

2023 Waste Diversion & Disposal Report

Purpose & Overview of Report

The Chittenden Solid Waste District (CSWD) produces this annual waste diversion and disposal report to help track and evaluate how well District members are utilizing CSWD and private sector facilities, programs, and overall opportunities to reduce and divert their waste from the land-fill; to fulfill State reporting requirements; and to provide information about the District's solid waste management system for communications to the general public, the media, and other communities and organizations. It includes materials generated within Chittenden County only. It is produced for each calendar year.

The comparison of results to the previous year are found in the next section. Appendix A describes the methodology and nuances of the data used in this report. The tons of CSWD waste disposed and diverted from disposal are displayed in the table on page 10. Notes on the lines in the table may be found on pages 11-12.

Comparison of Results to Previous Year

NOTE: This report uses the US Census 2023 population estimate for Chittenden County in relevant calculations (e.g., pounds per capita disposed). The US Census adjusts population estimates over time. Relevant calculations for these years will be amended as this data becomes available and will appear in future reports.

Summary

This year's report shows some marked changes with the last two in terms of solid waste disposal and diversion. Overall, compared to 2022, total generation of solid waste fell to 306,814 tons versus 309,212 last year. The tons of MSW disposed increased by around 1.8%, with MSW tons diverted decreasing by 12.0% falling back to levels last seen in 2018 and 2019 prior to the COVID pandemic. C&D tons disposed increased over 2022, which was the highest level it had been in 10 years. C&D tons diverted rose sharply to its highest amount since 2019. The amount of material used for Alternative Daily Landfill Cover (ADC) increased by 71.8% due in large part to the deconstruction of Burlington High School. The MSW diversion rate remained high at 51.2%, though dropping from a long-term trend of steady growth. A drop in food residuals and a change in estimated backyard composting largely drove this rate of change. The C&D diversion rate decreased slightly year-over-year; however, the MSW and C&D combined diversion lowered to 59.7% though this is in-line with historic highs. The estimated recovery rate of 80% for MSW mandatory recyclables decreased for a second year in a row (80% in 2023), and the recovery rate for all currently divertible MSW materials dropped to 64.5% from last year's all time high of 67.6%.

Municipal Solid Waste

The amount of MSW landfilled increased by 1.8%, raising the pounds per capita per day disposed from 2.67 to 2.72. This reversal is largely driven by a lower amount of clean wood diverted and an adjustment to how residential on-site composting is estimated based on the 2023 Vermont Waste Composition Study conducted by the Vermont Department of Environmental Conservation. Overall generation of MSW has dropped rather sharply since the pandemic years, comparable to totals experienced in 2017. However, over the last ten years the increment diverted increased at an annualized rate of 2.1% versus a 0.5% decline of MSW that is disposed or incinerated. Notably, organics, which now makes up roughly 47% of total material diverted from MSW has grown 4.5% annually over the last decade, though organics did experience a setback of around 10.6% overall from last year.

The total of MSW materials diverted was down 12.0% from last year. There were significant decreases in the tonnages of glass, clean wood, and food residuals diverted. The tonnage of electronics diverted also declined reflecting an industry wide trend of less weight due to light weighting of electronic products despite sustained volumes of disposal. Scrap metal diversion decreased by 30.5% settling in closer to the ten-year average than last year, and unregulated hazardous waste remains similar to the last two years. Tires diverted increased about 24.5% from 2022 climbing above the ten-year average. However, recent information from a major processor of tires for Chittenden County indicates that recycling rates may have been accidentally reported lower than actual over at least the past year. This may impact future reporting for tires increasing the rate of diversion in the future. The diversion of textiles increased 8.8% from 2022. The decrease in paper recycling was due in part to a steep decline in paper usage by one of the commercial business reporters.

Quantities of clean wood have varied tremendously over the years, often due to the practice of recording quantities when wood is chipped and then transferred to the McNeil Generating Station inventory from the Wood Depot in Burlington. In 2023, McNeil received and added approximately 5,751 tons of wood to their inventory which is about 82 percent of all clean wood waste. As with last year, wood collected by CSWD facilities is now chipped and transferred to the Organics Recovery Facility and used for feedstock in their compost products, accounting for another 15%, or 1,044 tons of the annual total, as compared to 1,916 tons in 2022. Chipping of ORF's wood also follows a lagged schedule and may affect numbers reported in future years.

There was a 7.6% drop in food residual quantities diverted from 2022. CSWD's ODF took in almost 1,700 less tons than in 2022. Spent grains from breweries remained strong, as reported by individual businesses, contributing almost 6,200 tons to organic diversion. This year's decline is in large part due to revised state estimates of backyard composting in Chittenden County published by the state. Those changes forced a revision of the methodology used to estimate backyard

composting which may have been too generous in past years. A future waste survey to be conducted in the next few months will provide us with additional information to more accurately refine these estimates. Regardless, over the last ten years there has been a 4.5 percent annualized increase in diverted organics.

Glass diverted declined to historic averages in 2023 and decreased year over from 2022 by 21.4%. This includes PGA material utilized in various aggregate products by processors in the county. Materials sorted at CSWD's MRF are not considered recycled or diverted from the landfill until they are shipped from the facility.

The minimum MSW diversion rate went down from 54.8% to 51.2%, and the pounds per capita per day diverted decreased from 3.24 to 2.85 down from a high point last year though still higher than the 10-year average. For comparison, the US EPA reported that in 2018, the most recent year for which data is available, the US diversion rate was 32%. The Vermont Agency of Natural Resources reported that in 2022, also the most recent year data are available, the Vermont diversion rate was 34%. While what is included in calculations varies to some degree, rates for communities that are considered to be high performing include Seattle at 53% in FY 2021, San Francisco at 51% in FY 2021, and Portland Metro in Oregon at 47% in CY 2021. Interestingly, an analysis from SWANA illustrates that the best performing city diversion rates, similar to Chittenden County, have remained relatively flat for several years (SWANA Applied Research Foundation, Zero Waste Programs: An Analysis of Seattle's Performance Data, pp. 10). Over the past ten year's Chittenden County's rates have caught up to the 'best in class' but have yet to exceed those rates. Based on the diversion data and estimates of the components of waste disposed, the maximum MSW diversion rate achievable by CSWD is 80.0%.

Diverting recyclables and organics from landfill disposal reduced 2022 GHG emissions by an estimated 158,000 metric tons of carbon dioxide equivalent (MTCO₂E). This is equivalent to taking about 34,000 cars off the road or conserving over 17.5 million gallons of gasoline.

Using the diversion data and CSWD's estimates of the components of what is currently disposed, the estimated recovery rate for blue bin recyclables is at 80.3%, slightly lower than 82.3% in 2022. For comparison, the average recovery rate for curbside recyclables for participating households across studies compiled by The Recycling Partnership is 57% (2024 *State of Curbside Recycling Report*, pp. 18).

CSWD's estimated recovery rate for all MSW materials that are currently divertible is 64.5%, down significantly from 67.6% in 2022 and 66.6% in 2021 but still higher than all years prior.

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Construction & Demolition Debris

The tonnage of C&D landfilled increased by 5.4%, and the amount of C&D reported recycled increased by 7.4%. The estimated C&D diversion rate increased from 71% to 71.4% this year. The maximum C&D diversion rate possible is estimated at 79.7%.

Asphalt and concrete recycled is higher than last year at 92,297 tons compared to 85,870 tons in 2022. Demand for these materials was down in 2020 but increased dramatically in 2021 and 2022 and has only grown since. Many towns postponed road projects due to the tax revenue uncertainties caused by COVID-19. There are numerous major construction projects around the county such as Burlington High School, South Burlington's new town center, and a variety of larger housing developments. These materials make up the vast majority of recycled C&D tonnage.

MSW and C&D Combined

The combined estimated MSW and C&D diversion rate is 59.7% compared to 61.2% in 2022. The maximum combined diversion rate possible is estimated at 79.7%. The MSW and C&D combined pounds per capita disposed rose from 3.78 to 3.89, while the MSW and C&D combined pounds per capita diverted decreased from 5.97 to 5.77.

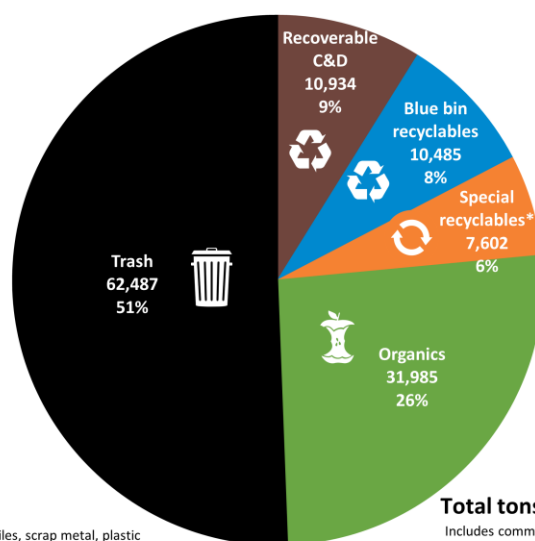
Alternative Daily Landfill Cover

Material used as ADC is up 10,992 tons, or 71.8%, compared to 2022. ADC consists primarily of contaminated but not hazardous soil. The number and size of projects requiring the removal of contaminated soils vary from year-to-year. Last year the demolition and beginning of reconstruction at Burlington High School was a major contributor.

Composition of Material Sent to the Landfill

What is ultimately sent to the landfill is a mix of materials that could have been diverted and materials for which there currently are no other options for disposal. Based on waste composition studies from 2018, 2020 and 2023 it is estimated 49 percent of material sent to the landfill could be recovered. See figure 1.

Figure 1
What Chittenden County residents & businesses sent to the landfill in 2023 (tons)



Total tons landfilled = 123,493

Includes commercial, institutional, and residential municipal solid waste and construction and demolition debris (C&D), but not alternative daily landfill cover material (e.g., contaminated soil) or biosolids.

*Special recyclables includes textiles, scrap metal, plastic bags, electronics, and hardcover books from non-C&D sources.

Sources: Estimates based on 2018-2023 Vermont & 2020 CSWD Waste Composition Studies & CY 2023 CSWD Disposal Data

Historical Trends

Diversion and disposal data for the period 2013-2023 are included in the charts below. Figure 2 shows trends over time in MSW tons diverted versus disposed and C&D tons diverted versus disposed. MSW tons disposed in 2023 is 4,500 tons less than it was in 2013, despite an increase in population of 10,500 over that same period. Figure 3 shows these same trends in aggregate, illustrating increased total generation and the respective disposition of materials.

The increase in tons of MSW diverted before 2020 is likely due to the business reporting requirement that was implemented in 2016 and the increased diversion of organics as Act 148 was implemented. This upward trend was interrupted in 2023 due to the change in organics (i.e. lower feedstocks recorded at the Organics Diversion Facility and lower estimated backyard composting).

Tons of C&D diverted experienced a significant increase during 2014-2017 when new C&D recycling facilities came online. Tons have been declining since one of the facilities closed. However, a significant rebound occurred since 2021 as the region emerged from the pandemic and construction activity remained strong. C&D disposal has increased as well meaning that in terms of overall generation the C&D diversion rate has remained relatively flat since 2020 (see Figure 5).

Figure 2

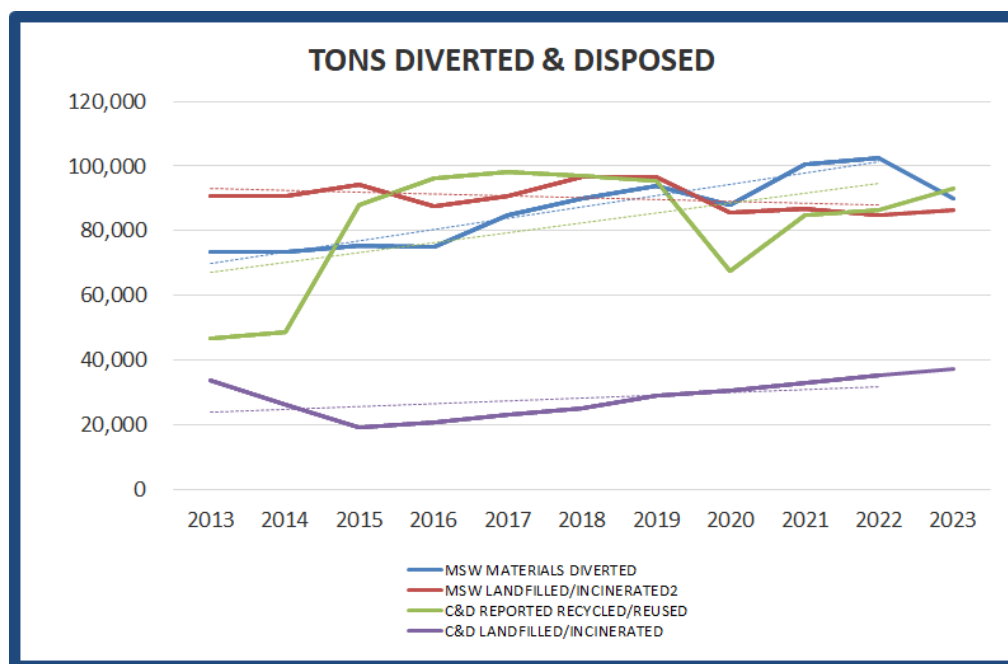


Figure 3

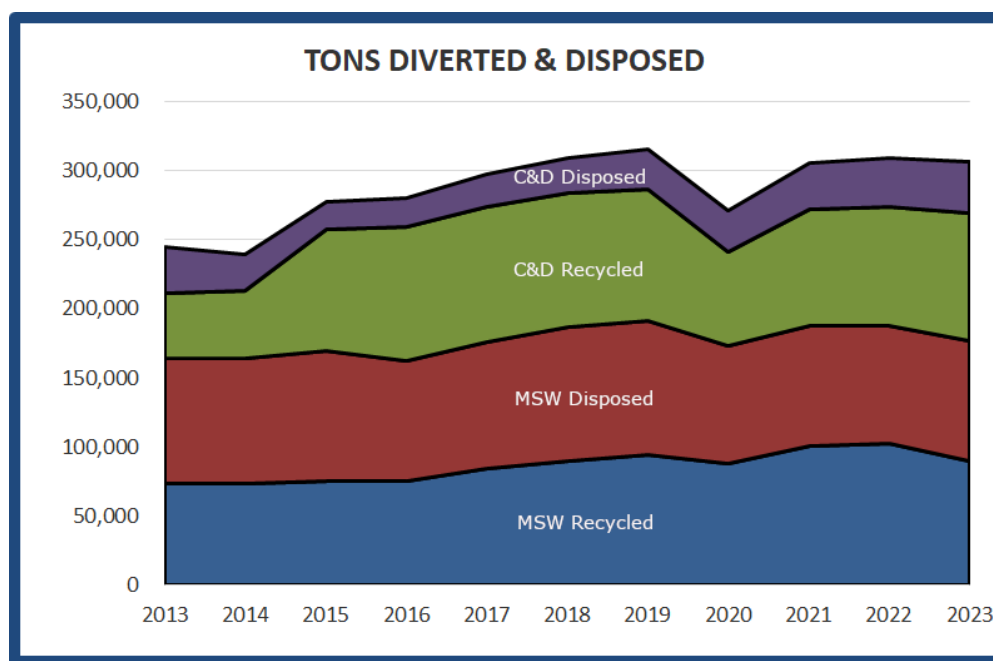


Figure 4 displays disposal rates over time. The MSW disposal rate was on an upward trend from 2016-2019 until COVID-19 arrived. The rate is currently 11.9% less than it was in 2013. The C&D disposal rate went down following the opening of C&D recycling facilities but continues to trend upward.

Figure 4

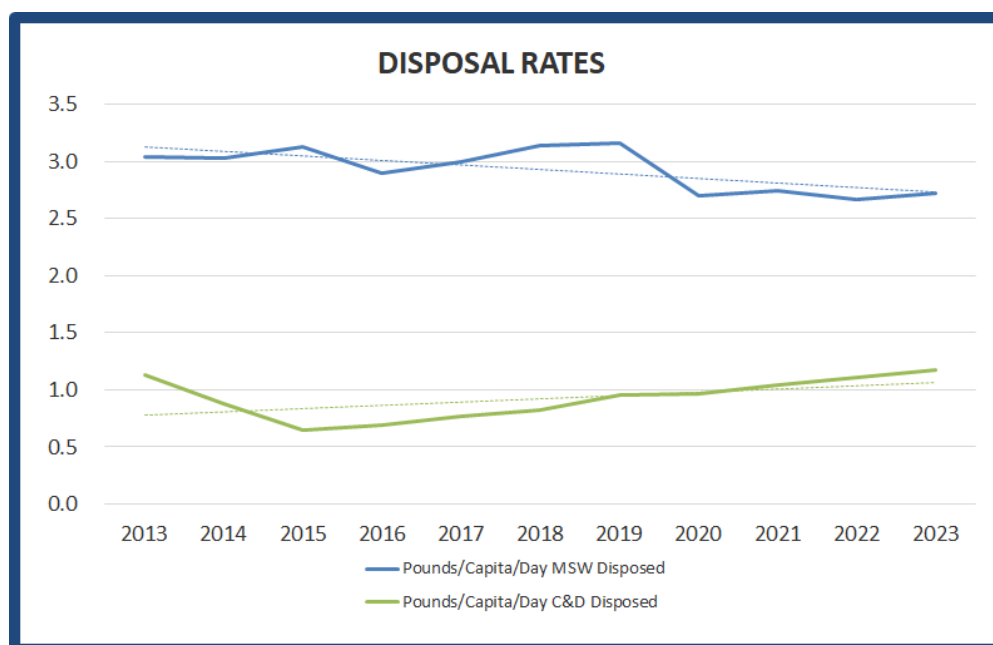
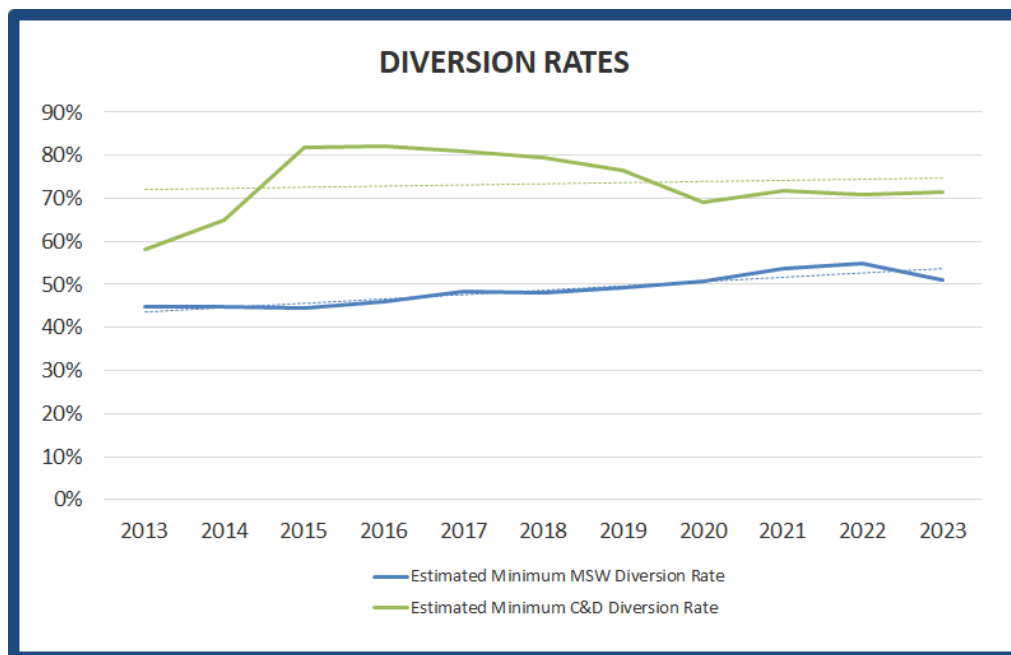


Figure 5 displays diversion rates over time. The MSW diversion rate increased over the last decade by 12.6%. This year marks the first single year decline in 8 years, though some of this is due to the aforementioned methodological change in estimating backyard organics diversion. The C&D diversion rate increased by 18.5%. Prior to 2021, the C&D diversion rate had increased significantly with the opening of recycling facilities but then decreased following the closure of one facility and the arrival of COVID-19. It has remained relatively flat since.

Figure 5



Conclusion

With a strong economy, diversion rates are holding steady and the amounts of MSW and C&D materials diverted, almost 183,000 tons in 2023, is about 6,000 tons less than in 2022. As evidenced by the recovery rates for MSW recyclables and organics, however, a large quantity of recoverable material is disposed, perhaps as much as 61,000 tons when recoverable C&D is also included. Without changes to the current solid waste management system, including additional policies, education, enforcement, markets and facilities, it is expected that solid waste generation will continue to increase over the long-term, along with currently divertible waste being sent to the landfill.



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CSWD WASTE DIVERSION TABLE FOR CALENDAR YEARS 2013-2023 Tons of CSWD Materials Disposed & Diverted from Disposal

MATERIALS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	% CHG 22-23	% CHG 13-23
MSW Materials Diverted & Disposed¹													
1 Paper ²	24,439	23,685	26,303	26,743	33,199	36,723	35,215	35,348	43,211	35,724	31,729	-11.2%	23.0%
2 Plastic	1,660	1,606	1,708	1,705	1,998	2,250	2,232	2,408	2,328	2,383	2,167	-9.0%	23.4%
3 Glass	4,148	4,506	3,499	3,907	3,784	3,914	3,420	4,321	3,189	4,377	3,441	-21.4%	-20.5%
4 Metal Cans & Foil	538	623	600	694	673	662	725	784	707	699	925	32.3%	41.8%
5 Single-Stream Recyclables/Composite Materials	0	1,951	0	0	0	26	1	36	74	43	11	-75.0%	100.0%
6 Estimated Share of Redeemed Bottle Bill Material	4,447	4,462	4,506	4,521	4,551	4,593	4,588	4,577	4,583	4,574	3,605	-21.2%	-23.4%
7 Estimated Additional Commercial	4,935	4,955	5,011	3,024	NA	NA	NA	NA	NA	NA	NA	NA	NA
8 TOTAL PAPER, CONTAINERS, & PACKAGING	40,167	41,788	41,626	40,594	44,206	48,169	46,180	47,474	54,092	47,799	41,879	-12.4%	4.1%
9 Estimated Backyard Composting/On-site Management	11,798	11,836	11,032	11,345	11,363	11,615	13,714	14,901	15,670	15,673	12,837	-18.1%	8.1%
10 Wood ³	7,740	5,843	7,833	5,826	9,201	7,439	9,256	3,511	5,834	8,481	7,056	-16.8%	-9.7%
11 Reported & Estimated Yard Trimmings	4,390	4,574	4,835	5,151	5,379	5,155	5,663	5,124	4,360	3,975	4,683	17.8%	6.3%
12 Food Residuals & Non-recyclable Paper	3,302	3,870	4,474	5,684	6,934	10,811	12,118	10,775	14,091	19,131	17,669	-7.6%	81.3%
13 TOTAL ORGANICS	27,229	26,123	28,173	28,006	32,876	35,020	40,751	34,312	39,955	47,261	42,245	-10.6%	35.5%
14 TEXTILES	642	677	1,025	1,102	1,174	1,309	1,465	882	2,029	1,235	1,344	8.8%	52.2%
15 SCRAP METAL	3,484	3,097	3,127	3,728	4,261	3,303	3,386	3,694	2,933	5,074	3,525	-30.5%	1.2%
16 HAZARDOUS WASTE	123	142	113	91	109	207	186	101	98	97	99	1.6%	-24.5%
17 ELECTRONICS	909	964	816	777	795	666	648	440	642	470	358	-23.7%	-153.6%
18 TIRES ⁴	855	574	549	593	1,256	1,124	1,442	932	922	775	965	24.5%	11.3%
19 MSW MATERIALS DIVERTED	73,408	73,366	75,429	74,891	84,679	89,797	94,059	87,834	100,670	102,711	90,413	-12.0%	18.8%
20 MSW LANDFILLED/INCINERATED²	90,751	90,688	94,377	87,735	90,890	96,686	96,800	85,457	86,904	84,727	86,294	1.8%	-5.2%
21 Pounds/Capita/Day MSW Diverted	2.46	2.45	2.50	2.47	2.79	2.92	3.07	2.78	3.18	3.24	2.85	-12.1%	13.6%
22 Pounds/Capita/Day MSW Disposed	3.04	3.03	3.13	2.90	2.99	3.14	3.16	2.70	2.74	2.67	2.72	1.7%	-11.9%
23 Estimated Minimum MSW Diversion Rate	44.7%	44.7%	44.4%	46.1%	48.2%	48.2%	49.3%	50.7%	53.7%	54.8%	51.2%	-6.6%	12.6%
C&D Materials Diverted & Disposed													
24 C&D REPORTED RECYCLED/REUSED	46,833	48,786	87,799	96,354	98,404	97,181	95,404	67,658	84,703	86,491	92,906	7.4%	49.6%
25 C&D LANDFILLED/INCINERATED	33,639	26,299	19,397	20,957	23,330	25,178	29,085	30,408	33,126	35,282	37,200	5.4%	9.6%
26 Pounds/Capita/Day C&D Diverted	1.57	1.63	2.91	3.18	3.24	3.16	3.12	2.14	2.67	2.73	2.93	7.3%	46.3%
27 Pounds/Capita/Day C&D Disposed	1.13	0.88	0.64	0.69	0.77	0.82	0.95	0.96	1.04	1.11	1.17	5.3%	3.7%
28 Estimated Minimum C&D Diversion Rate	58.2%	65.0%	81.9%	82.1%	80.8%	79.4%	76.6%	69.0%	71.9%	71.0%	71.4%	0.5%	18.5%
MSW & C&D Combined													
29 TOTAL MSW & C&D LANDFILLED/INCINERATED²	124,391	116,987	113,773	108,691	114,220	121,865	125,885	115,865	120,031	120,009	123,494	2.9%	-0.7%
30 Pounds/Capita/Day MSW & C&D Diverted	4.03	4.08	5.41	5.65	6.03	6.08	6.19	4.92	5.85	5.97	5.77	-3.2%	30.2%
31 Pounds/Capita/Day MSW & C&D Disposed	4.17	3.91	3.77	3.59	3.76	3.96	4.11	3.66	3.79	3.78	3.89	2.8%	-7.2%
32 Estimated Minimum MSW & C&D Diversion Rate	49.2%	51.1%	58.9%	61.2%	61.6%	60.5%	60.1%	57.3%	60.7%	61.2%	59.7%	-2.4%	17.7%
Other Disposal													
33 Alternative Daily Landfill Cover	9,040	7,052	16,927	12,254	23,815	7,480	6,318	7,162	11,357	15,309	26,301	71.8%	65.6%
POPULATION ESTIMATES													
CSWD Resident Population	159,432	159,945	161,382	161,531	162,372	164,572	163,774	168,386	169,271	169,301	169,481	0.1%	5.9%
CSWD Seasonal Population ⁵	3,985	3,985	3,985	3,985	3,985	3,985	3,985	4,462	4,462	4,462	4,462	0.0%	10.7%
TOTAL POPULATION	163,417	163,930	165,367	165,516	166,357	168,557	167,759	172,848	173,733	173,763	173,943	0.1%	6.1%

¹Under a CSWD Solid Waste Management Ordinance data reporting requirement implemented in 2016, additional quantities of materials shipped by businesses directly to markets for composting, recycling, animal feed, etc. are included beginning with that year.

²Beginning in 2015, the out-of-District portion of MSW contamination at the MRF and the out-of-District portion of MSW disposed at CSWD Drop-Off Centers are subtracted from Total MSW Landfilled/Incinerated; the out-of-District portion of non-recyclable C&D at Myers Recycling Facility and CSWD Drop-Off Centers is subtracted from Total C&D Landfilled/Incinerated; and the out-of-District portion of mandatory recyclables delivered to CSWD Drop-Off Centers is subtracted from Paper. Tires that go to waste-to-energy facilities are added to MSW Landfilled/Incinerated.

³The bulk of clean wood reported each year is wood processed at the Burlington Electric Department Wood Depot. Wood is processed into wood chips and periodically moved to the inventory of the McNeil Generating Station. It is on the transfer date that tons are recorded. Consequently, large quantities processed in one year may be counted in the next year.

⁴In 2012, the total includes 832.9 tons of tires that were removed from a junk yard in Milton.

⁵The seasonal population is calculated following the instructions provided by the Vermont Department of Environmental Conservation Solid Waste Program in the document titled, "Disposal Data for SWIP Reports."

Note: Some columns may not add up to totals due to rounding.

Diversion Table Notes by Line Item

LINE 1: This line includes corrugated cardboard, boxboard, paper bags, telephone directories, magazines and catalogs, newspaper, office paper, mixed paper, hardcover and paperback books, and junk mail.

LINE 2: This line includes polyethylene terephthalate plastic (#1 plastic), high density polyethylene plastic (#2 plastic), polyvinyl chloride plastic (#3 plastic), low density polyethylene plastic (#4 plastic), polypropylene plastic (#5 plastic), polystyrene plastic (#6 plastic), plastic labeled “other” (#7 plastic), and any mixture of plastic types.

LINE 3: This line includes glass from food and beverage containers and waste glass from a manufacturing process.

LINE 4: This line includes aluminum and tin/steel beverage and food containers, aerosol cans, and aluminum foil and pie plates.

LINE 5: This line includes 1) paper and container recyclables mixed together that were shipped to facilities outside of Chittenden County for sorting and marketing and 2) composite materials that were shipped for recycling.

LINE 6: This line is an estimate of the bottles and cans redeemed under the Bottle Bill. The estimate is based on Chittenden County’s share, based on population, of estimates provided by Vermont ANR.

LINE 7: This line is an estimate of the quantities of materials recycled by businesses that are not reported to CSWD. The estimate is based on a study conducted by DSM Environmental Services for CSWD in 2007. Quantities for businesses in the study that began reporting directly to CSWD in 2016 or have closed are subtracted from the estimate. In 2017, the estimate was eliminated due to direct reporting by businesses.

LINE 9: Participation rates in on-site management of food scraps and yard trimmings are obtained from CSWD’s biennial household solid waste surveys. A national study conducted in 1995 for the U.S. Environmental Protection Agency and the Composting Council by Applied Compost Consulting found an average of 650 pounds of material was diverted per household per year through backyard composting. This amount is used to calculate this line.

LINE 10: This line includes tree limbs, brush, pallets, and dimensional lumber that have never been painted, stained, or treated and do not have adhesives, such as plywood or particle board.

LINE 11: This line includes grass clippings, leaves, weeds, flowers, pine needles, and garden plants.

LINE 12: This line includes discarded food, food-soiled paper, and oils from restaurants, cafeterias, grocery stores, food and beverage product manufacturers, other businesses, and residents that were composted, anaerobically digested, donated for human consumption, or used as animal feed.

LINE 14: This line includes clothing and other textiles collected from Drop-Off Centers and private processors.

LINE 15: This line includes metal items such as car parts, furniture, batteries, sheet metal, oil filters, propane cylinders, bicycles, lawn mowers, outdoor grills, and appliances. It does not include scrap metal delivered directly to scrap metal dealers by generators except for those materials reported by businesses and recycling processors.

LINE 16: This line includes antifreeze; mercury-added products, including fluorescent light tubes; paint and other products redistributed through CSWD's Hazbin Reuse Program; rebled paint sold by the Environmental Depot; and paint shipped from the Depot for recycling. It also includes some of the items recycled by private businesses offering collection programs beginning in 2016.

LINE 17: This line includes computer and other electronic equipment shipped for processing (recycling and reuse).

LINE 18: This line includes tires from bicycles, motorcycles, cars, trucks, and off-road vehicles that were recycled into new products or reused.

LINE 20: This line includes municipal solid waste (MSW) that was disposed in landfills or incinerated including tires that went to waste-to-energy facilities.

LINE 23: Estimated Minimum MSW Diversion Rate = Total MSW Materials Diverted/(Total MSW Materials Diverted + Total MSW Landfilled/Incinerated).

LINE 24: This line includes construction materials such as asphalt, concrete, brick, drywall, wood, scrap metal, and asphalt shingles.

LINE 25: This line includes construction and demolition waste that was disposed in landfills or incinerated, including material, such as fines from C&D recycling processing and other C&D debris, used for landfill site improvements (road building).

LINE 28: Estimated Minimum C&D Diversion Rate = C&D Recycled/(C&D Recycled + Total C&D Landfilled/Incinerated).

LINE 32: Estimated Minimum MSW & C&D Diversion Rate = (Total MSW Materials Diverted + C&D Recycled)/(Total MSW Materials Diverted + C&D Recycled + Total MSW Landfilled/Incinerated + Total C&D Landfilled/Incinerated).

LINE 33: This line includes materials that were used as alternative daily cover at a landfill (e.g., contaminated soil, catch basin grit).

Appendix A: Methodology

Data Sources

Quantities of materials recycled, composted, and disposed are reported to CSWD by facilities that manage solid waste generated in Chittenden County and by businesses that ship their materials directly to other facilities that are not required to report to CSWD. Data received directly from the following facilities are included in this report:

- A. Marcelino & Co. (2011-2017)
- American Paper Recycling Corp. (2011-2011)
- BDS Waste Disposal, Inc.
- BED Waste Wood Yard
- Bob's Tire Co. (2016-2018)
- Budzyn Tire (beg. 2016)
- Burlington Area Transfer Station
- Canusa Hershman Recycling Co.
- Casella C&D Recycling Facility (2016-2018)
- Casella Transfer Station
- CSWD facilities
- FBS Tire Recycling, Inc. (2016-2018)
- Frank W. Whitcomb Construction Corp. (beg. 2015)
- Gauthier Trucking Co.
- Good Point Recycling
- Goodwill Industries
- Iron Mountain (beg. 2019)
- Moretown Landfill (2011-13)
- Myers C&D Recycling Facility (beg. 2013)
- Pike Industries, Inc.
- Ranger Asphalt & Concrete Processing
- Salvation Army (2011-2016)
- SecurShred
- Shred-Ex
- Sleep Well Recycling (beg. 2020)
- Tomra
- Vermont Food Bank (beg. 2020)
- Waste USA Landfill

It was discovered in 2019 that many of the construction and demolition debris (C&D) loads that were delivered to one of the disposal facilities during 2015-2018 were miscoded as municipal solid waste (MSW). CSWD staff believe that most, but not all, of the errors have been corrected. The total tons of MSW landfilled or incinerated is likely lower than was reported and the total tons of C&D landfilled or incinerated is likely higher than was reported for calendar years 2015-2018. The uncorrected errors affect the accuracy of the diversion and disposal statistics used in this report for those years.

Beginning January 1, 2016, businesses that ship materials directly to brokers or markets for composting, recycling, animal feed, etc., were required to begin reporting quantities diverted to CSWD. Not all the data is being captured yet, but the total far exceeds what had been estimated for calendar years 2011-2015 based on research conducted by DSM Environmental Services for CSWD in 2007. The business data that is reported are included by material in the Diversion Table

at the end of this report. CSWD's compliance and business outreach staff actively contact businesses who lapse in reporting or who have not yet reported but potentially may direct haul recoverable material out of the county.

The report includes only very limited data for salvage warehouse and other durable goods diversion through reuse and for extended producer responsibility program materials (e.g., fluorescent bulbs, thermostats, batteries, and paint) collected from the public by retailers. The report does not include data for commercial and institutional on-site composting. As of 2023, estimates for household on-site composting has been adjusted downward due to information provided by the State of Vermont's 2023 Waste Composition Study. These estimates will be revisited once CSWD completes its own survey of residential disposal, recycling and composting behavior later in 2024.

Residue rates for recycling end markets are unknown. No adjustments for material losses have been made to tons reported recycled.

In keeping with the State of Vermont and the U.S. Environmental Protection Agency MSW diversion calculations, this report does not include regulated hazardous waste and unregulated hazardous waste disposed at out-of-state hazardous waste facilities.

Population Estimates

Population estimates needed to calculate figures come from the U.S. Census (www.census.gov). The seasonal population is calculated following the instructions provided by the Vermont Department of Environmental Conservation Solid Waste Program in the document titled, "Disposal Data for SWIP Reports."

Adjustments for Non-District Solid Waste

Based on a 2015 survey, an estimated 4.1% of CSWD Drop-Off Center (DOC) users are non-District residents. The quantities of materials brought to CSWD facilities by these customers increase the total amount of solid waste diverted and the total amount disposed. Beginning in 2015, the estimated non-District portions of MSW and C&D landfilled and mandatory recyclables diverted from disposal were subtracted from the corresponding categories. No adjustments were made for special materials non-District users may or may not have delivered to CSWD DOCs.

Also beginning in 2015, the percentage of incoming materials at the MRF from non-District sources was applied to outbound contamination disposed as MSW. This quantity was subtracted from Total MSW Landfilled/Incinerated. Similarly, the percentage of incoming materials at Myers C&D Recycling Facility from non-District sources was applied to outbound material disposed as C&D and subtracted from Total C&D Landfilled/Incinerated.

2023 Waste Diversion & Disposal Report

JON DORWART
Board of Commissioners Meeting
October 23, 2024



1

Purpose of Diversion Report

- Track & evaluate programs
- Fulfill State reporting requirements
- Provide information for communications



2

Solid Waste Metrics

- Diversion rate: $\text{Diverted} / (\text{Diverted} + \text{Disposed})$
- Disposal rate: Lbs/Capita/Day Disposed
- Recovery rate: 80% of targeted, divertible material recovered
- Environmental impacts: GHG emissions saved



3

2023 Highlights

- Total solid waste generation (disposed) down 0.8%
- MSW: tons disposed increased 1.8% & tons diverted decreased by 12.0%
- C&D: tons disposed remains at historical high & tons diverted was 0.5% higher than 2022
- MSW diversion rate remained high at 51.2% though lower than 2022
- Recovery rate for mandatory recyclables decreased very slightly for a second year



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Data & Comparisons to 2022

MSW DISPOSED

- 2022: 84,727 tons
2023: 86,294 tons
Up 1.8%
- 2022: 2.67 lbs/cap/day
2023: 2.72 lbs/cap/day



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Data & Comparisons to 2022

MSW DIVERTED

- 2022: 102,711 tons
2023: 90,413 tons
Down 12.0%
- 2022: 3.24 lbs/cap/day
2023: 2.85 lbs/cap/day



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Data & Comparisons to 2022

MSW DIVERTED (continued)

- Revised methodology to calculate estimated backyard composting
- Decline in food residuals and clean wood
- Decline in paper, containers and packaging (largely accounted for in commercial and processor reporting)



7

Data & Comparisons to 2022

MSW DIVERTED (continued)

- McNeil Generating Station took in 82% of clean wood
- ODF now takes clean wood from CSWD facilities – about 15% of total this year
- Decreased food residuals largely due to revised estimates in backyard composting
- Organics diversion has grown 4.5% annually from 2013
- Textiles up 8.8%



8

Data & Comparisons to 2022

MSW DIVERSION RATE

- Diverted/(Diverted + Disposed)
- 2022: 54.8%
- 2023: 51.2%



9

Data & Comparisons to 2022

MSW DIVERSION RATE (continued)

- US 2018: 32%
- Vermont 2022: 34%
- Seattle FY21: 53%
- San Francisco FY21: 51%
- Portland Metro 2021: 47%



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Data & Comparisons to 2022

MSW DIVERSION RATE (continued)

- Maximum diversion rate: 80.0%
(tons diverted + tons disposed that are **currently divertible**)/(tons diverted + total tons disposed)



11

GHG Emissions Reduction

MSW RECYCLABLES & ORGANICS DIVERTED

- 158,000 MTCO₂E reduced
- Equivalent to taking 34,000 cars off the road



12

Data & Comparisons to 2022

C&D DISPOSED

- 2022: 35,282 tons
2023: 37,200 tons
Up 5.4%
- 2022: 1.11 lbs/cap/day
2023: 1.17 lbs/cap/day



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Data & Comparisons to 2022

C&D DIVERTED

- 2022: 86,491 tons
2023: 92,906 tons
Up 7.4%
- 2022: 2.73 lbs/cap/day
2023: 2.93 lbs/cap/day



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Data & Comparisons to 2022

C&D DIVERTED (continued)

- Asphalt and concrete recycling higher in 2023 (92,297 tons vs. 85,870 in 2022)
- Diversion rate increased slightly
- Many large construction and demolition projects



15

Data & Comparisons to 2022

C&D DIVERSION RATE

- 2022: 71.0%
2023: 71.4%
- Maximum 2023 diversion rate: 79.7%



16

Data & Comparisons to 2022

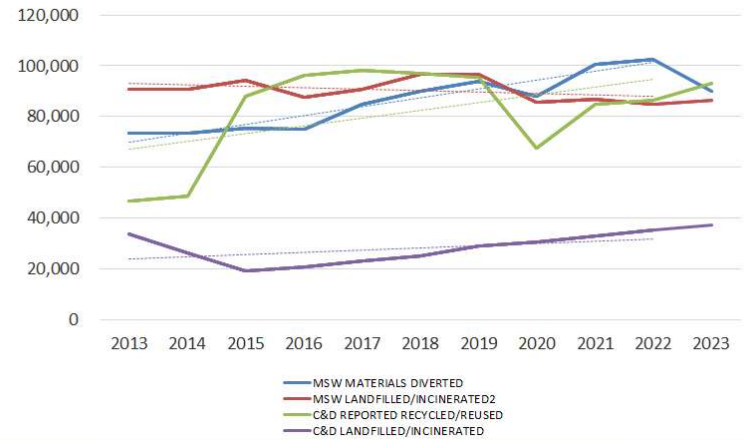
ALTERNATIVE DAILY LANDFILL COVER

- 2022: 15,309 tons
- 2023: 26,301 tons
Up 71.8%



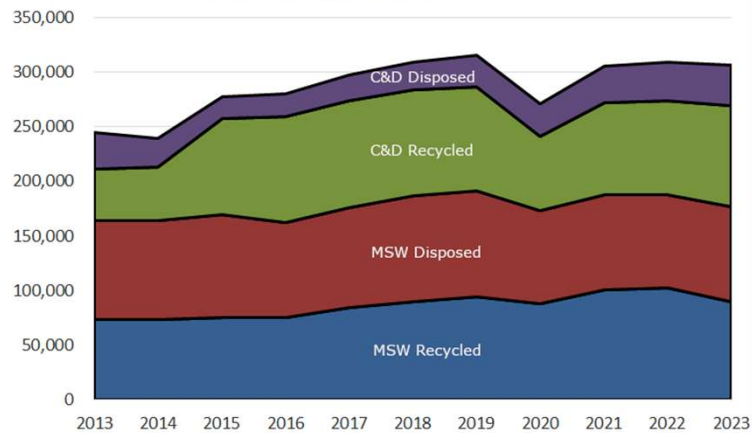
17

TONS DIVERTED & DISPOSED



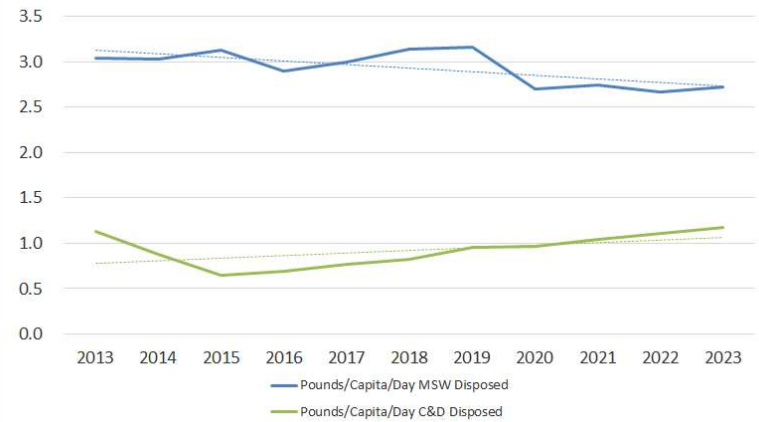
18

TONS DIVERTED & DISPOSED

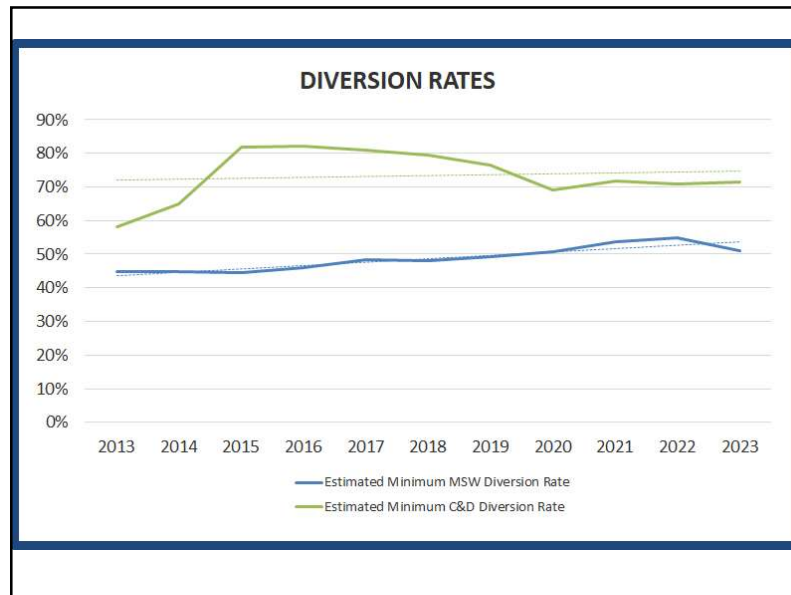


19

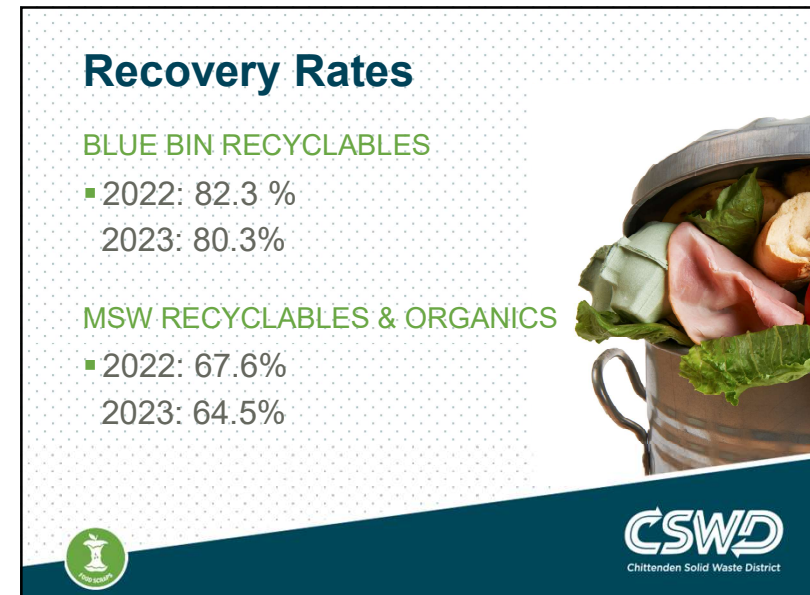
DISPOSAL RATES



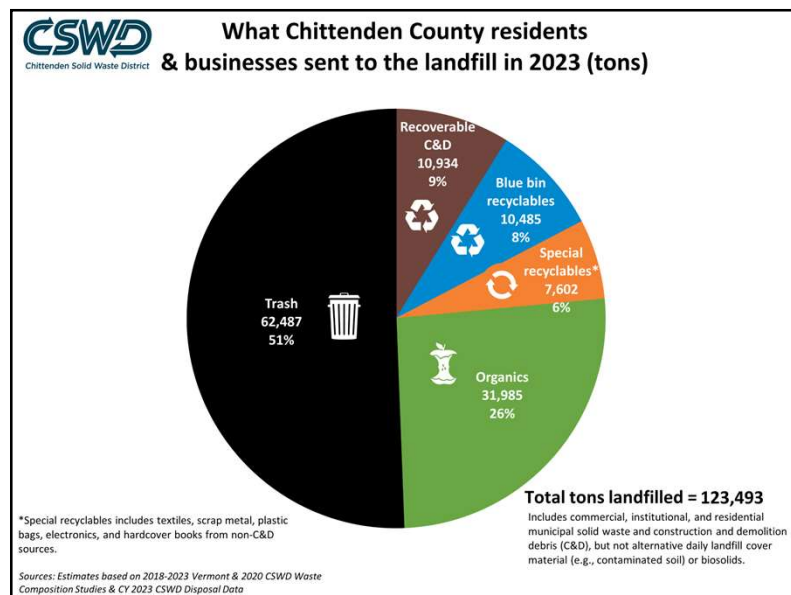
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21



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23

CSWD WASTE DIVERSION TABLE FOR CALENDAR YEARS 2013-2023

Tons of CSWD Materials Disposed & Diverted from Disposal

MATERIALS	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	% CHG 22-23	% CHG 13-23
MSW Materials Diverted & Disposed¹													
1 Paper ²	24,439	23,685	26,303	26,743	33,199	36,723	35,215	35,348	43,211	35,724	31,729	-11.2%	23.0%
2 Plastic	1,660	1,606	1,708	1,705	1,998	2,250	2,232	2,408	2,328	2,383	2,167	-9.0%	23.4%
3 Glass	4,148	4,506	3,499	3,907	3,784	3,914	3,420	4,321	3,189	4,377	3,441	-21.4%	-20.5%
4 Metal Cans & Foil	538	623	600	694	673	662	725	784	707	699	925	32.3%	41.8%
5 Single-Stream Recyclables/Composite Materials	0	1,951	0	0	0	26	1	36	74	43	11	-75.0%	100.0%
6 Estimated Share of Redeemed Bottle Bill Material	4,847	4,462	4,506	4,521	4,551	4,593	4,588	4,577	4,583	4,574	3,805	-21.2%	-23.6%
7 Estimated Additional Commercial	4,935	4,955	5,001	3,034	NA	NA	NA	NA	NA	NA	NA	NA	NA
8 TOTAL PAPER, CONTAINERS, & PACKAGING	40,167	41,788	41,626	40,594	44,206	48,169	46,180	47,474	54,092	47,799	41,879	-12.4%	4.1%
9 Estimated Backyard Composting/On-site Management	11,798	11,836	11,032	11,345	11,363	11,615	13,714	14,901	15,670	15,673	12,837	-18.1%	8.1%
10 Wood ³	2,740	5,483	2,883	5,426	6,205	7,499	9,256	2,513	5,831	9,481	2,664	-16.8%	9.7%
11 Reported & Estimated Yard Trimmings	4,390	4,574	4,835	5,151	5,379	5,155	5,663	5,124	4,360	3,975	4,683	17.8%	6.3%
12 Food Residuals & Non-recyclable Paper	3,302	3,870	4,474	5,684	6,934	10,811	12,118	10,775	14,091	19,131	17,669	-7.6%	81.3%
13 TOTAL ORGANICS	27,229	26,123	28,173	28,006	32,876	35,020	40,751	34,512	39,955	47,261	42,245	-10.6%	35.5%
14 TEXTILES	642	677	1,025	1,102	1,174	1,309	1,465	882	2,029	1,335	1,344	8.8%	52.2%
15 SCRAP METAL	3,484	3,097	3,127	3,728	4,261	3,303	3,386	3,694	2,933	5,074	3,525	-30.5%	1.2%
16 HAZARDOUS WASTE	123	142	113	91	109	207	186	101	98	97	99	1.6%	-24.5%
17 ELECTRONICS	909	964	816	777	795	666	648	440	642	470	358	-23.7%	-153.6%
18 TIRE ⁴	855	574	549	593	1,256	1,124	1,442	932	922	775	965	24.5%	11.3%
19 MSW MATERIALS DIVERTED	73,408	73,366	75,429	74,891	84,679	89,797	94,059	87,834	100,670	102,711	90,413	-12.0%	18.8%
20 MSW LANDFILLED/INCINERATED ⁵	90,751	90,688	94,377	87,735	90,890	96,686	96,800	85,457	86,904	84,727	86,294	1.8%	-5.2%
21 Pounds/Capita/Day MSW Diverted	2.46	2.45	2.50	2.47	2.79	2.92	3.07	2.78	3.18	3.24	2.85	-12.1%	13.6%
22 Pounds/Capita/Day MSW Disposed	3.64	3.63	3.13	2.90	2.99	3.14	3.16	2.70	2.74	2.67	2.72	1.7%	-11.9%
23 Estimated Minimum MSW Diversion Rate	44.7%	44.7%	44.4%	46.1%	48.2%	48.2%	49.3%	50.7%	53.7%	54.8%	51.2%	-6.6%	12.6%
C&D Materials Diverted & Disposed													
24 C&D REPORTED RECYCLED/REUSED	46,833	48,786	87,799	96,354	98,404	97,181	95,404	67,658	84,703	86,491	92,906	7.4%	49.6%
25 C&D LANDFILLED/INCINERATED	13,634	26,799	18,997	20,957	21,330	25,178	29,085	90,408	93,126	95,282	97,200	6.4%	6.4%
26 Pounds/Capita/Day C&D Diverted	1.57	1.63	2.91	3.18	3.24	3.16	3.12	2.14	2.67	2.73	2.93	7.3%	46.3%
27 Pounds/Capita/Day C&D Disposed	1.13	0.88	0.64	0.69	0.77	0.82	0.95	0.96	1.04	1.11	1.17	5.3%	5.7%
28 Estimated Minimum C&D Diversion Rate	58.2%	65.0%	81.9%	82.1%	80.8%	79.4%	76.6%	69.0%	71.9%	71.0%	71.4%	0.5%	18.5%
MSW & C&D Combined													
29 TOTAL MSW & C&D LANDFILLED/INCINERATED ⁶	124,391	116,987	113,773	108,691	114,220	121,865	125,885	115,865	120,031	120,009	123,494	2.9%	-0.7%
30 Pounds/Capita/Day MSW & C&D Diverted	4.03	4.08	5.41	5.65	6.03	6.08	6.19	4.92	5.85	5.97	5.77	-3.2%	30.7%
31 Pounds/Capita/Day MSW & C&D Disposed	4.17	3.51	3.77	3.59	3.76	3.96	4.11	3.66	3.79	3.78	3.89	2.8%	-7.2%
32 Estimated Minimum MSW & C&D Diversion Rate	49.2%	51.1%	58.9%	61.2%	61.6%	60.5%	60.1%	57.3%	60.7%	61.2%	59.7%	-2.4%	17.7%
Other Disposal													
33 Alternative Daily Landfill Cover	9,040	7,052	16,927	12,254	23,815	7,480	6,318	7,162	11,357	15,309	26,301	71.8%	65.6%
POPULATION ESTIMATES													
CSWD Resident Population	159,432	159,945	161,382	161,531	162,372	164,572	163,774	168,386	169,271	169,301	169,481	0.1%	5.9%
CSWD Seasonal Population ⁷	3,985	3,985	3,985	3,985	3,985	3,985	3,985	4,462	4,462	4,462	4,462	0.0%	10.7%
TOTAL POPULATION	163,417	163,930	165,367	165,516	166,357	168,557	167,759	172,848	173,732	173,763	173,943	0.1%	6.1%

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