Less Waste, Better Baltimore

Rethinking our waste management future

Update on the LWBB Plan

21 November 2019

Geosyntec consultants

Outline

1. Review scope and progress on LWBB Plan
2. Review of recycling and diversion options
    a. Basis and methodology
    b. Options analysis
3. Summary of findings

LWBB Project Scope

Master planning effort through 2040+

Identify programs that could be implemented by DPW to:

- **Reduce the amount of waste generated**
- **Maximize materials diversion, reuse, and recycling**

Identify the best options for disposing of what's left

Process for Plan Development and Execution

- Winter/Summer Waste Sorts
- 4x Community Meetings
- Online Survey/Email Feedback
- Review of Baltimore's Existing System
- Benchmarking Against Other Cities

Tasks 0 - 4

Task 5

Review Options for Improving Waste Diversion

Assess Potential Impact on Waste Diversion Rate

Task 7

Handling What's Left

Options for Increasing Waste Diversion

How do we go about analyzing the City's waste flows in order to understand how to reduce waste generation and divert more material from disposal?

- → **Understand waste flows and materials**
- → **Look at what options are available and would be supported by residents and other stakeholders**
- → **Objectively assess different options in terms of expected performance**

Options for Increasing Waste Diversion

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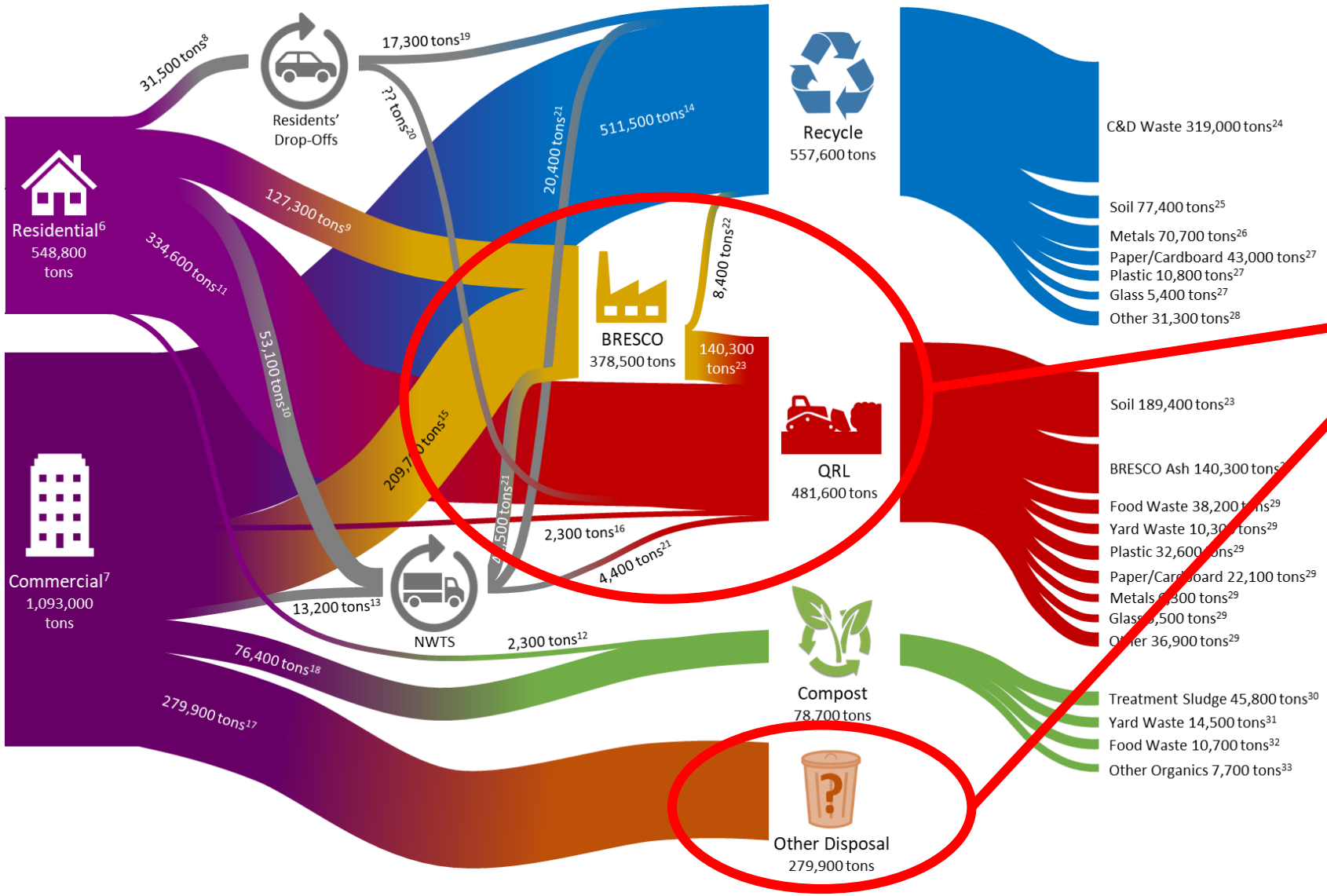
Waste Flows in Baltimore City



Estimated Quantities of Materials (2017-19 data)

Category	Residential Waste (tons)	Commercial Waste (tons)	Total (tons)
Total Disposal	**319,500**	**505,100**	**824,600**
Food and Other Compostables	101,700	61,500	163,200
Cardboard	24,600	32,400	57,000
"Easy-to-Recycle" Materials	34,000	28,600	62,600
"Hard-to-Recycle" Materials	73,900	47,400	121,300
Lumber	2,400	22,000	24,400
Other Mixed C&D Waste	3,100	261,200	264,300
Bulky Waste, Mattresses, Carpets	2,800	2,900	5,700
Unclassified (Disposal)	77,000	49,300	126,300

Options for Increasing Waste Diversion

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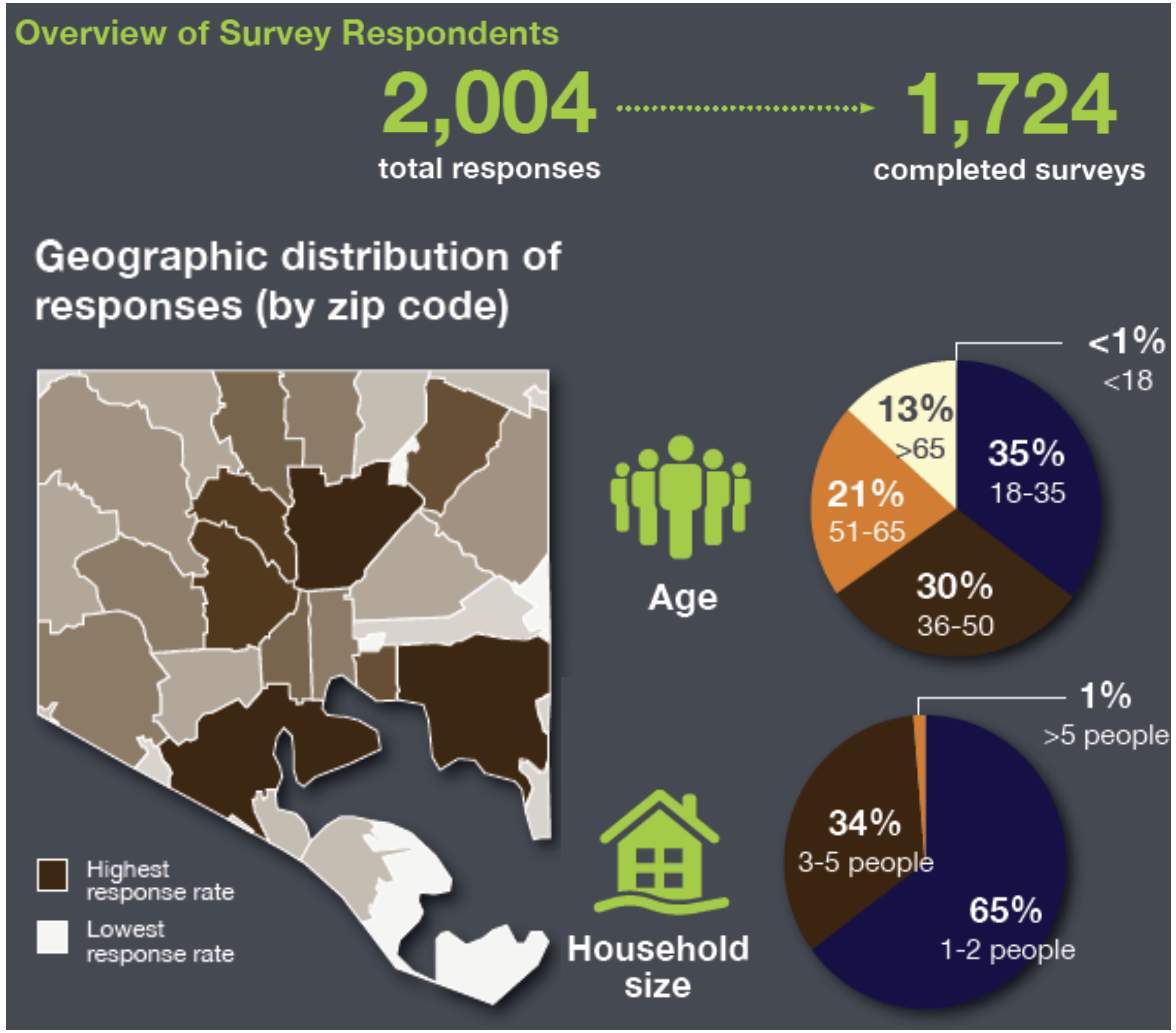
Stakeholders Invited to Participate

- Anchor Institutions
- Businesses
- Community organizers/leaders
- Economic development partnerships
- Elected officials
- Environmental protection groups
- Residents
- Other City agencies/partnerships
- Port Authority
- Schools
- Students
- Waste management companies

Public Input



Benchmarking – Learning from Other Cities

Options for Increasing Waste Diversion

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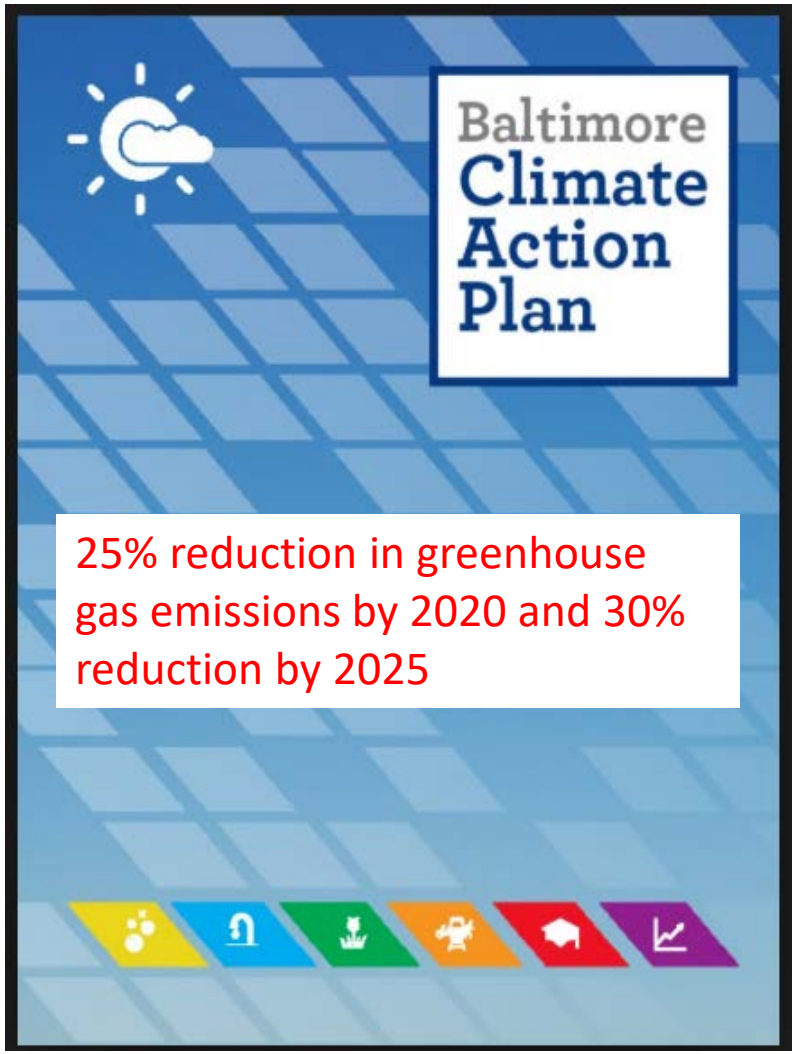
Baltimore City's Strategic Plans

Zero waste goal of 90% diversion
Increase recycling
Reduce litter
Legislative and policy changes
Waste-to-Wealth Initiative:

- Food waste
- C&D waste
- Wood

Goals for 2040

- 50% food waste reduction
- 80-90% diversion of food waste from disposal to composting and digestion



25% reduction in greenhouse gas emissions by 2020 and 30% reduction by 2025

Methodology for Assessment

Waste Diversion Potential:
Total tonnage
Materials
Interaction with Other Options

Costs:
Capital
Operation and Maintenance
Labor

Timeline:
Short – Medium – Long Term
Time Lag before Seeing Benefits

Benefits:
Social/Environmental
Greenhouse Gas Emissions
Job Creation
Revenue/Cost Offsets

Challenges to Implementation:
Permits
Infrastructure and Land Required
Training

Experience:
DPW's Experience
Local Private Sector Experience
Other Jurisdictions

Analysis of Waste Recycling/Diversion Options
Task 5 of LWBB Plan

- Draft Report Submitted to DPW on 30 Oct.
  - Chapters 1 and 2 – Basis for Evaluation
  - **Chapter 3 – Food Waste and Organics**
  - **Chapter 4 – "Traditional" Recyclables**
  - **Chapter 5 – Construction and Demolition Waste**
  - **Chapter 6 – "Non-Traditional" Recyclables**
  - Chapter 7 – Multi-Purpose Facilities
  - Chapter 8 – "Soft" Infrastructure
  - Chapter 9 – Operational and Administrative Improvements
  - **Chapter 10 – Summary of Findings**

Ch. 2 – Assessment of Overall Divertability

DRAFT FINDINGS ONLY

Based on 2017 data

Total waste generated 1,641,800 tons

Recycled 738,500 tons

Composted 78,700 tons

Disposal 824,600 tons

~50%

Baltimore Sustainability Plan (BSP) states
90% diversion goal
Additional diversion required
= 40% of total (656,700 tons)

BSP Goal for LWBB Plan

Potential Diversion
43% of total
(698,300 tons)

Disposal

Category		Residential Waste (tons)	Commercial Waste (tons)	Total
Organics	Food Waste	65,449	44,046	109,494
	Yard Waste	36,265	15,142	51,407
	Mixed Organics	0	2,287	2,287
Traditional Recyclables	Cardboard	24,582	32,359	56,942
	Mixed Paper	18,700	17,618	36,318
	HDPE/PET	12,722	7,551	20,273
	Mixed Plastic	55,179	29,783	84,962
	Aluminum Cans	3,985	2,517	6,502
	Steel Cans	7,664	9,007	16,671
	Mixed Metals	284	290	574
	Glass	9,350	9,229	18,578
C&D	Lumber	2,382	22,027	24,409
	Clay Bricks	0	6,326	6,326
	Concrete	2,059	199,297	201,356
	Asphalt Concrete	0	40,222	40,222
	Asphalt Shingles	0	7,138	7,138
	Soil	136	139	274
	Drywall	891	8,048	8,938
Non-Traditional Recyclables	Bulk	2,504	2,559	5,063
	Textiles/Carpet	252	257	509
	Other	32	33	65
Unclassified	-	77,025	49,249	126,274

Ch. 10 – Maximum Diversion Potential (MDP)

DRAFT FINDINGS ONLY

Chapter	Description	Universal Application	Food Waste Strategy		C&D Waste Strategy	
			A	B	A	B
3.1	Food Waste Reduction		-	72,400		
3.2	Residential Organics Composting		81,800	42,800		
3.3	Commercial Organics Composting		59,200	35,500		
4	Traditional Recyclables	153,500				
5.1	C&D Reuse				-	28,400
5.2	C&D Diversion				216,900	200,100
6.1	Bulk Waste	4,000				
7.1	Expand Residents' Drop-offs	16,100				
10	**Subtotal**	**173,600**	**141,000**	**150,700**	**216,900**	**228.5k**

Available Diversion = Universal + A/B from Food Waste Strategy + A/B from C&D Waste Strategy

Maximum Diversion Potential (MDP) Highlighted in Red = 173.6k + 150.7k + 228.5k = 552.8k tons

Achieving MDP would increase overall waste diversion to 83% (552.8k + 738.5k + 78.7k / 1641.8k = 0.83)

Ch. 10 – Direct Cost and Benefits (for MDP)

DRAFT FINDINGS ONLY

Chapter	Description	CAPEX $/ton		OPEX[A] $/ton		Job Creation Potential		GHG Reduction MTCO2E
		DPW	Total	DPW	Total	DPW	Others	
3.1	Food Waste Reduction	--	$687	$65	$3,415	3	not calc.	305,000
3.2	Residential Organics	$166	$415	$146	$230	--	40[C]	4,500
3.3	Commercial Organics	--	$331	$8	$197	3	70[C]	800
4	Traditional Recyclables	$128	$236	$120	$184	4	120[C]	349,700
5.1	C&D Reuse	--	--	$5	$5[B]	3	--[B]	25,000
5.2	C&D Diversion	--	$103	--	$91[B]	--	30[B,C]	32,700
6.1	Bulk Waste	--	--	$12	$12[B]	6	6[B,C]	11,400
7.1	Resid. Drop-offs	$12	$12	$22	$22	6	6[C]	25,800
10	**All**	**$262 (weighted avg.)**		**$563 (weighted avg.)**		**25**	**~270**	**754,900**

A: excl. revenues from sale of recovered materials, tip fees; B: excl. secondary job creation; C: excl. job losses at disposal facilities

Ch. 10 – Timeline and Phasing (for MDP)

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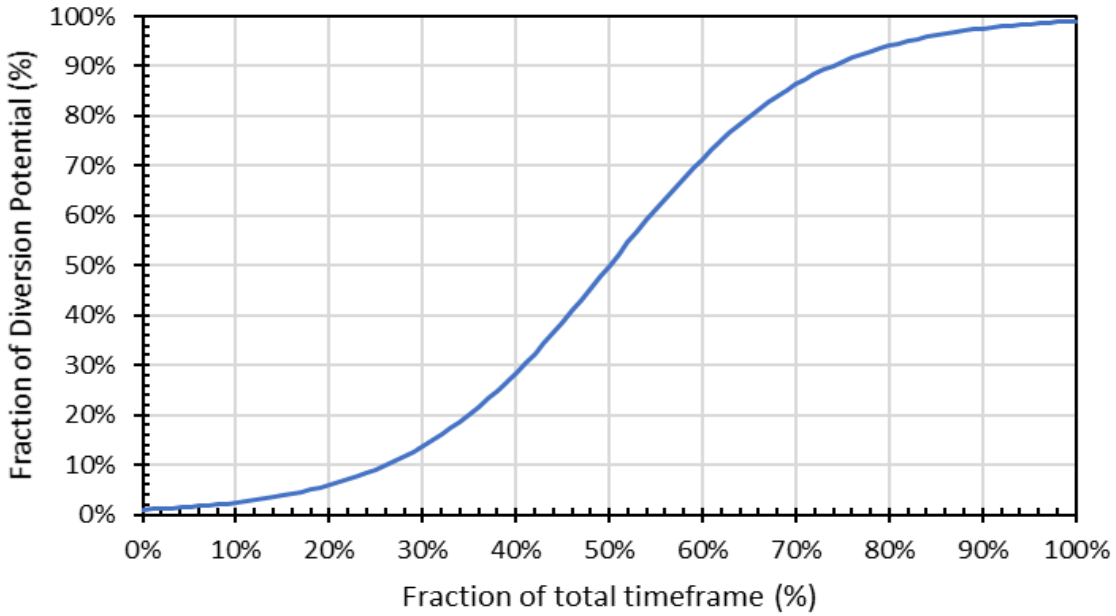
Chapter	Diversion Option	Timeframe (years)	Diversion Potential (tons)
3.1	FW Red.	20	0k or 72.4k
3.2	Resid. Org.	20	81.8k or 42.8k
3.3	Comm. Org.	20	59.2k or 35.5k
4.2	Trad. Recyc.	10	153.5k
5.1	C&D Reuse	10	0k or 28.4k
5.2	C&D Div.	20	216.9k or 200.2k
6.1	Bulk Waste	10	4k
7.1	Res. Dropoff	5	16.1k

Timeframe for achieving Max. Diversion Potential (MDP) for each Option



Assumed S-Curve Uptake Rate for each Option

Ch. 10 – Range of Diversion Outcomes

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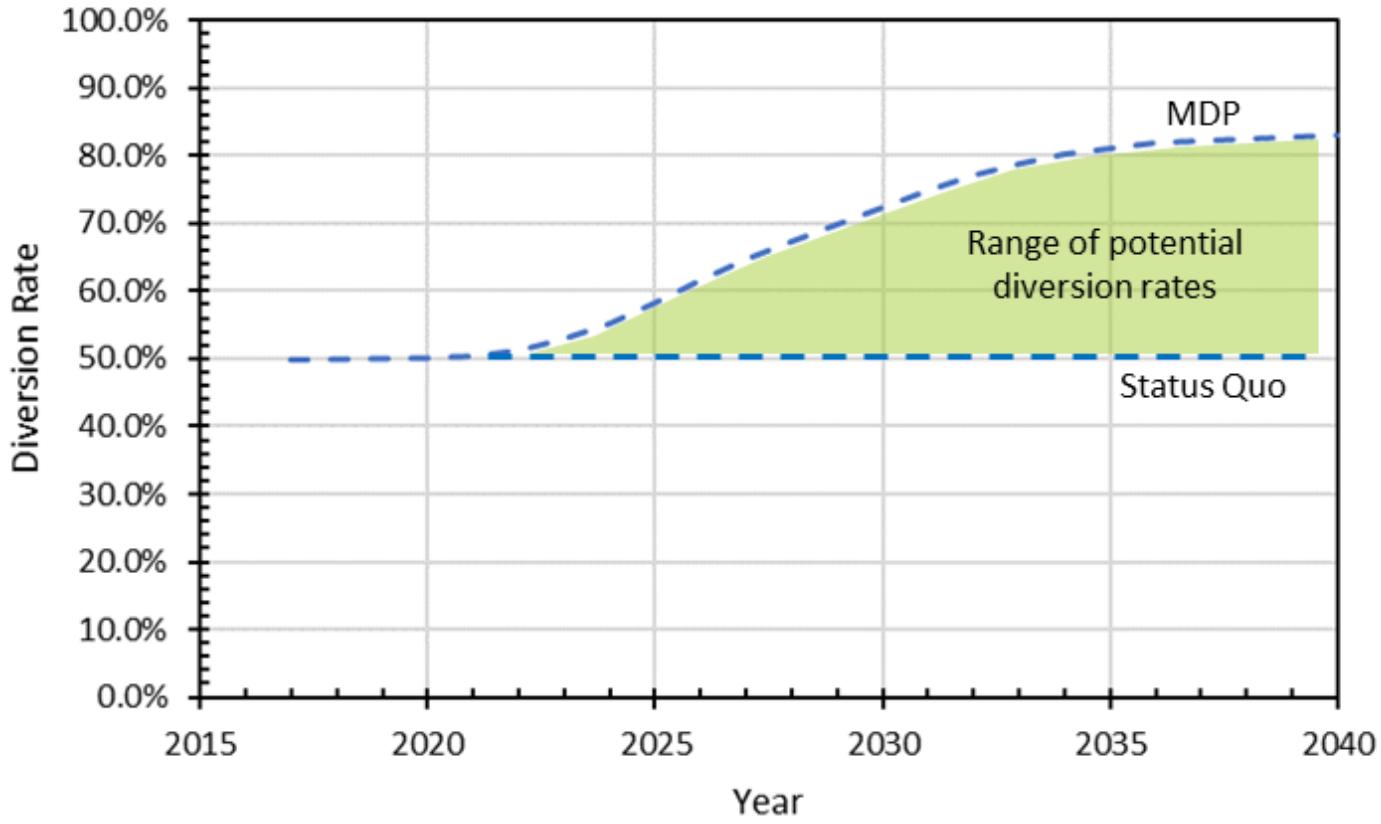

Range of Potential Diversion Rates

(depending on when each option starts and how successful it is)

Ch. 10 – What's Left for Disposal under MDP

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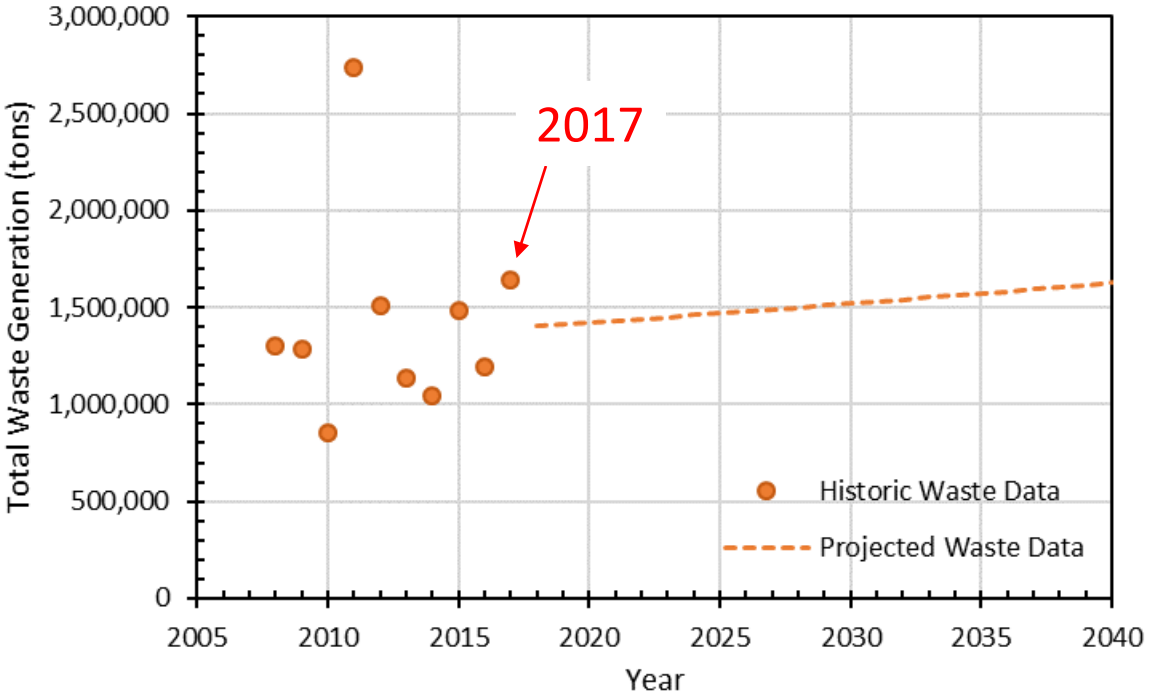
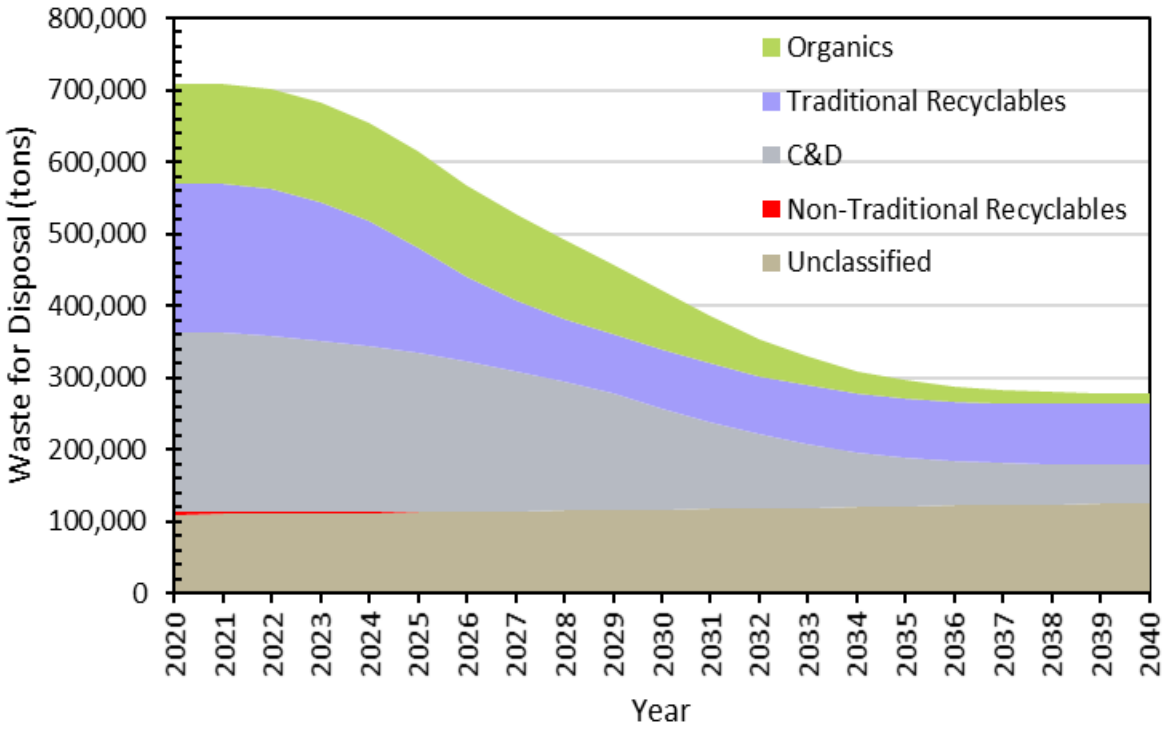


Historical and Projected Waste Generation
(growth projection = 0.7% per year)



What's Left for Disposal
(assuming the City achieves MDP by 2040)
(assuming 0.7% annual growth in all waste streams)

Ch. 10 – Range of Disposal Outcomes (Citywide)

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Looking forward to Task 7: What does this mean for the City's disposal needs?

MDP	2020	2025	2030	2035	2040
0%	463,700	479,700	496,200	513,200	530,800
20%	463,200	462,100	453,600	465,900	483,100
40%	462,600	444,600	410,700	413,900	428,600
60%	462,100	427,200	367,400	357,000	367,300
80%	461,600	409,900	323,700	295,200	299,200
100%	461,000	392,700	279,500	228,700	224,400

Expected MSW Disposal Tonnages under Various Diversion Rates as a Percentage of the MDP
(0% represents Status Quo)

MDP	2020	2025	2030	2035	2040
0%	249,800	258,400	267,200	276,400	285,900
20%	249,400	251,000	241,200	225,000	226,000
40%	249,000	243,500	215,500	178,400	172,700
60%	248,500	236,000	190,300	136,600	126,300
80%	248,100	228,300	165,500	99,600	86,600
100%	247,700	220,500	141,000	67,500	53,700

Expected C&D Disposal Tonnages under Various Diversion Rates as a Percentage of the MDP
(0% represents Status Quo)

Ch. 10 – Range of Outcomes for DPW

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What does this mean for DPW's collection and disposal needs?

MDP	2020	2025	2030	2035	2040
0%	31,600	32,700	33,800	34,900	36,100
20%	31,900	43,400	60,300	69,100	71,800
40%	32,300	54,100	86,700	103,200	107,400
60%	32,600	64,900	113,200	137,300	143,000
80%	33,000	75,600	139,700	171,500	178,600
100%	33,400	86,400	166,200	205,600	214,300

RECYCLING + ORGANICS

Expected DPW curbside collection (tons) under Various Diversion Rates as a Percentage of the MDP

(0% represents Status Quo)

MDP	2020	2025	2030	2035	2040
0%	271,700	281,000	290,700	300,700	311,000
20%	271,300	270,300	264,200	266,600	275,400
40%	271,000	259,600	237,700	232,400	239,800
60%	270,600	248,800	211,300	198,300	204,200
80%	270,300	238,100	184,800	164,100	168,500
100%	269,900	227,300	158,300	130,000	132,900

TRASH FOR DISPOSAL

Expected DPW curbside trash collection (tons) under Various Diversion Rates as a Percentage of the MDP

(0% represents Status Quo)

Thank You

Less Waste, Better Baltimore

Rethinking our waste management future

publicworks.baltimorecity.gov/lesswaste