

Regional Waste Movement Study

2024

Task 3 Final Technical Memorandum Qualitative Research Results

Prepared For

New York Metropolitan Transportation Council

Prepared By

Rutgers University, Center for Advanced Infrastructure and Transportation
100 Brett Road
Piscataway, NJ 08854-3925

with

Econsult Solutions Inc.
Ramboll Americas Engineering Solutions, Inc.
University at Albany, State University of New York

Date

October 29th, 2024



Contents

1.	Introduction	3
2.	Summary.....	4
3.	Participants	5
4.	Key Findings	9
4.1	Waste Movement.....	9
4.1.1	Challenges and Current Conditions	9
4.1.2	Truck	11
4.1.3	Rail.....	13
4.1.4	Barge	15
4.2	Waste Generation	15
4.3	Waste Data and Analysis.....	17
4.4	Waste Diversion	18
4.4.1	Recycling	18
4.4.2	Organics	19
4.4.3	Policies and Strategies	20
4.5	Disposal (Waste-to-Energy Incinerators and Landfills).....	22
5	Survey Findings.....	26
5.1	Waste Diversion	26
5.2	Disposal	27
5.3	Environmental Justice	27
5.4	Transportation.....	28
6	Workshop Findings	28
7	References	30

FIGURES

Figure 1. Metropolitan Area Planning (MAP) Forum Study Area

TABLES

Table 1. Interviews

Table 2. Survey

Table 3. Workshop

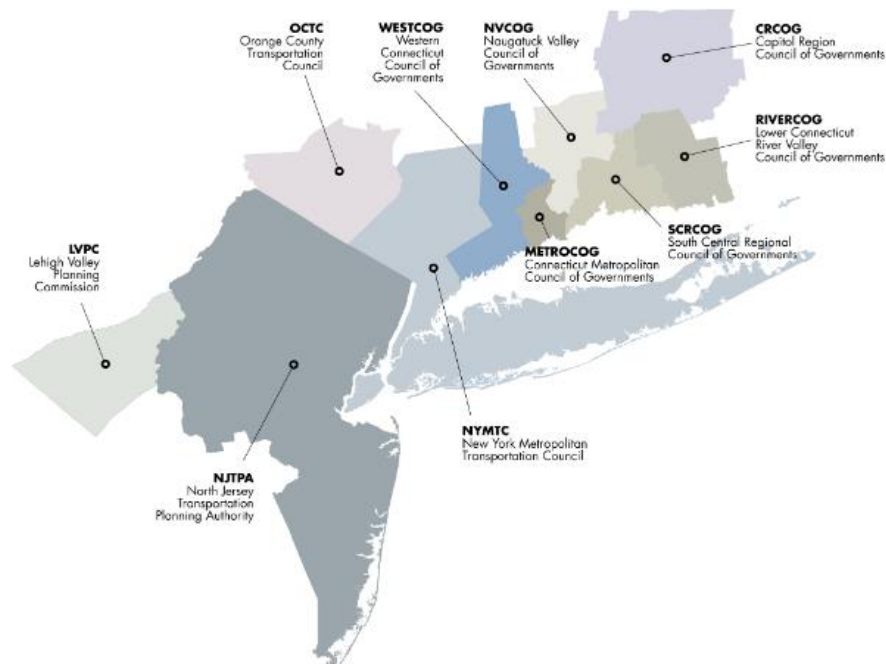
ATTACHMENTS

Attachment A. Survey Responses and Workshops

1 Introduction

The Regional Waste Movement Study is focused on identifying the needs and opportunities associated with the movement of municipal solid waste (MSW) and construction and demolition (C&D) debris or waste in the Metropolitan Area Planning (MAP) Forum study area, which encompasses six councils of government (COGs) in Connecticut and four metropolitan planning organizations (MPOs) in New Jersey, New York, and Pennsylvania (refer to Figure 1) [**Error! Reference source not found.**].

Figure 1: Metropolitan Area Planning (MAP) Forum Study Area [**Error! Reference source not found.**]



This memorandum provides a summary of 20 hour-long, unstructured interviews conducted by the CAIT team to support the Regional Waste Movement Study. The purpose of this memorandum is to record the ideas, opinions, concerns, and recommendations of participants. Conclusions based on these data, along with other data collected through this study, will be synthesized in the Task 7 memo.

These interviews took place via online video calls between January and June 2024. Interview participants, listed below, included local and state officials, representatives from the freight and waste industries, metropolitan planning organizations, advocates, and academics. Participants were selected for their direct experience with issues related to waste and waste movement. The initial list of participants was developed in collaboration with the study's steering committee—the Freight Subcommittee of the New York Metropolitan Transportation Council (NYMTC).

Additional participants were identified using a snowball sampling technique, in which interviewees were asked to recommend other potential participants.

These findings are supplemented by insights from an online survey distributed to the NYMTC Technical Advisory Committee in spring 2024 and two public online workshops held in late 2023.

Note: The opinions or suggestions expressed below reflect those of the interview, survey, or workshop participants and should not be considered endorsements or recommendations by the CAIT team. The inclusion of any information in this memorandum does not verify its accuracy, and any sentiments expressed reflect participants' perspectives.

2 Summary

Participants covered a wide range of topics during the interviews conducted for this study. The following is a summary of key themes around the movement of waste that emerged from these discussions.

- 1) **Regional coordination.** Despite the interstate nature of waste movement, cooperation across states is limited. Participants noted that this lack of coordination poses barriers to comprehensive data collection and leads to regulatory conflicts. Examples include varying vehicle weight limits between states and state-specific regulations for waste containers transported by rail. Additionally, while some areas aim for self-sufficiency in waste management, the constitutional Commerce Clause limits states' ability to restrict waste transport, resulting in reliance on low-cost, out-of-state disposal options.
 - 2) **Alternative transport modes.** Trucking remains the dominant mode of waste transport in the region and is expected to continue in this role. However, participants discussed rail and water transport as alternative options that could alleviate road congestion and potentially reduce greenhouse gas emissions in some instances. The transition to these alternative modes, particularly rail, presents infrastructure, governance, and market challenges.
 - 3) **Disproportionate impact of waste transport on local communities.** Participants explored the tension between centralizing waste transport to maximize efficiency and distributing the adverse impacts of that transport, such as noise and pollution, across communities. Waste movement along rail corridors or highways disproportionately affects communities near those corridors, many of which are low-income and minority populations. While some areas benefit economically from hosting landfills or WTE plants, other communities experience negative health and environmental impacts. Participants noted that increasing reliance on rail could reduce emissions but also brings issues such as pollution, noise, and delays.
 - 4) **Challenges with trucking and rail transport.** The prevalence of trucks in waste movement contributes to congestion and environmental impacts. Participants discussed considerations regarding electric vehicles (EVs), noting that weight and charging constraints currently make them less viable for long-haul waste transport. Rail transport is increasingly used in the region but faces challenges related to infrastructure limitations, chokepoints, and the need for coordination with other rail users.
 - 5) **Data limitations.** Participants identified difficulties in obtaining accurate waste data due to inconsistent reporting and limitations in state data systems, which hinders long-term planning. Recycling rates and waste trends are also challenging to predict.
 - 6) **Waste diversion strategies.** Recycling and composting are widely supported among participants as strategies to reduce landfill waste. Challenges include contamination of recyclables and market instability, particularly in plastics recycling. Diverting organics from landfills through methods such as anaerobic digestion or composting was seen as a key opportunity, though participants expressed uncertainty about the scalability of these solutions.
 - 7) **Policy and strategy gaps.** Participants discussed the need for cohesive, top-down policies to achieve effective waste reduction, observing that piecemeal approaches often lack lasting impact. Education and enforcement were identified as important factors in successful waste
-

diversion efforts, with examples such as Westchester County's recycling education campaigns and Connecticut's recent mandate to source-separate organics.

- 8) **Waste disposal challenges.** Participants noted that both landfills and WTE facilities face growing opposition due to health and environmental justice concerns. High tipping fees and limited landfill capacity create financial strain on local disposal options, leading to reliance on out-of-state facilities. Expanding existing facilities or siting new ones remains difficult due to public opposition and lengthy permitting processes.
- 9) **Private haulers are adapting.** Private haulers are adapting to changing dynamics in waste movement within the study area. Participants noted that haulers are exploring new technologies, transport modes, and infrastructure developments to accommodate future regional demands.

3 Study Participants

Interviews

ID	Category	Organization by Interview Grouping	State
AR-I	Academic/Research	Rowan University	NJ
		Stony Brook University	NY
		Environmental Research & Education Foundation (EREF)	
		City College of New York	NY
AV-I	Advocacy	Civics United for Railroad Environmental Solutions (CURES)	NY
GI-I	Government/Industry	Bayshore Recycling, Formerly New Jersey Department of Environmental Protection (DEP)	NJ
		National Waste & Recycling Association (NWRA), Formerly EPA	
IN-I	Industry	Trucking Association of New York (TANY)	NY
		Winters Bros	NY
		Waste Management	NY
		Port Liberty New York	NY
		Reworld	
MR-I	MPO or Regional Government	Lehigh Valley Planning Commission (LVPC), Northeastern Pennsylvania Alliance (NEPA), and Monroe County	PA
		Western Connecticut COG, Metro COG, South Central COG, Lower Connecticut River Valley COG, Southeast Connecticut COG, Capital Region COG, Naugatuck Valley COG	CT
		Regional Plan Association (RPA)	NY, NJ, CT
WD-I	Municipal or Waste District	Westchester County Department of Environmental Facilities	NY
		Housatonic Resources Recovery Authority (HRRA)	CT
		New York City Department of Sanitation (DSNY)	NY
SG-I	State Government	Connecticut Department of Energy and Environmental Protection (CT DEEP)	CT
		New Jersey Department of Environmental Protection (DEP)	NJ

Surveys

ID	Category	Organization	State
AR-S	Academic/Research	Baruch College, School Public and International Affairs	NY
AV-S	Advocacy	Manhattan Solid Waste Advisory Board	NY
		Zero Waste Ithaca	NY
		Civics United for Railroad Environmental Solutions Inc	NY
		Brookhaven Landfill Action and Remediation Group (BLARG)	NY
		Clean Air Action Network of Glens Falls	NY
IN-S	Industry	Republic Services	NY
		WSP	
MR-S	MPO or Regional Government	Orange County Transportation Council	NY
		Naugatuck Valley Council of Governments	CT
WD-S	Municipal or Waste District	Village of Valley Stream	NY
		Town of Smithtown	NY
		Town of Islip	NY

Workshops

ID	Workshop	Date
W1	Workshop 1	November 10, 2023
W2	Workshop 2	December 13, 2023

4 Key Findings

The following are results from the 20 interviews, online survey, and two focus groups conducted during this study. Results are organized by the following subjects: waste movement, waste generation, data and analysis, diversion and disposal.

4.1 Waste Movement

This section summarizes participants' comments on the complexities of freight and waste transport, focusing on regulatory inconsistencies across states, infrastructure limitations, and environmental justice concerns. It presents the challenges of long-distance waste movement by truck, rail, and barge, as well as the industry's transition to sustainable technologies like electric vehicles. Additionally, it highlights the disproportionate impact of waste management on low-income and minority communities.

4.1.1 Challenges and Current Conditions

1) Freight and waste transport regulations differ by state affecting cross-border movements.

- Different areas in the region have different rules regarding the maximum weight of a vehicle, particularly across state borders (WD-I) or between New York State and New York City (IN-I).
- In Westchester County, New York, more trucks are needed to move the same amount of waste to Connecticut or Pennsylvania, which can create challenges when the typical disposal facility is unavailable (WD-I).
- Inconsistent regulations make compliance with weight limits and other regulations difficult for C&D haulers who, as sub-sub-contractors, often do not know who oversees the construction site where they picked up (IN-I).
- New York State passed a regulation to require waste containers on freight trains to have hard covers, which was supported as an environmental impact mitigation measure by CURES (AV-I). It was challenged in litigation filed by the National Waste and Recycling Association (IN-I). The suit alleged federal agencies, not the state, has the authority to regulate this (IN-I). "When a state like New York does that, you can imagine that CSX is saying wait a second. I got to load a car in Massachusetts. I get to the New York border, and now my cover doesn't meet the law?" (IN-I).

2) While states can encourage self-sufficient management of waste, constitutionally they cannot stop waste movements across state lines.

- A Supreme Court ruling, *City of Philadelphia v. New Jersey* (1978), interpreting the Commerce Clause in the U.S. Constitution means states cannot ban the transport of waste in or out of their boundaries (AR-I, GI-I, SG-I). This allows waste haulers to shop around, including out of state, for the best price for disposal, even if state policy has historically encouraged keeping waste in-state (SG-I).
- New Jersey had regulations requiring the disposal of waste in certain locations, but after they were found to be a violation of the Commerce Clause in the late-1990s, many counties that had built infrastructure to manage waste locally found it hard to make up the

revenue shortfall (AR-I). “We had a landfill and it met its revenue projections so long as everyone in the county was required to bring their stuff here. And now they're no longer required to do that. They can go to Pennsylvania, where it's half the price and the county is on the hook for a \$300 million bond payment that they don't know what to do with” (AR-I).

- In New Jersey, some areas switched to a collective bargaining model where “the county will negotiate on behalf of all the towns in the county a centralized, solid waste contract, which is essentially the same thing as directing the flow of waste again, except that individual towns can opt out if they want” (AR-I).

3) Long-distance waste transport requires low-cost transportation, such as rail, and low landfill tipping fees.

- If waste is traveling long distances, greater than 250 or 300 miles, and landfills have rail-accepting facilities, waste becomes more economical to move by rail (GI-I).
- States like Ohio, Virginia and Pennsylvania are common destinations for transporting waste long distances due to their low tipping fees and landfill space (IN-I, SG-I, MR-S). This means policies in these states may also impact the future management of the study area’s waste: “For instance, if Ohio decides to stop accepting our waste, we may need to ship it farther.” (MR-S).

4) Waste movement and management disproportionately impact some, often low-income or minority, communities.

- Environmental justice issues need to be considered for the management or movement of waste (MR-I, AV-S, W1, W2). “Historically waste industries locate through the path of least political and economic resistance, largely in lower income and minority communities” (AV-S). “I think we need to be honest with ourselves and say like, is there an equitable way to distribute waste movement throughout our region and what does that look like?” (MR-I).
- In Bridgeport, Connecticut, the location of one of the state’s four Waste-to-Energy facilities, 90 percent of emissions from the waste sector, including trucks, are imported (MR-I). “So it's a big environmental justice issue where a lot of the waste for the rest of Southwestern Connecticut is being sent to Bridgeport” (MR-I).

5) River crossings are a challenge for moving waste out of New York City or Long Island

- The nearest rail crossing of the Hudson River is far north of the city (IN-I, AR-I, WD-I, W1, 18). There have been talks of a cross-harbor rail tunnel that would help the movement of freight rail in and out of the city (IN-I). Barring the development of a Brooklyn to New Jersey crossing, the Port Authority’s float operation is a useful way to cross the river (IN-I). “That float operation is extremely valuable, and I would imagine that it will get more activity in the future unless... that freight tunnel is going to be built [connecting] Brooklyn and Jersey” (IN-I).

6) Connecticut has long pursued self-sufficiency in waste management, but in recent years the amount of waste moving out of state has increased.

- Since the 1990s, Connecticut pursued a policy of self-sufficiency in waste management, supported by investments in six waste-to-energy facilities (SG-I, MR-I). Two of the facilities have closed since 2015, leading to 860,000 tons of the roughly 3.5 million tons of waste generated in Connecticut each year needing to be exported out of state, often to Ohio or Pennsylvania (SG-I, MR-I) which has an impact on roads and tipping fees (W2).
- While the planning community and some people in municipalities see this as a crisis, waste haulers and other local officials do not (MR-I). “We enjoyed being a leader when trash energy plants were developed 30 or more years ago. And we all kind of feel like failures that we now are going backwards in terms of technology and how we're managing this.” (MR-I).
- Of the four remaining waste-to-energy incinerators, all are nearing the end of their life spans (MR-S). “When they go offline, we will need to find some other way to deal with that waste... and it is unlikely to be in-state, since we have no landfills and it would take years to build a new WTE plant.” (MR-S).

7) Contracts between towns and waste haulers in Connecticut can be costly and volatile.

- Every municipality in CT is responsible for its residents’ waste, and small towns can negotiate better contracts when they collaborate (WD-I). The state has allocated money to study the creation of more regional waste authorities, but some planners say they have heard little interest in regional cooperation from municipalities not already in a district of this kind (MR-I).
- In recent years, Connecticut municipalities have been reluctant to sign long-term contracts as local officials have two-year terms, and they believed the freedom to shop around would provide more favorable rates (SG-I). This forgoes the security and predictability of long-term contracts and, since municipalities are not contracting directly with disposal facilities, the waste haulers can explore both in- and out-of-state options for disposal (SG-I). The facility must be permitted, but the state doesn’t have the resources to verify all facilities for all haulers (SG-I).

4.1.2 Truck

1) E-commerce has shifted freight movement patterns affecting residential truck traffic.

- Consumers receive more home deliveries. “Post pandemic, there's been a complete flip. 60 percent of freight was delivered to, you know, businesses, commercial corridors B to B type of stuff. It's like 80 percent residential now with ecommerce.” (IN-I). This results in more residential waste and trucks in residential areas. “That's a massive, massive shift in consumer behavior” (IN-I).

2) Truck traffic has increased in areas with a high concentration of warehouses, causing congestion and parking issues.

- Red Hook in New York City has seen the number of warehouses increase, increasing truck traffic in the neighborhood (MR-I).
- The Lehigh Valley in Pennsylvania is experiencing strain on the county freight network, particularly I-80, as large parcels of land are being developed or redeveloped into warehouses or fulfillment centers (MR-I).

- A new PA state law allows trucks to drive on PA state routes (MR-I) and trucks do not have enough places to park overnight (IN-I, MR-I). Parking issues do not directly affect waste movements in eastern PA as most waste traveling to the area requires a single day trip without a need for overnight parking (MR-I).

3) EV trucks are currently too heavy to be a feasible option for long-haul waste movement.

- EV trucks are heavier than current trucks (WD-I, MR-I, AR-I), which poses several challenges to the hauling of waste. To haul current tonnages of waste, EVs require a lot of power (WD-I, AR-I). “They don’t make electric vehicle engines that are powerful enough to move the waste we move” (WD-I).
- Trucks are subject to weight limits that include both the weight of the truck and the weight of the load. Many trucks are already operating at the limit, so heavier trucks would affect load capacity unless an exemption is made (GI-I, MR-I, AR-I).

4) EV vehicles require charging, which is more feasible for short haul than long-haul transport.

- Using EV trucks for waste transport, “just doesn’t make sense with today’s technology as far as making the trip to the landfill ... I [would] have to wait six hours to charge the battery to come back” (IN-I).
- The shortage of truck parking in some areas is also a barrier to electric vehicle usage, as these trucks must park to charge (IN-I). “If there’s going to be a future for electric vehicles, especially in waste movement, it’s going to be the door-to-door collection where they can charge them at night before they start deliveries” (MR-I).
- Mack Trucks is building electric garbage trucks for door-to-door collection and partnering with the NYC Department of Sanitation to test these trucks (MR-I).

5) The trucking industry is looking beyond EVs to other technologies and wide-ranging programs to support a transition to more sustainable fuel types.

- Waste and freight haulers are exploring or in the early stages of implementing a variety of alternative fuel types (IN-I, GI-I).
- Waste Management has converted its waste collection fleet to compressed natural gas. “I think we are right behind UPS as the largest fleet owner of compressed natural gas trucks across the country” (IN-I).
- Mack Trucks uses landfill gas and converts it into fuel to run the garbage trucks (GI-I).
- Trucking Association of New York (TANY) is encouraging freight fleets to use renewable diesel (IN-I).
- For general freight, including non-waste movements, TANY has partnered with CALSTART to develop a holistic approach to implementing EV fleets. This program aims to overcome cost barriers, work with utility companies to build charging infrastructure, and address workforce needs to maintain these vehicles (IN-I). “Creating a secondary market for commercial electric vehicles is really important because small fleets do not buy new trucks, they buy them used and until there’s a market of used vehicles, you’re just not going to get that many fleets able to purchase them.” (IN-I).

6) Freight truck congestion is common throughout the region. Those mentioned include:

- I-78 in Lehigh Valley, Pennsylvania (AR-I)
- I-80 in Lehigh Valley, Pennsylvania (MR-I and AR-I)
- I-95 and I-84 (W2)
- Route 17 NYS (W2)
- County roads in Lehigh Valley Pennsylvania (MR-I)
- George Washington Bridge in New York City (IN-I)
- Truck routes off Long Island (IN-I)

4.1.3 Rail

1) The transport of waste by rail has increased in recent years.

- Since 2006, New York City has made strategic investments to move residential and institutional waste out of the city by rail (WD-I).
- With the coming closure of one of the largest landfills in Long Island, Winter Brothers is seeking to create a rail transfer station in Yaphank to move waste off Long Island (IN-I).
- New Jersey has seen companies use more rail in the past five years, increasing from about 10 percent rail to 30 or 40 percent rail (SG-I).
- In Connecticut, transfer station facilities are seeking permits to transfer MSW to rail, which was once prohibited (MR-I).

2) Rail infrastructure used in waste movement requires investment to mitigate environmental impacts.

- “I think you're going to see that probably the EPA is going to mandate the railroads over time to improve upon the equipment they're using” (IN-I).
- Pollution, odors, and noise are issues for communities near freight railroads (AV-I, W1, W2). To mitigate these issues, CURES has advocated for lower emission freight engines and hard covers for train cars carrying waste, though they have seen limited industry willingness to adapt or adhere to regulations supporting these goals (AV-I). “These are industries that are externalizing the cost of their industrial process. They're laying it on the public in the form of the spread of pollution, air, water, land.” (AV-I).

3) Transporting waste by rail can be unreliable, as it requires coordination with other users of the limited freight rail capacity.

- Rail transport is essentially a monopoly, which means there are limited options when moving waste by rail (GI-I, WD-I).
- Backlogs and delays on rail lines are common (IN-I, SG-I, IN-I). “We are competing with other users for access and rail staff to move our freight. So you get in line and you wait till your turn and if there's not enough people, you just wait” (WD-I).
- Shipping waste out is often faster than getting the empty containers back in order to ship more waste, which can often be slow (SG-I, WD-I).
- Movements must be coordinated with other shippers or users of the railway, such as passenger rail, causing some routes to only operate at night limiting the hours during which waste can be shipped by rail (IN-I, WD-I).

- Due to limited redundancy in the New York City system, moving waste by rail can be disrupted by weather and labor strikes (WD-I). Additionally, like trucking, railroads can struggle with employee retention (SG-I).

4) Moving waste by rail can provide operational savings, particularly for long distance transport.

- Using a single rail car to move waste eliminates four tractor trailers which means less wear and tear on bridges, tunnels, and roadways, which is beneficial to municipalities and states budgets (IN-I).
- Waste haulers also link this to environmental benefits: “Boy, isn't it better to take five trucks off the road for every rail car?” (IN-I). Savings are most apparent on long haul trips (GI-I, SG-I). “When you start moving, you know outside of 100 miles, now you're looking at less round trips or less turns” (SG-I).
- Many participants believe increased investments in rail is needed for the future of waste transportation (IN-S, W1, W2).

5) The existing rail network used to transport waste out of New York City has chokepoints and lacks redundancy.

- Freight rail out of New York City has little or no redundancy, placing stress on critical junctures (WD-I).
- Not all rail spurs in New York City metro area are fully utilized, which may present an opportunity (WD-I).
- Chokepoints for the movement of waste by rail in the region include:
 - Rail congestion in or on the way to the Selkirk Yard near Albany (IN-I, WD-I).
 - Freight must travel north to this yard in order to cross the Hudson before travelling south to Virginia or west to Rochester, New York (IN-I).
 - CSX access to this yard from New York city is shared with Metro North, a commuter rail line, so freight movements must happen at night (IN-I).
 - The yard may face additional pressure if more waste is transported out of the Northeast and needs to pass through this yard (IN-I).
 - Additionally, “there's huge inefficiencies in terms of energy costs and emissions from using rail” (AR-I).
 - Rail congestion in the Oak Island Yard in Newark (IN-I) and nearby Brills Yard (WD-I)
 - Cross Harbor Float Bridge to 65th Street Yard in Brooklyn to Greenville Yard in Jersey City is limited capacity with many entities touching it (IN-I).
 - The Arthur Kill Vertical Lift Bridge, that connects Elizabeth to Staten Island, experiences delays and mechanical breakdowns (IN-I). “If that bridge for some reason gets stuck in the up position, we're trucking waste off of Staten Island, trying to get it to our facilities because it's a bad situation.” (IN-I). This bridge must be raised to move wastewater sludge by barge (WD-I).
 - Oak Point switches in New York, operated by CSX (WD-I).
 - Fresh Pond Junction, operated by New York & Atlantic Railway (WD-I, W2).
 - The Northern Line on Long Island is challenging because there are a lot of places where it is single track (IN-I).

4.1.4 Barge

1) Transporting waste via barge removes waste movement from areas where people live.

- Barging waste is costly but removes trucks from the road and railway (AV-I, IN-I). “It’s less wear and tear on the road, less traffic moving it all by water seems very clean and efficient way to do it” (IN-I). This reduces the environmental and quality of life impacts on neighborhoods near busy waste trucking or rail routes (AV-I).
- Environmental problems can still occur with barging, and there are historical examples of these vehicles leaking or tipping over (AR-I). New York has the Blue Highways Program, which is exploring moving waste by water (AV-I, AR-I, W2).

2) New York City uses barges as one method to move waste out of the city.

- New York City converted and constructed marine transfer stations to help move waste out of the city following the closure of Freshkills Landfill on Staten Island (WD-I). MSW is dropped at marine transfer stations in several boroughs, then transferred to barge and taken to Staten Island to be transferred to truck, then rail (IN-I). Waste handled by Reworld from this point is taken to waste-to-energy plants in Niagara Falls or Chester (IN-I).

3) Disposal facilities are not typically located on the waterfront. Therefore, barged waste must be transferred to other modes to reach its destination.

- Barges often rely on intermodal transportation where the waste is transferred from barge to rail and then taken to a plant or landfill by truck (IN-I). Changing from barge to rail to truck adds costs (IN-I). Though someday someone might “build that mousetrap,” currently “you don’t want to barge all the way down the coast and then drive 300 miles to a disposal location. Those economics just won’t work.” (IN-I).

4) Barges must navigate natural elements or old technology that can be unpredictable and challenging.

- Wind, fog, and changes in the tide significantly impact barge operations and often result in delays which back up the entire system. “The barges themselves are fairly light, believe it or not, for their size. So sometimes the wind can be a challenge for them” (IN-I).
- In addition, drawbridges that barges pass under frequently have issues as the technology is old and should be automated or upgraded (IN-I).

5) Barges require waterfront access, which is in high demand.

- Moving waste by water requires a port facility at both ends of the trip (SG-I, IN-I).
- In Red Hook in New York City, many warehouses and other developments are taking advantage of lenient zoning requirements and locating along the waterfront, but this may be a missed opportunity for a port that can handle waste or other goods (MR-I).

4.2 Waste Generation

1) Waste tonnage produced by the region has flatlined or declined in recent years.

- “The long-term trend [for waste generation] may no longer be an increase” (AR-I). Westchester, NY has reduced the amount of waste generated by 28 percent from 2005 levels (WD-I).
- Since 2004, Brookhaven, NY experienced a total waste generation reduction of approximately 7 percent and a 25 percent per capita decrease in residential waste.
- Generally, waste generation increased during the pandemic although it has decreased since. Residential waste in New York City has experienced a similar trend (AR-I).
- In Connecticut, waste tonnage has not fluctuated in recent years (SG-I).

2) The popularity of e-commerce and the trend toward dematerialization has generated more light-weight waste.

- In NYC, tonnage has been static for a decade, but the volume has increased because the waste stream now has more lightweight materials, such as plastic and cardboard (WD-I). Consumers are receiving more home deliveries from e-commerce. “Well, things are getting lighter. The volume has increased, and ... it seems to me that it's more piece meal” (IN-I).
- Dematerialization over the past forty or fifty years, the manufacturing of goods using fewer raw materials, has also contributed to lighter waste (GI-I). For example, glass packaging has been replaced by lighter weight plastic packaging for many products. “It's all about using as little as possible, which means it's heavily driven by plastics right now” (GI-I).
- The trend toward more light-weight materials is not captured in tonnage rates, the metric typically used by the waste management industry. “Volume is hard to measure but it is something the DSNY is paying more attention to” (WD-I).
- Regulation could keep plastics out of packaging and divert them from the waste stream (MR-S, W1, W2). “An EPR (extended producer responsibility) mandate for packaging could have an enormous impact on diverting plastics from the waste stream. The legislature has flirted with this idea in years past, but it is probably still a long way from coming to fruition.” (MR-S).

3) Increased frequency of natural disasters can increase waste production even if overall MSW consumption goes down.

- Florida waste generation “looks different” compared to New York City and Seattle. Per capita waste generation in Florida has increased in recent years, likely in part due to destructive weather events, like hurricanes (AR-I). In New York’s Westchester County, major storms have struck during routine maintenance work, pushing the county’s waste-to-energy incinerator to capacity and requiring authorities and haulers to find alternate disposal options quickly (WD-I).

4) Reducing waste generation requires clear vision and coordinated, wide-ranging policies.

- It is important for states, governments, and companies involved to identify what their goals are with waste management (AR-I). “There’s not really political willpower for the municipalities to take on successful programs like unit-based pricing just because they are going to get the political backlash. If the state were to push for something more

effective like that, I think it would be more effective from the top down rather than at the municipal level” (MR-I).

4.3 Data and Analysis

This section covers the challenges in gathering and analyzing waste data, highlighting issues like the poor quality and inaccuracy of data reported by waste facilities and private companies. It discusses the difficulties in calculating recycling rates and predicting long-term waste trends, with examples of unexpected industry shifts, such as changes in recycling demand and waste transport methods.

1) Waste data is often limited, inconsistent, or inaccurate.

- Waste facilities report data to state agencies, and private sector data is often low quality (AR-I, WD-I, W2).
 - “Folks who help develop the kind of data infrastructure for waste will tell you, there is no shortage of problems and limitations with the data set that exists for New Jersey. But it's still better than most” (AR-I).
 - “NYS DEC does not double check the data in the annual reports. I know this for a fact for public facilities because we have FOIL-ed for such reports, and they have huge gaps -- like a facility that accepts recycling with no data reported on recycling.” (W2).
- Business and tax considerations incentivize companies to report inaccurate quantities (AR-I).
- Collated data sources, such as the New York SWMP, also have inaccuracies.
- Data for New York City in the state plan is not “accurate at all” due to the exclusion of commercial waste and the direct movement of the city’s waste out of state (WD-I). “I think they're being consistent statewide, so it is useful to compare generation rate from location to location. But I don't like the actual number, like the pounds per day” (WD-I).

2) Recycling rates are difficult to calculate.

- Recycling and composting are not managed or regulated to the degree that landfilling is, making it more difficult to collect data (AR-I). Calculating recycling rates is also fraught. In New York State’s SWMP, the C&D recycling rate is included in the statewide recycling rate (WD-I). “There are the C&D recycling rates like upwards of 60%. I think that just inflates the number of statewide and misrepresents how we're actually doing with diversion and recovery” (WD-I).

3) Waste trends are difficult to predict. Long-term projections often assume the continuation of the status quo, though in past years the status quo has unexpectedly or rapidly changed.

- “Projections tend to be based on the assumption ... nothing changes, and I've seen some real whoppers in the past. Projections, for instance, about newspaper recycling and 2030 that never considered the fact that newspapers might be a dying industry.” (GI-I). Paper used to consist of 40 percent of the waste stream and the amount of paper used has probably fallen by 50 percent (AR-I).

- In 2018 China stopped taking U.S. recycling, causing the industry to scramble to find new buyers, and for many materials the industry has not recovered. “China for a long time, for the most of the 2000s was like the main buyer of U.S. recycled material. And then they said no, kind of overnight” (AR-I).
- During the COVID-19 pandemic, a truck driver shortage drove several major waste haulers to shift to rail transport, raising the proportion of New Jersey waste moved by rail from about 10 percent to 30 or 40 percent. “[In] the last year or so it's starting to stabilize a little, but I still think that you're going to see the shift probably more to rail” (SG-I).

4.4 Diversion

This section examines waste diversion, focusing on recycling, organic waste, and related policies and strategies. It outlines the challenges in recycling, including market fluctuations and material contamination, which hinder effective recycling. The section also addresses the growing emphasis on diverting organic waste and the development of infrastructure to support this. The findings identified a need for holistic and sustainable approaches to waste management, noting barriers like political will and financial constraints.

4.4.1 Recycling

1) Recycling is market-driven, and, without a market, recyclable materials are often disposed.

- “The John Q public thinks Recycling is like this Boy Scout, mom and apple pie thing. It's the floor of the New York Stock Exchange. It's incredibly competitive and cutthroat” (GI-I).
- Recycling that does not have a market often ends up in warehouses awaiting an upturn in value (AR-I) or disposed of in a landfill or waste-to-energy incinerator (AR-I).
- In some cases, disposing of recycling without a market in landfills is not an option. For example, New York state requires the recycling of glass (WD-I). While it ensures the glass is recycled, it also disincentivizes the collection of this material: “If nobody wants to buy it from you, which no one does by the way, and you have to pay to recycle it, now you've got a budgetary hole” (WD-I).

2) Waste for disposal and recyclables are sometimes not sufficiently separated.

- Recycling is often contaminated with non-recyclables, making materials more difficult or expensive to recycle (IN-I, WD-I, SG-I, W1). Some of the challenges of cross contamination come from single-stream recycling (WD-I). “We certainly need more recycling capacity, but we'd like to see more recyclables,” i.e. materials that can be recycled to a quality that can be competitive on the market (IN-I).
- Waste Management and other companies are investing in upgrading or building sorting facilities (IN-I, SG-I). More sorting at a local level is important for the future of waste movement (W1, W2).

3) Plastic recycling faces physical and market barriers.

- Much of the plastic in the diversion waste stream is low-quality or contaminated with non-recyclables (AR-I, GI-I, WD-I). While high-quality plastic is technically recyclable,

the recycling process degrades the material (AR-I). “If I recycle food grade plastic, it does not become new food grade plastic. It is downcycled to a lower quality item and ... it loses value very quickly compared with other recycled materials” (AR-I). “I think that’s a design problem. I don’t think it’s a diversion problem, and I think that again, policies like EPR [Extended Producer Responsibility], where companies are actually responsible for what they put out there could affect that” (WD-I).

- Absent domestic recycled plastic markets, pledges like Pepsi’s commitment to cut down its use of virgin plastic by 2030, become difficult to fulfill (AR-I). Plastic continues to be an appealing packaging option for companies as it is lighter weight than glass, though domestic recycled plastic would have to compete with cheap virgin plastic and recycled plastic from Europe (GI-I).

4) International recycling markets have weakened in the past decade, creating a vacuum.

- The market for overseas buyers of recycled material has decreased dramatically since China’s 2018 ban on importing US recycled materials. Other Asian countries have decided to halt or cut down their importation. As a result, ocean traffic for recycled content decreased, a negative market shock lowered the material’s price, and a drastic recession in the recyclables market ensued (AR-I, WD-I).
- The underlying issue was the low quality of US material. Single-source recycling played a significant role in the quality of the recycling stream (WD-I).
- China’s ban was also due to unscrupulous vendors, including organized crime elements, engaging in dishonest practices to buyers overseas concerning the quality of the material (AR-I).
- Research has shown that price volatility has discouraged domestic investment in recycling facilities and the use of recycled content in manufacturing (AR-I). The challenge that remains involves the US finding material streams that are significant enough to warrant the development of local processing infrastructure, so exports are not heavily relied upon (WD-I).

5) Messaging by local governments can either encourage or discourage recycling among residents.

- Following China’s 2018 ban on importing US recycled materials, some municipalities started suspending recycling programs (WD-I). The public “will never trust you and start separating again” (WD-I). Westchester officials say they maintained a dual stream recycling system and upgraded facilities, which helped maintain public confidence and ensure the generation of low-contamination materials that recyclers would take (WD-I).

4.4.2 Organics

1) Many in waste management believe diverting organics from the waste stream is an opportunity to substantially increase the diversion of waste away from landfills while reducing GHG emissions.

- Organics account for a third of the New York City waste stream and diversion of this material is “one of the biggest programs that the Department of Sanitation is rolling out” (WD-I).

- Connecticut State Senate passed a law in 2024, requiring everyone in Connecticut, including residents, to source-separate organics by 2028, with the potential to divert over a quarter of the waste stream (WD-I).
- In 2020 Ridgefield, CT received a grant to build the first municipal solar powered aerated static pile (ASP) system. “We’ve been running that for over two years, and we have really proven that municipalities can be self-sustainable when it comes to residential organics” (WD-I).
- When landfilled, organic waste produces methane, a potent greenhouse gas. Landfill waste is the third largest source of methane emissions in the country, “I think because of the realities of methane emissions, there will be increased emphasis on food waste recovery” (GI-I).

2) Existing organic waste processing infrastructure is evolving but underdeveloped.

- Currently, many composting facilities exist, but they are generally small and serve within a 50-mile radius (AR-I). “I think as policies are changing, to do more diversion, having that capacity is going to be really important and there might not be enough of that infrastructure currently present” (AR-I).
- Organics are dense compared to other waste types and hauling them long-distance can be expensive and polluting (WD-I, MR-I).
- Alternative technologies for managing organics are being explored, such as applying machine learning to anaerobic digestors (AR-I), pyrolysis, or gasification (SG-I).
- In Connecticut, Ridgefield and the Housatonic Resources Recovery Authority constructed a solar powered aerated static pile (ASP) system (WD-I).
- The Pacific Northwest does a lot with managing organic matter that could be useful for the rest of the country to learn from (AR-I).

3) Some are skeptical of the potential of organic waste processing infrastructure to scale.

- Current organic waste processing technologies often face technological and financial barriers (AR-I, SG-I). Anaerobic digesters, for example, are “finicky” and reliant on consistent flows of waste to operate at capacity (AR-I, W2). “Composting food waste organic matter—I sort of greet that with like a shoulder shrug because at an industrial scale that’s really, really, really hard to do unless you’re going to operate at a loss or if you have a ton of farms in your region that can supply agricultural waste to these facilities to kind of keep them running at full capacity” (AR-I).

4.4.3 Policies and Strategies

1) More materials can be managed locally.

- Interviewees identified various strategies and focuses for more local waste management. “One of the things that I am trying to advocate for is to be a part of the coming of the circular economy age and have more materials stay within New York City. Cultivate the next era of manufacturing from a more remanufacturing perspective” (WD-I).
- New York City could focus on greater C&D recycling within the city (WD-I).
- New Jersey has been increasing its support of green businesses with a waste reduction component, such as refill-oriented stores encourage their customers to bring their own containers to fill with products like laundry detergent (AR-I).

- A facility in Brooklyn receives and processes local organic waste that produces gas to be used as energy by New York City residents (IN-I).
- Housatonic has invested in municipal infrastructure to handle municipal waste, but also created a network in its region to provide easy, convenient access to educative backyard composting classes (WD-I).

2) Education is a common strategy for increasing diversion.

- Westchester, NY has been running education campaigns that have helped to create a “very highly educated population as far as recycling goes” (WD-I). A source separation law has been in effect since 1992 in the county and the generation of organic waste has been reduced (from 150,000 to 100,000) through teaching municipalities and residents about mulching in place and the use of grass clippings (WD-I).
- Housatonic Resources Recovery Authority in Connecticut has created a network in its region to provide easy, convenient access to educative backyard composting classes (WD-I).

3) Enforcement is a tool to increase diversion rates.

- Westchester was the first county outside of New York City in the state to have a formal recycling enforcement division. After the first year of implementation, the volume of recycling increased by 18 percent (WD-I).
- With the Connecticut State Senate mandate requiring all, including residents, to source-separate organics by 2028, the Housatonic Resources Recovery Authority is meeting with local officials to plan: “How do we get residents to change their behavior on what kind of local ordinances could be put in place?” (WD-I).

4) A successful diversion program may still be thwarted by political or financial barriers.

- In Connecticut, pilot programs funded by the state, including unit-based pricing, were often successful in increasing the diversion rate, but only a few opted to make the program’s permanent (SG-I). Local municipalities often did not have the political will to continue the programs (SG-I, MR-I).
- A curbside organics collection program in Bridgewater, Connecticut received 90 percent participation with low contamination, but once the residents were asked to pay for the service (\$20 a month), most dropped out and the program was shifted to drop-off (WD-I). “We lost a lot of participation, but over the years we’ve trickled up and regained a lot of participation in that one community. ... Not everybody’s willing to pay more than what they’re already paying” (WD-I).

5) Piecemeal waste management and movement policies fall short of making substantive change.

- It is important for states, governments, and companies involved to identify what are their goals with waste management (AR-I). “The biggest thing is to just realize that nothing happens in a vacuum, and the more holistically these plans happen, the better ... One-off pilots, they don’t mean a whole heck of a lot. You’re not going to get a lot of buy in.” (IN-I).

- In Connecticut, municipalities generally do not have the “political willpower” to take on successful programs like unit-based pricing just because of the political backlash – instead the push needs to come from the state (MR-I).
- As mentioned above, New York passed the Skip the Stuff bill to reduce waste generated from takeout restaurants and New York City passed a law requiring reusable cups in stadiums (WD-I). “Are these [policies] needle movers? No. Unless we change our stance as a consumptive capitalist society, we will not change trash generation rates significantly” (WD-I).

6) In the past several years, Connecticut has seen an increase in volume reduction facilities, which process waste, and transfer stations (SG-I).

- “Volume reduction plant is any solid waste facility that processes waste processes, meaning sorting, shredding, crushing, grinding, et cetera. So, we can have volume reduction plans that are strictly for recyclables, in which case they would get curbside recyclables and potentially sort them into composite material types to prepare them for market” (SG-I).
- Some transfer stations are seeking permits to move waste to rail, which was not previously permitted (SG-I).

4.5 Disposal (Waste-to-Energy Incinerators and Landfills)

This section discusses waste disposal methods, focusing on both waste-to-energy (WTE) incinerators and landfills. It highlights the growing public opposition to WTE facilities due to health and environmental concerns, as well as the financial pressures threatening their sustainability. Additionally, it addresses issues surrounding landfills, such as high tipping fees, limited capacity, and community resistance to landfill expansions. Respondents emphasized the need for effective waste management solutions that prioritize public health while leveraging the region's existing infrastructure and resources.

1) WTE facilities were once seen as a sustainable solution for waste disposal but are currently politically challenging.

- “There's such a political animosity towards waste energy facilities these days.” (GI-I).
- Current public opposition to waste-to-energy incinerators centers on health problems and environmental justice, and people do not want to live near them (AR-I, GI-I, IN-S, W2).
- Additionally, they are seen as competing with recycling, composting, and landfills as they accept the same type of materials (AR-I).
- WTE facilities were a cornerstone of Connecticut’s waste management policy in the 1990s and 2000s, although two have since shut down (SG-I, MR-I). “While we were forerunners back in the day, there are a lot of environmentalists who do not believe that our plants are actually a good a good solution. They're dirty. The byproducts are difficult” (MR-I).
- Companies that did not upgrade or poorly maintained their WTE facilities, gave the industry a bad reputation: “The technology is there and people need to start to understand the technology of the science behind it and not be afraid of these types of facilities.” (IN-I).

2) Incineration at modern, well-maintained waste-to-energy facilities offers some benefits, primarily sustainability, over landfilling.

- Incinerators burn waste to produce energy or steam (AR-I, GI-I).
- They can provide disposal options reasonably near dense areas, avoiding many miles in transport (AR-I, WD-I, IN-I).
- Westchester County in New York sends much of its waste to a WTE incinerator within the county and, while it periodically reviews this decision, Westchester believes it is environmentally the best available option for large scale waste disposal: “When you compare it to landfilling, there's really no comparison as far as greenhouse gas emissions. It does produce carbon, but landfilling produces methane, which is up to 80 times more potent greenhouse gas” (WD-I).
- WTEs are especially useful for certain plastics that don't have a recycling market, as plastics, which are essentially oil, will help the incinerator reach high temperatures needed burn more cleanly and generate electricity (AR-I).
- Elected officials in HRRAs prefer WTEs to landfills for future disposal (WD-I). “Do we as 14 municipalities want to join another sister Resource Recovery Authority in the state and bond for another waste-to-energy plant which is unlikely [to] happen because of the not in my backyard. But we can't just assume at this point that it wouldn't be accepted, and we can't just assume we can't afford it.” (WD-I).

3) Financial pressures in the current policy environment threaten the continued operation of waste-to-energy incinerators.

- WTE facilities require periodic refurbishment to function optimally (SG-I, MR-I). These refurbishments are costly.
- Incinerators on Long Island are due to be refurbished, but if they cannot finance this, they may have to close (AR-I).
- In New York State, all non-green energy sources need to be eliminated by 2040 and WTE incinerators are not considered green energy by the state (AR-I). “So if you wanted to refurbish an incinerator to [last] say the next 20 years, it might be hard to bond that because you might not be able to sell your electricity after 2040” (AR-I).
- Connecticut issued an RFP to upgrade or modify the operations of the state's largest Waste-to-Energy facility in Hartford but were unable to secure a contract and the plant closed in 2022. (SG-I). “Revenues were not sufficient to invest in the capital improvements that were necessary to ensure the viability of the facility” (SG-I).
- Finally, selling energy back to the grid is not as lucrative as it once was (MR-I).

4) Waste-to-energy incinerators produce ash, and the management of this material can be improved.

- WTE facilities operate better at high heat (AR-I, MR-I). “The trash that's brought into the waste-to-energy plants might not actually be reduced as much as we think, and that there's a potential for them to run more efficiently and produce less ash product.” (MR-I). There are also opportunities to use the ash produced by incinerators in the production of concrete and asphalt. (IN-I).

- Plastics help the incinerator reach high temperatures needed burn more cleanly and generate electricity, providing an alternative source for plastics with a limited recycling market (AR-I).

5) Siting new waste disposal facilities in the study area is very difficult, but there may be lessons learned from previous efforts.

- While WTE facilities in Connecticut or near New York City may solve some waste disposal or transportation challenges, siting facilities face strong local opposition (WD-I, GI-I). Additionally, the lengthy and uncertain permitting process may make banks reluctant to finance these projects (GI-I).
- Waste and other facilities that have faced strong opposition, have nevertheless been sited, such as Cricket Hill Power Plant or landfills in 1980s and 1990s New Jersey (WD-I, GI-I). “Fist fights, spit on, you know, hit with vegetables and like it was brutal. But what we did in that process is we cited through the counties and constructed 12 double composite line modern landfills” and other facilities still operating in New Jersey (GI-I).

6) The Brookhaven Landfill on Long Island, one of the region’s primary facilities that handles C&D and ash, is shutting down.

- The closure of the Brookhaven Landfill means that approximately 800,000 tons of waste annually will need to find a new destination (IN-I).
- Winter Brothers, the landfill’s largest customer, believes closure could put 75,000 trucks on the roads each day, and are instead pursuing rail transit of waste (IN-I).
- The Brookhaven landfill is also one of the main places to dispose ash from waste-to-energy incinerators on Long Island, “So when the Brookhaven landfill closes, there’s probably 350,000 tons of ash from these municipal combustors that need to get off Long Island” (IN-I).
- In anticipation of this closure, several privately run facilities are at various stages of permitting for rail transport off Long Island (WD-S).

7) The landfill tipping fees in the Tri-State area are high due to a combination of high demand with low capacity.

- “The Northeast and the New England regions have relatively high tip fees because arguably there’s a lack of space to be able to manage that waste, which is going to lead to higher landfill tipping needs and greater efforts at diversion” (AR-I).
- Restrictive government policies may also artificially inflate tipping fees (AR-I).
- Permitting landfill expansions is slow...taking about 5 years in New York (AR-I).
- Landfills in New Jersey were built 30 years ago, with periodic expansions, and Connecticut landfills only take C&D or ash, not MSW (GI-I, SG-I, MR-I).
- Other states, such as Pennsylvania, Virginia, and Michigan offer lower tipping fees, which encourages movement of waste out of state (AR-I). This reduces the amount of business going to local facilities, making it difficult to keep “them open to be able to process the areas trash” (AR-I).

8) Pennsylvania, which accepts a lot of waste from out of state, is seeing opposition to landfill expansions tempered by some local support.

- Landfill expansions are unpopular and parts of the state are seeing hikes in municipal waste prices, dissatisfaction with the high rate of waste import, and concern regarding the import of unregulated potentially harmful waste, “dirty dirt” (MR-I). For landfill expansions, “everybody is suing everybody else.” (MR-I).
- While many people don’t want to live near landfills, some appreciate that these facilities keep their taxes low (MR-I). Monroe County, Pennsylvania has taken steps to ensure their future landfilling capacity by buying air rights for waste in two landfills (MR-I).

9) Waste disposal is a public health issue.

- The environmental benefits or challenges of different disposal types, which are add-ons, can distract from the underlying public health motivations of waste management—removing solid waste from homes, businesses, and public places to prevent the spread of disease, and improve the overall quality of life for residents—which have been successful (AR-I, W1). “I think sometimes we get in trouble when we let these add-ons become the more important factor... If a waste energy plant is justifying their existence because they produce energy, that's wrong” (AR-I).

10) The Tri-State region has strong physical and institutional infrastructure for improving waste management.

- In the region, there is a concentration of strong universities and knowledgeable individuals in the waste management industry. There is also a concentration of ports, railroads, roads, and warehouses. “The region should lean into the fact that it has a heritage of managing waste and recycling and thus try to show everyone how it can be done at a really high innovative level” (AR-I).

5 Survey Findings

The following section summarizes the findings from 13 responses to an online survey distributed via a NYMTC email list serve in spring 2024. Themes include waste diversion, disposal, environmental justice, and transportation.

5.1 Waste Diversion

1) Mandatory recycling and increased concerns about sustainability will reduce the volume of MSW in landfills.

- State policies and building infrastructure for C&D recycling are also necessary (AV-S). “Mandatory recycling, composting organics and limits on exportation. Increasing recycling and the composting of organics will reduce the volume to MSW that has to be placed in landfills”(MR-S).

2) Mandates on packaging could have a significant impact on waste diversion.

- Regulation could keep plastics out of packaging and divert them from the waste stream (MR-S). “An EPR (extended producer responsibility) mandate for packaging could have an enormous impact on diverting plastics from the waste stream. The legislature has flirted with this idea in years past, but it is probably still a long way from coming to fruition” (MR-S).

3) Efforts to implement unit-based pricing and food scrap diversion mandates. Could significantly increase waste reduction and diversion.

- “There have been efforts by both the legislative and executive branches to implement unit-based pricing (pay as you throw) and food scrap diversion pilot programs and/or mandates. These could significantly increase waste reduction and diversion, but these efforts have yet to gain a permanent foothold” (MR-S).

4) Better infrastructure for composting could significantly reduce the amount of waste in landfills.

- “If we can get more anaerobic digestors or composting facilities in CT, that infrastructure would allow us to process more food waste in-state. About 22.5% of CT MSW is food waste, and that number raises to about 40% if you include all compostable materials” (MR-S).

5) Waste management and movement is run as a profit-generating enterprise and needs stronger government oversight.

- “[T]he export of MSW and C&D is primarily a privately-funded goldrush that has attracted investors, including foreign investors. They will spend the least and pocket the most they can, fighting against regulation, seeking loopholes, polluting community air, water, soil, and harming the health of workers and residents unless government steps in to prevent it” (AV-S).

5.2 Disposal

1) Waste-to-Energy facilities in the region are becoming obsolete due to lack of funding and support from the government.

- Public sentiment also impedes the development and refurbishment of waste-to-energy facilities as people do not want them in their backyard (IN-S). “We have 4 waste-to-energy incinerators in CT, and they are all nearing the end of their lifespans. When they go offline, we will need to find some other way to deal with that waste... and it is unlikely to be in-state, since we have no landfills and it would take years to build a new WTE plant” (MR-S).

2) Closure of the Brookhaven landfill will have a significant impact on the region's disposal of MSW and C&D.

- Ash on Long Island will need to be transported out of state as Brookhaven is the region's main ash disposal facility (WD-S). “Scheduled closure of Brookhaven landfill to C&D December 2024 and closure for Ash by 2027, this will significantly change the transportation and disposal of 100,000 tons of MSW waste for the Town [Smithtown] and C&D” (WD-S).¹
- “Closure of the Brookhaven Landfill will require alternate disposal of C&D in 2025. Currently several private facilities are at various stages of permitting for rail transport off of Long Island. Little information has been provided as to where the waste would be transported to or the anticipated cost of transport or reliability of such a system” (WD-S).
- “The closure of the ash landfill in Brookhaven will prompt out of state disposal since there is no availability to dispose of material in state. The mode of transport will consist of rail and truck” (WD-S).

3) Policies influenced by the public like “Not in my back yard” activism greatly impact the development of infrastructure.

- “Public NIMBY policies/sentiment also greatly impede industry development of infrastructure such as Transfer Stations, Waste Energy Plants, and Modern Landfills” (IN-S).

5.3 Environmental Justice

1) Historically waste facilities locate in and negatively impact low-income areas.

- “Historically waste industries locate through the path of least political and economic resistance, largely in lower income and minority communities. New infrastructure needs to address and remediate these historical harms” (AV-S).

¹ This is about an eighth of the annual acceptance rate of Brookhaven Landfill, the MAP Forum Area's largest landfill, (See Task 6) and a fraction of the 5.7 million tons in waste generated on Long Island in 2018, according to the New York State Solid Waste Management plan.

5.4 Transportation

1) Policies in states that accept the region's waste could impact where we send it.

- “Given that CT ships about 40% of its waste out of state, the policies in states that accept our waste (like PA and OH) could impact where we are sending it. For instance, if Ohio decides to stop accepting our waste, we may need to ship it farther” (MR-S).

2) Baling MSW for transportation on flatbeds will become more attractive as waste-to-energy facilities become less desirable (WD-S).

- “When incinerator ash can no longer be disposed of on Long Island the rates for incinerating will go up. This will make baling MSW more attractive and could result in more need/competition for flatbeds to carry MSW out of state” (WD-S).

6 Workshop Findings

This section summarizes the discussion at two public, online workshops conducted in late-2023. The discussions covered the need for regional coordination in waste management, environmental justice implications of waste disposal, methods of waste transportation (including rail and waterways), and strategies for reducing waste generation through extended producer responsibility and improved recycling efforts.

1) Waste movement and management requires regional coordination and consideration.

- We cannot discuss regional waste movement without discussing regional waste planning (W1). Permitting transfer stations is site-by-site without regard for transportation, air quality impacts (W2). Over-reliance on moving waste to other locations keeps issues out of site and out of mind, moving out burden on to others (W2). The New York State Department of Environmental Conservation (DEC) Local Solid Waste Management Plan should be regional and add freight planning as a component (W1).

2) Waste is disposed far from where waste is generated.

- New York City waste is transported to rural upstate New York (W2). Connecticut is shipping 800,000 tons of waste out of state annually (W2).

3) The environmental justice and pollution implications of waste movement and disposal are of top concern.

- Waste flows through cheapest/least political resistance which is often in overburdened disadvantaged and Environmental Justice (EJ) communities (W1). There is concern regarding how the study will express the impact of pollution and greenhouse gases associated with waste (W1).

4) The future of waste movement is likely trucks and rail.

- Rail provides the lowest cost per ton to move solid waste. Perhaps site transfer stations near the rail (W2). Lowest cost per ton by rail is untrue since railroads are using old locomotives and externalizing health and environmental costs for workers and residents (W2). Truck traffic has implications for air quality and street safety (W2). Waste

movement can be improved by using New York City's waterways or "Blue Highways" (W2).

5) The amount of waste requiring disposal should be reduced using a variety of strategies.

- These strategies include extended producer responsibility (EPR), more local organics processing/composting, and improved recycling (W1, W2).
- Commercial waste zones and universal curbside organics collection in NYC are going to change waste movement significantly (W1).

7 References

1. New York Metropolitan Transportation Council. *News and Events*. <https://www.nymtc.org/en-us/News-and-Events#rwms> (last accessed February 16, 2024).
2. New York Metropolitan Transportation Council. *Metropolitan Area Planning (MAP) Forum*. <https://www.nymtc.org/en-us/ABOUT-US/procedures-and-agreements/other-mous/MAP-forum> (last accessed February 16, 2024).

8 Attachment A: Survey Responses and Workshops

This attachment includes responses from a survey and two workshops. Survey responses and workshop notes have been edited for relevance and clarity.

Survey Responses

Q1: What policies and regulations for the transportation or disposal of waste are most likely to affect MSW movement, generation, and diversion in your region over the next 10 to 25 years?

- Mandatory recycling and composting. Limits on exportation. Resulting in reduced volume to MSW that is placed in landfills
- In NJ flow control regulated by the state is the single largest barrier to MSW movement.
- Zero-waste oriented state policies
- Public NIMBY policies greatly impede industry development of infrastructure such as transfer stations, waste energy plants, modern landfills.
- Policies in states that accept waste from the New York metropolitan area could impact movement. For example, if Ohio decides to stop accepting waste, we may need to ship further driving up costs.
- Efforts to implement unit-based pricing (pay as you throw) and food scrap diversion mandates. Could significantly increase waste reduction and diversion.
- An extended producer responsibility mandate for packaging could have an enormous impact on diverting plastics from the waste stream.
- “When incinerator ash can no longer be disposed of on LI the rates for incinerating will go up. This will make baling MSW more attractive and could result in more competition for flatbeds to carry MSW out of state.”
- Scheduled closure of Brookhaven landfill to C&D December 2024 and closure for Ash by 2027 will significantly change the transportation and disposal of 100,000 tons of MSW waste.
- Ban the use of sewage sludge in agricultural or gardening soil amendments as it is toxic.
- Ban organics to landfills

Q2: What policies and regulations for the transportation or disposal of waste are most likely to change C&D movement, generation, and diversion in your region over the next 10-25 years?

- The separation of wood, metals, glass and concrete from the C&D waste stream could reduce the volume that ends in landfills.
 - Regulations will stop allowing recyclable C&D to enter landfills or disposal waste streams in the next 25 years. Instead, this material will be recycled and handled by Materials Recovery Facilities (MRFs).
 - Concerns about sustainability will result in more materials being recycled. Less material will be needed to construct buildings to begin with due to this
 - Ban the disposal of gypsum wallboard in landfills
 - Tax the export of C&D residue from NYS.
-

- Reward repurposing, reusing building.
- Mandate deconstructing buildings instead of demolishing them
- Enforce Governor Hochul law signed in 2023, which required solid covers on rail cars of non-putrescible waste.

Q3: What technologies for the transportation or disposal of waste are most likely to change MSW movement generation, and diversion in your region over the next 10 to 25 years?

- Greater automation to all levels of the industry. Less physical manipulation.
- Rail becoming the primary means of movement of all waste within 2 decades
- More anerobic digestors
- “Technological determinism in solid waste have shown to lead to problems (as in WTE incineration, chemical recycling of plastics, land spreading of sewage sludge as soil amendment, biochar made out of sewage sludge, bioplastics contaminating compost)” – Many answers like this one
- Technologies for composting organics as close to the source as where they are generated as possible and using compost as a soil amendment
- Reduction technologies in the amount of packaging and the toxics in packaging

Q4: What technologies for the transportation or disposal of waste are most likely to change C&D movement generation, and diversion in your region over the next 10 to 25 years?

- Sorting technology improvement

Q5: In your region, what capital investments in roads, trucking facilities, rails, rail facilities, ports or port facilities will impact the movement of MSW or C&D?

- Maintenance of roadways
- Improvements to the rail network moving more volume to rail
- With the exception of NYC, new capital investments in waste movement infrastructure does not matter as waste movement is “primarily a privately funded goldrush” interested in profit above all other goals. “Draw your conclusions based on data and independent research, not on what those seeking to profit off waste tonnage are telling you in their questionnaires or interviews!”
- Threat of a large MSW transfer station at the Port of Albany.

Q6: Are there any planned MSW or C&D debris landfill expansions or new landfills in your region?

- Seneca Meadow Landfill
 - <https://www.nytimes.com/2023/09/17/nyregion/new-york-landfill-seneca-meadows.html>

Q7: Are you aware of any Waste-to-Energy capacity expansions or new Waste-to-Energy facilities in your region?

- Hughes Energy - <https://www.hughesenergygroup.com/projects>
- Planned anerobic digester - <https://www.usbiopower.com/>
- Newton Creek WRF - <https://hellgatenyc.com/flaring-methane-in-greenpoint-per-usual>
<https://www.theexaminernews.com/time-for-westchester-to-shut-down-incinerator-develop-zero-waste-plan/>

Q8: Are you aware of any transfer station capacity expansions or new transfer stations in your region?

- Townline rail proposed railroad and transloading facility for Ash and C&D - <https://www.stb.gov/proceedings-actions/search-stb-records/>
- Winter Bros is targeting an overburdened EJ community for the largest waste transfer station on site not allowed by zoning. They are appealing to federal STF to override local zoning. – www.landfillaction.org

Q9: Are you aware of any material recovery facility capacity expansions or new material recovery facilities in your region?

- Marangi Solid Waste <https://colliersengineering.com/wp-content/uploads/2023/03/Dolsontown-Corridor-FGEIS-Notice-of-Completion-3.9.23.pdf>
- Cayuga Waste Facility <https://www.fingerlakes1.com/2022/07/18/dec-grants-permit-to-cayuta-waste-facility-while-effectively-denying-foil-request-for-key-docs/>

Q10: Are you aware of any other recycling or composting facility expansions or new facilities in your region?

- Moreau NY biochar plant made out of sewage sludge
<https://earthjustice.org/press/2024/over-70-state-and-nationwide-groups-oppose-dec-permits-for-the-proposed-saratoga-biochar-solutions-llc-facility-in-the-town-of-moreau>
- NYC has expanded facilities on Staten Island though the mayor has cut funding for all the community composting facilities in NYC.
<https://www.wastetodaymagazine.com/news/staten-island-compost-facility-undergoes-expansion-dsny/> <https://citylimits.org/2024/01/30/opinion-community-composting-produces-more-than-just-good-dirt/>
- Warren County NY is planning to develop a county-owned food waste composting facility

Q11: Can you recommend any other resources which can provide additional information on waste management related infrastructure expansions?

- Orange County DPW - Robert Grey, Deputy Commissioner
<https://storymaps.arcgis.com/stories/be24e917780f42909ddb3248384a2b90>

- Jamaica Ash, Omni Recycling, Winter Brothers, Tunnel Hill Partners - WIN Waste Innovations
- Peter MantiusTM blog has extensive coverage about the Finger Lakes regions solid waste issues <https://waterfrontonline.blog/>
- read the trade journals; monitor permit applications and public hearings on permitting, siting questions; review jurisdictional solid waste management plans and reports, speak with state environmental regulatory departments (NYS DEC, NJ DEP, etc.), join recycling, organics and hauling/disposal trade groups, attend conferences. There is no one source, you have to do a great deal of legwork and data compilation. Most private sector actors won't want to share details on business plans until they are solid, done deal. What you're looking for requires ongoing, active research and is not a simple matter to compile.

November 10th Workshop

- First discussion about how we cannot discuss regional waste movement without any entity discussing regional waste planning.
 - Given the New York State Department of Environmental Conservation refusal to take on this role.
 - Brookhaven has 2 million people's garbage going into overburdened.
 - Need real waste planning and transport planning otherwise there is no solution.
- Commercial waste zones and universal curbside organics collection in NYC are going to change waste movement significantly.
- Concerns about the documentation of secondary products such as glass cullet, [crushed glass that can be used in manufacturing]
- Concerns about if the study includes transportation of all types of materials i.e., solid waste, recycling, glass, plastics, food waste, etc.
- Concerns about if the study captures residential and commercial waste streams
- Concerns about how study should include environmental justice perspectives in addition to climate change -Mary Arnold
- Concerns that NYMTC should center on environmental justice in the process. Waste flows through cheapest/least political resistance which is often in overburdened disadvantaged and EJ communities. Brookhaven Landfill would like to be included in any EJ conversations
- Concerns about how will interstate and even international destinations or waste, well beyond the NYMTC region be expressed?
- Concerns of how the study will express the locus of control in permitting and export – public vs private sector
- Concerns of how the study will express the movement and fate of pollution and GHG that is associated with waste.
- Concerns on how foreign investors that are involved in waste management will be expressed in the study

- New York City Department of Transportation has partnered with New York department of sanitation to explore ways of reducing negative impacts of waste set out and collection on the city's streets and sidewalks.
 - NYC DOT is particularly interested in innovative methods to reduce VMT associated with waste mobility for less traffic congestion and wear and tear on our infrastructure.
 - Also, how it relates to effects in disadvantaged communities who may experience disproportionate amount of truck traffic.

Workshop Questions

***Question: What organization or community do you represent?**

- Capital Region Council of Governments in CT
- Civics United for Railroad Environmental Solutions
- New York and Atlantic Railway
- MetroCOG CT
- Rockland Green
- Naugatuck Valley Council of Governments
- USDOT-FHWA
- Queens Solid Waste Advisory Board

***Question: What 'top of mind' concerns do you have on the topic of today's workshop?**

- Concerns of quality of data and participation in Study
- Concerns of conflicting law and policies in the different jurisdictions of the study area
- Concerns that the study area will not be hampered by the selection of data and that it will include the human health and safety impacts of waste movement.

***Question: "What aspects of these waste streams most impact your family/community/organization?"**

- The limitations of the freight rail system east of the Hudson, and how it impacts community health and quality of life (noise, pollution, use of tracks in communities) (impacts of use of bay ridge by IBX pushing car storage and movement into neighborhoods)
- Organics and food waste, EPR – packaging, C&D demo and deconstruction, EJ and GHG concerns, tipping fees, out of state transportation and disposal capacity
- Contamination and recovery in single stream
- Waste-by-rail pollution, blowoff, leachate, odors, e.g., toxics in C&D and burner ash.
- MSW and recycling

***Question: "What local, state, or federal waste policies and/or regulations most impact your family/community/organization?"**

- Lack of infrastructure/tech in transportation, especially for private haulers and decreased staffing on trucks in waste collection
- Long distance hauls to find disposal sites
- Permitting, EPR, lack of funding and state-wide-support

- Department of Environmental conservation effectively ceding planning to private haulers and allowing permitting on a site-by-site basis, without regard to transportation impacts except traffic congestion directly associated with the building envelope. No Air quality permit required for transfer stations because there is not a full accounting of emissions. NYS corruption.
- Lack of consistent education on recycling
- Relaxed regulations for transfer stations (e.g., for C&D can have 3 walls and a roof). Lack of enforcement.

***Question: “What waste disposal MANAGEMENT policies are most important for the future in your community/organization? (i.e., recycling; waste-to-energy; etc.)”**

- A facility nearby takes organics “bio slurry” from waste management transfer stations and co-digests it with sewage yielding methane and contaminated sludge.
- Waste to energy
- Sludge has to be exported
- Need for new innovations in management. Everything currently leaves too much volume, too much transport.
- EPR, organics, C&D, composting
- Reduction, extended producer responsibility (EPR), bigger, better bottle bill, recycling gypsum from construction debris.
- Cooperation between public and private organizations, lack of infrastructure and funding to develop technology

***Question: “Where do you see bottlenecks or chokepoints in waste movement? (By movement we mean the transport of waste via a conveyance either to or between waste facilities)”**

- Rehandling centers... both the legal and the illegal
- The lack of accounting for the health, safety, environmental costs means that the current disposal methods are the “cheapest”.
- NO capacity – increased tipping fees and reliance on out of state transportation not only in CT, but growing in all of New England

***Question: “What methods of waste movement are most important for the future?”**

- Rail
- Fresh pond Yard and the ongoing erosion of freight rail facilities in favor of needed passenger transport. Freight rail is for bulk goods, limited market and low to no-value loads predominate (waste and stone). One of the reasons NYC is pitching towards marine movement of freight.
- just more trucks
- Multi-modal, esp. rail and cost effective/efficient local facilities for disposal. -Robyn Nichols
- Development of innovative technologies for zero waste-circular economy through public/private partnerships
- When enforcement is effective, limiting trucks to less than 80,000 pounds. We then need 3x more trucks.

- The movement toward reduction, reuse, real recycling.

***Question: “How can the management and disposal of waste be improved?”**

- Make permitting easier
- Reduce distance MSW, etc. needs to be moved – more facilities
- Decarbonize waste transport
- Stop making single use products
- Change NYSDEC LSWMP requirement to regional and add freight planning as a component.

December 13th Workshop

This meeting began with introductions, discussion of the study, followed by polling. Below are the poll questions and relevant responses:

- Concerns about the topic of waste movement:
 - Keeping waste export cheap, which externalizes actual costs
 - Environmental Justice
 - Transportation of NYC waste to rural upstate NY
 - Protecting the environment and air quality
 - The need for a change in “business as usual” of the legacy waste and rail industries, to reduce the amount of waste and decarbonize transport
 - Toxic chemical and LNG transport – public health hazard
 - Multi-modal connectivity
 - Connecticut shipping 800,000 tons out of state annually – impact on roads and the increased tipping fees
 - Inclusion of low-tech local solutions like aerobic composting
- The study is focused on municipal solid waste and construction & demolition debris. What aspects of these waste streams most impact your community / organization?
 - Microplastic shedding.
 - Cost, trucking needs, no good alternative
 - Truck traffic – air quality and street safety
 - Air pollution from incineration, water pollution
 - GHG emissions
 - Hazardous dust and debris
 - Waste spillage, odors, leachate, blowoff from rail cars of waste, unhealthy noise
 - Safety due to overloaded vehicles
 - Health impacts
- What waste policies/regulations most impact your community/organization?
 - DEC limiting and controlling transfer waste has cost implications.
 - Site by site permitting transfer stations without regard for transportation, air quality impacts.
 - Organics recycling and permitting is too cumbersome and focused on enabling high capital/scale digesters/WTE plants.
 - NYC local laws regulation waste streams
 - Need clear public policy to increase recycling

- Over-reliance on moving waste to other locations keeps issues out of site and out of mind, moving out burden on to other
 - Investors, including foreign investors, profiting from relaxed US and state regulation over in-use locomotive emissions, standards for waste transfer stations
 - Climate goals like PlaNYC
 - Transportation board waving local zoning regulations
 - Another problem is commercial transfer stations that are being sited inappropriately, like on the Hudson River. The Port of Coeymans in Albany County for example.
 - NYS DEC does not double check the data in the annual reports. I know this for a fact for public facilities because we have FOILED for such reports, and they have huge gaps -- like a facility that accepts recycling with NO DATA reported on recycling. Many examples
 - What facilities are most relevant to waste disposal in your community/organization?
 - Transfer stations
 - Anerobic digester for food
 - Reuse centers
 - Landfills
 - Where do you see bottlenecks or chokepoints in waste movement?
 - Organics that wind up in landfills and incinerators or co-digested with sewage instead of being composted and turned into soil amendment
 - EJ communities that bear a disproportionate share of waste facilities and transport impacts
 - Long distance haulers on NYS Route 17
 - Hunts point
 - Traffic impacts collection and collection impacts traffic
 - I95 and I84 already congested, export trash exceeds capacity of highway system
 - Fresh pond yard
 - What methods of waste movement are most important for the future?
 - Extended Producer Responsibility
 - Reduce waste
 - Recycle more
 - Reduce environmental impacts of transportation
 - Fully enclosed freight cars – no spillage
 - Reduce distance traveled
 - Ban on transport of highly toxic chemics/oils/etc.
 - Localize composting
 - Curbside containerization
 - Increased use of water modes
 - Keep organics out of the waste stream, reduce waste on trucks, rail, barge by 41% coming out of NYC
 - Greater weighting on transportation impact. More sorting and reduction and local levels
 - Barge and Rail
 - Reduce packaging
 - How can the movement of waste be improved?
 - Charge manufacturers more for things that can't be transported easily
-

- More communication to public
 - Lowest cost per ton by rail is untrue since railroads are using old locomotives and externalizing health and environmental costs for workers and residents
 - Use NYC's blue highways
 - Rail provides the lowest cost per ton to move solid waste. Perhaps site transfer stations near the rail
 - Increased reuse (so less traffic)
 - NYS adopts the California rail regulation recently approved by EPA
 - We need a viable high capacity and high-tech port near JFK to transfer waste from Brooklyn/Queens/Nassau
 - Segmentation and reduction closer to the point of generation for more local solutions with less hauling
 - Increased capacity for trucks
 - Truck onboard technologies for safety
 - Decarbonize transportation
 - Other concerns?
 - NYMTC and Rutgers CAIT should be using the EPA Wasted Food Scale in the analysis about externalizing costs
 - Concerns about how railroads will be discussed in the study as they are the cheapest way of transporting but also have large health and environmental impacts for communities.
 - Discuss the odds of derailment and effect on people
-