Plastics Pact is a member of the Ellen MacArthur Foundation's Global Plastics Pact network, and sets 2025 targets and actions among governments, NGOs and industry to create a circular plastics economy.
1.1.3 MV Will: Strongly advocate for EPR programs to reduce waste disposal through implementation of design-for-environment principles, and best management practices that focus on waste reduction, reuse, and recycling. Offer staffing support for and partnership with Ministry of Environment to help accelerate EPR.	In 2021, Metro Vancouver evaluated and provided feedback on the BC Ministry of Environment and Climate Change Strategy 2021-2026 Extended Producer Responsibility Action Plan. The Action Plan identifies priority product categories and estimates implementation timelines for key items, including: mattresses, single-use canisters, medical sharps, and others.
1.1.4 MV Will: Work with other municipalities and regions across BC, Canada, and internationally, to advocate for more development by senior governments in encouraging and developing incentives, including regulation, that promote design of products with an emphasis on reuse and recycling (cradle-to-cradle design).	This action is primarily covered under 1.1.1 which is Metro Vancouver's support for and participation in the National Zero Waste Council. See also actions 1.1.2 and 1.3.3. Previously, this was carried out by the Council's product and packaging design working group. Currently, this is carried out through the NZWC's Reuse Working Group.

1.1.5 MV Will: Participate on federal EPR initiatives such as the Canadian Council of Ministers of Environment (CCME) Extended Producer Responsibility Task Force, to develop national guidelines for sustainable packaging.	In 2022, CCME published a report titled *Guidance to Facilitate Consistent Extended Producer Responsibility Policies and Programs for Plastics*, which was a commitment of the *Canada-Wide Action Plan on Zero Plastic Waste*. Ongoing participation in the CCME Waste Management Task Group is through Ministry of Environment and Climate Change Strategy staff who are the official participants in these processes. Metro Vancouver contributes to these processes under 1.1.3, which is the joint EPR work with the Ministry of Environment.
1.1.6 MV Will: Participate on industry stewardship advisory committees.	Metro Vancouver participates on several advisory groups, including: Electronic Products Recycling Association, Major Appliance Recycling Roundtable, Recycle BC, and Tire Stewardship BC.
1.1.7 MV Will: Participate on the BC Product Stewardship Council to assist in evaluating existing and developing new EPR programs.	Metro Vancouver is participating in the BC Product Stewardship Council and continues to participate in its regular meetings.
1.1.8 MV Will: Waste projections will consider future trends in population, generation, and management, including EPR.	Solid waste generation and disposal forecasts are continuously improved and updated based on the solid waste system's most current information. Work on the solid waste projection model is ongoing and continues to help the region proactively address future solid waste management opportunities and challenges.
1.1.9 Municipalities Will: Partner with Metro Vancouver in support of actions 1.1.1 through 1.1.8	This action is ongoing and consists of collaborating on EPR actions 1.1.1 through 1.1.8 with member municipalities through the REAC Solid Waste Sub-committee. A significant point of emphasis is the Recycle BC program for residential packaging and paper products, and the 2022 expansion to include single-use items and packaging-like products.
1.1.10 Other Governments & Agencies Will: Ministry of Environment to accelerate EPR program development and implementation. **1.1.11 Other Governments & Agencies Will:** Include Metro Vancouver and its member municipalities in the negotiations with producers regarding future EPR programs to ensure that appropriate consideration is given to the existing convenient curb-side collection systems.	These actions are ongoing and a collaborative effort between Metro Vancouver, member municipalities and the Ministry of Environment and Climate Change Strategy in support of EPR actions 1.1.1 through 1.1.5.

1.1.12 Other Governments & Agencies Will: Ensure that the waste recovered under EPR programs will be properly managed in the region and that such materials will not be exported without adequate knowledge of and control over its eventual disposition.	This is a fundamental principle included in all discussions and negotiations with industry, member municipalities and the Ministry of Environment and Climate Change Strategy in EPR actions 1.1.1 through 1.1.11

Strategy 1.2: Reduce or eliminate materials entering the solid waste system which hinder or limit the opportunities to achieve reuse, recycling, or energy recovery, or that may exacerbate environmental impacts of disposed residuals	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
1.2.1 MV Will: Work with facility operators, local municipalities and the recycling industry to introduce material bans after alternatives are identified and suitable public information programs.	Public outreach programs are primarily covered by the actions in strategy 1.3 to develop and deliver community-based social marketing programs. No new disposal bans were contemplated in 2021 or 2022.

Strategy 1.3: Provide information and education on options to reduce waste	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
1.3.1 MV Will: Develop and deliver a social marketing program to inform and educate citizens on waste education opportunities including schools. (a) Target a minimum of 70% diversion goal by 2015 over all sectors and an aspirational goal of 80% by 2020 to be featured in communication materials.	Metro Vancouver develops advertising campaigns: Holiday Waste Reduction "Create Memories Not Garbage" campaign; Illegal Dumping "Waste In Its Place" campaign, Organics Diversion "Food Scraps Aren't Garbage" campaign, and Textile Waste Reduction "Think Thrice About Your Clothes" campaign, among others. Each campaign targeted relevant audiences within the region. Metro Vancouver is also a partner in the National Zero Waste Council's food waste prevention campaign, "Love Food Hate Waste Canada." A single-use item reduction campaign, "What's Your Superhabit?" was launched in 2021. Support for K-12 teaching and learning about waste reduction is provided by Metro Vancouver School & Youth Leadership programs (see 2.2.6) for schools to continue to support waste reduction behaviours, including food scraps recycling in schools.
1.3.2 MV Will: Develop and deliver a community-based social marketing business education plan, including business guides and other outreach programs to inform and educate businesses on waste reduction opportunities.	The National Zero Waste Council updated the Circular Economy Business Toolkit in 2021 and has since been presented at numerous conferences and workshops.
1.3.3 MV Will: Develop a national zero waste marketing council so that cities across Canada can pool resources and develop common messaging, with national impact, on the need to reduce waste, resulting in informed and educated citizens on waste reduction opportunities.	The National Zero Waste Council activities from 2021 and 2022 include: researching products, creating a best practice guide and continuous communication and education activities that are focussed on waste prevention and waste reduction. Knowledge sharing amongst cities occurred via different engagement activities through 2021-2022. See Strategy 1.3 in Section 2.0 for engagement activities.
1.3.4 Municipalities Will: Partner with and assist Metro Vancouver in the development and delivery of public and business information and education programs.	Metro Vancouver and its members strive for coordinated and aligned public messaging on waste reduction through the ongoing collaborative relationship between Metro Vancouver and the member jurisdictions. Efforts to align outreach programs are coordinated through the REAC Solid Waste Sub-committee and the Municipal Waste Reduction Coordinators' Committee. Outreach materials produced by Metro Vancouver, such as behaviour change campaigns, are shared with member jurisdictions as well as jurisdictions beyond the region, who are welcome to use and/or customize the materials for their own use.

(a) After suitable public information programs, expand disposal bans to include materials encompassed by new EPR programs and materials for which new recycling markets are developed.	Disposal bans are in place for all materials included in EPR programs. Materials have been added as new EPR programs are put in place.

Strategy 2.1: Increase the opportunities for reuse

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.1.1 MV Will: Investigate financial and regulatory barriers which prevent or discourage the reuse of materials. 2.1.2 MV Will: Investigate the effectiveness and adequacy of existing material exchange networks. **2.1.3 MV Will:** Bring forward appropriate measures which respond to the findings of 2.1.1 and 2.1.2.	Metro Vancouver provided feedback to senior levels of government on the need for support of reuse not just recycling infrastructure. Metro Vancouver wrote letters of support for funding applications for companies which provide convenient and safe reusable alternatives to single-use items. In 2021, Metro Vancouver completed a procurement process to develop a regional food recovery network to help local organizations rescue and redistribute surplus food, moving food away from landfills and compost, and up the waste hierarchy to feed people and animal. A key learning is that effective material exchange networks require investment in relationship building and maintenance.
2.1.4 MV Will: Enhance partnerships with the Province, industry, academia and community groups to research and develop solutions to overcome barriers to reuse and recycling and new opportunities to re-engineer recycled material.	Metro Vancouver's work with the Canadian Plastics Pact included learning about and promoting the Golden Design Rules for plastic packaging which look to better align plastic packaging design with recycling collection and processing infrastructure. CPP is also looked at recycled content opportunities. Metro Vancouver partnered with the Binner's Project to increase the number of coffee cups collected for recycling in the region through the annual Coffee Cup Revolution. In 2021, Metro Vancouver hired a University of British Columbia sustainability scholar to explore opportunities to divert building materials from single-family homes built after 1970 and advance deconstruction in the region.
2.1.5 Municipalities Will: Work with Metro Vancouver to give effect to Strategy 2.1.	Municipal collaboration with Metro Vancouver in actions 2.1.1 through 2.1.4 is coordinated through the REAC Solid Waste Sub-committee, Municipal Waste Reduction Coordinators' Committee and other member staff on an ongoing basis.

Strategy 2.2: Increase the effectiveness of existing recycling programs

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.2.1 MV Will: Implement disposal bans on materials that limit opportunities to achieve reuse, recycling, or energy recovery. (a) Work with facility operators, local municipalities, senior governments and the recycling industry to determine the impact and source of components of the waste stream, the consequence and feasibility of banning materials with the most negative impacts and the most suitable recycling options for those materials.	Metro Vancouver's disposal ban program has been effective at diverting material from the garbage to recycling. Beginning in 2022, a comprehensive review of disposal ban project was undertaken to evaluate the efficacy of the disposal ban inspection process. Metro Vancouver's waste composition monitoring program annually examines some components of the waste stream to help determine the effectiveness of existing bans and identify items that could be targeted for future bans. Full scale waste composition studies were completed in 2021 and 2022, in addition to studies covering the multi-family residential, commercial/institutional, and construction and demolition sectors.
(b) Expand the monitoring and enforcement of disposal bans and enhance with effective communications to raise awareness of the bans.	This action is substantially complete. Regional outreach and communication activities supporting awareness of bans were completed under action 1.3.4 which is ongoing collaboration between Metro Vancouver and the member jurisdictions. From 2010 to 2022 the number of inspections has increased from 140,000 to 194,000 per year. In 2017, video monitoring technology was installed at the Waste-to-Energy Facility through live video streaming. Inspection rate at the facility increased from 1% to 20% of loads, consistent with other facilities. Metro Vancouver facilities also implemented a paperless inspection and surcharge system starting in mid-2019 which improved efficiency and timeliness of disposal ban enforcement.
(c) Analyze the effectiveness of disposal bans and possible alternative enforcement models including enforcement at source.	This action is substantially complete. Metro Vancouver worked with a Disposal Ban Effectiveness Working Group of haulers, recyclers and other stakeholders to review implementation of the disposal ban program and receive feedback on proposed changes and communication tools. Metro Vancouver began a comprehensive review of the disposal ban program beginning in 2022 to evaluate the effectiveness of the disposal ban program and identify opportunities for improvement.
(d) After suitable public information programs, expand disposal bans to include materials encompassed by new EPR programs and material for which	No new bans were initiated in 2021 and 2022, however Metro Vancouver continues to examine and reassess the disposal ban program as well as new EPR programs and recycling markets.

new recycling markets are developed.	
2.2.2 MV Will: Provide ongoing information for businesses and residents of recycling opportunities. (a) Continue to maintain and upgrade a regional web-based database on recycling opportunities for businesses and residents.	Metro Vancouver entered an agreement with to RCBC to maintain the "where to recycle" data base which powers both the Recycling Council of BC's Recyclopedia and MetroVancouverRecycles.org. The BC-wide service is supported by MoECCS, other Regional Districts and Product Stewards. RCBC also answers call about what can be recycled at the Metro Vancouver regional facilities. Metro Vancouver website provides details on what materials can be dropped off at regional facilities. Metro Vancouver added a disposal recycling cost calculator in 2022 to help residents better understand which items can be dropped off recycling for a fee or free.
(b) Keep municipalities fully informed as to recycling collection and drop facilities and changes to policies and facilities.	This is an ongoing activity between Metro Vancouver and its member municipalities which is facilitated through the REAC Solid Waste Sub-committee and other municipal staff. This includes annual member surveys and compilation of information on municipal waste and recycling services.
(c) Provide outreach services.	This is primarily covered under strategy 1.3.
(d) Work with other information sources to achieve maximum harmonization possible.	Worked with member municipalities to develop (for example): • Consistent messaging and vocabulary on its solid waste campaigns including Food Scraps, Make Memories not Garbage, Waste in its Place, Love Food Hate Waste, Think Thrice About Your Clothes. • Agree to and promote a consistent colour scheme for public recycling facilities and receptacles. Metro Vancouver coordinates with RCBC on shared recycling messaging, where possible
2.2.3 MV Will: Increase the efficiency and consistency of recycling collection services across the region. (a) Work with municipalities to review materials accepted for recycling from residential and Commercial/Institutional sources	This action is substantially complete. Approximately one-third of residents in Metro Vancouver receive recycling service directly from Recycle BC. Many others are served by their local municipality under contract to Recycle BC. As a result, collection of recyclables from residents has now been standardized for virtually all single-family residents in the region. The Province is reviewing policy options to address recycling from commercial and institutional sources. More than 97% of single-family homes in the metro Vancouver region receive organic collection, diverting 84% of single-family food scraps. Metro Vancouver continues to focus efforts on the multi-family and commercial sectors as they have lower food scraps diversion rates of 35% and 41%, respectively."
(b) In collaboration with municipalities, undertake a business case review of the	Over one-third of residents in Metro Vancouver receive recycling service directly from RecycleBC (formerly MMBC). Many others are served by their local municipality under contract to RecycleBC. As a result,

residential and Commercial/Institutional waste and recycling collection services over the region to determine and implement the appropriate level of consistency between municipalities. Where appropriate, Metro Vancouver will develop model policies or bylaws to assist municipalities in achieving consistency.	collection of recyclables from residents has now been standardized for virtually all single-family residents in the region. Roughly half of the member municipalities currently have policies and programs (such as mandatory service requirements or diversion plans) to encourage recycling and/or organics collection for multi-family residents, and for Commercial/Institutional businesses.
(c) Analyze the effectiveness of pricing strategies and other economic instruments to encourage additional recycling.	This action is substantially complete. As previously reported, in 2017, Metro Vancouver finalized a consultant study to evaluate vulnerabilities in the Recycling network. The study concluded that much of the ongoing activities and actions already undertaken by Metro Vancouver were appropriate to protect or improve the resiliency of the recycling network.
2.2.4 MV Will: Establish Eco-Centres. (a) Establish a stakeholder and municipal work group to determine the scope, terms and conditions and the relationship to existing and planned EPR programs and municipal recycling depots for participating municipalities and industries. (b) Develop the model of Eco-Centres to include numerous, small-scale, one-stop-drop centres for recycling and small quantity drop-off disposal. (c) With municipalities, determine the terms and conditions for participating municipalities and industries and develop appropriate business cases.	This action is substantially complete. Metro Vancouver completed a financial analysis of the costs of operating a recycling depot. Starting in 2022, Metro Vancouver no longer obtains funding from municipalities that contribute towards the operating costs of the recycling depots at North Shore and United Boulevard recycling and waste centres. For those municipalities (Bowen Island, Burnaby, Coquitlam, Maple Ridge and Richmond) that have their own recycling depot, we have service agreements and now contribute towards their operating costs since they have opened it up to residents and businesses throughout the region. The funding for the regional recycling depot system (Metro Vancouver's and municipal recycling depots) is now captured through the garbage tipping fee so that everyone in the region contributes. Two new recycling and waste centres are currently in operation (as of 2022) and provide significantly improved user access and recycling services. These two new facilities, United Boulevard and Central Surrey are a replacement commercial and residential waste and recycling facility in Coquitlam, and a residential waste and recycling facility in Surrey.
(d) After determining terms and conditions, establish the first Eco-Centre in Surrey to replace commitment for residential drop off facility in the 1995 Plan. (e) Progressively expand the Eco-Centre system across the region	The Central Surrey Recycling and Waste Centre began operations in September of 2022. The United Boulevard Recycling and Waste Centre began operations in June of 2022. Metro Vancouver completed an assessment of the solid waste system, which identify opportunities to expand recycling services to all Metro Vancouver recycling and waste centres across the region, keeping with

as municipal business cases determine.	Eco-centre principles. Metro Vancouver is currently in the design phases for adding free recycling depots at the North Surrey and Langley recycling and waste centres.
2.2.5 MV Will: Promote recycling at festivals and events. (a) Develop a Zero Waste toolkit for festivals and events. (b) Continue to work with municipalities, EPR groups and local community groups to implement waste minimization and recycling at community festivals and events, including conferences and tradeshows. (c) Provide outreach services.	This action is substantially complete. Metro Vancouver continues to work with the Pacific National Exhibition to promote recycling and work toward a "zero waste fair". • Metro Vancouver participated in the PNE Fair with a major exhibit for the first time in 2021, with the objective of allowing visitors to learn about recycling and reuse in a fun and interactive way. • In 2022, Metro Vancouver conducted a study to identify opportunities to support the PNE with their waste reduction goals at the PNE Fair.
2.2.6 MV Will: Work with school districts and individual schools to promote waste reduction and recycling. (a) Develop instructional programs that encourage waste reduction and recycling both within the schools and at home.	Metro Vancouver K-12 School & Youth Leadership Programs promote waste reduction awareness and actions in schools and communities. K-12 audiences, including students, youth leaders (13-18), K-12 teachers, school districts and other partners in sustainability education were engaged and supported through these core activities in 2022: i) Teacher professional development workshops are delivered to inform, inspire and support teachers to integrate connections to waste management and waste reduction through ongoing delivery of K-12 curriculum (In 2022, 11 teacher workshops were delivered to 300+ Metro Vancouver K-12 teachers.), and; ii) Youth leadership programs, such the Love Food, Hate Waste Youth4Action Leadership Clinic, equip and support regional high school youth leaders to influence awareness and action for waste reduction and sustainability in school communities. (In 2022, 12 regional Youth4Action Leadership events, were delivered to 400+ high school youth-leaders from Metro Vancouver's 11 school districts; iii) Updates to Solid Waste K-12 Resources to support K-12 teaching and learning about regional solid waste and waste reduction. iv) Solid Waste Management Facility Tours for school audiences to Waste-to-Energy Facility and the Vancouver Landfill (link goes to current offerings) were suspended due to COVID19. Grade 5 to 12 Facility Tour request were redirected to available online K-12 Resources.

2.2.7 Municipalities Will: Work with Metro Vancouver on actions designed to: (a) Implement effective disposal bans for collection of municipal waste at source. (b) Inform businesses and residents of recycling opportunities. (c) Increase the efficiency and consistency of recycling collection services over the region.	The implementation of disposal bans and the supporting communications with businesses and residents is primarily covered under action 2.2.2(b) which is the ongoing activity between Metro Vancouver and its member municipalities facilitated through the REAC Solid Waste Sub-committee and other municipal staff.
(d) Establish Eco-Centres	This action is substantially complete under action 2.2.4 (development of an Eco-Centres Business Model).
(e) Promote recycling at community events and festivals.	This action is substantially complete under action 2.2.5 (development of resource materials for public event recycling).
(f) Work with school districts and individual schools to promote waste reduction and recycling.	This is primarily covered under action 2.2.6 which consists of the Metro Vancouver K-12 School & Youth Leadership Programs which promote waste reduction awareness and actions in schools and communities.

Strategy 2.3: Provide opportunities to increase private sector recycling

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.3.1 MV Will: Facilitate the siting of private sector recycling activities. (a) Review the GVS&DD Solid Waste Regulatory Bylaw to facilitate the siting of municipal solid waste facilities that meet municipal bylaws.	Metro Vancouver consulted on proposed updates to Bylaw 181 (which regulates private sector facilities that manage municipal solid waste and recyclable material) that would modernize private sector facility regulation, increase recycling and foster a level playing field among facilities. In late 2017, the GVS&DD Board approved proceeding with changes to Bylaw 181. The Minister of Environment and Climate Change Strategy deferred consideration of the proposed Bylaw 309 pending the review of the region's solid waste management plan. The Solid Waste and Recycling Industry Advisory Committee formed in 2022, provides a forum where industry members, including facility operators, can contribute to discussions on regional management planning, operations, and policy issues related to solid waste and recycling services.
2.3.2 MV Will: Foster research and market development for recycled materials. (a) Evaluate a business case for a regional scale recycling service delivery model. (b) Review desirability, feasibility and opportunity for establishing a non-profit organization to facilitate the development of recycling businesses and markets, along the lines of the 'London Remade' model in the U.K. (c) Subject to the results of 2.3.2 (a) and (b), establish a regional role in processing and marketing of recycled materials, a land acquisition strategy for required recycling facilities, and enhanced policy-based initiatives to promote local recycled content in consumer goods.	This action is substantially complete. In 2017, Metro Vancouver finalized a consultant study to evaluate vulnerabilities in the Recycling network. The study concluded that much of the ongoing activities and actions undertaken by Metro Vancouver were appropriate to protect or improve the resiliency of the recycling network. Furthermore, the increased role of EPR programs (e.g., packaging and paper product) means that post-collection/recycling processing is no longer within the jurisdiction of local government. The National Zero Waste Council was launched in October 2013 to support behavior and design change in the production and use of products and packaging. Some of the work of the council includes rethinking the amount of recycled material that could be included in products and packaging. For example, the work that the National Zero Waste Council is doing associated with recycled asphalt and the participation on Canadian Plastics Pact.
2.3.3 Municipalities Will: Facilitate the siting of private sector recycling activities. (a) Review zoning bylaws to remove unnecessary impediments to and encourage recycling and material	This action is substantially complete. As previously reported, Metro Vancouver staff reviewed municipal zoning bylaws and interviewed municipal planners and other municipal staff. The review did not identify unnecessary municipal barriers to the development of private recycling facilities. At this time, the main

recovery activities in appropriately zoned areas.	impediment appears to be the high cost of industrial land in the region. Metro Vancouver continues to work with the solid waste and recycling industry to discuss barriers to the development of private sector recycling activities.
2.3.4 Municipalities Will: Work with Metro Vancouver on the evaluation of regional scale recycling facilities and development of recycling markets.	This action is substantially complete. As previously reported, in 2017, Metro Vancouver finalized a consultant study to evaluate vulnerabilities in the Recycling network. The study concluded that much of the ongoing activities and actions undertaken by Metro Vancouver were appropriate to protect or improve the resiliency of the recycling network. Furthermore, the increased role of EPR programs (e.g., packaging and paper product) means that the responsibility for post-collection/recycling processing is no longer within the jurisdiction of local government.
2.3.5 Actions Requested of Other Governments and Agencies. Provincial and Federal Governments to identify and establish minimum post-consumer recycled content requirements for consumer goods.	The Provincial government continues to require EPR programs to report on the 'end-fate' (e.g., reuse, recycling, recovery or garbage) of all their collected materials. Continuous improvements requirements encourage EPR programs to find appropriate markets for collected materials.

Strategy 2.4: Target construction and demolition (C&D) sector for increased reuse and recycling

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.4.1 MV Will: In collaboration with municipalities and industry groups, develop a process to require C&D recycling at construction/demolition sites.	This action is substantially complete. Metro Vancouver in collaboration with member municipalities developed a sample municipal bylaw for encouraging Construction and Demolition (C&D) recycling. Ten municipalities have adopted regulatory measures that establish recycling or reuse requirements for building material and others are considering adopting a regulatory program. Municipalities continue to share information as they implement their respective demolition recycling requirements.
2.4.2 MV Will: Implement waste reduction strategies directed toward diverting C&D waste from disposal while supporting opportunities for beneficial use. (a) Encourage the role of building supply retailers and producers in the collection of C&D material for recycling. (b) Provide areas for separated recyclable C&D materials at Eco-Centres and at transfer stations as they are upgraded.	Metro Vancouver provides a range of recycling services at all of its recycling and waste centres, including wood and other C&D materials to promote recycling and improve convenience for customers, as recycling options for these materials are limited across the region. As Metro Vancouver develops new recycling and waste centres, recycling depots accepting a variety of free and paid recyclables will continue to be included. Metro Vancouver is including infrastructure for recycling of C&D materials in the design of new facilities. With the completion of North Surrey and Langley recycling depots in the future, all of Metro Vancouver's recycling and waste centres will have free recycling services. Review of current management practices in the residential C&D industry is ongoing to identify opportunities to minimize contamination of recyclable material and illegal dumping of hazardous C&D material. Metro Vancouver also publishes recycling rates for construction and demolition processing facilities.
2.4.3 MV Will: Review existing C&D recycling and processing capacity, project future needs and develop a strategy to address any identified gaps.	Metro Vancouver continues to monitor C&D waste flows, trends, and barriers to recycling.

2.4.4 Municipalities Will: Work with Metro Vancouver to develop a process to require C&D recycling at construction/demolition sites. (a) Review municipal C&D permitting processes with a view to requiring waste management plans as a condition of such permits. (b) Review the desirability and feasibility of deposit systems or other financial incentives to increase enforcement of C&D waste management plans.	This action is substantially complete. As stated in 2.4.1, several municipalities have implemented tools to encourage reuse and recycling of building materials through material management plans and/or deposit systems.

Strategy 2.5: Reduce paper and paperboard being disposed

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.5.1 MV Will: In collaboration with municipalities, businesses and non-profit organizations, conduct pilot programs to determine the most effective method of reducing unwanted junk mail and other publications and act accordingly on the results. **2.5.2 MV Will:** Promote reduced paper use and increase paper recycling opportunities in the community and businesses.	This action is substantially complete. As previously reported - junk mail, phone directories, newspapers and other publications delivered to residents are regulated items in Packaging and Paper Product EPR. As a result, the ability to influence options to manage these materials is no longer within the jurisdiction of local government.
(a) Carry out a community-based social marketing campaign to determine and overcome barriers to reducing the use of and increasing the recycling of paper in schools and community facilities.	This is largely covered under actions in 1.3.1 and 2.2.6 which involve carrying out community-based social marketing programs for neighborhoods and schools to promote waste reduction and increase recycling.
(b) Carry out a targeted outreach campaign to business to determine and overcome barriers to reducing the use of and increasing the recycling of paper.	Supported by actions under 2.2.2.
2.5.3 Municipalities Will: Collaborate with Metro Vancouver in junk mail reduction pilot programs and community-based social marketing programs in community facilities.	This action is substantially complete. As previously reported - junk mail, phone directories, newspapers and other publications delivered to residents are regulated items in Packaging and Paper Product EPR. As a result, there is a limited role for local governments to influence options to manage these materials.

Strategy 2.6: Target organics for recycling and energy recovery

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.6.1 MV Will: Evaluate options for processing and utilization of organics with biosolids and other utility residuals.	This action is substantially complete. As previously reported, Metro Vancouver evaluated a wide range of different concepts to integrate the replacement of the Lions Gate Wastewater Treatment Plant with new community spaces, commercial ventures, environmental features, and opportunities to co-manage solid wastes such as source-separated organics. Results of the business casing indicated that the cost of co-processing large amounts of source-separated organics together with wastewater residuals such as biosolids would be cost-prohibitive. However, a limited amount and types of select source-separated organics continue to be processed at suitable existing wastewater treatment facilities operated by Metro Vancouver. Metro Vancouver has completed preliminary design of a biosolids receiving system at the Waste-to-Energy Facility that would allow for processing up to 25,000 tonnes per year along with the normal processing of municipal solid waste and is currently working on the detailed design of the system.
2.6.2 MV Will: Divert organics from the waste stream. (a) Establish additional organics processing facilities.	Metro Vancouver's overall recycling rate is 65% with an about 390,000 tonnes of organics diverted per year. Organics recycling increased by 60% between 2013 and 2018 as a result of municipalities implementing municipal organics programs, private sector hauling partnerships and Metro Vancouver's Organics Disposal Ban. The greatest opportunity for increasing organics recycling lies in the commercial and multi-family residential sectors. Metro Vancouver will continue to assess trends going forward through waste composition studies and the annual report process. To respond to the processing challenges in the commercial and multi-family sectors, a pilot project was initiated in 2022 to provide commercial organics transfer services at the North Shore Recycling and Waste Centre.
i) establish a system for monitoring emissions from organics processing facilities including bioaerosols.	This action is substantially complete. As previously reported, under provincial legislation, Metro Vancouver has the delegated authority for air pollution control and air quality management in the region. Metro Vancouver issues permits that include requirements for the management of

	odour and other air emissions, as well as monitoring and assessment.
(b) Determine which paper and paperboard products are suitable for processing at an organics management facility.	Metro Vancouver advocated that senior levels of government review the trend of plastic-lined paper products and the need for solutions for them as an unintended consequence of restrictions of the sale and use of plastic take out container and cups. Metro Vancouver updated their messaging around putting parchment paper and waxed cardboard in the green-bin to reflect the shift towards synthetic coatings and PFAS which are not suitable for composting. Metro Vancouver liquid waste services provided feedback to the Federal government on the impact of PFAS in biosolids and composting quality from common food packaging and products.
(c) In collaboration with municipalities, develop and implement a work plan for the diversion of organic waste, including food waste from: i) single family residences ii) multi-family residences iii) Commercial/Institutional sector	This action is substantially complete. As previously reported, under an ongoing collaborative relationship between Metro Vancouver and the member municipalities, Metro Vancouver supports residents of single family homes through online searchable information focussed on mobile applications, establishing and promoting a hotline, and providing translated educational materials into additional languages. In 2021, we tested messaging on how diverting organics is an everyday action residents can take to reduce greenhouse gases. The messaging tested well, and we are now including carbon impacts as a way to encourage participation in residential green bin programs. Metro Vancouver supports residents of multi-family homes through convening property managers, engaging member municipalities on their pilot multi-family programs to share learning, and developing and promoting resources such as the Multi-Family Recycling Toolkit to help improve recycling in their buildings, including food scraps. The “Food Scraps Aren’t Garbage” campaign informs and encourages all groups to recycle organic materials. Work with the Commercial/Institutional sector is outlined in 1.3.2
(d) Develop and implement supporting communication programs for 2.6.2 (c).	This action is substantially complete.

	As previously reported and described above, the *Food Scraps Aren't Garbage* campaign and the now-national *Love Food Hate Waste* campaign have been ongoing communications programs since their inceptions. See also action 1.3.4
(e) Ban all compostable organics allowed in residential green bins from disposal to landfills and all forms of waste-to-energy, except anaerobic digestion.	This action is substantially complete under 1.2.1, Metro Vancouver's implementation of the disposal ban for organics. See also actions 2.2.1, 2.6.2, and 2.7.5
2.6.3 Municipalities Will: In collaboration with Metro Vancouver, develop and implement a work plan, including appropriate communication programs for the diversion of organic waste from: i) single family residences, ii) multi-family residences, iii) the Commercial/Institutional sector	This action is substantially complete. As previously reported, this is primarily covered under 1.3.4 which is ongoing collaboration between Metro Vancouver and the member municipalities for joint development and sharing of information and materials See also action 2.6.2(c) and (d)
(a) Municipalities will divert organics from the waste stream to a Metro Vancouver or alternative licensed organics processing facility. (b) Municipalities will report the tonnage of diverted organic waste to Metro Vancouver if organics are delivered to licensed non-regional processing facilities.	This action is substantially complete. As per previous reports, more than 97% of all the single-family homes in Metro Vancouver receive organics recycling services from their respective municipalities. Many of the member municipalities also provide service to multi-family residences, and some offer or are piloting services to schools and businesses. All municipalities provide regular tonnage information to Metro Vancouver.

Strategy 2.7: Target wood for reuse, recycle, and energy recovery	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
2.7.1 MV Will: Encourage reuse of wood. (a) Examine and, where feasible, implement incentives for reuse and remove barriers to reuse of wood waste.	Metro Vancouver continues to support member jurisdictions as they develop municipal construction and demolition diversion bylaws. Currently, ten member jurisdictions have construction and demolition diversion requirements in place to encourage recycling and reuse. The requirements range from submission of a waste management declaration form, to meeting minimum diversion requirements of all material generated on site with a refundable deposit based on levels of compliance. Recent updates to Metro Vancouver's construction and demolition toolkit included an increased emphasis on reuse. The updated toolkit includes adaptive reuse, house moving, and deconstruction Metro Vancouver continues to research North American cities, such as Portland, that have successfully implemented deconstruction requirements and conduct comparative analysis to identify policy and/or regulatory framework that can lead top increased wood salvage. Metro Vancouver worked to expand on the 2019 trial with a Reuse Days pilot at the North Shore Recycling and Waste Centre starting in the spring of 2022. See also actions 2.1.4, and 2.4.2(a)
(b) Develop and implement information and education programs on the reuse and effective recycling of wood and other C&D waste.	This action is substantially complete under 1.3.4 which is ongoing collaboration between Metro Vancouver and the member municipalities for the joint development and sharing of information and materials.
2.7.2 MV Will: Collect wood for reuse, recycling, and energy recovery at regional transfer stations and Eco-Centres.	This action is substantially complete under 2.4.2 which is Metro Vancouver's provision of space at most existing and future regional facilities for collection of clean wood and reusable building materials.
2.7.3 MV Will: Encourage highest and best use for wood following waste management hierarchy in the following priority: (a) Reuse wood for comparable structural and non-structural applications. (b) Recycle wood fibre into other fibre based products.	Metro Vancouver continues to monitor the end markets for wood and investigate ways to support more recycling and reuse in this sector, including: • Exploring options for the highest and best use of wood through the University of British Columbia Sustainability Scholars Program. Recent projects include Exploring options to divert building materials from single-family homes built after 1970 in the region.

(c) Compost wood with other organic materials. (d) Digest wood to produce biofuels. (e) Process wood as a fuel for energy production.	• Business casing producing alternative fuel from wood and other material from the C&D sector as well as from material dropped-off at recycling and waste centres in small vehicles (see 2.4.3) • Receiving clean wood at recycling and waste centres.
2.7.4 MV Will: Pass by-laws as required to support highest and best use of wood as outlined in 2.7.3. **2.7.5 MV Will:** Ban all wood from landfill disposal.	This action is substantially complete. As previously reported, Metro Vancouver introduced a Clean Wood Disposal Ban at regional facilities on January 1, 2015. Metro Vancouver conducted research into higher uses and markets for wood waste, but cannot identify further regulatory measures due to high costs of land, inability to control the flow of wastes, and technology limitations.
2.7.6 Other Governments & Agencies Will: Provincial Government to expand the inclusion of the reuse of wood in building codes.	In the CCME report "Progress Report on the Canada-wide Action Plan on EPR", CCME scaled back performance expectations for the Action Plan. As a result, the timeline for provincial actions related to EPR for construction and demolition materials, or other potential measures adopted in the BC Building Code is unknown.

Strategy 2.8: Target plastics for increased recycling	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
2.8.1 MV Will: Expand the recycling of plastics in the residential and commercial sectors. (a) Establish a standard for municipal programs for collection of plastics based on market strength.	This action is substantially complete. As previously reported, over one-third of residents in Metro Vancouver receive recycling service directly from Recycle BC. Many others are served by their local municipality under contract to Recycle BC. As a result, collection of recyclables from residents is mostly standardized. The Province is reviewing policy options to address recycling from commercial sources.
(b) In cooperation with retail partners and municipalities, undertake social marketing pilot programs to reduce the use of disposable take-out food and beverage packaging including plastic and other disposable bags.	In 2021, Metro Vancouver launched a behaviour change campaign to target single-use item reduction for residents, called "What's Your Superhabit?" The campaign focus is on priority items, including single-use checkout bags, straws, utensils, take-out containers and cups.
2.8.2 Municipalities Will: Work with Metro Vancouver on programs to reduce the use of disposable take-out food and beverage packaging including plastic and other disposable bags.	Metro Vancouver continues to provide input into residential packaging EPR programs which now manage much of the disposable food and beverage packaging materials. Metro Vancouver staff participated in the Canadian Plastic Pact which aims to bring industry, government and other key stakeholders together to reduce plastic waste and increase plastic recycling in Canada. Solid waste staff participated in the Source Reduction and Compostable Plastic Rapid Action Groups as well the Advisory Council. In November 2022, Metro Staff attended the CPP summit in Toronto to provide feedback on how to adjust the CPP's initial roadmap to better achieve reductions in food packaging waste. Metro Vancouver advocated for and provided feedback on proposed federal and provincial regulations to restrict the sale and use of single-use items. In addition, staff provided input into potential Canada-wide labelling rules to further improve recycling of plastic packaging.
2.8.3 Other Governments & Agencies Will: The Provincial Government to develop EPR programs for all plastics that provide incentives for alternatives to non-recyclable plastics. **2.8.4 Other Governments & Agencies Will:** The Provincial and Federal Governments to require all plastic material sold in BC to have a material code identifying its composition.	This action is substantially complete. Over one-third of residents in Metro Vancouver receive recycling service directly from RecycleBC (formerly MMBC). Many others are served by their local municipality under contract to RecycleBC. As a result, collection of recyclables from residents is mostly standardized. The Province is reviewing policy options to address recycling from commercial and institutional sources.

	Metro Vancouver staff provided feedback on the Government of Canada's discussion paper titled "Towards Canada-wide rules to strengthen recycling and composting of plastics through accurate labeling"; The BNQ Compostable Plastic Specification CAN.BNQ 0017-088 Public Review; The Government of BC's Preventing Single-Use and Plastic Waste in British Columbia Intentions Paper.

Strategy 2.9: Target multi-family and commercial and institutional (Commercial/Institutional) sectors to improve diversion rates

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.9.1 MV Will: Develop bylaws to require recycling in all multi-family and commercial buildings and complexes. (a) Develop a model bylaw and enforcement model to require recycling in multi-family and commercial buildings.	Metro Vancouver continues to work with member municipalities to implement further programs and policies to encourage recycling in multi-family and commercial complexes. Metro Vancouver works with industry contacts through the Solid Waste and Recycling Industry Advisory Committee to discuss challenges in improving recycling in multi-family and commercial buildings.
(b) Create an advisory service for recycling programs for multifamily and commercial buildings.	This action is substantially complete. As previously reported, this is largely covered under actions 1.3.1 and 1.3.4 which involves the collaboration of member municipalities with Metro Vancouver to develop and deliver community-based marketing programs to inform and educate citizens on waste reduction opportunities.
2.9.2 Municipalities Will: Work with Metro Vancouver to implement recycling in multi-family and commercial buildings.	This is largely covered under actions 1.3.1 and 1.3.4 which involves the collaboration of member municipalities with Metro Vancouver to develop and deliver community-based marketing programs to inform and educate citizens on waste reduction opportunities.
2.9.3 Other Govt's & Agencies Will: The Provincial Government to modify the BC Building Code to require that space be provided for recycling collection, sorting and pick-up in multi-family residential and commercial buildings.	Under action 2.9.1, Metro Vancouver updated the technical specifications for recycling storage space and access to reflect changes to collection services resulting from RecycleBC's program. Several municipalities have adapted the technical specifications to their needs and implemented them as part of development permit requirements. Metro Vancouver is working with the Ministry of Municipal Affairs and Housing's Office of Housing and Construction Standards to amend the local government building requirements in the *Building Act*. As a result, it was amended to unrestrict the following items as they relate to buildings: • the load capacity of loading pads; • the height of loading bays from ground level and the minimum size of loading bay openings; • the minimum dimensions of rooms for the temporary collection of specified waste and the minimum width of doorways through which collection equipment is to enter or leave those rooms;

	• ramps within a building for moving containers for specified waste within the building to a collection point within the building; • any matter as it relates to the prevention of animals being attracted to or accessing specified waste.

Strategy 2.10: Develop contingency plans for the loss of recycling markets

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.10.1 MV Will: Manage diverted materials in accordance with the requirements of the Environmental Management Act and regulations in that material will not be disposed unless all feasible opportunities for higher uses of the materials have been taken. **2.10.2 Municipalities Will:** Manage diverted materials in accordance with the requirements of the Environmental Management Act and regulations in that material will not be disposed unless all feasible opportunities for higher uses of the materials have been taken.	This action is substantially complete. As previously reported, in 2017, Metro Vancouver finalized a consultant study to evaluate vulnerabilities in the Recycling network. The study concluded that much of the ongoing activities and actions undertaken by Metro Vancouver were appropriate to protect or improve the resiliency of the recycling network. Furthermore, the increased role of EPR programs (e.g., packaging and paper product) means that post-collection/recycling processing is no longer within the jurisdiction of local government. Metro Vancouver maintains continual liaison and input into provincial stewardship planning. Compliance with applicable regulations is an ongoing responsibility with all actions associated with the ISWRMP. As described in actions 2.1.1 and 2.3.2, Metro Vancouver is engaged in various activities to improve markets for key recycled materials, especially compost and reusable building materials.

Strategy 2.11: Integrated Utility Management Advisory Committee

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
2.11.1 MV Will: Establish a new overarching committee, the Integrated Utility Management Advisory Committee (IUMAC), to advise Metro Vancouver on plan implementation, particularly from the perspectives of integrated planning and resource recovery across utility systems.	This action is substantially complete. As previously reported, in 2015, Metro Vancouver obtained Ministry approval to modify its approach and separate the monitoring of the solid and liquid waste utilities' Plans. ISWRMP implementation is reviewed and critiqued by the Zero Waste Committee, a functional committee of the GVS&DD Board. As reports to the Zero Waste Committee and Board are public, their reviews are supplemented by any public input received.

Strategy 3.1: Use waste-to-energy to provide electricity and district heating	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
3.1.1 MV Will: Continue use of existing waste-to-energy facility in Burnaby. (a) Subject to the limitations established in the section titled "Flow Control", use the facility at its current usage and capacity of 280,000 tonnes per year to recover available energy in the waste remaining after recycling for district energy and electricity generation.	Continue to work with WTEF facility operator to maximize electricity generation from the facility. Metro Vancouver is working on detailed design of a district energy system utilizing heat from the Waste-to-Energy facility. This project will triple the overall energy recovery from the facility.
(b) Continue to meet the monitoring and emission requirements in Appendix A. (c) Continue to improve environmental performance of the facility with improved technologies and monitor performance to ensure compliance with applicable legislation and regulations. (d) Operating performance will continue to be reported on a regular and timely basis and will also be available on the Metro Vancouver web site.	(b) The Ministry of Environment issued an Operational Certificate for the existing Waste-to-Energy Facility in December 2016; this Certificate incorporates the emission objectives outlined in the Ministry's 2011 Policy "Guideline for Emissions from Municipal Solid Waste Combustion". The Operational Certificate was amended in 2020. These monitoring requirements supersede the monitoring and emission requirements of the ISWRMP appendix A. Per the Operational Certificate, compliance summaries were reported monthly to the Ministry of Environment. c) in 2018, Metro Vancouver completed the installation of non-ferrous recovery system to enable the recovery of non-ferrous metals such as aluminum and copper and secondary recovery of ferrous metal. Approximately 260 tonnes of non-ferrous metals and 420 tonnes additional ferrous metals are recovered each year. The primary economizers are undergoing replacement to improve energy recovery from the facility. The Main Ash Silo is also currently undergoing refurbishment to improve operational control. d) Operating performance is reported to Ministry of Environment, Fraser Health Authority and City of Burnaby on a monthly basis. Emission data are posted on Metro Vancouver's website quarterly following receipt of manual stack test results. Continuous Emissions Monitoring data is available on the Metro Vancouver website in real time. e) Metro Vancouver's Waste-to-Energy Facility in Burnaby continues to comply with all legislation. Metro Vancouver has completed dispersion modelling and a public health risk assessment

(e) The waste-to-energy facility in Burnaby will comply with applicable legislation and operating contracts may include penalties for any violations of performance criteria.	as required by the Operational Certificate. These reports are available on the Metro Vancouver website. Metro Vancouver is also completing an ambient air monitoring study. Once finalized, this report will be available on the Metro Vancouver Website.
3.1.2 MV Will: Expand the use of waste-to-energy. (a) Establish up to 500,000 tonnes per year of new waste-to-energy capacity within the region in one or more facilities. (b) Ensure implementation of new waste-to-energy capacity maximizes energy recovery for use in district heating, production of alternative fuels, industrial applications and electricity generation.	The procurement process for New WTE has been discontinued.
(c) Monitor trends in waste reduction, recycling and waste flows and implement additional waste-to-energy capacity if, and only if, justified on the basis of these trends.	Waste flows and trends are monitored on a regular basis by Metro Vancouver as a component of 1.1.8 the results of which are used for forecasting system needs and adjustments.
(d) Scale any additional waste-to-energy capacity so that total waste-to-energy capacity in the region does not exceed the most probable minimum waste flow projected over the economic life of those facilities.	The procurement process for New WTE has been discontinued.
(e) Operating performance will be reported on a regular and timely basis and will also be available on the Metro Vancouver web site. Any new waste-to-energy facility will comply with applicable legislation and operating contracts may include penalties for any violations of performance criteria.	The procurement process for New WTE has been discontinued.

3.1.3 **MV Will:** Locate new waste-to-energy capacity within the Region on the basis of: site availability; suitability of site for providing district heating from recovered energy; potential for site to optimize network of transfer stations; results of local screening level impact assessment and triple bottom line analysis; and results of community consultation process for each potential site.	The procurement process for New WTE has been discontinued.
3.1.4 **MV Will:** Ensure that new waste-to-energy facilities are designed to maximize the environmental, financial and social benefits of facilities. (a) Evaluate cost/benefits of proposed new facilities over their lifetime, including construction, commissioning, operation and maintenance, future retrofits and decommissioning impacts, and ownership structure.	The procurement process for New WTE has been discontinued.
(b) Conduct an environmental impact assessment of a waste-to-energy facility(ies), based on applicable provincial and federal government requirements, including an assessment of human health risk acceptable to the applicable health authority.	The procurement process for New WTE has been discontinued.
(c) Evaluation criteria will include: cost; use of best available commercial technology; air emission and health impacts; GHG emissions; alignment with sustainability principles; electricity, district heating and alternative fuel production; beneficial use of ash; metals recovery; potential local job creation; and opportunities for research and education.	The procurement process for New WTE has been discontinued.
3.1.5 **MV Will:** Recover metals, ash or other residues from new and existing waste-to-energy facilities for beneficial use. (a) Work with regulatory agencies to identify and remove barriers to beneficial use of ash.	The Ministry of Environment and Climate Change Strategy has authorized the beneficial use of processed bottom ash. Metro Vancouver is conducting pilot studies to process bottom ash as a feedstock to cement kilns for the production of cement clinker.
(b) Maximize metal recovery from the waste stream after recycling.	A non-ferrous recovery system was commissioned in 2018, recovering approximately 260 tonnes per year of non-ferrous metals (primarily aluminum and copper) and an additional 420 tonnes per year of additional ferrous metals.

(c) Process bottom and fly ash to generate products for beneficial use. (d) Use processed bottom and fly ash beneficially for highest value applications available.	Metro Vancouver has initiated pilot tests to process bottom ash for beneficial use at a cement kiln. These pilot tests should be completed in 2024. About 76,300 tonnes of bottom ash were used in the construction of the new United Boulevard Recycling and Waste Centre. Metro Vancouver is now investigating further beneficial use of bottom ash through processing trials.
(e) If beneficial use of a residue is not reasonably available, dispose of the residue in accordance with applicable legislation.	Fly ash is being shipped to the private Columbia Ridge landfill in Oregon, following a procurement process completed in mid-2017. As noted in the table in section 1.2, that amounts to about 10,000 tonnes per year of fly ash.
3.1.6 MV Will: Recover energy from regional utility materials that cannot be recycled, including liquid waste and water utilities. (a) Recover energy from drinking water treatment processes, such organic filter media that cannot be recycled. (b) Use waste-to-energy to process grit and screenings from wastewater treatment for beneficial uses, where appropriate. (c) Use reclaimed water from wastewater treatment plants in waste-to-energy steam generation or district heating, if viable.	This action is substantially complete. As previously reported, drinking water residuals are being used at the Lafarge Canada cement plant. All wastewater treatment plant screenings are being managed at the Waste-to-Energy Facility. Metro Vancouver has completed preliminary design of a biosolids receiving system at the Waste-to-Energy Facility that would allow for processing up to 25,000 tonnes per year along with the normal processing of municipal solid waste, and is currently working on detailed design.

Strategy 3.2: Recover energy from other solid waste management facilities	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
3.2.1 Municipalities (City of Vancouver) Will: Recover landfill gas from Vancouver Landfill and strive to maximize the beneficial use of the recovered gas.	In May 2022, the existing landfill gas utilization came to an end while two RNG plants began construction.

Strategy 3.3: Utilize non-recyclable material as fuel

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
3.3.1 MV Will: Direct recoverable loads of combustible material received at transfer stations to public or private energy recovery facilities.	The City of Vancouver is monitoring opportunities for material recovery at the Vancouver Landfill.
3.3.2 Municipalities (City of Vancouver) Will: Collaborate with Metro Vancouver in ensuring action 3.3.1 is carried out at solid waste management facilities operated by the City of Vancouver.	The City of Vancouver is monitoring opportunities for material recovery at the Vancouver Landfill.
3.3.3 Other Governments and Agencies Will: Provincial Government to develop material and energy requirements for existing and future stewardship programs to use the non-recyclable portion of returned material as fuel rather than landfilling.	EPR programs are required to report on the 'end-fate' of collected materials (i.e., the amount of material that is reused, recycled, recovered for energy and disposed). Continuous improvement requirements leverage EPR program efforts to move up the hierarchy.

Strategy 4.1: Utilize the Vancouver Landfill as a disposal site

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
4.1.1 MV Will: Use the Vancouver Landfill to dispose of any remaining waste not directed to waste-to-energy facilities. (a) Metro Vancouver will work with the City of Vancouver and Corporation of Delta to reduce the quantity of waste going to the Vancouver Landfill to a maximum of 100,000 tonnes annually, exclusive of waste-to-energy residuals, by 2020. Should these reductions not be achieved because overall waste flows exceed the combined capacity of disposal options, Metro Vancouver will evaluate cost effective alternatives and if appropriate seek an amendment to this Plan to expand waste-to-energy capacity to further reduce waste flows to the Vancouver Landfill.	With the discontinuation of the procurement process for new Waste-to-Energy Facility capacity, Metro Vancouver will continue to utilize the Vancouver Landfill within the limits of its Operational Certificate.
(b) Monitor the Vancouver Landfill to ensure compliance.	The City of Vancouver generates an annual landfill report that includes monitoring data, to meet OC requirements for submittal to the Ministry of Environment and Climate Change Strategy.
4.1.2 MV Will: Report annually on the remaining capacity of the waste management system and prior to the closure of Vancouver Landfill, reassess the region's waste-to-energy and disposal options.	The region disposed of 1.25 million tonnes of municipal solid waste in 2022, which was adequately accommodated with the regional disposal system composed of the Vancouver Landfill, the Waste-to-Energy Facility, three regionally contracted contingency landfills, and private C&D waste disposal facilities.
4.1.3 Municipalities (City of Vancouver & Delta) Will: Work with Metro Vancouver to accommodate residual waste flows at the Vancouver Landfill.	Metro Vancouver works with Vancouver and Delta to optimize the use of the Vancouver Landfill.
4.1.4 Municipalities (City of Vancouver & Delta) Will: Where limits in the Operational Certificate, contracts, agreements and regulations appear to conflict with the Plan, review the particular provisions in good faith with the Province, Metro Vancouver and any other involved party to determine if there is a solution acceptable to all affected parties.	Metro Vancouver works with Vancouver and Delta within their Tripartite agreement.

Strategy 4.2: Ensure a disposal site is available for C&D waste	
ISWRMP Strategy and Actions	**Current Status of Key Strategies and Actions in the ISWRMP**
4.2.1 MV Will: Assess long-term disposal of construction and demolition (C&D) waste remaining after recycling in collaboration with the private sector, neighbouring regional districts and First Nations communities.	This is primarily covered under 2.4.3 which is Metro Vancouver's ongoing monitoring of the regional flows and recycling and disposal capacity of C&D wastes. See also action 1.1.8
4.2.2 MV Will: Identify disposal sites for C&D waste remaining after recycling that will be available when existing disposal facilities reach their capacity.	This is primarily covered under 2.4.3 which is Metro Vancouver's ongoing monitoring of the regional flows and recycling and disposal capacity of C&D wastes.

Strategy 4.3: Establish contingency disposal sites

ISWRMP Strategy and Actions	Current Status of Key Strategies and Actions in the ISWRMP
4.3.1 **MV Will:** Ensure adequate landfill capacity for: (a) non-combustible and non-recyclable material; and (b) municipal solid waste in excess of waste-to-energy and in-region landfill capacity (including allowances for variability in waste flows and short-term operational disruption), and non-recyclable ash.	System disposal capacity is sufficient for the region's requirements. Projected waste flows are assessed prior to any procurement to ensure suitable capacity is secured. With the closure of the Cache Creek Landfill in 2016, contingency disposal was required. Interim contracts for contingency disposal were established with new contingency operations beginning April 2018. A procurement process was initiated in 2022 for ongoing contingency disposal.
4.3.2 **MV Will:** If sufficient waste-to-energy or in-region landfill capacity is not available, this Plan explicitly permits Metro Vancouver to seek, through an appropriate procurement process, the best available out-of-region landfill(s) for the disposal of remaining waste, subject to that facility having appropriate permits, from the local permitting jurisdiction in which it is located, to accept such waste. (a) Categories of evaluation for a contingency landfill will include, but not necessarily be limited to cost, air emissions, GHG emissions, energy benefit and, where appropriate, completion of a satisfactory human health impact assessment. (b) Monitor contingency disposal site(s) for performance and compliance.	Metro Vancouver continues to monitor waste flow projections and remaining disposal capacity and will take into consideration environmental, social, and economic factors when determining alternative disposal sites when and if deemed necessary. Out-of-region disposal sites are chosen based on selection criteria requiring the use of high standards of environmental controls (e.g., Landfill gas collection and leachate collection)

APPENDIX 1 – METRO VANCOUVER RECYCLING AND SOLID WASTE QUANTITIES 2021 AND 2022

WASTE SECTOR		DISPOSED (tonnes)		RECYCLED (tonnes)		GENERATED (tonnes)		RECYCLING RATE (%) [3]		
		2021	2022	2021	2022	2021	2022	2021	2022	% change
Residential	**tonnes**	**510,337**	**505,592**	**601,509**	**579,754**	**1,111,845**	**1,085,346**	**54%**	**53%**	**-0.7%**
	tonnes/capita	**0.18**	**0.18**	**0.21**	**0.20**	**0.40**	**0.38**			
Single Family [1]	tonnes	266,999	248,750	455,723	434,495	722,722	683,245	63%	64%	0.5%
Multi-Family [2]	tonnes	243,337	256,842	145,786	145,259	389,123	402,101	37%	36%	-1.3%
Commercial/ Institutional [2]	**tonnes**	**372,861**	**400,976**	**316,406**	**375,466**	**689,267**	**776,443**	**46%**	**48%**	**2.5%**
	tonnes/capita	**0.13**	**0.14**	**0.11**	**0.13**	**0.25**	**0.27**			
Construction & Demolition [4]	**tonnes**	**371,972**	**338,955**	**1,433,933**	**1,395,360**	**1,805,905**	**1,734,315**	**79%**	**80%**	**1.1%**
	tonnes/capita	**0.13**	**0.12**	**0.51**	**0.49**	**0.64**	**0.61**			
Total	**tonnes**	**1,255,169**	**1,245,523**	**2,351,848**	**2,350,580**	**3,607,018**	**3,596,103**	**65%**	**65%**	**0.2%**
	tonnes/capita	**0.45**	**0.44**	**0.84**	**0.82**	**1.28**	**1.26**			
	tonnes/ household	**1.15**	**1.11**	**2.15**	**2.10**	**3.29**	**3.21**			

(1) Reported tonnes of disposed and recycled waste are obtained from municipal reports, private recycling and processing facility records, landfill records, or product stewardship association records. This includes residential drop-off tonnages.

(2) Estimated tonnes of disposed waste are based on per capita multi-family disposal rates and the total recycling and waste centre weigh scale reports for commercial waste, which includes multi-family and commercial/institutional tonnages. A calculated portion of that total is then attributed to each sector. Multi-family recycling is reported by municipalities and combined with estimated residential drop-off tonnages.

(3) The total recycling rate includes the EPR tonnages. The recycling rates for individual sectors also include EPR tonnages, based on estimates of the relative contributions to EPR tonnages from single family homes (54%), multi-family homes (36%), and businesses (10%) with the exception of Recycle BC tonnages that are allocated 60% to the single family sector and 40% to the multi-family sector.

(4) Reported tonnes of recyclable materials and disposed waste are obtained from private licensed brokers, composters and transfer stations, and from unlicensed recycling facilities.

(5) 2017 demographics data has been updated from the 2017 annual report to reflect new information that has become available

Year	Single Family		Multi Family		Total	
	Population	Households	Population	Households	Population	Households
2021	1,656,892	504,527	1,150,577	570,927	2,807,469	1,075,454
2022	1,636,112	516,377	1,218,263	602,291	2,854,375	1,118,668

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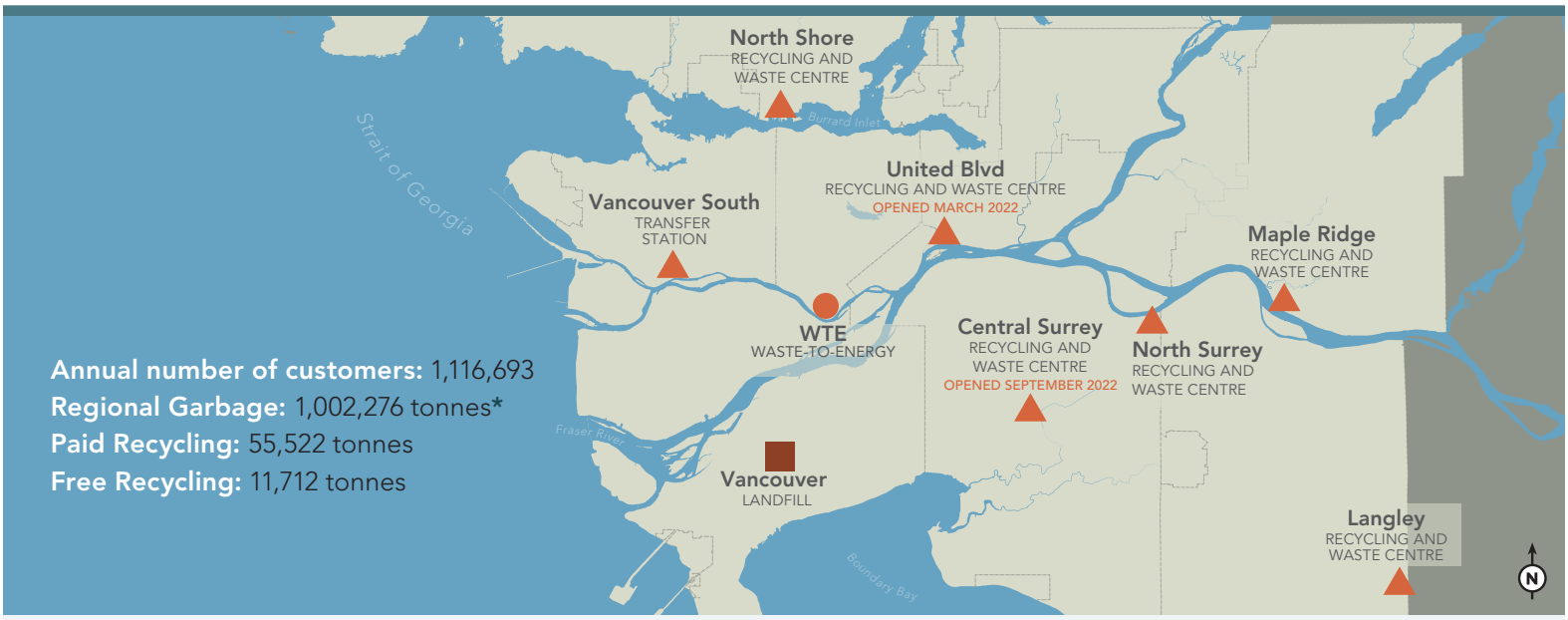
APPENDIX 2 – 2022 FACTSHEETS



Annual number of customers: 1,116,693
Regional Garbage: 1,002,276 tonnes*
Paid Recycling: 55,522 tonnes
Free Recycling: 11,712 tonnes

2022 Metro Vancouver

Solid Waste System

System Description

Metro Vancouver is responsible for waste reduction, recycling planning, and the operation of a series of solid waste facilities in the region. Planning for less waste, improving reuse and recycling systems and managing the remaining waste reflects the public's expectations of high environmental stewardship, as well as the desire to keep waste management affordable.

Metro Vancouver operates six recycling and waste centres where residents and businesses drop off garbage, yard trimmings and a variety of other recyclable materials. The new United Boulevard and Central Surrey recycling and waste centres opened in 2022. Planning is currently underway to develop full scale recycling depots at the North Surrey and Langley recycling and waste centres.

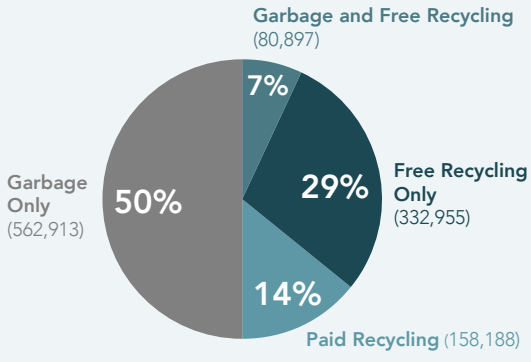
In addition to the Metro Vancouver facilities, Burnaby, Richmond, Coquitlam, Bowen Island and the Ridge Meadows Recycling Society (in partnership with Maple Ridge) operate their own recycling depots funded in part by Metro Vancouver. Recycling information from those facilities is included as part of the regional solid waste recycling statistics, but not included as part of this summary of Metro Vancouver solid waste facility data. The Vancouver Landfill, Vancouver South Transfer Station and Zero Waste Centre are owned and operated by the City of Vancouver.

Garbage remaining after recycling is managed at the Metro Vancouver Waste-to-Energy Facility and the Vancouver Landfill. Garbage in excess of what can be managed at these local facilities is sent to remote landfills for disposal.

Metro Vancouver Facilities

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	625,550	696,816
Clean Wood, Organics & Other Paid Recycling	144,582	51,428
Gypsum	13,606	2,164
Mattresses	61,898 units	1,930
Free Recycling	413,852	11,712

2022 Overall Customer Use of Solid Waste Facilities



* Regional garbage received at Metro Vancouver and City of Vancouver facilities (from residential and commercial/institutional sources) totaled 1,002,276 tonnes in 2022. In addition, the Waste-to-Energy Facility received 13,968 tonnes of residuals from the operations of liquid waste services and water services, and international waste. The Vancouver Landfill received 52,970 tonnes of construction and demotion waste, 6,117 tonnes of residuals from the operations of liquid waste services, and 37,281 tonnes of bottom ash.

All figures are based on 2022 data.

30 Riverside Drive, North Vancouver

North Shore

Recycling and Waste Centre

Facility Description

The North Shore Recycling and Waste Centre accepts garbage and a wide range of recyclables from both small and large vehicles. It has both attended and automated scales, the latter for use mainly by account customers with mechanically unloaded vehicles. Garbage is unloaded onto a tipping floor in the main building and a front end loader pushes the waste into a below ground compactor for shipment to disposal. Yard trimmings, clean wood, gypsum and mattresses are accepted for recycling for a fee.
A recycling depot where customers can drop off materials for free is located ahead of the scales. Accepted materials include batteries, electronics, cardboard, metal, expanded polystyrene, plastic containers and bags, light fixtures, cooking oil, books and textiles.

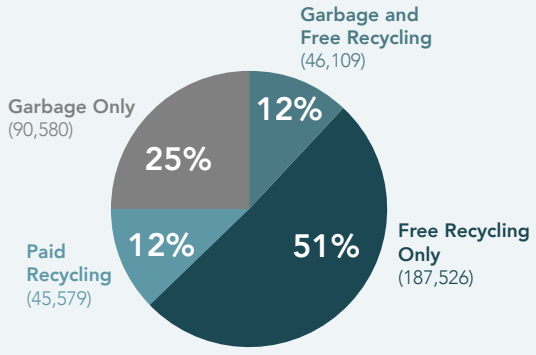
Site Area: 1.78 hectares including yard trimmings area

Building Area: 52 m x 61 m = 3,172 m^2

Number of customers in 2022: 369,795

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	136,689	121,291
Clean Wood, Organics & Other Paid Recycling	42,461	37,558
Gypsum	3,118	496
Mattresses	15,459 units	501
Free Recycling	233,635	4,701

2022 Overall Customer Use of North Shore Recycling and Waste Centre



All figures are based on 2022 data.

1200 United Boulevard, Coquitlam

Coquitlam

Recycling and Waste Centre

Facility Description

The Coquitlam Recycling and Waste Centre closed in March 2022 and was replaced by the new United Boulevard Recycling and Waste Centre. It accepted garbage and a wide range of recyclables from both small and large vehicles. It had both attended and automated scales, the latter for use mainly by account customers with mechanically unloaded vehicles. Garbage was unloaded onto a tipping floor in the main building and a front end loader pushed the waste into a below ground compactor for shipment to disposal. Yard trimmings, clean wood, gypsum and mattresses were accepted for recycling for a fee. A recycling depot where customers could drop off materials for free was located ahead of the scales. Accepted materials included batteries, electronics, cardboard, metal, expanded polystyrene, glass packaging, light fixtures, cooking oil, books and thermostats.

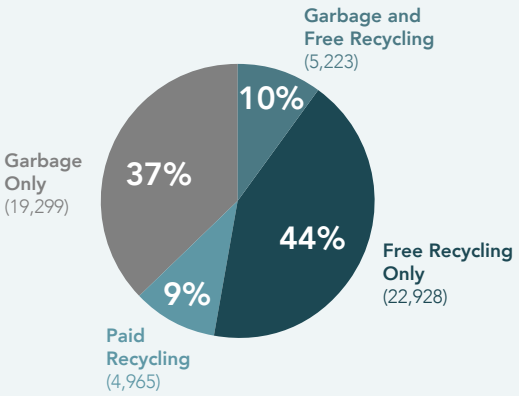
Site Area: 2.681 hectares

Building Area: 50 m x 78 m = 3,900 m^2

Number of customers in 2022: 52,415

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	24,522	29,213
Clean Wood, Organics & Other Paid Recycling	4,292	1,067
Gypsum	673	106
Mattresses	3,467 units	115
Free Recycling	28,151	1,207

2022 Overall Customer Use of Coquitlam Recycling and Waste Centre



All figures are based on 2022 data.

995 United Boulevard, Coquitlam

United Boulevard

Recycling and Waste Centre

Facility Description

The United Boulevard Recycling and Waste Centre, opened March 2022, has both attended and automated weigh scales, the latter for use by commercial access card holders. Garbage is unloaded onto the 5,800 m2 flat tipping floor in the main transfer building and a front end loader pushes the waste into a below ground compactor for shipment to disposal. Service vehicles picking up recycling and the compacted waste have a designated entrance and traffic flow through the facility, separated from customers. Yard trimmings, clean wood, food scraps, gypsum and mattresses are accepted for recycling for a fee. A full-service recycling depot, where customers can drop off materials for free is located ahead of the scales. Accepted materials include batteries, electronics, cardboard, metal, expanded polystyrene, plastic containers and bags, light fixtures, cooking oil, books, textiles and more. Customers can choose to leave the recycling depot after dropping off their free recycling, or can join a separate traffic lane to reach the scale house to drop off their garbage or paid recycling.

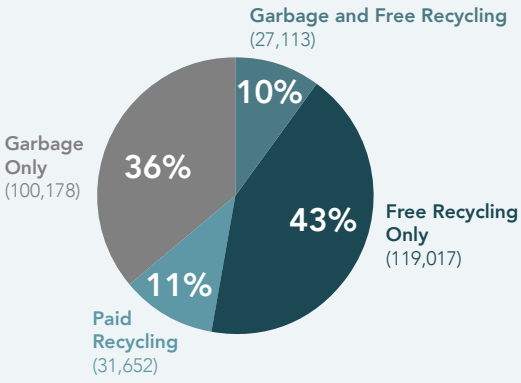
Site Area: 6.2 hectares

Building Area: 63 m x 100 m = 6,300 m^2

Number of customers in 2022: 277,960

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	127,291	165,875
Clean Wood, Organics & Other Paid Recycling	28,841	4,836
Gypsum	2,811	392
Mattresses	17,247 units	521
Free Recycling	146,130	5,579

2022 Overall Customer Use of United Boulevard Recycling and Waste Centre



All figures are based on 2022 data.

9770 192nd Street, Surrey

North Surrey

Recycling and Waste Centre

Facility Description

The North Surrey Recycling and Waste Centre accepts garbage and a limited number of recyclables from both small and large vehicles. It has both attended and automated scales, the latter for use mainly by account customers with mechanically unloaded vehicles. Garbage is unloaded into a pit for mechanical unloading vehicles and onto the tipping floor for small vehicles. A front end loader pushes the waste into a below ground compactor for shipment to disposal. Yard trimmings, clean wood, gypsum and mattresses are accepted for recycling for a fee. General recyclables such as metals are managed within the transfer building. Customers have the option to pay for recyclables with their garbage, or weigh in and out for free drop off of their recyclables.

A new expanded recycling depot at North Surrey Recycling and Waste Centre is under development. The recycling depot will be located ahead of the scales and will allow customers to drop off many additional materials for recycling.

Site Area: 3.45 hectares

Building Area: 80 m x 71 m = 5,680 m^2

Number of customers in 2022: 192,271

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	157,898	229,608
Clean Wood, Organics & Other Paid Recycling	31,029	3,305
Gypsum	3,344	595
Mattresses	13,602 units	434

All figures are based on 2022 data.

6711 – 154 Street, Surrey

Central Surrey

Recycling and Waste Centre

Facility Description

The Central Surrey Recycling and Waste Centre, opened September 2022, accepts garbage and a wide range of recyclables at the free recycling depot. It has attended weigh scales only, and is not used by mechanically unloading trucks. Garbage is hand-unloaded into a below ground compactor container. Yard trimmings, clean wood, food scraps, gypsum and mattresses are accepted for recycling for a fee. A full-service recycling depot, where customers can drop off materials for free is located ahead of the scales. Recyclables accepted include batteries, electronics, cardboard, metal, expanded polystyrene, plastic containers and bags, light fixtures, cooking oil, books, textiles and more.

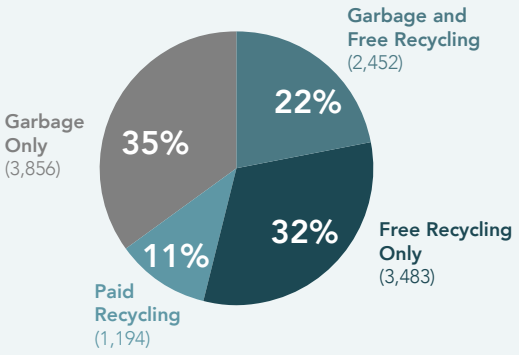
Site Area: 1.7 hectares

Building Area: 60 m x 50 m = 3,000 m^2

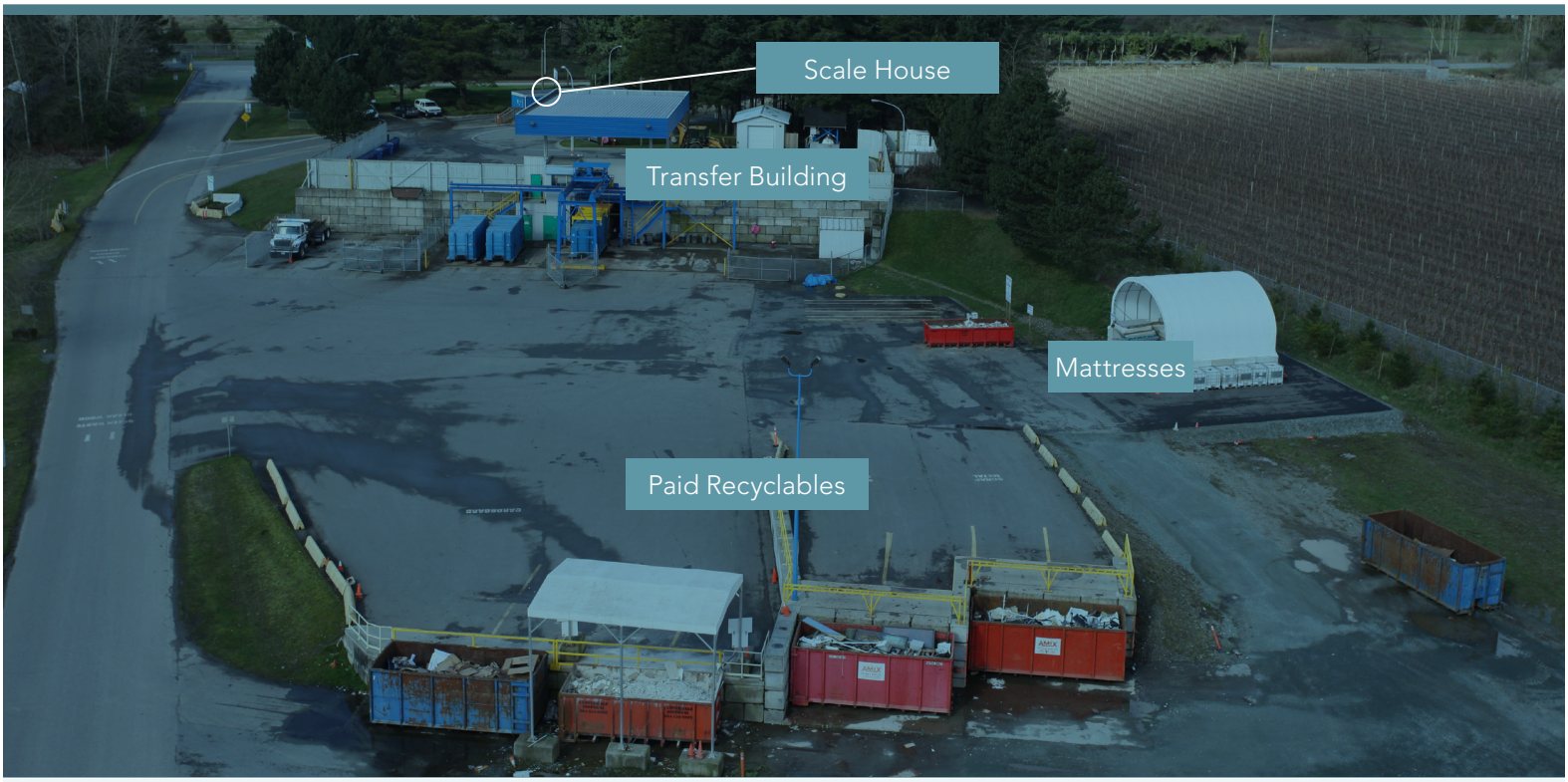
Number of customers 2022: 10,985

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	6,308	862
Clean Wood, Organics & Other Paid Recycling	984	118
Gypsum	210	26
Mattresses	1,199 units	33
Free Recycling	5,935	225

2022 Overall Customer Use of Central Surrey Recycling and Waste Centre



All figures are based on 2022 data.



1070 – 272nd Street, Langley Township

Langley

Recycling and Waste Centre

Facility Description

The Langley Recycling and Waste Centre accepts garbage and limited recyclables from customers in small vehicles. It has attended scales only, and is not used by mechanically unloading trucks. Garbage is hand-unloaded by customers onto a walking floor that is then loaded into a compactor container. Recyclables accepted for a fee include yard trimmings, clean wood, gypsum and mattresses. Other recyclables such as batteries, cardboard, metals, plastic bags and containers, refillable propane tanks and oil filters, are accepted within the transfer building area. Customers have the option to pay for recyclables with their garbage, or weigh in and out for free drop off of their recyclables.

A new expanded recycling depot at Langley Recycling and Waste Centre is under development. The recycling depot will be located ahead of the scales and will allow customers to drop off many additional materials for recycling.

Site Area: 3.86 hectares

Building Area: 21 m x 13 m = 273 m^2

Number of customers in 2022: 72,630

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	50,780	6,946
Clean Wood, Organics & Other Paid Recycling	20,254	2,037
Gypsum	1,596	276
Mattresses	4,630 units	131

All figures are based on 2022 data.

10092 – 236th Street, Maple Ridge

Maple Ridge

Recycling and Waste Centre

Facility Description

The Maple Ridge Recycling and Waste Centre accepts garbage and a number of recyclables from small vehicles that are hand-unloaded. It has attended scales only, and is not used by mechanically unloading trucks. Garbage is unloaded directly into trailers located below the tipping floor. Yard trimmings, clean wood, new and used gypsum and mattresses are accepted for recycling for a fee.

A part of the property where the recycling and waste centre is located also contains a recycling depot which is leased to Maple Ridge who in turn sublease to the Ridge Meadows Recycling Society. The Ridge Meadows Recycling Society operate the recycling depot and it accepts recyclable materials for free.

Site Area – recycling and waste centre: 1.887 hectares

Site Area – recycling depot: 0.543 hectares

Building Area: 36 m x 46 m = 1,656 m^2

Number of customers in 2022: 108,229

MATERIAL(S)	CUSTOMERS	TONNES
Garbage	89,654	9,523
Clean Wood, Organics & Other Paid Recycling	16,721	2,508
Gypsum	1,854	274
Mattresses	6,294 units	195

All figures are based on 2022 data.

5150 Riverbend Drive, Burnaby

Waste-to-Energy Facility

Facility Description

Metro Vancouver's Waste-to-Energy Facility has operated in Burnaby since 1988 and handles about 240,000 tonnes of garbage per year – roughly a quarter of the region's garbage. It is a mass-burn facility that turns waste into electricity, approximately 180,000 MWh / year, (enough to power 16,000 homes) and recovers approximately 5,000 tonnes of ferrous and non-ferrous metal annually.

Metro Vancouver has an agreement with River District Energy to provide heat and hot water through a new district energy system. When fully built out, the district energy system will provide heat and hot water up to 50,000 residential units in Burnaby and Vancouver, reducing greenhouse gas emissions by up to 70,000 tonnes CO2eq.

The waste-to-energy process is monitored 24 hours a day, seven days a week, 365 days a year from a control room located on site. Facility emissions data and compliance reports are available on Metro Vancouver's website in real time. The range of emissions monitored, includes common air contaminants such as nitrogen oxides and particulate matter, as well as acid gases, trace metals, trace organics, and dioxins / furans.

The facility receives waste from an average of 80 mechanically unloading trucks per day that empty their loads into a large garbage bunker.

Site Area: 1.8 hectares

Building Area: 70 m x 70 m = 4,900 m^2

Direct Haul: 147,474 tonnes

Transfer: 85,578 tonnes

Total Processed (2022): 233,052 tonnes

Customers (2022): 32,408

All figures are based on 2022 data.