



Maryland
Department of
the Environment

APPENDIX F

MULTIFAMILY AND COMMERCIAL
RECYCLING SERVICES



FINAL NEEDS ASSESSMENT | MARYLAND STATEWIDE RECYCLING NEEDS ASSESSMENT





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1 Introduction

Understanding the recycling service availability, gaps, and opportunities associated with multi-family and commercial entities in the State of Maryland supports the potential expansion and/or optimization of collection and processing services. This technical memorandum summarizes the multi-family and commercial generators, collection programs, tonnage and diversion rates, capture rates, recycling access, and potential diversion opportunities for this generator sector.

1.1 Background

Recycling services provided to multi-family housing and commercial properties, including businesses and schools, are similar. Throughout the majority of this needs assessment, multi-family and single family housing together are considered “residential recycling”, However, this Appendix considers multi-family recycling separately and highlights the similarities between multi-family and commercial recycling. Multi-family and commercial collection services do not typically involve cart service, which is used in residential collection. Instead, larger containers such as open top roll off, dumpsters, or compactors are used, and sometimes these containers must be specialized to the property’s needs depending on space or enclosure constraints.

The type of truck servicing these properties is engineered to manage larger containers, including dumpsters collected via front or rear-load trucks. Collection frequency and schedules vary for both commercial and multi-family properties and can be more frequent than once per week. Multi-family properties may use communal recycling areas and collection containers may not be co-located with trash. While the services provided can be similar, the way in which the recycling is collected from a location determines whether it is a multi-family/commercial or residential collection route.

The composition of multi-family recycled materials can vary from being generally consistent with residential generators (e.g., seasonal/holiday fluctuations in recycling material volume and composition) to consisting of volumes of recyclable materials consistent with commercial entities (e.g., more cardboard, paper, and flexible packaging waste due to procurement/purchasing needs). Multi-family properties may also have varying composition and volume of recycling based on the number of units, property size, amenities, housing density, tenant turnover, and location. Both commercial and multi-family properties have varying levels of participation in recycling programs due to convenience, education, local ordinances, state law, and property management requirements.

1.1.1 Apartment Building and Condominium Recycling (ABCR) Law

In 2012, the Maryland General Assembly passed House Bill 1, Environmental-Recycling-Apartment Buildings and Condominiums (ABCR) that requires recycling services to be provided in all apartment buildings and condominiums that contain ten or more dwelling units. The law became effective on October 1, 2012 (amending Section 9-1703 of the

Environment Article, Annotated Code of Maryland). Counties and/or municipalities are required to implement this program and are permitted to pursue their own multi-family or commercial ordinances if they are more stringent than the State's law. Counties and/or municipalities are able to charge up to fifty dollars per day to property owners, managers of an apartment, or councils of unit owners of a condominium in violation of this law.¹

1.1.2 Office Space Recycling Statute

Although there is a requirement in place for the multi-family sector, the State does not require the commercial sector to recycle, except for office buildings greater than 150,000 square feet².

1.1.3 State Government Recycling

The Maryland Recycling Act (MRA), originally passed in 1988, requires state agencies to have at least a 30% recycling rate. As part of the implementation process, MDE asked that State agencies revise their recycling plans to include a recycling goal and steps towards reaching the goal by December 2012³. In 2009, requirements expanded to mandate that the State Government Recycling Plan should include a system for recycling aluminum, glass, paper, and plastic generated for disposal by the State government, including the placement of collection bins in State-owned or State-operated office buildings in locations in the state where it is determined to be practical and economically feasible.⁴

1.1.4 Public School Plans

In July 2009, the Maryland General Assembly passed House Bill 1290, Environment-Recycling-Public School Plans requiring recycling in publicly funded schools⁵. This bill requires each county's recycling plan to implement a strategy for collecting, processing, marketing, and disposing of recyclable materials from its public schools.

¹ Maryland General Assembly. 2023. *Maryland Environment Code Section 9-1711: Apartment Buildings and Condominiums*. Retrieved from Justia website: [Maryland Environment Code Section 9-1711 \(2023\) - Apartment Buildings and Condominiums :: 2023 Maryland Code :: US Codes and Statutes :: US Law :: Justia](#)

² Maryland General Assembly. Office Building Recycling Statute. [Laws - Statute Text](#)

³ Maryland General Assembly. 2012. Recycling Rates and Waste Diversion Statewide Goals. [House Bill 929](#)

⁴ Maryland General Assembly. 2009. House Bill 595 Recycling at State-Owned or Operated Office Buildings. [House Bill 595](#)

⁵ Maryland General Assembly. 2009. House Bill 1290 Public School Plans [Microsoft Word - \\$ASQBD_0901eeec80124015_21297.doc](#)

1.2 Methodology

1.2.1 Surveys

The Project Team leveraged survey information collected from municipalities, counties, and haulers to evaluate the current services available and potential growth opportunities for recycling among these property types. This evaluation involved identifying how services are currently provided to multi-family and commercial generators, recycling program performance, and local and state policies pertaining to multi-family and commercial properties.

1.2.2 Desktop Research

The Project Team identified the number of multi-family properties based on the Census 2022 American Community Survey (ACS). (The 2022 survey is the most recent five-year ACS available that incorporates places with populations over 65,000.) The Project Team evaluated commercial entities by North American Industry Classification System (NAICS) code from a 2023 ESRI database.⁶ NAICS codes were then categorized by less than or greater than five million in annual revenue. The following types of commercial entities and associated NAICS codes or other sources of classification were included:

- **Schools and universities:** Includes school locations (NAICS code 6111) and data from Maryland Higher Education Commission (MHEC) via Maryland iMap. Includes public and private two (2) year and four (4) year and higher education facilities and regional higher education centers.
- **Accommodations:** Includes NAICS codes 7211, 7212, 7213
- **Food Services:** Includes NAICS codes 7223, 7224, 7225
- **Arts and recreation:** Includes NAICS codes 7111, 7112, 7113, 7114, 7115, 7121, 7131, 7132, 7139
- **Public administration:** Includes state and local government buildings.⁷
- **Retail:** Includes NAICS codes 4411, 4412, 4413, 4441, 4442, 4451, 4452, 4453, 4491, 4492, 4551, 4552, 4561, 4571, 4572, 4581, 4582, 4583, 4591, 4592, 4593, 4594, 4595, 4599

⁶ ArcGIS Places sourced from Data Axle focuses specifically on businesses and contain business locations updated as of June 2024.

The Business Summary dataset includes the total count of businesses classified by 31 unique SIC Code industry groups by and 38 unique NAICS Code industry groups, including retail, entertainment, finance, and more. This data can be used to determine which businesses are needed in an area and which are well represented.

⁷ Maryland Department of the Environment. 2022. *Maryland State Agencies' 2022 Recycling Rates*. [Maryland State Agencies' 2022 Recycling Rates](#)

The Project Team utilized primary NAICS codes and removed duplicate entries entered as separate entities in the same location (e.g., an elementary school and the headquarters of the school district at the same address).

Manufacturing is a major sector in the generation of tertiary materials, or business-to-business materials that are recycled on site. Further description of tertiary recycling is provided in **Section 3.2**.

The following sections describe the current state of recycling programs in Maryland based on county, municipality, and facility survey data for multi-family and commercial customers.

2 Multi-Family Recycling Programs

For this technical memorandum, “multi-family” refers to a wide range of housing units including two (2) to four (4) units (e.g., townhomes), five (5) to nine (9) units (small apartment complexes, and ten or greater units (e.g., larger multi-family complexes). Based on responses from the hauler survey, multi-family recycling programs present an important opportunity to increase future recycling rates. Recycling from multi-family housing is collected on both residential and commercial recycling routes. While the 2012 ABCR law only mandates that recycling services are provided to complexes with ten or more units, recycling services may be provided for customers with two units or greater as well.

Survey respondents indicated that some residential curbside recycling collection includes multi-family customers, and most commercial recycling routes include multi-family customers. The percentage of multi-family customers on a recycling route can range from 0% to 30% of the total customers per route.

2.1 Multi-Family Recycling Access

As described in **Task 4: Recycling Stream Analysis**, each Maryland county provides access to at least one (1) drop-off location for recycling services that is available to residents of multi-family properties. Recycling access refers to recycling service being available by service providers in the respective county. These results do not indicate the number of multi-family units or complexes that subscribe to the service or have additional containers (e.g., carts, dumpsters, etc.) and/or enclosures, but provides a general indication of where service, or the option for service, is currently being provided. For modeling purposes, a population within a municipality was categorized as having access to recycling service if their municipality responded to the survey indicating service is provided in their jurisdiction, if a review of the municipality or local service provider website showed residents could subscribe to the service, or if a recent study indicated that service was provided in that municipality.



2.1.1 Generators

Multi-family housing options span a diverse range of structures, catering to various residential needs. These can include duplexes, which are two (2)-unit homes often side-by-side or stacked, and triplexes or quadplexes, which offer three (3) or four (4) units within a single building. Townhomes or rowhouses, common in the urban areas of the State and featuring multiple connected units with shared walls but private entrances, were also included as multi-family units.

Low-rise, mid-rise, and high-rise apartment buildings cater to urban areas with greater population density. Larger housing projects, often subsidized or mixed income, include sprawling developments with numerous apartments and shared amenities designed to serve diverse income groups. Other multi-family units include senior living communities, student housing, and mixed-use developments, blending residential and commercial or retail space for convenience and accessibility. **Table 1** presents the number of multi-family dwelling units by Region and County.

Table 1: Multi-Family Dwelling Units by County

Region/County	2 units	3 or 4 units	5 to 9 units	10 to 19 units	20 or more units	Total
Western Maryland	3,900	3,500	4,300	3,800	4,200	19,700
Garrett	200	200	200	100	400	1,100
Allegany	1,600	900	1,300	700	1,500	6,000
Washington	2,100	2,400	2,800	3,000	2,300	12,600
Washington Metro	6,000	13,900	49,100	85,200	122,400	276,600
Frederick	1,300	1,800	3,400	6,600	4,700	17,800
Montgomery	2,200	6,100	19,000	35,800	78,500	141,600
Prince George's	2,500	6,000	26,700	42,800	39,200	117,200
Baltimore Metro	22,200	30,000	60,100	88,600	98,700	299,600
Harford	500	1,700	3,500	7,700	3,300	16,700
Baltimore	3,800	7,200	24,500	37,300	27,100	99,900
Carroll	1,100	1,300	1,000	2,100	1,900	7,400
Howard	600	1,500	7,100	11,900	11,000	32,100
City of Baltimore	14,300	16,300	16,600	12,400	41,900	101,500
Anne Arundel	1,900	2,000	7,400	17,200	13,500	42,000
Southern Maryland	700	1,200	2,400	4,400	5,200	13,900

Region/County	2 units	3 or 4 units	5 to 9 units	10 to 19 units	20 or more units	Total
Charles	200	600	800	1,400	2,300	5,300
Calvert	100	200	200	500	1,000	2,000
St. Mary's	400	400	1,400	2,500	1,900	6,600
Upper Eastern Shore	2,100	2,600	4,500	1,900	2,600	13,700
Talbot	500	500	1,000	200	300	2,500
Caroline	300	500	600	100	100	1,600
Queen Anne's	100	300	800	200	400	1,800
Kent	100	300	500	100	400	1,400
Cecil	1,100	1,000	1,600	1,300	1,400	6,400
Lower Eastern Shore	1,800	3,900	5,800	8,100	17,800	37,400
Dorchester	300	500	700	200	600	2,300
Wicomico	700	1,200	1,600	2,900	2,600	9,000
Somerset	200	500	500	900	200	2,300
Worcester	600	1,700	3,000	4,100	14,400	23,800
Total	36,700	55,100	126,200	192,000	250,900	660,900

Source: Census 2022 ACS 5 YR (most recent 5 YR ACS available that incorporate places with populations over 65,000)

The highest concentrations of multi-family units are in the Baltimore Metro (299,600 units) and Washington Metro (276,600 units) Regions. In these regions there are particularly elevated concentrations of complexes with twenty or more units.

Southern Maryland has one of the lowest total counts (13,900 units) of multi-family complexes and the Upper Eastern Shore has a higher concentration of the two (2)-unit and three (3) or four (4)-unit categories (e.g., townhomes and duplexes) versus larger complexes.

The Lower Eastern Shore has stronger concentrations in five (5) to nine (9) units and 20 or more units, particularly in Worcester County, where the twenty or more units category are disproportionately high (14,400 units), likely due to tourism and seasonal housing.

Urban Regions like Baltimore Metro and Washington Metro have significantly more multi-family units, particularly in higher density categories, compared to rural areas like Western Maryland or the Eastern Shore.

Table 2 compares the percentage of single family and multi-family units in the State, highlighting the differences in housing composition by Region and County.



Table 2: Breakdown of Single Family and Multi-Family Housing Types by County

Region/ County	Percent Single Family Units	Percent 2-9 Units	Percent 10+Units	Percent Mobile Home and Other types of Units
Western Maryland	78.8%	10.2%	7.0%	4.0%
Garrett	85.2%	3.4%	3.1%	8.4%
Allegany	77.6%	11.7%	6.6%	4.1%
Washington	77.5%	11.4%	8.4%	2.7%
Washington Metro	67.7%	8.0%	23.9%	0.4%
Frederick	82.2%	6.2%	10.8%	0.8%
Montgomery	64.7%	6.8%	28.3%	0.2%
Prince George's	66.8%	9.8%	22.8%	0.5%
Baltimore Metro	73.5%	9.6%	16.0%	0.9%
Harford	81.2%	5.5%	10.6%	2.8%
Baltimore	70.6%	10.1%	18.4%	0.8%
Carroll	88.0%	5.2%	6.0%	0.8%
Howard	73.1%	7.5%	18.5%	0.9%
City of Baltimore	65.3%	16.0%	18.5%	0.2%
Anne Arundel	80.8%	4.8%	13.2%	1.2%
Southern Maryland	88.4%	2.9%	6.8%	1.9%
Charles	90.4%	2.5%	6.1%	1.0%
Calvert	93.4%	1.2%	4.4%	0.9%
St. Mary's	81.7%	4.8%	9.6%	3.8%
Upper Eastern Shore	82.9%	8.5%	4.2%	4.4%
Talbot	84.4%	10.4%	2.8%	2.5%
Caroline	80.4%	10.1%	1.8%	7.7%
Queen Anne's	88.1%	5.8%	2.6%	3.5%
Kent	83.8%	8.7%	5.3%	2.2%
Cecil	80.2%	8.4%	6.2%	5.3%
Lower Eastern Shore	65.2%	9.1%	20.3%	5.4%



Region/ County	Percent Single Family Units	Percent 2-9 Units	Percent 10+Units	Percent Mobile Home and Other types of Units
Dorchester	78.9%	9.3%	4.8%	7.1%
Wicomico	75.1%	8.1%	12.8%	4.0%
Somerset	69.3%	11.3%	9.8%	9.7%
Worcester	52.7%	9.3%	32.7%	5.2%

The Washington Metro and Lower Eastern Shore Regions (23.9% and 20.3%, respectively) have the highest concentrations of multi-family housing with ten or more units. Within these two Regions, Montgomery County (28.3%), Prince George’s County (22.8%), and Worcester County (32.7%) contain the highest concentrations of multi-family housing with ten or more units. Despite the lower population density, Worcester County’s large concentration of multi-family housing is likely due to tourism and seasonal housing.

The Southern Maryland, Upper Eastern Shore, and Western Maryland Regions have the highest fraction of single-family housing. The more rural areas of the state including Garrett and Somerset Counties have the highest concentration of mobile homes and other housing types.

Table 3 shows the density (per square mile) of multi-family complexes with ten or more units.

Table 3: Density (per mi²) of Multi-Family Complexes of 10 or More Units per County

Region/County	Density of Multi-Family (per mi ²)
Western Maryland	8.30
Garrett	3.27
Allegany	8.32
Washington	15.40
Washington Metro	129.10
Frederick	18.29
Montgomery	234.19
Prince George's	173.70
Baltimore Metro	88.73
Harford	31.70
Baltimore	112.44

Region/County	Density of Multi-Family (per mi ²)
Carroll	9.96
Howard	95.52
City of Baltimore	677.27
Anne Arundel	80.69
Southern Maryland	12.13
Charles	9.63
Calvert	8.98
St. Mary's	17.20
Upper Eastern Shore	5.95
Talbot	3.82
Caroline	4.00
Queen Anne's	3.51
Kent	2.80
Cecil	14.53
Lower Eastern Shore	19.26
Dorchester	3.60
Wicomico	19.56
Somerset	6.65
Worcester	45.73

City of Baltimore stands out with the highest density at 677 multi-family units/mi², reflecting its urban character, high population density, and extensive multi-family housing infrastructure. Montgomery County in the Washington Metro has a density of 234 units/mi², indicative of its urban-suburban mix and growing demand for multi-family housing. Prince George's County also in the Washington Metro Region, has a density of 173.70 units/mi², supporting the Region's overall high density of 129 units/mi².

Kent County in the Upper Eastern Shore has the lowest density at 2.80 units/mi², reflecting its rural character and limited multi-family housing development. Talbot County (3.82 units/mi²) and Queen Anne's County (3.51 units/mi²), also in the Upper Eastern Shore, follow closely, further demonstrating the region's sparse multi-family housing stock.

Wicomico and Worcester Counties stand out with higher concentrations of multi-family housing units in the Lower Eastern Shore due to their more densely populated municipalities such as Ocean City and the City of Salisbury.

2.1.2 Collection Programs

Single stream recyclables at multi-family complexes are collected via carts, dumpsters, roll off containers, or compactors. At complexes with ten or more units, collection is typically provided by dumpster or compactor that require a separate enclosure. Recycling material generated from multi-family units is reported to be more contaminated than material generated from single family households.

The services summarized in **Table 4** are provided via multiple mechanisms, including municipal haulers, county contracts, municipal contracts, or open market contracted services. Additionally, estimated participation by region is presented. This information is derived from the County/Municipal survey responses.

Table 4: Multi-Family Curbside Recycling Collection Services and Estimated Participation

Region	County	Services Provided	Estimated Participation
Western Maryland	Allegany ¹	Open Market, Municipal Contract (s)	N/A
	Garrett	Open Market	25%
	Washington	Open Market, Municipal Contract(s)	Less than 25%
Washington Metro	Prince George's ²	Open Market	N/A
	Frederick	Open Market	25-49%
	Montgomery ³	Open Market, County contract(s)	100%
Baltimore Metro	Anne Arundel	Open Market	100%
	Baltimore	County Contract	25%
	Carroll	Open Market	25-49%
	City of Baltimore	Open Market	25%
	Harford	Municipal Collection, Open Market	N/A
	Howard	Open Market	N/A
Southern Maryland	Calvert	Open Market	N/A
	Charles	Open Market	N/A
	St. Mary's	N/A	N/A
Upper Eastern Shore	Cecil	Open Market, Municipal Contract(s)	N/A
	Caroline ⁵	Open Market	50-75%
	Kent ⁶	Open Market	25-49%
	Queen Anne's	Open Market	N/A
	Talbot	Open Market	50-75%
Lower Eastern Shore	Dorchester	Open Market	N/A



Region	County	Services Provided	Estimated Participation
	Somerset ⁷	N/A	N/A
	Wicomico ⁸	Open Market	20%
	Worcester ⁹	Open Market, Municipal Collection	25% - 49%

1. City of Cumberland provides collection for single family residents and manages a contract for recycling collection from multi-family units. City of Frostburg indicated that multi-family units receive service through the open market.
2. City of College Park and Greenbelt indicated the multi-family collection is provided by open market and City of Laurel provides municipal collection to service multi-family customers.
3. Montgomery County identified that there are 145,000 multi-family dwelling units in the County. City of Rockville and Takoma Park indicated that multi-family collection is provided by open market.
4. The Town of Elkton provides municipal collection to multi-family complexes.
5. The Town of Denton administers a contract with a private sector hauler that that services multi-family complexes.
6. The Town of Chestertown indicated that multi-family dwellings are serviced by open market.
7. The Town of Princess Anne indicated that while trash from multi-family units is serviced by municipal collection, recycling from multi-family is provided on the open market.
8. Wicomico County indicated that the County’s staff engage with multi-family complexes to encourage compliance with the ABCR program, and that currently about 5 of 25 multi-family properties provide recycling service The City of Salisbury indicated municipal collection services are provided to some multi-family properties.
9. The Town of Snow Hill indicated that multi-family recycling is serviced by municipal collection.

Feedback from the surveys suggest that some areas in the State struggle to have multi-family properties participate or subscribe to recycling services and others are able to enforce mandatory participation (e.g., Anne Arundel and Montgomery County indicated 100 percent in their survey responses) Carts, dumpsters, and roll-off containers are used for multi-family collection service, varying based on the number of units and size of the complex. Larger complexes are typically serviced by dumpster or roll-off containers, while smaller condos or duplexes may be best serviced by carts.

According to survey responses, the frequency of service varies by region and is dependent on the needs and equipment of the apartment complex. The open market predominantly services the recycling needs at multi-family buildings.

2.1.3 Active Recycling Service

Active recycling service refers to a multi-family unit with access to recycling services. These results indicate the number of households who have either been provided with recycling or have subscribed to a recycling service but does not suggest each unit recycles. **Table 5** presents the estimated number of multi-family units with active service provided by counties, municipalities, or the open market. An estimate of units that do not have active recycling service is also presented.

Table 5: Number of Multi-Family Dwelling Units with Active Recycling Service by Region

Region	County Provided	Municipality Provided	Open Market Provided	Total Active Service	No Service	All Multi-Family Households
Western Maryland	0	0	3,500	7,300	12,500	19,800



Region	County Provided	Municipality Provided	Open Market Provided	Total Active Service	No Service	All Multi-Family Households
Washington Metro	0	0	176,000	176,200	100,300	276,500
Baltimore Metro	82,900	0	32,400	115,300	183,900	299,200
Southern Maryland	0	0	8,100	8,100	5,800	13,900
Upper Eastern Shore	0	0	10,300	10,300	3,500	13,800
Lower Eastern Shore	0	0	8,800	8,800	28,700	37,500
Statewide	83,000	0	239,200	326,000	334,800	660,800

Table 6 presents the percentage of multi-family units with and without active service. Overall, approximately 51% of multi-family households in Maryland do not have active recycling service.

Table 6: Percent of Multi-Family Households with Active Recycling Collection Service by Region

Region	County Provided	Municipality Provided	Open Market Provided	Total Active Service	No Service
Western Maryland	0%	0%	18%	37%	63%
Washington Metro	0%	0%	64%	64%	36%
Baltimore Metro	0%	0%	11%	39%	61%
Southern Maryland	28%	0%	58%	58%	41%
Upper Eastern Shore	0%	0%	75%	75%	25%
Lower Eastern Shore	0%	0%	23%	23%	77%
Statewide	13%	0%	36%	49%	51%

The Washington Metro Region has the most multi-family units with active service followed by the Lower Eastern Shore Region. The high multi-family household density combined with strong open market recycling service in these Regions may enable service to be provided more readily to this sector.



The Western Maryland, Southern Maryland and Upper Eastern Shore Regions have the lowest number of total multi-family households in addition to among the lowest active recycling service.

The disparity in active service reflects the distribution of collection, transfer, and processing infrastructure across the State. Across Regions of the State, open-market provision is the primary source of active service for multi-family units, indicating a reliance on private-sector solutions required to fill this gap in access to service.

2.2 Recycling Diversion Rate for PPP

Table 7 presents the quantities of paper and packaging product (PPP) recyclable materials generated across different Regions in Maryland. “Generation” refers to total materials in consumed in the state, whether or not they are recycled or disposed. Estimated volumes generated by the multi-family sector were determined using the waste characterization data presented in **Task 2: Waste Characterization Study**, County recycling data from MDE, and recycling data provided by the Material Recovery Facility (MRF) surveys and interviews.

Table 7: Total Multi-Family Recycling Tons by PPP Material Type Generated Annually (2022)

Region/ Category	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Western Maryland	600	1,300	1,200	900	2,000	1,600	200	7,700
Washington Metro	5,000	14,800	11,000	17,300	32,100	20,600	1,000	101,800
Baltimore Metro	6,700	17,600	15,200	10,000	32,900	26,400	1,900	110,700
Southern Maryland	300	700	700	600	1,400	1,000	100	4,800
Upper Eastern Shore	300	800	700	600	1,400	1,200	100	5,100
Lower Eastern Shore	800	1,800	2,100	1,300	3,500	2,900	300	12,700
Statewide	13,700	36,900	30,900	30,700	73,300	53,700	3,600	243,800
% of Generation	6%	15%	13%	13%	30%	22%	1%	100%

The Baltimore Metro and Washington Metro Regions generate the highest volume of multi-family recyclable PPP materials. Rural areas like Western Maryland, Southern Maryland, and the Upper and Lower Eastern Shore Regions show potential for growth with targeted investment in multi-family recycling infrastructure and programs. Across the State, efforts to increase carton, flexible plastic, glass, and metal recycling and enhance collection in underperforming regions could further improve the State’s overall recycling success.

Paper and OCC/cardboard are generated at the highest quantities from the multi-family sector across the State, particularly in the Baltimore Metro Region. Cartons are generated in fewest quantities across the State.



Rural areas of the State such as Western Maryland and Upper Eastern Shore have similar profiles, with higher quantities in certain categories like OCC/cardboard.

Table 8 compares the total tons of recycled PPP material by type from multi-family generators in the State. This information was determined using the recycling data provided by the Material Recovery Facility (MRF) surveys and interviews.

Table 8: Total Tons Recycled by PPP Material Type in Multi-Family Sector (2022)

Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Western Maryland	110	170	0	110	50	130	0	570
Washington Metro	1,310	2,830	0	1,790	9,520	6,990	150	22,590
Baltimore Metro	710	2,950	0	1,030	4,080	5,300	60	14,130
Southern Maryland	30	70	0	0	240	180	0	520
Upper Eastern Shore	50	170	0	0	210	250	0	680
Lower Eastern Shore	50	100	0	0	120	310	0	580
Statewide Totals	2,260	6,290	0	2,930	14,220	13,160	210	39,070
% of Recycling Stream	6%	16%	0%	7%	36%	34%	1%	100%

Table 9 presents the recycling rate by PPP material and by region for the multi-family sector. These estimated recycling rates were determined using the waste characterization data presented in **Task 2: Waste Characterization Study** and recycling data provided by MDE and the Material Recovery Facility (MRF) surveys and interviews.

Table 9: Recycling Rates for Multi-Family Sector by PPP Material Type (2022)

Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Western Maryland	18%	14%	0%	12%	3%	8%	0%	7%
Washington Metro	26%	19%	0%	10%	30%	34%	15%	22%
Baltimore Metro	11%	17%	0%	10%	12%	20%	3%	13%
Southern Maryland	10%	10%	0%	0%	17%	18%	0%	11%
Upper Eastern Shore	17%	21%	0%	0%	15%	21%	0%	13%



Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Lower Eastern Shore	6%	6%	0%	0%	3%	11%	0%	5%
Statewide	16%	17%	0%	10%	19%	25%	6%	16%

Statewide, the total PPP recycling rate for multi-family material of 19% represents the opportunity to separate and recycle about 197,500 additional tons per year. On a per material basis, the greatest opportunity exists in the rigid plastic, flexible plastic, and paper/OCC categories. On a regional basis, Washington Metro generates the most PPP recyclable material and has the greatest opportunity for increased diversion in the multi-family sector given the existing collection and processing infrastructure in the Region. Conversely, the Lower Eastern Shore has opportunity for significant additional recovery but lacks the infrastructure or volumes to justify economic collection and processing programs on a year-round basis. There may be opportunities to capture significant quantities of recycling on a seasonal basis in the Eastern Shore Regions.

2.3 Ordinances

In addition to the ABCR program, some counties and municipalities have local ordinances in place that incentivize multi-family recycling. Prince George’s and Montgomery County are two examples of Counties that have local ordinances, in addition to the municipalities within them, that cover multi-family properties.

Cities and towns mainly rely on multi-family reporting at the County level; however, the law only states that counties may enforce this law, but are not required. Feedback from the surveys indicate that most counties do not have dedicated staff for enforcing state or local ordinances. Although multi-family properties with ten or more units are required to provide recycling service, the feedback received via surveying suggests levels of compliance could be improved as participation is primarily lower than 50% (see Table 4).

Based on survey results, most counties are not compliant with the State’s ABCR program. Twelve of the counties who responded to the survey do not have enforcement program in place for multi-family property compliance. Specifically, there are no multi-family property compliance programs (e.g., programs with dedicated compliance staff) in Western Maryland, Southern Maryland, or Lower Eastern Shore Regions. Eight (8) counties have compliance program; however, not all of them have dedicated staff for the effort. Compliance programs involve various strategies to gain information on multi-family property compliance such as:

- Resident complaints
- Reporting from haulers
- Reporting from multi-family property owners or managers
- Site visits conducted by County staff

- Reporting from recycling facilities who receive loads of trash with significant recyclables

Counties conducting these enforcement efforts typically have at least one (1) staff member dedicated to enforcement. These counties have local ordinances in place at the County or municipal level that require multi-family recycling in addition to the State's law. Six (6) of the eight (8) counties also have hauler licensing programs. While these programs do not necessarily have dedicated requirements for multi-family properties, they could be updated to include requirements related to the service of multi-family complexes. The cities and towns rely on the County for compliance efforts, and few manage their own enforcement of the State's recycling law.

The lack of enforcement at multi-family properties presents an opportunity for EPR program funding to improve the statewide recycling rate. The composition of multi-family materials can vary from being generally consistent with residential generators (e.g., seasonal/holiday fluctuations in recycling material volume and composition) to consisting of volumes of recyclable materials consistent with commercial entities (e.g., more cardboard, paper, and flexible packaging waste due to procurement/purchasing needs). Counties are in need of additional financial support to employ enforcement staff, such as inspectors and educators to manage the reporting from multi-family property managers or owners and bring properties into compliance.

2.4 Key Findings

The following presents the key findings from the information presented above:

- **There is an estimated 243,800 tons of recycling materials generated from multi-family dwellings annually, but only 46,500 tons processed and recycled.** Statewide, the total recycling rate for multi-family material of 19% represents the opportunity to separate and recycle about 197,500 additional tons per year. On a per material basis, the greatest opportunity exists in the rigid plastic, flexible plastic, and paper/OCC categories. On a regional basis, Washington Metro generates the most recyclable material and has the greatest opportunity for increased diversion in the multi-family sector given the existing collection and processing infrastructure in the Region. Conversely, the Lower Eastern Shore has opportunity for significant additional recovery but lacks the infrastructure or volumes to justify economic collection and processing programs on a year-round basis. There may be opportunities to capture significant quantities of recycling on a seasonal basis in the Eastern Shore Regions.
- **The Baltimore Metro and Washington Metro Regions generate more multi-family recycling tonnage as compared to more rural areas of the State.** Urban Regions like Baltimore Metro and Washington Metro have significantly more multi-family units, particularly in higher density categories, as compared to rural areas. The highest concentrations of multi-family units are in the Baltimore Metro (299,600 units) and Washington Metro (276,600 units) Regions. In these Regions, there are particularly elevated concentrations of complexes with 20 or more units reflecting the large multi-family complexes and high-rise apartments.

- **Rural areas such as Western Maryland, Southern Maryland, and the Eastern Shore have fewer concentrations of multi-family generators and generate fewer tons of multi-family recycling tonnage, with exceptions for specific municipalities (e.g., Worcester County).** The Lower Eastern Shore has higher concentrations of five (5) to nine (9) units and 20 or more units multi-family complexes, particularly in Worcester County, where the 20 or more units category is disproportionately high (14,400 units), likely due to tourism and seasonal housing. Southern Maryland has one of the lowest multi-family unit totals (13,900 units) and the Upper Eastern Shore has a higher concentration of the 2-unit and 3 or 4-unit categories (e.g., townhomes and duplexes), with few large complexes. There is opportunity for targeted investment in infrastructure and programs to increase access and participation in multi-family recycling in the more rural areas of the State.
- **Density of multi-family recycling contributes to the ability to develop and implement economically sustainable programs.** City of Baltimore stands out with the highest density at 677 units/mi² reflecting its urban character, high population density, and extensive multi-family housing infrastructure. Montgomery County in the Washington Metro Region has a density of 234 units/mi², indicative of its urban-suburban mix and growing demand for multi-family housing. Prince George's County also in the Washington Metro region, has a density of 173.70 units/mi², supporting the Region's overall high density of 129 units/mi². Urban Regions like Baltimore Metro and Washington Metro have significantly more multi-family units, particularly in higher density categories (more units per complex), compared to rural areas like Western Maryland or the Eastern Shore, and therefore are able to achieve a higher multi-family PPP recycling rate as shown in the Washington Metro and Baltimore Metro regions.
- **Paper and OCC represent most of the existing multi-family recycling tonnage.** Paper (30%) and OCC/Cardboard (28%) of the State material volumes constitute the largest portion of the recycling stream, indicating robust generation and collection efforts in these categories. Metal (5%) and Cartons (1%) make up smaller percentages of the recycling stream, suggesting opportunities for improvement in collection, education, infrastructure, and end markets for these materials.
- **The lack of enforcement at multi-family properties presents an opportunity for EPR program funding to improve the statewide recycling rate.** Multi-family properties and single family homes generate residential recycling streams, specifically materials such as packaging and paper products. To capture this material in the State's recycling system, Counties are in need of additional financial support to employ enforcement staff such as inspectors and educators to manage the reporting from multi-family property managers or owners and support the effort to bring properties into compliance.

3 Commercial Recycling Programs

For the purposes of this technical memorandum, 'commercial' refers to a wide range of businesses. The size and the type of business are key factors in the volume and



composition of recyclables generated. Based on responses from the hauler survey, commercial recycling is widely offered but customers do not elect to receive recycling collection service, and material generated from this sector presents an important opportunity to increase future recycling rates in the State. Respondents indicated that commercial recycling routes commonly include multi-family customers.

Respondents indicated that the various types of businesses serviced on commercial recycling routes include schools/universities, accommodations, arts and recreation, food service, and retail, establishments. The following presents detailed information on properties, represented by NAICS codes for commercial entities, that typically generate high volumes of recyclable packaging.

3.1 Generators

The following sections describe quantities of various commercial generators by type and Region in Maryland and discuss potential opportunities for increased capture of recyclable materials from these entities. **Table 10** shows the total properties in each NAICS code. Collectively, these properties represent the majority of the opportunity for additional commercial recycling in the State.

Table 10: Total Number of Commercial Properties by NAICS Code (2023)

Region/ County	Elementary, Secondary Schools and Universities	Accommodations	Arts and Recreation	Food Service	Retail
Western Maryland	123	95	107	208	324
Garrett	18	23	22	27	64
Allegany	33	28	20	69	83
Washington	72	44	65	112	177
Washington Metro	777	278	1,066	1,461	1,622
Frederick	101	49	146	202	238
Montgomery	373	105	552	655	750
Prince George's	303	124	368	604	634
Baltimore Metro	1,005	453	1,581	2,192	2,069
Harford	82	51	118	141	201
Baltimore	290	97	463	630	646
Carroll	61	14	82	114	152
Howard	121	63	204	189	191
City of Baltimore	270	102	311	637	401
Anne Arundel	181	126	403	481	478
Southern Maryland	131	77	171	222	267
Charles	46	31	76	98	113



Region/ County	Elementary, Secondary Schools and Universities	Accommodations	Arts and Recreation	Food Service	Retail
Calvert	32	14	51	43	56
St. Mary's	53	32	44	81	98
Upper Eastern Shore	104	118	176	170	271
Talbot	13	39	27	36	58
Caroline	12	4	11	14	38
Queen Anne's	22	14	40	28	64
Kent	15	23	29	22	28
Cecil	42	38	69	70	83
Lower Eastern Shore	90	187	171	236	276
Dorchester	17	8	18	19	33
Wicomico	43	30	53	82	117
Somerset	12	8	6	7	26
Worcester	18	141	94	128	100
Total	2,230	1,208	3,272	4,489	4,829

The Washington Metro and Baltimore Metro regions have a high number of commercial properties in the categories most likely to generate recyclable materials (retail, food service, accommodations, arts and recreation). Baltimore Metro has the highest number of commercial properties across several categories, suggesting and the area should have elevated material generation. The counties with high numbers of commercial properties are City of Baltimore, Montgomery County, and Anne Arundel County. These counties represent the highest number of NAICS categories in the retail, food service, and arts and recreation, likely driven by high population density, proximity to major urban centers, and tourism.

3.1.1 Schools

The State has over 1,400 public schools in 24 local education districts serving the state's 23 counties plus City of Baltimore. In September 2023, over 890,000 students (pre-kindergarten through high school) enrolled in public schools, while over 138,000 students were enrolled at approximately 1,200 private schools.⁸ **Table 11** shows that the highest concentration of primary and secondary schools is in the Baltimore Metro Region, followed by Washinton Metro. Other Regions have significantly fewer schools (approximately 100 or fewer).

⁸ Maryland Manual On-Line. 2024. [Maryland Elementary & Secondary Education](#)



Table 11: Elementary, Secondary Schools and University Locations by Region

Region	Primary and Secondary Schools	Universities ⁹	Total
Western Maryland	118	5	123
Washington Metro	760	17	777
Baltimore Metro	969	36	1,005
Southern Maryland	124	7	131
Upper Eastern Shore	100	4	104
Lower Eastern Shore	87	3	90
Total	4,316	135	4,364

Represents schools generating under \$5 million in revenue, reflecting predominately public schools in the State.

Recycling at school is generated in two (2) main locations: cafeterias and classrooms. Most recycling generated in cafeterias contains food waste including packaging for milk cartons, paper trays, beverage bottles, cutlery, and wrappers. In cafeteria kitchens, packaging is associated with large-scale food preparation such as plastic pallet wrap, canned goods, cardboard boxes, and plastic bags from frozen food. In the cafeteria, most waste is consumer packaging such as beverage bottles, milk cartons, snack packaging, and disposable food service ware. Schools often lack staff dedicated to implementing and monitoring recycling programs. Additionally, they do not typically collect waste composition data, hindering their ability to implement targeted diversion or contamination reduction approaches.

Universities generate waste beyond the classroom and cafeteria due to the larger populations, housing on campus, and typically large athletic event spaces. Universities generate significant quantities of recyclables, and they typically have more resources to manage a recycling program as compared to primary and secondary schools. Large quantities of wastes are generated at universities, particularly during student move-out time periods where additional programs and resources might be needed.

Schools and universities also present opportunities for reuse, which are discussed in **Task 5: Infrastructure and Capacity Technical Memorandum.**

3.1.2 Accommodations

Accommodations such as hotels, motels, casino hotels, bed and breakfast inns, and RV campgrounds are reported under NAICS Code 721. These establishments typically utilize trash and recycling dumpsters that may be emptied multiple times per week and generate elevated quantities of recyclable material that typically are not separated due to lack of on-site programming, equipment, and collection. Resorts collect their materials in multiple ways using roller carts, various sized dumpsters and roll-offs that are emptied as often as daily during the busiest times of the year. Resorts may also have individual or corporate goals, such as diversion from disposal, sustainability, and greenhouse gas reduction.

⁹ Maryland Higher Education Commission (MHEC) via MD iMap

Seasonal destinations experience fluctuations in the amount of waste generated due to tourism. For example, counties in the Upper and Lower Eastern Shore Regions reported a 25% to 50% increase in tonnage during heavy tourism seasons. **Table 12** presents the total number of accommodation properties below and above five (5) million in gross annual revenue based on NAICS Code 721.

Table 12: Accommodation Properties by Region

Region	Accommodations <\$5M	Accommodations >\$5M	Total
Western Maryland	93	2	95
Washington Metro	237	41	278
Baltimore Metro	381	72	453
Southern Maryland	77	0	77
Upper Eastern Shore	114	4	118
Lower Eastern Shore	93	94	187
Total	1,897	332	2,229

Most accommodations are located within the Baltimore Metro Region, followed by the Washington Metro and the Eastern Shore Regions. These establishments present an opportunity for improved diversion programs, specifically regarding packaging materials. Accommodations generate elevated quantities of cardboard, glass, plastic, aluminum, and potentially compostable packaging materials. Accommodation properties may specifically consider on-site compactors to assist with recycling large quantities of cardboard, or source-separated glass collection to ensure higher rates of glass recycling.

3.1.3 Arts and Recreation

The Arts, Entertainment, and Recreation sector includes a wide range of establishments that operate facilities or provide services to meet varied cultural, entertainment, and recreational interests. This sector includes the following:

- 1) Establishments that are involved in producing, promoting, or participating in live performances, events, or exhibits intended for public viewing;
- 2) Establishments that preserve and exhibit objects and sites of historical, cultural, or educational interest; and
- 3) Establishments that operate facilities or provide services that enable patrons to participate in recreational activities or pursue amusement, hobby, and leisure-time interests.

Table 13 shows the total number of accommodation properties under and over five (5) million in gross annual revenue.

Table 13: Arts and Recreation Properties by Region

Region	Arts and Recreation <\$5M	Arts and Recreation >\$5M	Total
Western Maryland	106	1	107
Washington Metro	1,026	40	1,066
Baltimore Metro	1,538	43	1,581
Southern Maryland	170	1	171
Upper Eastern Shore	167	9	176
Lower Eastern Shore	153	18	171
Total	6,167	206	6,373

Most Arts and Recreation venues are found in the Washington Metro and Baltimore Metro regions. Waste generated at Arts and Recreation events typically involve food and drink-related materials, such as bottles, cans, cups, various food containers, and service ware. Often food containers are deemed too contaminated with food particles to be recycled. Some communities have compost facilities that will accept compostable service ware, which may be a viable solution for managing this material. Event recycling rates vary greatly depending on the event organizer. Planning for recycling involves purchasing recyclable or compostable products that may minimize confusion, training employees and sorters, and creating educational materials to promote recycling at the event. Events frequently employ zero waste services that help attendees properly sort materials, including well-marked bins with extensive signage and sometimes incorporating staff at the waste and recycling stations. Sorting service is often provided by an outside vendor or a non-profit and can be a significant additional cost for the event organizer.

3.1.4 Food Service

This includes food services and drinking establishments such as full-service restaurants; limited-service establishments; and special food services such as contractors, caterers, and mobile food services. **Table 14** shows the number of food service establishments that earn above and below five (5) million in gross revenue annually.

Table 14: Food Service Properties by Region

Region	Food Service <\$5M	Food Service >\$5M	Total
Western Maryland	206	2	208
Washington Metro	1,441	20	1,461
Baltimore Metro	2,156	36	2,192
Southern Maryland	217	5	222
Upper Eastern Shore	168	2	170
Lower Eastern Shore	228	8	236
Total	8,604	138	8,742

Washington Metro and Baltimore Metro Regions contain the highest number of food service establishments in each revenue category. Food service establishments generate large volumes of packaging waste such as cardboard, plastics, glass, and cans. Restaurants are often located in shopping complexes, or downtown areas, which commonly have shared containers for collecting their waste. Arrangements for shared containers are sometimes made by the businesses themselves or with property managers. Food service businesses often buy goods in bulk and need increased space for recycling the larger profile packing materials.

Compostable containers are often used in restaurants, particularly coffee cups; however, these materials often end up in the trash or as contamination in compost bins, as multiple compost sites do not accept compostables containers at their facilities.

3.1.5 Public Administration

As stated previously, the MRA mandates that State government achieve a waste reduction goal of at least 30%, or to an amount that is determined "practical and economically feasible", but in no case less than 15%. The All StAR (**All State Agencies Recycle**) program is the State government agency recycling program. Each All StAR agency designates a Recycling Coordinator to manage their sites throughout Maryland. The Agency Coordinator provides technical support to encourage recycling within their facility locations and to submit annual online reports detailing each facility's recycling and waste data. According to MDE's 2022 recycling data, 341 of the 369 State facilities reported on their recycling efforts. These facilities roll up into 35 State agencies, which collectively achieved a recycling rate of 23.3% for calendar year 2022.¹⁰ Typically, waste generated from various types of government buildings are collected on the same route as non-government businesses, so the material is combined with other commercial waste streams. Therefore, it is difficult to quantify generation for government waste, but it is assumed to be similar in composition to other business-type waste.

The State holds a recycling collection contract for state office buildings for City of Baltimore and the following counties: Anne Arundel, Baltimore, Calbert, Charles, Frederick, Garrett, Howard, Montgomery, Prince George's and St. Mary's Counties¹¹. Parts of Baltimore Metro, Western Maryland, and the Eastern Shore Regions are not included in this contract.

3.1.6 Retail

Table 15 shows the number of retail properties below and above five (5) million in annual gross revenue based on specific NAICS codes within the Retail Trade category (44-45¹²).

¹⁰ Maryland Department of Environment. 2022. *Maryland State Agencies' 2022 Recycling Rates*. [Maryland State Agencies' 2022 Recycling Rates](#)

¹¹ State of Maryland. 2021. *Blanket Purchase Order*. [PDF version of FMIS Blanket Purchase Order](#)

¹² Retail Trade NAICS Codes: 4411, 4412, 4413, 4441, 4442, 4451, 4452, 4453, 4491, 4492, 4551, 4552, 4561, 4571, 4572, 4581, 4582, 4583, 4591, 4592, 4593, 4594, 4595, 4599

Table 15: Retail Properties by Region

Region	Retail <\$5M	Retail >\$5M	Total
Western Maryland	287	37	324
Washington Metro	1,348	274	1,622
Baltimore Metro	1,735	334	2,069
Southern Maryland	228	39	267
Upper Eastern Shore	242	29	271
Lower Eastern Shore	243	33	276
Total	7,923	1,459	9,382

Retail businesses may generate more cardboard and plastic packaging waste related to transporting products, which is also called “business to business” packaging or tertiary recycling. Retail businesses in the State are more commonly located in the Washington and Baltimore Metro Regions. Although these entities generate large quantities of business to business recyclable materials, it is common for business-to-business packaging to be considered exempt within Extended Producer Responsibility (EPR) legislation. For example, business-to-business packaging is excluded in each of the U.S. states where legislation has been introduced and in Canadian packaging and paper product EPR policies except for in Quebec, which will require all businesses to have recycling services no later than five (5) years after the regulation is active.

3.2 Collection Programs

Commercial generators in the State can be serviced in different ways. Commercial service is provided by local haulers that are primarily contracted at the discretion of the business. Commercial service may be provided by the County in certain areas; however, the business needs to confirm with their respective County. Business are not able to choose their service provider if the municipality they are located in requires use of communal enclosures in their downtown location. However, even municipalities that provide residential single hauler contracts typically allow businesses to contract their waste with whichever hauler they choose. Single hauler contracts are often specific to residential hauling only.

Based on the hauler survey, commercial recycling is managed in dumpsters and roll off containers (open top and roll off). Carts can be used for collection at commercial locations, but this is typically for smaller businesses. Vehicle types utilized for collection of curbside trash and recycling include front load, roll off, and rear loader vehicles with capacities of 25 to 28 Cubic Yards (CY). Typically, collection operations utilize diesel vehicle fuel, with some utilizing Compressed Natural Gas (CNG). Alternative fuels are used on a more limited basis.

Although some counties oversee commercial collection, the majority of these services are provided via open market contracts, meaning that individual properties are responsible for signing up and paying for service with a selected hauler who provides services in their area. The lack of transparency around these contract terms is a challenge for evaluating cost data and enforcement mechanisms.



Although the survey of haulers indicated that recycling service was offered in most counties, respondents also indicated they collect material from approximately 15,935 commercial trash customers and only 4,780 commercial recycling customers. While this is not a comprehensive survey of commercial customers in the State, this means that only an estimated 29% of customers that have trash service elect to have recycling collection service. Correspondingly, respondents indicated that they collected approximately 428,105 tons of residential curbside garbage and 32,925 tons of commercial recycling, indicating that only 7% of commercial tonnage collected from is recycling.

When comparing recycling services routes, the number of routes, tons collected per route, and number of customers able to be serviced per route are significantly lower for commercial recycling as compared to commercial trash. **Table 16** compares the collection metrics for trash and recycling routes from hauler respondents. It is important to note that **Table 16** is only representative of a small sampling of the hauling activity across the State.

Table 16: Sample of Commercial Trash and Recycling Collection Metrics From Hauler Survey Responses

Vehicles	Routes	Tons per Route	Customers per Route
Trash	181	2,365	88
Recycling	85	506	74

County and municipality survey responses indicate that commercial recycling participation is challenging due to the lack of requirement at the state and/or county level and lack of education on what materials are recyclable, which contributes to confusion and contamination in the recycling stream.

Cardboard-only collection is also a common service option provided by private haulers across Maryland counties and municipalities for commercial properties. Typically, large manufacturing and retail entities manage their own recycling for tertiary packaging materials, which consumers don't typically interact with. Tertiary packaging is also known as bulk packaging or transit packaging because it is used to transport larger numbers of goods to their destination for safety or security purposes, often wrapped in a flexible film wrap to prevent movement in transit. These material generation and recycling quantities are estimated based on nationwide data due to the lack of available information from the commercial sector in Maryland, and they are described in further detail below.

The Project Team estimated how much direct tertiary packaging recycling may be occurring in Maryland using data published by retailers in neighboring Virginia. Retailers in Virginia can submit their recycling totals to the state each year.¹³ The following retailers submitted material specific recycling totals for Virginia in 2023:

- Marshalls & TJ Maxx
- Weis Markets

¹³ Virginia Department of Environmental Quality. 2023. "2023 Virginia Recycling Rate Report." [Recycling Reports | Virginia DEQ](#)

- Best Buy
- Kohls
- Target
- Walmart & Sam’s Club

Among these stores, a total of 130,000 tons of OCC and 2,200 tons of plastic film was reported as being sent for recycling in Virginia in 2023.

This recycling tonnage data was put on a per-store basis for Virginia. This per store average could then be applied to the number of each store type in Maryland to estimate how much recycling is occurring. Using this methodology, there is estimated to be at least 65,000 tons of OCC directly recycled from these retailers in Maryland, and 1,000 tons of tertiary plastic film. The plastic film tonnage includes both bags returned to retailers by consumers, as well as “back of house” tertiary packaging. There could be more recycled as these retailers are not representative of a comprehensive listing of tertiary retail packaging occurring in the state.

3.3 Recycling Diversion Rate

Table 17 presents the quantities of recyclable materials and estimated total materials generated across different regions in the State. Tons generated were calculated from the Statewide Waste Characterization study and MDE reported recycling tonnages. These were combined with the MRF survey data to assess total recycling and further categorize tonnages into specific materials. The subsequent recycling tonnage tables are calculated from the same data.

Table 17: Total Commercial PPP Recycling Tons Generated by Region (2022)

Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Western Maryland	2,800	5,500	12,500	1,800	23,000	47,400	1,100	94,100
Washington Metro	18,600	50,300	82,500	41,100	154,800	260,500	7,200	615,000
Baltimore Metro	21,000	61,300	135,500	22,300	188,000	317,200	11,300	756,600
Southern Maryland	5,700	7,000	11,000	6,200	21,900	35,700	1,000	88,500
Upper Eastern Shore	1,900	17,300	11,600	2,700	23,900	64,900	1,000	123,300
Lower Eastern Shore	2,700	8,300	16,000	4,000	17,300	26,800	1,300	76,400
Statewide	52,700	149,700	269,100	78,100	428,900	752,500	22,900	1,753,900
Statewide % of Generation	3%	9%	15%	4%	24%	43%	1%	100%

The Baltimore Metro region generates the highest volume of commercial recyclable materials in the State, contributing 756,600 tons or approximately 43% of the statewide total. This generation is driven by its dense population and elevated industrial activity. OCC/Cardboard (317,200 tons, or 42%) and Paper (188,000 tons, or 25%) make up the



largest portions of Baltimore’s recycling stream from the commercial sector. The Washington Metro region contributes 615,000 tons (35% of the statewide total), with a similar material profile concentrated of primarily OCC/Cardboard and Paper. Together, these urban regions account for nearly 80% of the State’s total commercial recyclables. The Lower Eastern Shore and Western Maryland Regions generate significantly less commercial recyclable volumes due to lower population density and fewer industrial activities. **Table 18** presents the total tons of material recycled by the commercial sector.

Table 18: PPP Total Tons of Material Recycled by Commercial Sector (2022)

Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC/ Cardboard	Cartons	Total
Western Maryland	1,200	300	0	0	11,500	32,000	100	45,100
Washington Metro	8,100	15,800	0	10,700	79,400	158,900	700	273,600
Baltimore Metro	3,700	4,600	0	4,500	64,200	150,300	600	227,900
Southern Maryland	4,300	2,400	0	0	11,900	22,200	100	40,900
Upper Eastern Shore	400	12,400	0	0	13,300	50,500	100	76,700
Lower Eastern Shore	700	1,600	0	0	2,800	7,200	0	12,300
Statewide	18,400	37,100	0	15,200	183,100	421,100	1,600	676,500
% of Recycling Stream	3%	5%	0%	2%	27%	62%	0%	100%

Table 19 presents the recycling rate of material and region by the commercial sector.

Table 19: PPP Recycling Rate for Commercial Material (2022)

Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Western Maryland	43%	5%	0%	0%	50%	68%	9%	48%
Washington Metro	44%	31%	0%	26%	51%	61%	10%	44%
Baltimore Metro	18%	8%	0%	20%	34%	47%	5%	30%
Southern Maryland	75%	34%	0%	0%	54%	62%	10%	46%



Region	Metal	Rigid Plastic	Flexible Plastic	Glass	Paper	OCC	Cartons	Total
Upper Eastern Shore	21%	72%	0%	0%	56%	78%	10%	62%
Lower Eastern Shore	26%	19%	0%	0%	16%	27%	0%	16%
Statewide	35%	25%	0%	19%	43%	56%	7%	39%

The Regions with the highest percentage of commercial material recovery are Southern Maryland and Upper Eastern Shore, which have particularly high commercial recovery rates for metal, glass, and OCC/Cardboard. These regions show strong performance in specific material categories, particularly in OCC/Cardboard and glass. However, they also present opportunities for further improvements in other areas, particularly rigid and flexible plastics, where recovery rates are notably low or absent for the commercial sector. In contrast, the Baltimore Metro and Lower Eastern Shore regions have the lowest overall commercial recycling efficiency, with the Baltimore Metro region showing the most significant opportunities to improve commercial material recovery in categories like metal (18%) and OCC/Cardboard (47%). The Lower Eastern Shore has low commercial recovery rates across the board, especially in paper (16%) and OCC/Cardboard (27%), indicating considerable room for increased commercial recycling efforts in these areas. In all Regions, flexible plastics appear to be a material where improved capture via the commercial sector is an opportunity.

3.4 Ordinances

Respondents to the municipal survey indicated some areas require recycling for small businesses and hospitality locations. Typically, ordinances combine commercial entities together, so the requirements for small business recycling versus businesses requiring hospitality recycling may overlap. Communities that require commercial recycling in the State often require that the recycling container be a certain proportion as compared to the trash container, such as 33% or 50% of the size of the trash container.

Commercial recycling ordinances are in place primarily in the Washington Metro, Baltimore Metro, and Upper Eastern Shore Regions. At the county level, these ordinances are enforced via haulers. Prince George’s, Harford, Montgomery (including a separate requirement for City of Takoma Park), and Howard Counties utilize municipal staff and inspectors to enforce these ordinances.

From the municipality survey responses, the amount of commercial recycling activity can vary widely. Many jurisdictions believe that less than 25% of their businesses are recycling. Some counties with commercial ordinances responded that over 75% of their businesses are recycling.

3.5 Key Findings

The following presents the key findings from the information presented above:

- **There is an estimated 1,753,940 tons of PPP recycling materials generated from commercial entities annually in the State, but only 676,500 tons processed and recycled.** This represents a significant opportunity to increase the capture rate of key recyclables that have a low current capture rate in the commercial sector. Although this capture rate is higher than the multi-family sector, it is important that recycling be available where generators live and work to provide a long-term impact on the future of recycling in the State. The lack of recycling for customers of commercial establishments, and for the businesses, makes it challenging to build trust in the recycling system on a statewide basis.
- **The Washington Metro and Baltimore Metro Regions have the highest number of commercial properties in categories most likely to generate recyclable materials (retail, food service, accommodations, and arts and recreation).** Baltimore Metro has the highest number of properties across several categories, suggesting it is a region that generates elevated volumes of recyclable material. The counties that stand out with high numbers of commercial properties are City of Baltimore, Montgomery County, and Prince George's County. These counties have the highest number of retail, food service, and arts and recreation establishments based on NAICS data, and are driven by factors such as high population density, proximity to major urban centers, and the commercial and tourism activity.
- **The Washington and Baltimore Metro Regions have the highest number of commercial properties generating recyclable materials, particularly in retail, food service, and arts and recreation categories.** The Baltimore Metro Region generates the highest volume of commercial recyclable materials in the State, contributing 756,600 tons driven by its dense population and industrial activity. The Washington Metro Region generates 615,000 tons of commercial recyclables, with a similar material profile containing elevated volumes of OCC/cardboard and paper. Together, these urban Regions account for nearly 80% of the State's total commercial recyclables. The Lower Eastern Shore and Western Maryland Regions generate less due to lower population density and fewer industrial activities.
- **Key challenges to increasing commercial recycling capture rates include the lack of requirements at the state and/or county level, and lack of education which contributes to contamination in the recycling stream.** Survey responses reveal that many jurisdictions estimate less than 25% of commercial businesses recycle, citing a lack of statewide mandates and education as major barriers. Confusion about recyclable materials and contamination further hinder recycling generation.
- **Commercial recycling ordinances are in place in the Washington Metro, Baltimore Metro, and Upper Eastern Shore Regions.** At the county level, these

ordinances provide mechanisms to hold haulers accountable to work with customers to minimize contamination. Prince George's, Harford, Montgomery (including a separate requirement for City of Takoma Park), and Howard Counties utilize staff and inspectors to enforce these ordinances.

- **There is estimated to be at least 65,000 tons of OCC directly recycled from retailers in Maryland annually, and 1,000 tons of tertiary plastic film.** The plastic film tonnage includes both bags returned to retailers by consumers, as well as “back of house” tertiary packaging. There could be more recycled as these retailers do not represent a comprehensive listing of tertiary retail packaging occurring in the state.

4 Benchmarking and Best Practices

Planning efforts can be enhanced by understanding best practices and lessons learned from other communities who strive to increase multifamily and commercial recycling. The Project Team reviewed existing approaches including recycling ordinances and universal commercial recycling ordinances across the country to identify existing programs that may be applicable to the State.

4.1 Case Studies

The policies reviewed ranged from requirements to offer recycling services to requiring entities to meet a specified recycling rate and/or recycle specific materials. Comprehensive policies currently in place to increase recycling and improve capture rates were explored in further detail in this section.

4.1.1 Minnesota Seven County Metro Area Commercial Recycling Law

Minnesota Statue 115A.151 requires that all buildings (commercial and multi-family) located in one (1) of the seven (7) metro counties in Minneapolis/St. Paul region with at least one (1) business classified in sectors 42 through 81 of the NAICS codes, generating more than four (4) cubic yards of trash per week, must collect at least three (3) types of recyclables from the following list:¹⁴

- Glass
- Metal
- Plastic
- Paper: office paper, cardboard, newspaper
- Organics: food waste and non-recyclable paper
- Less common materials specific to your business, such as textiles

¹⁴ Minnesota Pollution Control Agency. *Minnesota solid waste policy report*. Retrieved from <https://www.pca.state.mn.us/sites/default/files/w-sw10-02.pdf>

This law does not specify how recyclables must be collected and transferred to a recycler. The purpose of this law is to decrease waste, reduce property owner taxes, and increase commercial recycling. Increased commercial recycling is crucial to meeting Minnesota's recycling goals set in the Metropolitan Solid Waste Management Policy Plan, County Master Plans and Minnesota Statute 115A.551, which requires the Seven County Metro Area set a recycling goal of 75% by 2030.¹⁵

Increasing recycling and reducing trash is incentivized with taxes. There is no tax on recyclables or organics in Minnesota, but there is a 17% tax on commercial trash.¹⁶ Some counties charge up to 53% on commercial trash. Reducing trash and increasing recycling collection can save business and property owners on their monthly bill.

The counties and cities within the Seven County Metro Area (Minneapolis/St. Paul region) are required to mandate ordinances consistent with the Commercial Recycling Law. Both counties and cities are allowed to inspect properties for compliance and non-compliance with this law and enforce this law. The Minnesota Pollution Control Agency (MPCA), Minnesota environmental regulatory agency, works closely with businesses, cities and counties to distribute educational resources and general information about the law throughout the Seven County Metro Area.

According to the 2022 Select Committee on Recycling and the Environment (SCORE) Report published by the MPCA, the Seven County Metro Area had a combined organics and recycling rate of 49.1% which is the highest rate since the inception of SCORE.¹⁷ This is an approximate 10% increase since the recycling goal was increased to 75% in 2014.

4.1.2 Hennepin County, Minnesota Multifamily Recycling Ordinance and Grants

Ordinance 13, adopted by Hennepin County (Minneapolis area) in 1986 (Section III), requires property owners of multi-family properties (multi-family property definition varies by city) to provide recycling collection services to lessees.¹⁸ It is the cities' responsibility to enforce this ordinance. Collected recyclables are required to be sent to a MRF.

In addition to the recycling collection requirements, education, bin and labeling requirements are also enforced by the cities in Hennepin County. Educational material and instructions must be provided in print or electronic form on the following topics:

¹⁵ Minnesota Office of the Revisor of Statutes. *Minnesota Statute 115A.551: Recycling goals*. Retrieved from <https://www.revisor.mn.gov/statutes/cite/115A.551>

¹⁶ Minnesota Office of the Revisor of Statutes. *Minnesota Statute 297H: Solid waste management tax*. Retrieved from <https://www.revisor.mn.gov/statutes/cite/297H/pdf>

¹⁷ Minnesota Pollution Control Agency. SCORE Report 2022: Legislative progress combined recycling and organics rate. Retrieved from <https://data.pca.state.mn.us/views/SCOREreport2022/Legislativeprogresscombinedrecyclingandorganicsrate?%3Aembed=y&%3AisGuestRedirectFromVizportal=y>

¹⁸ Hennepin County, MN. *Ordinance 13: Solid waste management*. Retrieved from <https://www.hennepin.us/your-government/ordinances/ordinance-13>

- Reasons to properly manage mixed recyclables, organic materials, and adopt practices that result in waste reduction.
- Mixed recyclables and organic material guidelines, including the description of materials accepted and not accepted, as well as preparation guidelines.
- Disposal options for household hazardous waste and bulky items.
- Location of collection containers for lessees to use.
- Contact information for the city or county for additional information.

Property managers or the responsible party must co-locate labeled trash and recycling bins of sufficient size in convenient locations of common areas of the building. Bin labels must include:

- Clearly and legibly state a waste type and show images of acceptable materials for mixed recyclables and organic material.
- Be color-coded to differentiate the material being collected. Blue must be used for mixed recyclables; green for organic material for composting or anaerobic digestion; and red, gray or black for trash.
- Include standardized and relevant terminology.
- Include preparation instructions where applicable.

Hennepin County has many dedicated staff working with multifamily properties to ensure compliance with Ordinance 13 and increase recycling efforts. Hennepin County offers grants, free signage and assistance for multifamily properties to start or improve recycling programs.

Grant rounds are on an annual cycle and applicants can receive up to 20,000 dollars for hauling costs, constructing waste enclosures or chutes, managing and preventing bulky waste and educating residents.¹⁹ Property owners can order free container labels, posters and flyers in multiple languages to make recycling easier for lessees.²⁰ Hennepin County staff will work directly with property managers to review potential costs and savings and determine the pathway to improve the recycling program. In 2023, Hennepin County staff provided technical support to improve waste reduction, recycling, and organics recycling at 329 properties with more than 34,000 units. Served 133 new properties and provided follow-up assistance to 196 properties.²¹

In addition to dedicating Hennepin County staff to work on improving capture rates and increasing recycling, Hennepin County residents are encouraged to contribute to the

¹⁹ Hennepin County. *Multifamily recycling grant flyer*. Retrieved from <https://mc-379cbd4e-be3f-43d7-8383-5433-cdn-endpoint.azureedge.net/-/media/hennepinus/business/recycling-hazardous-waste/apartment-recycling/multifamily-recycling-grant-flyer.pdf?rev=e2586f2704ce4b76ab6e0159b81fba09&hash=980C8832EEE45AB41733BB50CBA6315A>

²⁰ Environmental Resources. *Apartment resources*. Retrieved from <https://environmental-resources.myshopify.com/collections/apartment-resources?ls=apartment-resources-hennepin>

²¹ Hennepin County. *Recycling progress report*. <https://www.hennepin.us/-/media/hennepinus/your-government/projects-initiatives/solid-waste-planning/recycling-progress-report.pdf>

success of Hennepin County’s recycling efforts and meeting the 2030 capture rate goal of 75%. The Apartment Recycling Champion program was launched in 2023 and paid residents at multifamily buildings to become champions and help educate their neighbors about recycling and motivate them to reduce waste.²² These champions ensure recycling and trash bins are labeled and co-located, adequate signage is installed where necessary and interact with their neighbors one-on-one to spread educational recycling information. The overarching goal of this program is to spark behavior change through peer relationships instead of the regulatory body (i.e. Hennepin County).

4.1.3 Vermont’s Universal Recycling Law

The State of Vermont passed Act 148, the Universal Recycling law to improve the capture and diversion rates of recyclable and compostable materials through landfill bans and other infrastructure requirements. The law bans disposal of curbside recycling materials²³, yard debris²⁴, and food scraps from the landfill in a phased in approach.

The law also requires parallel collection of these materials at facilities, from “fast-trash” haulers that typically offer trash collection, and from haulers that offer curbside collection. This includes a requirement to provide recycling containers in public buildings and on publicly owned or controlled land, where trash cans are located. An update to the legislation in 2018 clarified that Solid waste facilities are able to charge a separate fee for recyclables collection; however, haulers are not able to charge a separate fee for recyclables collection but can charge a bundled fee that covers both trash and recycling costs²⁵. Fast-trash haulers can turn away customers that seek only recycling services. Municipalities are required to implement variable rate pricing (also known as Pay As You Throw (PAYT)) for residential customers, which also has to be followed by the local haulers.²⁶

Vermont Agency of Natural Resources (ANR) is responsible for overseeing facility and hauler rate structure to ensure that rates are transparent to residential consumers.

In 2016, Vermont published an implementation update outlining their progress since the law was enacted. The State confirmed that after extensive outreach to facilities by the Department of Environmental Correction (DEC), transfer stations and landfills are offering recycling collection services. The DEC responded to resident and business complaints and issued minimal Notices of Violation as part of their enforcement strategy. The DEC

²² Hennepin County. *Apartment Recycling Champions*. Retrieved from <https://www.hennepin.us/apartment-recycling-champions>

²³ Aluminum and steel cans, aluminum foil and pie pans, glass bottles and jars from beverage containers, PET and HDPE plastic containers/bottles/jugs, corrugated cardboard, white and mixed paper, newspaper, magazines, paper mail, and envelopes, box board, and paper bags.

²⁴ Leaf and yard debris and wood waste

²⁵ State of Vermont. *2018 Legislative Changes to Vermont Solid Waste and Bottle Bill Laws*. Retrieved from: [2018-Leg-Changes-Summary-UR-Bottle-Bill.pdf](#)

²⁶ State of Vermont. *Universal Recycling Law (Act 148) Summary Sheet*. Retrieved from: [UR SummarySheet CURRENT.pdf](#)

conducts site visits as part of a “Universal Recycling spot check day” to follow up on the status at these facilities.

Additionally, municipalities have adopted PAYT pricing ordinances. As a result, some towns have seen a significant decrease in trash disposal and saved money on trash collection costs. Municipalities are also working together to purchase recycling bins for public spaces.²⁷

Exemptions are available for haulers and facilities who wish to opt out of the requirements. Those who wish to opt out must work with their local solid waste management district to apply for an amendment to their Solid Waste Management Plan.

4.1.4 Seattle Ban of Recyclables in Garbage

Seattle Municipal Code sections 21.36.082 and 21.36.083 require that residential and commercial entities do not dispose of food, yard waste, and other recyclable materials in the garbage and expands the list of materials that must be recycled.²⁸ Businesses are also required to provide convenient recycling, food, and yard waste collection services at the commercial and residential properties.

These ordinances are enforced by Seattle Public Utilities (SPU). SPU inspectors give warning notices for garbage containers that contain more than 10% recyclable or compostable materials. After two warnings, the property may receive a 50 dollar fine on their waste bill. The only exceptions are for commercial or multi-family properties without adequate space for collection as determined by the SPU inspector and garbage containers that are accessible to the public. This doesn't only apply to curbside customers; self-haul businesses are also required to not dispose of recyclable or compostable materials in the garbage or at transfer stations.

These business requirements are available on the SPU website in 16 different languages to ensure various demographics of Seattle are informed of these requirements.

To encourage a compliance with the ordinances and divert more recyclable and compostable materials from the landfill, SPU provides multiple resources to commercial properties.

- Apartments within Seattle are eligible for free recycling service
- Seattle transfer stations accept recyclables for free and charge a higher fee for garbage compared to yard debris disposal
- The Green Business Program provides free assistance to Seattle businesses

²⁷ State of Vermont. 2016. Universal Recycling Law Status Report. Retrieved from: [Universal.Recycling.Status.Report.Dec.2016.pdf](#)

²⁸ City of Seattle. *Ban of recyclables in garbage*. Retrieved from: <https://seattle.gov/utilities/your-services/collection-and-disposal/ban-of-recyclables-in-garbage>

According to the 2022 Waste Prevention & Recycling Report published by SPU to the City Council, 61.7% of MSW recycled was generated by the commercial sector, while only 11.8% of MSW recycled was generated by multi-family properties.²⁹

4.2 Key Findings

The following presents the key findings from the Benchmarking of Best Practices presented above:

- **Mandatory recycling for businesses and multifamily properties increases recycling yield, but potentially requires additional investment and reporting.** Laws like Minnesota’s Seven County Metro Area Commercial Recycling Law and Hennepin County’s Multifamily Recycling Ordinance require businesses and multi-family property owners to provide and maintain recycling services. These laws focus on increasing recycling participation through mandatory collection of specific materials such as paper, glass, plastics, and organics. Multiple case studies also mentioned providing free educational resources and/or assistance to business owners to distribute information on how commercial entities can ensure compliance with a ban on recyclables in the garbage or trash.
- **Clear guidance, incentives, and targeted support benefit compliance efforts.** Hennepin County provides clear guidelines on bin labeling, educational materials, and offers grants for multifamily properties to support recycling programs. Similarly, Seattle incentivizes compliance with recycling rules by offering free services and resources to businesses and apartment complexes. Offering incentives such as free recycling services (as in Seattle) and technical assistance to businesses (as in Minnesota) is a key strategy for increasing compliance and participation. Multi-family buildings often face challenges in providing sufficient space for recycling collection. Hennepin County offers tailored grants and technical support to improve recycling in these buildings, making it easier for property owners to meet compliance standards.
- **Compliance and monitoring are critical for successful programs. Compliance mechanisms such as inspections, warnings, and fines (e.g., Seattle’s \$50 fine for non-compliance after two warnings) help ensure that businesses and residents adhere to recycling laws. Regular compliance inspections and audits (e.g., in Vermont and Seattle) help identify areas where improvements can be made.**
- **Public education and community involvement contribute effective programs.** Both Minnesota and Seattle emphasize public education to increase awareness about recycling requirements. For instance, Seattle provides educational materials in multiple languages and encourages residents to engage in recycling through programs like the “Apartment Recycling Champion” program. This peer-to-peer educational model helps foster community buy-in and behavior change.

²⁹ Seattle Public Utilities. *2022 Waste Prevention and Recycling Report*. Retrieved from: <https://www.seattle.gov/documents/departments/spu/documents/reports/solidwaste/wasteprevention-recyclingreport-2022.pdf>

- **Collaboration between state agencies and local government enhance program results.** Minnesota’s law requires local counties and cities to implement consistent ordinances, with support from the state-level Minnesota Pollution Control Agency (MPCA). The collaboration between state agencies and local municipalities ensures uniform enforcement and maximizes the reach of the law.