

NYCHA 2.0

Waste Management Plan



Table of Contents

Letter from Leadership	2
Executive Summary	4
Introduction	8
Goal #1: Set positive norms and expectations	16
Initiative 1: Launch “Campaign for a Clean NYCHA”	18
Initiative 2: Support robust outreach and education by resident-led and nonprofit groups	20
Goal #2: Make proper waste disposal convenient	22
Initiative 3: Improve trash chutes to encourage proper use.....	24
Initiative 4: Evaluate adoption of new collection technology.....	26
Initiative 5: Provide trash cans, improve drop-off sites, and redesign waste processing areas.....	27
Initiative 6: Improve bulk waste collection.....	28
Goal 3: Reduce landfill-bound trash by improving and expanding recycling	30
Initiative 7: Improve metal, glass, plastic, and paper recycling	32
Initiative 8: Recycle textile waste	35
Initiative 9: Recycle electronics and appliances.....	36
Initiative 10: Recycle bulk waste	37
Goal 4: Eliminate food in garbage that attracts rodents and pests	38
Initiative 11: Remove food waste from landfill-bound garbage.....	40
Initiative 12: Improve containerization of landfill-bound garbage.....	42
Implementation	44
Appendices	49
NYCHA Bulk and Recycling Composition Study Summary of Findings.....	50
Trash Talk: Findings from Resident Waste Management Outreach.....	55
Abbreviations	75
Acknowledgments	76

LETTER FROM LEADERSHIP



Dear New Yorkers,

We are proud to present the New York City Housing Authority’s comprehensive plan to make our buildings and grounds visibly clean and free of pests by 2025. Waste management is one of the most important and complex challenges that the Authority faces. Although NYCHA caretakers already spend half their day or more on waste management, there is far too much visible garbage attracting pests and degrading quality of life. Through strategic partnerships, capital investments, and improvements in policies and procedures, this plan will fundamentally change the day-to-day experience of waste at NYCHA.

The NYCHA 2.0 Waste Management Plan is the product of extensive discussion with internal and external stakeholders, and many of the improvements included here have already been tested successfully at NYCHA properties. It applies the lessons learned in NYCHA’s participation in the Mayor’s Rat Reduction Initiative, and builds on steps NYCHA has already taken, such as the 2016 Authority-wide installation of recycling bins. The Plan supports the City’s goal to send Zero Waste to Landfill by 2030 and delivers on the promise of the 2015 NextGeneration NYCHA commitment to safe, clean, and connected communities.

This plan, like the Sustainability Agenda it builds on, represents a commitment by the Authority and an invitation to residents, employees, community organizations and sister agencies to work together to make this vision for a clean NYCHA a reality. Residents, employees, and NYCHA communities deserve no less.

In partnership,

Vito Mustaciuolo
General Manager

Deborah Goddard
Executive Vice President
Capital Projects

EXECUTIVE SUMMARY

The NYCHA 2.0 Waste Management Plan

The consensus among NYCHA residents and staff alike is that garbage is everywhere, disorganized, and much too visible an intrusion on every-day quality of life. NYCHA caretakers — nearly one in three NYCHA employees — are on the front-lines of managing the 200,000 tons of waste produced on NYCHA developments every year. Although they already spend half of their day on waste management, they fight an up-hill battle: since NYCHA buildings were built, the amount of waste generated by American households has tripled, and expectations about waste management have changed over time, while available resources to invest in modernizing NYCHA’s waste infrastructure have fallen behind. NYCHA residents deserve better.

The Waste Management Plan proposes a comprehensive approach to make NYCHA buildings and grounds visibly clean and free of pests by 2025. The goals and initiatives of the plan are guided by the following vision for a clean NYCHA:

- » NYCHA campuses should be free of visible garbage, litter, and pests
- » Residents should have convenient and clearly marked locations to deposit garbage of all types, including recyclables and food waste
- » Waste management infrastructure should be well-maintained, adequate for the volume of waste, and state-of-the-art wherever possible

The Plan includes 12 initiatives, many of which NYCHA has already begun or will begin today:

Goal 1: Set positive norms and expectations

Launch “Campaign for a Clean NYCHA.” The Campaign will apply the tools of public awareness and behavior change campaigns to define and promote a positive waste culture at NYCHA. The campaign will be reinforced through changes in procedures that immediately improve environmental cues.

Support robust outreach and education by resident-led and nonprofit groups. NYCHA has been investing in effective collaboration with mission-driven non-profit organizations serving NYCHA communities. NYCHA, in partnership with DSNY, will support and invest in

resident- and community-led initiatives that seek to reinforce a positive waste culture.

Goal 2: Make proper waste disposal convenient

Improve trash chutes to encourage proper use. In the short-term, progress toward a trash-free NYCHA will entail effective use of existing waste infrastructure combined with waste reduction and recycling. NYCHA will improve signage, communications, and cleaning policies, and improve the usability of chutes to encourage residents to use existing trash chutes.

Evaluate adoption of new collection technology to replace or supplement the existing infrastructure. NYCHA will evaluate longer-term capital improvements to modernize waste infrastructure, including pneumatic waste systems, which can eliminate chute clogs and waste spillage, allow for recyclables and organics source separation, and work reliably regardless of weather.

Improve drop-off sites and waste processing areas and provide trash cans on NYCHA grounds to manage litter. NYCHA will revise waste management procedures to process trash and recycling out of sight of the residents; test various methods of containerizing large trash bags; and work with residents to devise organized drop-off areas that promote cleanliness.

Improve bulk-waste collection. Disposal of bulk waste, such as discarded furniture, is particularly challenging for residents and staff. NYCHA will designate clearly marked bulk deposit areas; deploy bulk crushers to containerize bulk waste; and institute bulk collection policies that make it easier to remove bulk waste from NYCHA sites quickly.

Goal 3: Reduce landfill-bound trash by improving and expanding recycling

Improve metal, glass, plastic, and paper recycling. Providing recycling bins at all NYCHA developments was only a first step in building a robust recycling program for public housing residents. NYCHA and DSNY will continue to work on making recycling more convenient. NYCHA will also recycle cardboard, which is currently disposed with bulk waste.

Recycle textile waste. DSNY estimates that textiles comprised 8% of NYCHA’s waste stream in 2017. NYCHA and DSNY will explore recycling textiles starting in 2019.

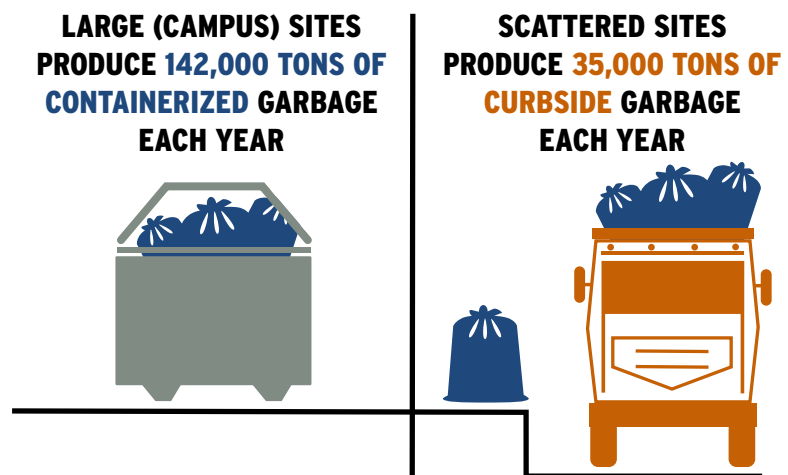
Recycle electronics and appliances. Since January 2015, it has been illegal for New Yorkers to discard electronics in the trash. NYCHA will work with DSNY to provide convenient recycling options for electronic waste at all developments by 2025.

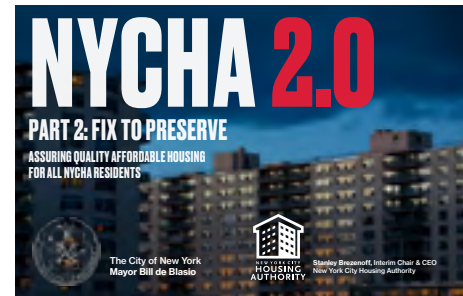
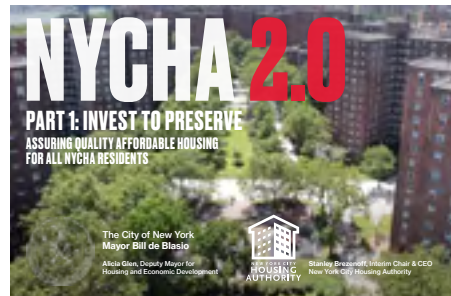
Recycle bulk waste. A large share of bulk waste could be recycled or repurposed but no municipal program currently exists for bulk recycling. NYCHA will explore both private and public programs to divert furniture and other reusable or recyclable materials.

Goal 4: Eliminate food in garbage that attracts rodents and pests

Remove food waste from landfill-bound garbage. NYCHA’s current infrastructure makes standardizing an approach to collecting food waste very difficult; however, where possible, NYCHA will participate in DSNY’s curbside organics pickup. NYCHA, in partnership with DEP, will also install in-sink food disposers at select sites, sending food waste to be converted to energy at the Newtown Creek wastewater treatment plant.

Improve containerization of landfill-bound garbage. As long as household waste contains food scraps, the best defense against vermin is to minimize the time that trash sits outside of sealed containers. NYCHA will invest in equipment replacements and upgrades, including of interior and exterior compactors, and revise collection procedures where necessary to move trash quickly into rat-proof containers.





NextGeneration NYCHA and NYCHA 2.0

NYCHA serves over 390,000 low-income New Yorkers in 316 public housing developments. Like other infrastructure created for the public good—water supply and sewers, transit, parks, and roads—public housing is an asset that must be preserved for future generations. But New York’s public housing is in trouble, threatened by decades of federal disinvestment. In the past 15 years alone, NYCHA has lost \$2.7 billion in federal operating and capital funding. Combined with the inevitable aging of NYCHA’s buildings, these shortfalls have resulted in the need for \$32 billion in capital improvements.

On May 19, 2015, Mayor de Blasio and NYCHA announced NextGeneration NYCHA, a wide-ranging ten-year plan to stabilize the financial crisis facing New York City’s public housing authority and deliver long-needed improvements to residents’ quality of life by changing the way NYCHA is funded, operated, and how it serves its residents. Developed over the course of a year from 150 collaborative meetings with NYCHA residents, stakeholders and elected officials, NextGen NYCHA builds on the de Blasio administration’s commitment to stabilize, preserve, and revitalize public housing. Facing the worst financial crisis in NYCHA’s history, the Authority continues to launch targeted initiatives with the goal of improving resident quality of life and preserving public housing for the present and future generations. With increased transparency, infrastructure improvements, and stakeholder engagement, NYCHA is taking meaningful steps to change the way it does business and become a more modern, effective, and efficient landlord.

In the past three years, NYCHA has made major progress in its commitment to improving quality of life: NYCHA modernized operations using technology; implemented flexible property management staff schedules to provide better customer service; and generated revenue for repairs through ground-floor leasing to businesses and improved rent

collection. NYCHA has also placed residents into nearly 15,000 jobs since 2014 through the Authority’s workforce development programs.

In December 2018, Mayor de Blasio and NYCHA unveiled NYCHA 2.0, a comprehensive plan to preserve public housing. This plan will resolve \$24 billion in vital repairs to New York City’s aging public housing and improve health and safety conditions for all residents. The ten-year plan will deliver top-to-bottom renovations for 175,000 residents, fund essential capital repairs across the rest of NYCHA’s portfolio, and launch aggressive new repair strategies to tackle lead paint, mold, elevators, heat, and vermin.



OneNYC and the NYCHA Sustainability Agenda

The NYCHA 2.0 Waste Management Plan directly contributes to the Zero Waste by 2030 goal of *One New York: The Plan for a Strong and Just City (OneNYC)*. Released in April 2015, Mayor de Blasio’s plan for growth, sustainability, resiliency, and equity provides a blueprint for tackling New York City’s most significant challenges—population growth, aging infrastructure, increasing inequality, an evolving economy, and climate change. As New York City heads into its fifth century, NYCHA plays an important role in ensuring the vision of a thriving, just, equitable, sustainable, and resilient city.



The Waste Management Plan is an extension of the *NextGeneration NYCHA Sustainability Agenda*, which expresses NYCHA’s commitment to create healthy and comfortable homes that will withstand the challenges of climate change. The Agenda details the goals the Authority has set for 2030 for climate change mitigation, indoor environmental quality, and efficient and effective resource management. By communicating these priorities and goals clearly, NYCHA seeks to establish a firm foundation for partnerships with residents and the communities surrounding them to work together towards achieving the City’s long-term vision.

INTRODUCTION

The Vision for a Clean NYCHA

Achieving the clean NYCHA campuses that residents deserve will require everyone to pitch in. The NYCHA 2.0 Waste Management Plan seeks to reset both NYCHA employees' and residents' expectations through the following vision for a clean NYCHA:

- » NYCHA campuses should be free of visible garbage, litter, and pests;
- » Residents should have convenient and clearly marked locations to deposit garbage of all types, including recyclables and food waste; and
- » Waste management infrastructure should be well-maintained, adequate for the volume of waste, and state-of-the-art wherever possible.

Toward these ends, NYCHA will invest in waste infrastructure and institute programs and policies that:

1. Set positive norms and expectations
2. Make proper waste disposal convenient
3. Reduce landfill-bound trash by improving and expanding recycling
4. Eliminate food in garbage that attracts rodents and pests

The scourge of visible, ubiquitous trash

The consensus among NYCHA residents and staff is that garbage is everywhere, disorganized, and an intrusion on everyday quality of life. Disorganized waste is not only visually unappealing, but also invites vermin by providing easy access to food in household waste and protected pathways to travel, hidden by bulk waste and trash piles.

This visible and ubiquitous waste belies the substantial effort expended by NYCHA caretakers — nearly one in three NYCHA employees — who are on the front-lines of managing some 200,000 tons of waste produced on NYCHA developments every year. Although caretakers report spending half or more of their shift on waste management, they fight an up-hill battle: since NYCHA buildings were built, the amount of waste generated by American households has tripled and expectations about waste management have changed over time, while available

Based on the EPA's national waste tonnages recorded from 1960 vs. 2013. Does not account for population growth, waste industry changes, population demographics, etc.

Source: <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/>

resources to invest in modernizing NYCHA’s waste infrastructure have fallen behind.

That NYCHA caretakers spend so much time on waste management may come as a surprise to residents and outside observers. Much of the caretakers’ efforts entail moving bagged garbage from one location to another, such as from the interior compactor room to the exterior compactors. The time caretakers spend on managing trash detracts from other aspects of caretakers’ work that also contribute to cleanliness, such as sweeping, checking entryways and elevators, etc.

NYCHA residents—and NYCHA staff—deserve better.

What are the factors that have resulted in the current garbage crisis?

Numerous field studies of garbage and littering have generated some consensus around commonsense principles for waste management. At NYCHA, many of these basic principles for cleaner environments are subverted:

- 1. Social norms set the tone:** Personal decisions about garbage are strongly influenced by social norms. Anti-littering campaigns help to set social norms and provide visual cues (such as themed receptacles) that result in cleaner environments. NYCHA does not currently have a coherent and comprehensive messaging program encouraging proper waste disposal.
- 2. Litter begets litter:** The cleanliness of physical surroundings influences a person’s trash disposal behavior. When an area is already dirty, people tend to litter more. At NYCHA, the accu-

Left to Right: Mattresses in a compactor yard; Garbage accumulates outside an entryway; Trash bags deposited next to a recycling station



mulation of misplaced trash bags or littered grounds encourages people to follow suit. In some cases, even properly placed trash bags—set out for curbside pick-up, for example—can encourage the accumulation of additional, often un-bagged, garbage.

- 3. Convenience matters:** People use trash receptacles when they are conveniently placed. At NYCHA, the trash chute hoppers are too small to accommodate regular-sized kitchen trash bags. Rather than wrestle with the chute hoppers, residents take trash down to the grounds and create informal drop-off locations. In addition, there are no trashcans on the grounds, so there is no “right” place to dispose of litter.

What waste is generated at NYCHA?

NYCHA households generate about 20% more waste than the citywide average: 1.1 tons per household per year at NYCHA, compared to 0.9 tons per household per year citywide. The disparity may be attributable to larger household sizes, including the presence of off-lease residents.

The make-up of waste generated at NYCHA tracks closely to citywide residential waste composition, with a few small differences: NYCHA generates less yard waste and more food scraps and recyclables.

Of the approximately 200,000 tons of waste produced annually at NYCHA developments, 87.5% is household garbage and 12.5% is bulk waste. Although DSNY estimates a third of NYCHA household waste is material that can be recycled through existing recycling bins, residents currently recycle less than 2% of total household waste.

Left to Right: NYCHA caretakers collect trash to transport it to a compactor yard; Typical trash chute hopper door and signs of various vintages; “No Dumping” sign signals the opposite.



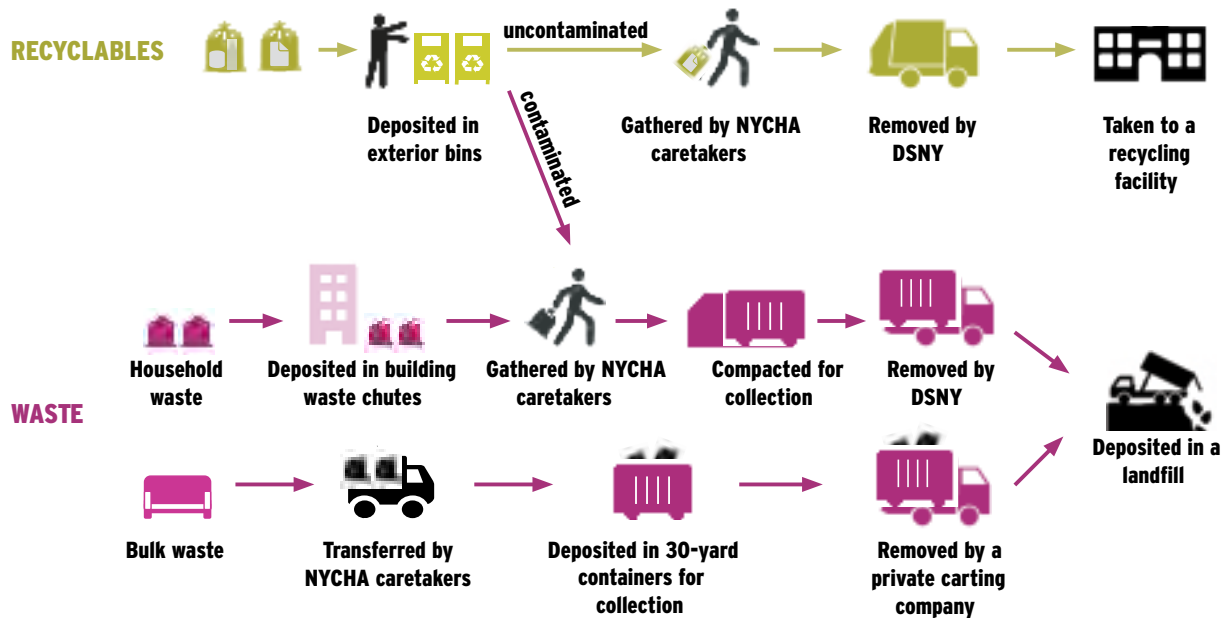
How is waste managed at NYCHA today?

All NYCHA master-planned campuses and large buildings have trash chutes that lead to interior compactors, which produce 40-pound compacted bags of refuse. These bags are hand-trucked or driven to exterior 30-yard sealed compactors. The exterior compactor containers are swapped out and trucked away by DSNY when full. Recycling infrastructure consists of one set of exterior permanent metal bins for paper and metal, glass, and plastic for every 3 buildings. Bulk waste is collected in an exterior area in open-top 30-yard containers and hauled away by private carters with DSNY tip tickets.

Scattered-site developments and small buildings generally use portable plastic trash bins. Refuse is collected in 40-pound bags and set out for DSNY curbside pickup, as at other residential properties in the City. Recyclables in these buildings are also collected in movable recycling bins and are set out at curbside according to DSNY's schedules. Unlike at the master-planned developments, there are no dedicated areas for bulky items.

Throughout NYCHA, white goods such as stoves and refrigerators are subject to a process that ensures hazardous chemicals, like chlorofluorocarbons, are properly removed before the items are picked up by DSNY. Litter and small debris removal procedures are established by the management at each site and vary across developments.

Figure 1: Waste management is labor intensive.



Guiding principles for the Waste Management Plan

As with all NYCHA Sustainability Agenda initiatives, implementation of the Waste Management Plan will be guided by these principles:

1. Make improvements to **resident quality of life** the top priority and the key measure of success. Sustainability strategies often embrace multiple goals. NYCHA will give first priority to achieving improvements that residents can see and feel in their daily experience.
2. Adopt rigorous **evidence-based practices**. NYCHA will measure the impact of the Sustainability Agenda across its entire portfolio to see what works and what does not.
3. Communicate goals, metrics, and methods **clearly and transparently**.
4. Work in a **spirit of partnership** with sister agencies, residents, community organizations, and research institutions. The Sustainability Agenda outlines NYCHA's commitments in its role as a landlord, but NYCHA's actions alone will not achieve sustainability. NYCHA intends to be an open and effective partner in a shared pursuit of sustainability in the communities it serves. NYCHA will proactively and transparently identify opportunities for sustainability and welcome resident-led and community-led initiatives.

GOAL #1

**SET POSITIVE NORMS AND
EXPECTATIONS**

The visibility and ubiquity of litter and trash on NYCHA grounds encourage more littering. NYCHA seeks to identify a menu of strategies for behavior change, supported by improved management, to break this cycle. NYCHA intends to change the culture of waste by creating positively reinforcing norms, environments, and actions.

Research has shown that three factors influence individual decisions about waste disposal. First, norms and expectations provide a base framework that defines right and wrong choices. Then, whether a person chooses to act rightly or wrongly depends on two additional factors: 1) cues from the environment and 2) what other people are seen doing.

Resetting the culture of waste at NYCHA is necessary because many different people make the decisions that drive how waste is generated and managed. Undoubtedly, some decisions about waste are in the hands of NYCHA's 390,000 residents, including what they choose to buy or where they dispose the resulting refuse. These decisions drive how much waste is generated in NYCHA developments. Other waste-related decisions are the domain of NYCHA staff, such as how often litter is picked up and where trash receptacles are placed. These decisions affect how convenient or inconvenient it is to find the right place to dispose of trash and how quickly trash leaves the development. NYCHA staff also decide how to prioritize management resources, given the constraints imposed by the available infrastructure.

Initiative 1: Launch "Campaign for a Clean NYCHA"

The "Campaign for a Clean NYCHA" will apply the tools of public awareness and behavior change campaigns to define and promote a positive waste culture at NYCHA. The campaign will be reinforced through changes in procedures that immediately improve environmental cues.

Initiative 2: Support robust outreach and education by resident-led and nonprofit groups

Since the launch of NextGeneration NYCHA in 2015, NYCHA has been investing in effective collaboration with mission-driven non-profit organizations serving NYCHA communities. NYCHA, in partnership with DSNY, will support and invest in resident-led and community-led initiatives that seek to reinforce a positive waste culture.

Initiative 1

Launch “Campaign for a Clean NYCHA”

“

I take my trash to the compactor - but if it's too full, I have to push the garbage down. When I want to throw out furniture, I try to work with housing to ask where I can put the furniture.

”

“

It's confusing around where to throw the trash - if we put garbage in front of the building and management sees it, they give us a fine. But workers tell us it's ok and that we won't get in trouble.

”

“

I don't think there are labelled areas - there are just areas where trash usually is. This is where we leave them.

”

The “Campaign for a Clean NYCHA” will be anchored by highly-visible behavior change messages delivered through signage and other visual prompts, which will be developed in close collaboration with resident organizations, non-profits, and advocacy organizations. The campaign will initially launch at select developments for testing and refinement before rolling out NYCHA-wide.

Successful anti-litter campaigns, many of which are decades old, incorporate:

1. **Simple, inspiring messaging** that captures the essence of the campaign message in a few words and are easy to remember
2. **Social sharing and earned media** that carry the message across multiple social channels without high marketing costs
3. **A big core issue**, coupled with many smaller, actionable items
4. **Processes to measure success** by, for example, tracking reduction in litter, and/or reduction in costs

In 2018, Ideas42, a non-profit that uses behavioral science to design scalable solutions to social problems, assessed waste management practices at NYCHA. Based on interviews with residents and staff at seven developments, Ideas42 found that:

1. It's very difficult for NYCHA residents to throw trash out correctly. Residents with “middle sized trash” too big for trash chute hoppers do not have available alternatives.
2. Social norms have filled the gap left by inconsistently-enforced policies. People look to their neighbors, not NYCHA policy, for suggestions on where to put trash.
3. Misperception of norms promotes improper trash disposal. The amount of trash on NYCHA grounds suggest that ‘everyone’ is throwing trash out outside when in fact only a few are.

NYCHA will begin work in 2019 to develop the foundations of an Authority-wide “Campaign for a Clean NYCHA.” NYCHA will select five developments that are slated to receive waste management infrastructure upgrades and develop signage, environmental cues, and public messaging to reset the social norms for disposal behavior.



86it promotional materials.
Photos courtesy of Wake County.

Resetting Social Norms: “86it” Anti-litter Campaign

Wake County, Raleigh, North Carolina, 2010–present

The term “86it” means “to get rid of something; to throw it out.” The award-winning 86it Anti-Litter Campaign of Wake County, North Carolina, emphasizes the importance of personal responsibility in the reduction of litter by instilling a sense of community pride and setting anti-littering social norms.

Prior to the 86it program, the county had various clean-up programs, as well as littering laws and efforts to enforce them. But these were not enough to stop the littering behavior. Based on a study that found that the most persistent, deliberate litterers in North Carolina tend to be between the ages of 11 and 24, Wake County determined that the missing piece was a strong educational campaign for youth.

The campaign aims to change behavior through community outreach, organized cleanups, high school program development and an aggressive upbeat social media and multi-channel marketing campaign. Beyond the message, the campaign offers the “86it litter kit” for scheduled clean-up days consisting of safety vests, litter grabbers, garbage bags, and a safety guide. Over 32,000 people have taken the pledge to be an 86er as of March 2019.

Initiative 2

Support robust outreach and education by resident-led and nonprofit groups

Since the launch of NextGeneration NYCHA in 2015, NYCHA has stepped up its collaboration with non-profit organizations serving NYCHA communities. NYCHA's Office of Resident Economic Empowerment & Sustainability (REES) is committed to connecting residents to high-quality programs throughout New York City.

Using both the REES Zone Model and the NYCHA Ideas Marketplace, NYCHA will build on existing programs to attract and support resident-led and non-profit organizations' waste management efforts. REES' Zone Model is place-based and is focused on service coordination and strategic partnerships that leverage localized external resources and services. The Ideas Marketplace, hosted by ioby, is a crowd-funding platform designed to help connect like-minded residents and community groups in NYCHA communities to sustainability and quality-of-life projects.

The Ideas Marketplace seeks to support local organizations and grassroots leaders who know the on-the-ground conditions and local priorities, cultures, and needs that lead to successful resident sustainability initiatives.





Left: EcoRich composters on site. **Right:** Brigitte Vicenty, creator of the “white-glove” recycling pilot

Zero Waste in Shared Space Challenge

In 2017, Brooklyn’s Brownsville Houses, home to some 1,300 families, was chosen as the site for a NYCx Co-labs Challenge, created by the Mayor’s Office of the Chief Technology Officer (MOCTO) and New York City Economic Development Corporation (NYCEDC).

“Zero Waste in Shared Space” invited proposals from the community for innovative programs that would reduce litter and improper waste disposal; increase resident participation in recycling; and promote waste-free common spaces through increased community stewardship.

Brownsville-based organizations participating in the selection process included: Made in Brownsville, 3 Black Cats, the Community Solutions/ Brownsville Partnership, the Brownsville Community Justice Center, and Friends of Brownsville Parks. Green City Force is providing implementation support.

Two winning proposals were selected from 13 submissions:

EcoRich proposed installing its aerobic composting machines to process food waste into compost much faster than through traditional composting. The compost will be used at the development’s gardens and the Farms at NYCHA program located at nearby Howard Houses.

NYCHA resident Brigitte Vicenty of **Mothers on the Move**, a Bronx-based community organization, proposed a “white-glove” recycling service to provide door-to-door collection of metal, glass, plastic, and paper recyclables. Preliminary results show that recycling participation more than tripled during the intervention, from 2% of households to 7.9% at peak, with the highest per-building participation at 30%.

GOAL #2

**MAKE PROPER WASTE DISPOSAL
CONVENIENT**

Many residents choose not to use the indoor waste management facilities provided by NYCHA, preferring to take trash bags out to the grounds. Over time, unsightly informal collection areas have emerged, and these attract more trash and rodents. Whether dropped by passers-by or residents, or spilled from improperly placed trash bags, litter begets more litter.

Initiative 3: Improve trash chutes to encourage proper use

In the short-term, progress toward a trash-free NYCHA will entail effective use of existing waste infrastructure combined with waste reduction and recycling. NYCHA will improve signage, communications, and cleaning policies, and improve the usability of chutes to encourage residents to use existing trash chutes.

Initiative 4: Evaluate adoption of new collection technology

NYCHA will evaluate longer-term capital improvements to modernize waste infrastructure, including pneumatic waste systems, which can eliminate chute clogs and waste spillage, allow for recyclables and organics source separation, and work reliably regardless of weather.

Initiative 5: Provide trash cans to manage litter, Improve drop-off sites, and redesign waste processing areas

NYCHA will revise waste management procedures to process trash and recycling out of sight of the residents; test various methods of containerizing large trash bags; and work with residents to devise organized drop-off areas that promote cleanliness.

Initiative 6: Improve bulk-waste collection

Disposal of bulk waste, such as discarded furniture, is particularly challenging for residents and staff. NYCHA will designate clearly marked bulk deposit areas; deploy bulk crushers to containerize bulk waste; and institute bulk collection policies that make it easier to remove bulk waste from NYCHA sites quickly.

Initiative 3

Improve trash chutes to encourage proper use

Seventy-nine percent of NYCHA households live in buildings served by trash chutes on each floor. The trash chutes are intended to make disposal convenient, thereby reducing the time that garbage sits inside homes causing odors or attracting pests. The chutes are connected to trash compactors in basements. Developments served by trash chutes do not have other collection areas for household garbage.

When asked about disposal habits, residents have observed that typical 13-gallon kitchen garbage bags don't fit through the hopper doors; the hopper doors are heavy and often dirty; and signage in the chute areas sometimes provides outdated or conflicting information, particularly when trash chutes are out of service because of compactor breakdowns. Fifty-seven percent of residents surveyed in early 2019 noted that too-small, damaged, or dirty trash chute doors are a deterrent to their regular use, and 71% of survey respondents ranked "condition of trash chutes" and "disposal locations" as the most or second-most influential factor in their waste disposal habits.

Despite the inconveniences, the trash chutes remain the current best option for residents to dispose of landfill-bound trash. NYCHA recognizes that improvements in configuration and maintenance may help to encourage more residents to use the chutes rather than dispose of garbage outside their buildings.

Enlarge first floor lobby hopper doors

In 2018 NYCHA received approval from DOB and FDNY to provide larger hopper doors on the first floors of NYCHA buildings and began retrofitting 40 senior buildings. The larger doors can accommodate a typical 13-gallon kitchen garbage bag and offer an in-building disposal option to residents who are currently taking their trash out to the grounds because the mid-sized bags are too big to fit in the current hopper doors. NYCHA plans to provide larger hopper doors on the first floors of all buildings that can accommodate them.

More than 4,500 residents responded to an online survey and 147 residents provided in-person feedback on the challenges of trash disposal. Please see Appendix: Trash Talk: Findings from Resident Waste Management Outreach



Top: Old hopper doors are too small for kitchen garbage bags.

Bottom: new, larger hopper door installed in 2018.

Improve signage, communication, and cleaning policies

Residents should be able trust that signage in trash chute areas provides up-to-date, clear instructions. NYCHA will update its policies/procedures in the following ways:

1. Developments will remove conflicting and outdated signage and replace with the standard NYCHA Recycles! signage.
2. When trash compactors break down and need repair, NYCHA will post signage in the building to notify residents of the expected duration of the outage and provide clear instruction on alternate, conveniently-located trash collection locations. Temporary collection areas shall use enclosed containers to deter rodents. Residents will receive automated notification when compactors are back in service.
3. Maps indicating collection locations, including those for bulk waste and special waste such as electronics and appliances, and trash collection schedule information will be prominently posted in lobbies and management offices. Digital versions of the maps will be available at NYCHA electronic kiosks.
4. NYCHA will institute regular inspections and cleaning of trash chute areas.

Provide rat-proof collection bins in informal disposal sites

NYCHA will also regularize informal disposal areas by removing contradictory signage and providing lidded tilt trucks, with the goal of making the locations where residents already dispose their trash clean and rodent-proof. These locations are most often a short distance from the front door and quickly accumulate unsightly piles of bagged and unbagged trash. In partnerships with Ideas42, NYCHA is currently evaluating the efficacy of these interventions at 53 NYCHA developments. Developments were randomly assigned to an intervention group and a control group. The intervention group will receive the tilt trucks in May 2019. After the evaluation is complete, the control group will also receive tilt trucks in August 2019.

Initiative 4

Evaluate new collection technology

NYCHA will evaluate longer-term capital improvements to modernize waste infrastructure, including pneumatic waste systems.

NYCHA's large campus properties are well-suited to managing waste with pneumatic systems. Pneumatic waste systems automatically move waste to a central collection location. They are completely sealed and thus can isolate the waste from rats, eliminate chute clogs and waste spillage, allow for recyclables and organics source separation, and work reliably regardless of weather. An automated pneumatic waste system has operated successfully on Roosevelt Island for almost 40 years.

Pneumatic systems would also dramatically reduce the amount of time that NYCHA caretakers spend moving trash bags from interior compactors to exterior compactors. When surveyed, caretakers have reported spending more than half of their time on this one task. Eliminating it would mean they have more time to attend to other responsibilities that help keep NYCHA's buildings and grounds clean and trash-free.

Pneumatic systems could integrate with existing NYCHA chutes while improving convenience and helping to pest-proof NYCHA buildings. It may be possible to use the existing chute systems to collect organic waste while providing landfill trash collection and indoor recycling collection within the building rather than outside on the grounds. Daily disposal of organic waste into a sealed system would deter pests in apartments, common areas such as compactor rooms, and on the grounds through the elimination of informal trash deposit locations. Indoor collection of recycling would dramatically improve recycling convenience.

In 2019, NYCHA will begin a preliminary feasibility study to determine whether an automated pneumatic tube waste system can cost-effectively overcome waste disposal and recycling challenges at Polo Grounds Towers, an East Harlem development with four residential buildings. Polo Grounds was selected because of its relatively small size and compact configuration.

Initiative 5

Provide trash cans, improve drop-off sites, and redesign waste processing areas

With no trash cans on the grounds, litter has no “right” place to go. In spring 2019, NYCHA will provide trash receptacles next to entryways and on high-traffic pathways at 17 developments. The trash cans will serve the dual goals of reducing litter throughout the grounds and reducing contamination of recycling bins.

NYCHA will also adopt uniform policies and procedures for litter removal. The schedule for litter pickup on the grounds is currently left out of waste management policies and procedures and depends on the priority that each development’s management staff places on litter removal.

Visible accumulations of trash bags are blights, even when they are the byproduct of organized waste processing. Bagged recycling from recycling stations is typically picked up by NYCHA caretakers daily and stored for DSNY’s weekly pickup. Depending on the location, bagged recycling awaiting pickup may be visible from the grounds and pathways. Similarly, trash bags awaiting curbside pickup or transport to compactors are often stored in plain sight.

NYCHA will revise waste management procedures to process trash and recycling out of sight of the residents. Where screened-in waste processing areas already exist but are not large enough to accommodate the volume of bulk waste and recycling, NYCHA will enlarge the screened areas so that processing and storage is no longer visible.

In large developments where many buildings are far from the exterior compactor, it may be helpful to provide fenced collection areas that allow NYCHA staff to temporarily store compactor-bound waste. Such secondary processing areas should be shielded from view and provide enclosed containers large enough to hold accumulated trash bags during one work shift. NYCHA will test secondary processing areas at Marcy Houses in 2019.

Initiative 6

Improve bulk-waste collection

Bulk waste: trash that is too big to fit regular trash bags or in chutes, such as discarded furniture.

Unfortunately, bulk waste is a common sight on NYCHA grounds. It is particularly vexing to residents when bulk waste is not promptly removed and instead lingers in visible locations in hallways and on the grounds, attracting more improperly disposed trash.

Bulk waste is also expensive to manage because bulk waste is privately hauled. Currently NYCHA and DSNY spend approximately \$7.5 million annually on bulk waste carting and tipping fees.

Unlike household trash, which is collected in sealed compactors, bulk waste is collected in open containers at all but four NYCHA developments. The bulk containers, when not in a locked area, can be accessed by residents and non-residents alike, who often deposit both bulk items and household trash in the open containers and in adjacent areas. Waste processing areas also become disorderly and cluttered because, lacking bulk crushers, NYCHA staff may use compact loaders (such as Bobcats) to crush the bulk to increase the amount of bulk that can be loaded into an open-top container.

Four NYCHA developments (Washington, Linden, Coney Island 4/5, and Williams Houses) currently have bulk crushers that break down the large items and compact them in a closed container. At these locations, bulk waste does not accumulate in unsightly piles, and attracts less non-resident waste. The enclosed containers are collected by DSNY.



A compactor yard with a bulk crusher (left) can be kept cleaner than one without (right).

Designate bulk drop-off areas and clarify policies

Residents report that NYCHA gives contradictory instructions on where and how to dispose of bulk waste. Lack of convenient and clearly designated drop-off areas also means that NYCHA staff spend more time and effort to find and remove the furniture and cardboard that makes up most of the bulk waste. While waste reduction and waste diversion strategies will be critical to solving the problem of bulk waste, residents need a clear and correct message for proper disposal.

NYCHA will explore ways to provide bulk drop-off areas that are convenient, clean, and shielded from view. NYCHA will also develop clear and consistent policies for residents and make sure that these are well-displayed and communicated.

Deploy bulk crushers and containerize bulk waste in sealed compactors

By 2025 NYCHA will deploy bulk crushers at every development that can accommodate them to eliminate harborage for pests, maintain cleaner compactor yards, and enable bulk to be hauled by DSNY rather than private haulers.

Providing bulk waste drop-off sites and bulk crushers may require space trade-offs, such as nominal reductions in parking spaces. A typical bulk crusher/sealed compactor unit requires an area accessible to trucks of at least 97 feet by 31 feet (equivalent to a 30-yard container). To minimize the space requirements of new bulk crushers, NYCHA is evaluating the use of auger-type bulk crushers, which are smaller and quieter than the traditional hydraulic bulk crushers. The auger-type crushers also provide more compaction and less spillage than the traditional design.

GOAL #3

**REDUCE LANDFILL-BOUND TRASH BY
IMPROVING AND EXPANDING
RECYCLING**

The volume of NYCHA's landfill-bound garbage could be cut nearly in half when more types of materials are recycled and when recyclables are properly sorted. Reducing the amount of household garbage by diverting the recyclables would make it easier for residents to use smaller bags that fit in the trash chutes and avoid trash buildup outside building entryways. Increasing recycling diversion rates also helps meet New York City's zero waste goals.

Although the installation of NYCHA's outdoor recycling bins was an important first step in making recycling available to public housing residents, the recycling participation at NYCHA is still very low, capturing less than 2% of total estimated recyclable metal, glass, plastic, and paper. Clearly, improvements are needed to encourage resident participation, make recycling more convenient, and discourage contamination of recycling bins.

Initiative 7: Improve metal, glass, plastic, and paper recycling

Providing recycling bins at all NYCHA developments was only a first step in building a robust recycling program for public housing residents. NYCHA and DSNY will continue to work on making recycling more convenient. NYCHA will also recycle cardboard, which is currently disposed with bulk waste.

Initiative 8: Recycle textile waste

DSNY estimates that textiles comprised 8% of NYCHA's waste stream in 2017. NYCHA and DSNY will explore recycling textiles starting in 2019.

Initiative 9: Recycle electronics and appliances

Since January 2015, it has been illegal for New Yorkers to discard electronics in the trash. NYCHA will work with DSNY to provide convenient recycling options for electronic waste at all developments by 2025.

Initiative 10: Recycle bulk waste

A large share of bulk waste could be recycled or repurposed but no municipal program currently exists for bulk recycling. NYCHA will explore both private and public programs to divert furniture and other reusable or recyclable material.

Initiative 7

Improve metal, glass, plastic, and paper recycling

Metal, glass, plastic, and paper make up the largest share of NYCHA’s waste (33%). NYCHA installed 1,938 recycling bins in all NYCHA developments through an intensive 22-month effort that began in April 2015. The recycling bins are located outdoors in sets of two: one bin for mixed paper and cardboard and a separate bin for metals, glass, and plastics. Each pair of bins serves about three buildings. When surveyed, residents consistently report high levels of awareness and participation in recycling; however, the self-reported participation is not reflected by actual diversion rates, which DSNY reports to be only 1.5%.

In 2017, City Council passed Local Law 49, requiring DSNY to study financial incentive programs to increase recycling diversion rates in public housing. DSNY surveyed 2,090 residents and staff to identify attitudes about and barriers to recycling. Residents indicated that the current recycling stations located at NYCHA developments are too few and too far apart. In order of preference, residents want recycling to be located on their floor, in their building, or close to building entrances. Residents also said that they do not want to store recyclables in the apartment for long periods. Convenience was reported to be a more important factor than incentives in participation in a recycling program: 52% of respondents indicated “more containers and in more convenient locations” would be most effective in motivating them to recycle more, compared to the 30% of respondents who indicated “being rewarded or recognized” would be most effective.

Contributing to low diversion rates is the high incidence of contamination of the NYCHA recycling bins, on par with those of outdoor recycling bins in public areas such as parks.

Improve recycling of redeemable containers

In New York State, the Returnable Container Act (the “Bottle Bill”) requires a 5-cent deposit on certain beverage containers. Consumers purchasing these beverages may then return the empty containers to beverage retailers or recycling redemption centers to reclaim the deposit.

To read the full report “Local Law 49: Review of Voluntary Recycling Incentive Pilot Programs for NYCHA” (LL49 report) please visit <http://j.mp/2017LL49>

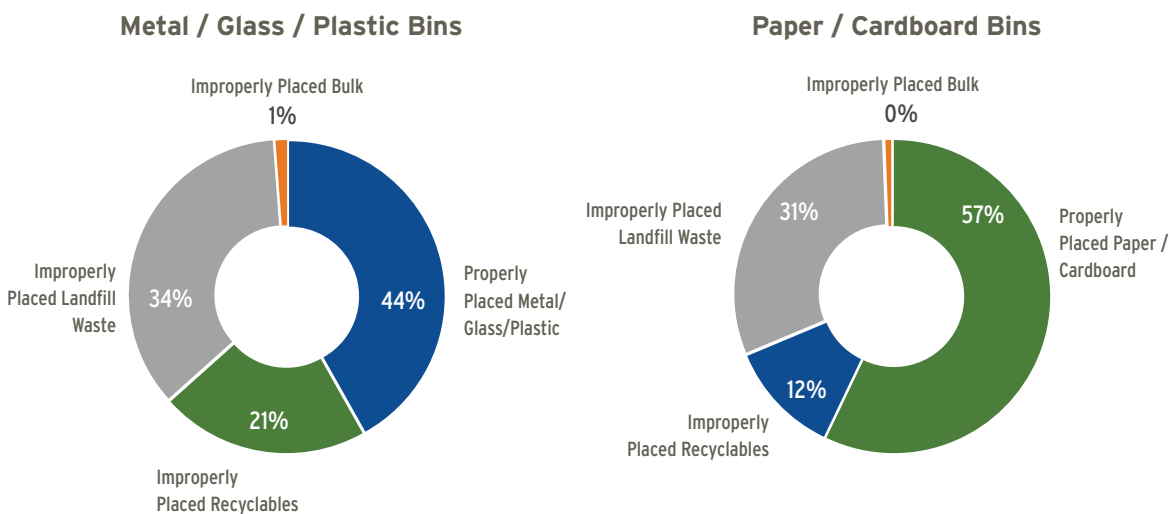


See appendix: Trash Talk: Findings from Resident Waste Management Outreach]

Residents and non-residents alike understand the value of redeemable containers. Forty-one percent of residents report using recycling redemption centers. Residents also reported that non-residents enter NYCHA grounds to collect redeemable containers, opening recycling bags to gather bottles and cans, which causes litter around the development.

A well-designed program for redeemable containers using Reverse Vending Machines (RVMs) may serve to improve diversion rates while reducing litter. RVMs in New York provide vouchers redeemable for cash in exchange for redeemable containers. DSNY found that participants in favor of RVMs cited the convenience of all-hours access and being able to deposit recyclables within the building. Removing redeemables from the NYCHA recycling bins may also deter litter associated with “can picking.” On the other hand, RVMs would address only a small portion of recyclables, which mitigates the added convenience of in-building recycling. DSNY’s cost analysis also showed that RVM revenues will not cover the costs of operating them. NYCHA and DSNY will explore a limited pilot program for RVMs by 2020.

Figure 2: A third of the contents of NYCHA recycling bins is misplaced trash



Recycle cardboard

Online shopping has brought countless cardboard boxes into people's homes. At NYCHA developments, these boxes pile up next to recycling stations and undesignated areas, and in windy weather, are blown around the grounds. Cardboard currently ends up in bulk waste containers, making up 15% of bulk waste, according to the 2017 NYCHA bulk-waste survey (see appendix: NYCHA Waste Stream Analyses).

In 2018, NYCHA began a pilot deployment of cardboard balers at five developments: Mitchel, Red Hook, Rangel, South Jamaica and Stapleton. The balers will enable DSNY to pick up the cardboard for recycling. Removing cardboard from bulk waste also reduces NYCHA's private bulk hauling costs. If balers prove successful and cost-efficient, by 2025 NYCHA will place them at every development that can accommodate them.



Top: Cardboard is visible inside a NYCHA open top bulk container.

Bottom: A cardboard baler flattens the boxes so that they can be recycled.



Initiative 8

Recycle textile waste

Every year NYC residents throw out approximately 200,000 tons of clothing, towels, blankets, curtains, shoes, handbags, belts, and other textiles and apparel. DSNY estimates that textiles comprised 8% of NYCHA's waste stream in 2017 (slightly more than the citywide average of 6%), equivalent to 11,000 tons.

DSNY has sponsored past programs that encourage the donation of still-wearable clothing and event-based collections at some developments. However, there are no dedicated facilities for NYCHA residents to repurpose or recycle textiles.

NYCHA will work with DSNY to introduce the refashionNYC program to NYCHA campuses. RefashionNYC provides collection bins at no cost to residential buildings that have 10 or more apartments. NYCHA will also explore if a commercial textile recycling program can provide financial benefits to NYCHA, including revenue from leasing space for textile recycling bins.

NYCHA Recycles! at Woodson Houses

In April 2018, Woodson Houses property management, residents, and non-profit partner GrowNYC were recognized for capturing 25% of their metal, glass, plastic and paper. GrowNYC convened recycling education sessions and provided door-to-door recycling information to residents.

Since then, Woodson House recycling rates have increased every quarter. Woodson's property managers believe that the high capture rates have also encouraged the development's residents to take pride in keeping the buildings clean and litter free.

Initiative 9

Recycle electronics and appliances

Since January 2015, it has been illegal for New Yorkers to discard electronics in the trash. At NYCHA buildings, as in the City’s residential buildings generally, electronics make up less than 1% of landfill waste; however, because electronic waste contains hazardous materials that can affect health and environmental quality, even this seemingly small amount presents a public health risk.

NYCHA began enrolling developments in the DSNY e-cycleNYC program in 2017. Administered by a DSNY-approved vendor, e-cycleNYC provides free electronic waste recycling to residential apartment buildings with 10 or more apartments. The experiences of the first buildings have brought to light various operational issues that must be solved before e-cycleNYC can be successful at NYCHA. For example, current e-cycle bins must be placed indoors, which limits them to placement in basement areas that are not accessible to residents. At the pilot buildings, NYCHA staff must pick up electronics and take them to the e-cycle bins.

NYCHA and DSNY will fine-tune the deployment of e-cycleNYC and enroll all developments that have enough space to accommodate e-cycleNYC by 2025.



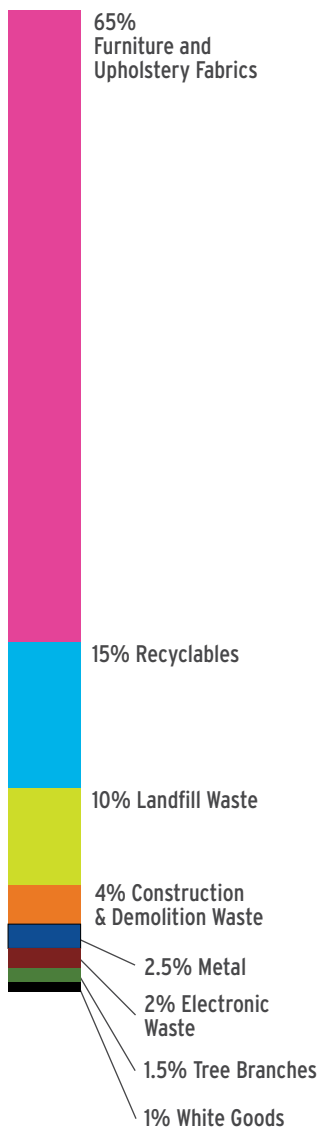
e-Cycle container dropoff. Photo courtesy of DSNY

Initiative 10

Recycle bulk waste

Furniture, upholstered furniture, and upholstered accessories make up 65% of NYCHA’s bulk waste. The City does not yet have programs available for recycling this type of waste; however, some private resource recovery companies, furniture repair, and “up-cycling” programs demonstrate that diversion is possible.

Figure 3: 65% of NYCHA’s bulk waste is furniture and upholstery fabrics.



In 2018, NYCHA licensed Renewable Recycling Inc.(RRI), a mattress recycling company, for a four-month mattress recycling pilot. At no cost to NYCHA, RRI deployed a 20-yard enclosed shipping container to eight developments: Queensbridge North & South, Ravenswood, Marcy, Whitman, Breukelen, Bayview, Hope Gardens, and Marlboro. NYCHA caretakers collected mattresses left outside on the grounds or delivered to bulk collection areas and placed them in the locked shipping containers.

Over the course of the four-month trial, RRI collected almost 70 tons of material (1,258 mattresses), diverting 7.5% of the bulk waste that would otherwise have been sent to landfill. Staff at participating locations reported that waste yards were cleaner and that removing the mattresses eliminated harborage for vermin. Up to 85% of the mattress materials collected were able to be recycled or repurposed, creating carpet padding and soundproofing material. RRI estimates that approximately 10% of recyclable materials were lost to contamination, such as waterlogging.

As of spring 2019, DSNY and NYCHA are reviewing the outcomes of the pilot and exploring a 2019 solicitation for mattress recycling services at 10-15 additional locations.



These mattresses have been picked up by NYCHA caretakers and stored in an enclosed container to be recycled

GOAL #4

**ELIMINATE FOOD IN GARBAGE THAT
ATTRACTS RODENTS AND PESTS**

Integrated pest management (IMP) focuses on pest prevention and seeks to eliminate the underlying cause of pest infestations before resorting to the use of pesticides.

Food waste accounts for 23% of waste generated in NYCHA buildings. The presence of food waste in garbage attracts vermin. Removing access to food is a prerequisite for effective pest and rodent control, and foundational to integrated pest management.

Because eliminating all presence of food in household garbage may not be possible, a secondary goal is to prevent pests from reaching the food present in trash bags by making sure that trash bags find their way into sealed containers as quickly as possible.

Initiative 11: Remove food waste from landfill-bound garbage

NYCHA's current infrastructure makes standardizing an approach to collecting food waste very difficult; however, where possible, NYCHA will participate in DSNY's curbside organics pickup. NYCHA, in partnership with DEP, will also install in-sink food disposers at select sites, sending food waste to be converted to energy at the Newtown Creek wastewater treatment plant.

Initiative 12: Improve containerization of landfill-bound garbage

As long as household waste contains food scraps, the best defense against vermin is to minimize the time that trash sits outside of sealed containers. NYCHA will invest in equipment replacements and upgrades, including of interior and exterior compactors, and revise collection procedures where necessary to move trash quickly into rat-proof containers.

Initiative 11

Remove food waste from landfill-bound garbage

When food waste isn't separated from household garbage, even proper disposal of garbage bags down the trash chutes can provide food for vermin. Even in developments where rats may not be visible, they are drawn to the food in the compactor rooms and on the grounds. The solution is to keep food scraps out of the trash as much as possible.

Participate in DSNY organics collection where possible

DSNY's organics collection program collects food scraps, food-soiled paper, and yard waste from multifamily buildings with up to 9 apartments in select areas. Small NYCHA buildings that receive curbside garbage collection, meet program requirements, and have room for the collection bins will be enrolled in the DSNY organics program starting in 2019.

Install in-sink food waste disposers where appropriate

In-sink food waste disposers shred food waste and send it through the sewer system to be processed in wastewater treatment plants. NYCHA installed in-sink food waste disposers a decade ago at 1,771 apartments at Hope Gardens, Harlem River Houses, and Baruch Houses. NYCHA assessed the overall efficacy of the disposers and found that they reduced solid waste by 15% with no increase in blocked drains or pipe damage.

More than 39,000 apartments in 72 NYCHA developments are located in the service area of the Newtown Creek wastewater treatment plant. These developments produce an estimated 175,000 pounds of food waste every day. The Newtown Creek plant, which serves parts of Brooklyn, Queens and Lower Manhattan, can convert food waste into energy through anaerobic digestion.

In 2019, NYCHA will start installing food waste disposers in 12 developments in the Newtown Creek catchment area. DEP and NYCHA will roll out a "Cease the Grease" campaign in conjunction with the food waste disposers to educate participating residents about proper food disposal and grease management. By 2020, NYCHA and DEP will evaluate the cost, feasibility, and environmental impact of installing in-sink disposers in the remaining 60 developments.



Service area of the Newtown Creek treatment facility



Residents can exchange food scraps for fresh produce at NYCHA urban farms.

Composting at NYCHA Farms

Residents who live in or near developments that host Farms at NYCHA (Red Hook Houses, Bay View Houses, Howard Houses, Wagner Houses, Forest Houses, and Mariner’s Harbor Houses) have a unique opportunity to take their food scraps “full circle” by exchanging them for fresh produce grown at the farms.

Through Farms at NYCHA, Green City Force and its local partners have constructed active urban farms on NYCHA land since 2013 with the help of resident volunteers. Over the past three seasons farms have grown and distributed more than 56,700 pounds of organic produce to NYCHA residents and collected over 13,800 pounds of compostable food scraps from residents. Farm cultivation and compost collection are led by 18 to 24 year old NYCHA residents who are Green City Force AmeriCorps Members. The Corps Members service learning includes training by master composters and internships at large-scale composting sites across the City.

The Farms at NYCHA program is part of Building Healthy Communities (BHC), a city-wide partnership focused on improving health outcomes in 12 neighborhoods throughout the city. The farms are designed to bring organic produce to food deserts and promote sustainable living in public housing communities. Their presence is intended to encourage residents to engage in local green spaces and start important conversations about food and environmental justice.

Initiative 12

Improve containerization of landfill-bound garbage

Sealed exterior compactors help control rodents and eliminate unpleasant odors. Until new technology is proven cost-effective (see pneumatic collection systems in Initiative 3), they are NYCHA's best tool for containing trash.

When surveyed in 2017, NYCHA staff indicated that moving compacted trash bags from interior compactor rooms to exterior compactors is their single most time-consuming waste management task, accounting for more than half of their working hours. Because current procedures are not designed to expedite the relocation of trash to enclosed containers, trash bags may languish on the grounds or curbside before being moved to enclosed compactors.

Additionally, breakdowns due to the age of compactors can disrupt containerization for days or weeks. Of 274 NYCHA developments, 255 have interior compactors and 108 have exterior compactors. Eighty-three percent of NYCHA's 2,919 interior compactors and 73% of the 259 exterior compactors are already deemed past the end of their useful life. An aggressive replacement program is needed to bring this equipment into good working order by 2025.

Finally, 61% of developments do not have exterior compactors. Trash from these locations are periodically taken to nearby developments that have exterior compactors, or is placed on the curb to be picked up by DSNY. At developments served by DSNY curbside pick-up, bagged trash is set out the night before, creating an opportunity for other trash to accumulate around it.

Total excludes RAD/PACT developments as of April 2019. As the PACT program expands to 60,000 units as proposed in NYCHA 2.0, the total outstanding needs are expected to decrease.

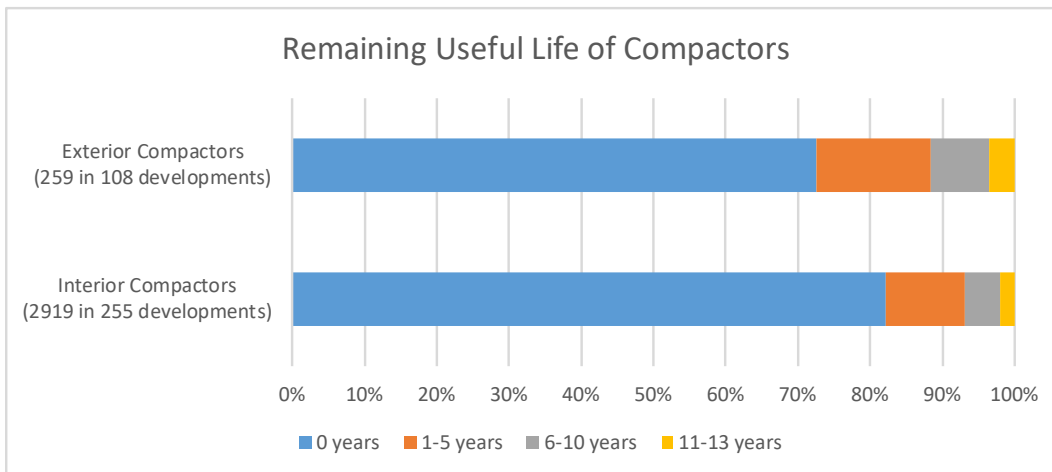
Implement compactor replacement schedule

In 2018, NYCHA received funding under the Mayor’s Rat Reduction Initiative to replace 223 interior and 43 exterior compactors at 36 developments in the Mayor’s Neighborhood Rat Reduction zones. To eliminate the backlog of past-useful-life equipment by 2025, NYCHA will need to dedicate \$5 million per year to exterior compactor replacements and \$20 million per year to interior compactor replacements through 2025.

Eliminate uncontained curbside trash

In order to minimize the time that bagged trash waits on the curb, NYCHA is working with DSNY to containerize curbside waste and/or adjust schedules for curbside placement and pickup. At the developments benefiting from the Neighborhood Rat Reduction Plan, schedule changes are already underway.

Figure 4: 83% of interior compactors and 73% of exterior compactors aged beyond their useful life



IMPLEMENTATION

The NYCHA portfolio is large and varied. NYCHA will begin work on almost every element of the Waste Management Plan in 2019. Investing the time and effort necessary to take dramatic steps toward visibly clean campuses and buildings is essential to the plan. Implementation will be phased over seven years and customized to the needs and conditions of each development. Rather than implementing one or two strategies everywhere, NYCHA seeks to develop coherent and comprehensive packages of interventions that are proven to work, then replicate them throughout the portfolio.

Oversight and coordination

NYCHA will continue to invest in agency partnerships throughout the Plan's implementation. Policy and operational coordination with DSNY and DEP is critical to the success of the plan. The plan also depends on the work of several mayoral initiatives, including the Neighborhood Rat Reduction Working Group, the Zero Waste Steering Committee, and the NYCHA Quality of Life Working Group.

To facilitate Authority-wide collaboration, the implementation of the Waste Management Plan will be overseen by an inter-departmental coordination committee that includes key personnel representing Capital Projects, Operations, Healthy Homes, Finance, and Community Engagement & Partnerships.

The Campaign for a Clean NYCHA

In 2019, NYCHA will select the pilot developments and procure the expertise needed to develop the campaign. Pilot locations will be selected from those that are budgeted to receive waste infrastructure upgrades in 2019 and 2020, and from locations where enhanced waste diversion efforts are already underway, such as Brownsville Houses.

NYCHA will also continue successful partnerships with DSNY and GrowNYC to conduct resident outreach and train Environmental Ambassadors at high-priority locations in the Neighborhood Rat Reduction program.

NYCHA and ioby will launch waste-management-focused challenges modeled on the NYCx Brownsville Zero Waste in Shared Space challenge to recruit resident- and non-profit-driven waste reduction and waste diversion efforts.

Environmental Ambassadors are resident volunteers who receive training from DSNY and GrowNYC to conduct peer-education about recycling and waste management.

2019-2020 Focus: Developments in Neighborhood Rat Reduction Zones

NYCHA has allocated almost \$38 million toward waste management interventions in the Neighborhood Rat Reduction zones, including \$13 million in City funding. These developments are home to more than 30,000 households. With the exception of compactor replacements that were funded in 2019, all work is planned to be completed by the end of 2020.

	Cost	Developments
Hopper Doors	\$ 996,000	45
Tilt Trucks & Trashcans	\$ 550,000	53
Secondary Collection Areas	\$ 800,959	1
Food Waste Disposers	\$ 4,471,314	10
Interior Compactors	\$ 12,077,353	32
Exterior Compactors	\$ 14,980,242	23
Bulk Crushers	\$ 3,750,000	10
Cardboard Balers	\$ 353,755	10
Total	\$ 37,979,623	

Pneumatic waste collection pilot

The pneumatic waste collection pilot will target Polo Grounds. Because the technology for pneumatic systems are proprietary to each company, these projects are usually procured as design-build projects. NYCHA does not yet have the authority to do such procurements but may receive approvals shortly. NYCHA will begin in 2019 by tasking an engineering company to produce a preliminary design and cost estimate that may be used for a subsequent sealed-bid by pneumatic system vendors, or to procure a design-build vendor.

Waste Management Plan Interventions in Neighborhood Rat Reduction Zone Developments

	Development Name	Residential Buildings	Households	Campaign for a Clean NYCHA Pilot	Food Waste Disposer	Larger Hopper Door	Interior Compactor	Cardboard Baler	Exterior Compactor	Bulk Crusher	Secondary Collection Areas	Tilt Trucks & Trash Cans
Bronx	BUTLER	6	1,468			X	Round 2		Round 1	Round 1		X
	CLAREMONT REHAB (GROUP 2)	6	105			X	N/A					X
	CLAREMONT REHAB (GROUP 3)	5	107			X	Round 1					X
	CLAREMONT REHAB (GROUP 4)	9	145			X	N/A					X
	CLAREMONT REHAB (GROUP 5)	3	128			X	N/A					X
	COLLEGE AVENUE-EAST 165TH STREET	1	94			X	N/A					X
	EAST 180TH STREET-MONTEREY AVENUE	1	238			X	Round 2		Round 2			X
	HIGHBRIDGE GARDENS	6	690			N/A	Round 1		Round 1			X
	JACKSON	7	860			X	RUL > 5					X
	MELROSE	8	1,019			X	RUL > 5	X	Round 2			X
	MORRIS I	10	1,078			X	Round 1	X	Round 1			X
	MORRIS II	7	799			X	Round 1		Round 1	Round 2		X
	MORRISANIA	2	205			X	N/A					X
	MORRISANIA AIR RIGHTS	3	825			X	RUL > 5	X	Round 2			X
	TELLER AVENUE-EAST 166TH STREET	1	88			X	N/A					X
	TWIN PARKS EAST (SITE 9)	1	216			X	Round 2					X
	WEBSTER	5	603			X	Round 2	X	Round 2	Round 2		X
	Brooklyn	303 VERNON AVENUE	1	233			X	RUL > 5		Round 2		
BEDFORD-STUYVESANT REHAB		3	84			X	Round 1					X
BUSHWICK		8	1,209			X	Round 1		Round 1	Round 1		X
HYLAN		1	207		X	X	Round 1					X
LAFAYETTE		7	871		X	X	RUL > 5		Round 1			X
MARCY		27	1,702	X	X	X	RUL > 5	X	Round 1	Round 2	X	X
MARCY AVENUE-GREENE AVENUE SITE A		2	48			N/A	N/A					X
ROOSEVELT I		6	757			X	Round 1	X	Round 1			X
ROOSEVELT II		3	340			X	Round 1					X
SUMNER		13	1,093			X	Round 1	X	Round 1			X
TOMPKINS		8	1,038			X	Round 1		Round 1			X
Manhattan	45 ALLEN STREET	1	104			X	Round 1					X
	BARUCH	17	2,179			X	RUL > 5		Round 1	Round 1		X
	BARUCH HOUSES ADDITION	1	193		X	X	RUL > 5					X
	BRACETTI PLAZA	1	108			X	Round 1					X
	CAMPOS PLAZA II	2	222			X	N/A					X
	FIRST HOUSES	8	124			X	Round 1					X
	GOMPERS	2	469			X	Round 1		Round 1			X
	HERNANDEZ	1	148			N/A	Round 1					X
	LA GUARDIA	9	1,090	X	X	X	Round 1	X	Round 2	Round 2		X
	LA GUARDIA ADDITION	1	148		X	X	Round 1					X
	LOWER EAST SIDE I INFILL	5	187			X	Round 2					X
	LOWER EAST SIDE II	4	184			X	Round 1					X
	LOWER EAST SIDE III	2	56			N/A	N/A					X
	LOWER EAST SIDE REHAB (GROUP 5)	2	55			X	N/A					X
	MELTZER TOWER	1	229		X	X	Round 1					X
	RIIS	13	1,171	X	X	X	RUL > 5	X	Round 1	Round 2		X
	RIIS II	6	569	X	X	N/A	N/A					X
	RUTGERS	5	718			X	Round 1		Round 1			X
	SEWARD PARK EXTENSION	2	360			X	Round 2					X
	SMITH	12	1,927			X	Round 1		Round 1	Round 1		X
	TWO BRIDGES URA (SITE 7)	1	247		X	X	Round 1					X
	VLADECK	20	1,518			N/A	Round 2	X	Round 1			X
VLADECK II	4	238			N/A	Round 2					X	
WALD	16	1,850			X	Round 1		Round 1	Round 1		X	

Preliminary Timeline

	2018			2019												2020					
	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
Set positive norms and expectations																					
1 Launch a "Campaign for a Clean NYCHA"																					
2 Support resident-led and nonprofit groups																					
NYCx Brownsville																					
GrowNYC Partnership																					
Ideas Marketplace Challenges																					
Outreach and Environmental Ambassadors																					
Challenge 1																					
Challenge 2																					
Make proper waste disposal convenient																					
3 Improve trash chutes																					
Enlarge hopper doors																					
Improve signage & policies																					
Provide tilt trucks																					
Pneumatic system																					
4 Provide trashcans																					
Deploy trashcans																					
Revise litter removal policies																					
5 Improve waste processing areas																					
Develop new waste area design guidelines																					
Secondary process area (pilot)																					
6 Improve bulk collection																					
New bulk crushers																					
Expand Recycling																					
7 Metal, glass, plastic, and paper recycling																					
Reverse Vending Machines																					
Cardboard balers																					
8 Textile recycling																					
refashionNYC																					
Commercial textile recycling																					
9 Electronics and appliance recycling																					
e-cycleNYC																					
10 Bulk waste recycling																					
Mattress recycling																					
9 developments (pilot)																					
10-15 developments																					
Eliminate food for rodents and pests																					
11 Remove food waste from garbage																					
Food waste disposer																					
Brown Bins																					
12 Improve containerization																					
Design / Construction																					
Compactor replacements (2018 funds)																					
Compactor replacements (2019 funds)																					
Containerize curbside pickup																					
Feasibility																					
Begin design / procurement																					

APPENDICES

NYCHA Bulk and Recycling Composition Study

Summary of Findings

Introduction

In 2017, DSNY conducted the *2017 NYC Residential, School, and NYCHA Waste Characterization Study* (nyc.gov/wastestudy), which included the first characterization of the household waste that DSNY collects via centralized exterior compactors at NYCHA's large developments. The study, however, did not examine NYCHA recycling because it is collected curbside, along with residential recycling from non-NYCHA buildings. NYCHA's bulk waste was also excluded from the study because it is collected by private carters rather than DSNY. In order to achieve a full picture of NYCHA's waste streams, in 2017 NYCHA contracted with Arcadis to conduct waste analyses of recycling and bulk waste at NYCHA developments.

The primary purpose of the recycling analysis was to estimate the quantity of misplaced materials within the separate paper and plastic/metal recycling streams. Although all NYCHA developments have access to recycling, DSNY estimates that the diversion rate is only 1.5%. NYCHA sought to understand the relative contribution of misplaced recycling (i.e. recyclable material placed in the wrong bin, such as plastic bottles in the paper recycling bin) and contamination by trash. Secondly, Arcadis observed waste management practices and interviewed staff to identify opportunities to improve diversion rates through staff training and procedural improvements.

The purpose of the bulk waste composition study was to estimate the quantity of potentially recoverable and recyclable materials within the bulk waste stream. Reducing bulk waste has immediate financial benefits for NYCHA, which pays for private carting, and DSNY, which pays the tipping fees. Increasing diversion also contributes toward the City's Zero Waste goals. Regular bulk waste is defined as large items that are neither metal nor predominantly metal (such as mattresses, sofas, chairs, wood tables, cabinets, etc.). Metal/Rigid Plastic Bulk consists of large items that are predominantly metal or rigid plastic and are too big for recycling containers or clear bags (such as metal furniture, small metal water heaters, plastic furniture, large rigid plastic toys, etc.). White goods that are also discarded with the bulk waste include household appliances such as washers, dryers, etc.

Methodology

The recycling analysis and bulk waste analysis occurred over a ten-business day period in June and July 2017 at five developments: Jefferson, Mitchel, Ravenswood, Riis, and Wagner Houses. These analyses were performed over a short timeframe with the intent to provide preliminary and illustrative information regarding waste stream composition as a supplement to the DSNY study of NYCHA containerized refuse. Unlike the DSNY characterization, which examined a sample size sufficient for statistical validity at the citywide level, Arcadis and NYCHA developed a methodology that was designed to 1) yield a reasonable level of waste characterization knowledge in a structured manner, in a short time, and at low cost, 2) produce accurate and reliable results, and 3) be repeatable for the selected developments.

Visual Recycling Waste Sort: On-site visual waste sort was performed on each of ten days for a dual-bin recycling collection container (one recycling paper bin and one recycling metal/glass/plastic bin) at the Ravenswood development. Arcadis deposited the materials from each bin on heavy-duty tarps and visually sorted the material into four categories (below). Arcadis recorded the contents of each bag by volume percentage.

Recycling Photographic Inventory and Composition Analysis: On each of ten days, Arcadis took at least two photographs of at least four dual-bin recycling collection containers at each development. Arcadis performed a desktop analysis based on the photos, categorizing the visible material into four waste categories, and analyzed for the volume percentage of properly and improperly placed contents within the collection containers.

The four categories for the recycling analysis were:

1. Properly Placed Recyclables - Depending on the bin, these are either metals, glass, or plastics or paper/cardboard, which has been properly placed in the correct bin.
2. Improperly Placed Recyclables - Depending on the bin, these are either metals/glass/plastics or paper/cardboard, which has been placed in the incorrect bin.
3. Improperly Placed Disposable Waste – these items are refuse, which have been incorrectly placed in a recycling bin.
4. Improperly Placed Bulk Waste- these items are bulk waste that cannot be recycled.

Bulk Waste Photographic Inventory and Composition Analysis: At least one photograph was taken of each bulk waste collection container once per day for ten business days at the five developments. Each development was identified as a large bulk producer as determined by bulk waste ticket distribution and selected by NYCHA. Each container was photographed by using a camera on a 15-foot pole and the photos were reviewed in a desktop analysis. An estimate of the bulk waste containers was made by evaluating each photo and characterizing the top layer of waste (by volume). The daily change in volume waste, (i.e. any item large enough to penetrate past the top level) was considered in the desktop analysis and used to estimate the daily waste addition (by volume percentage).

This composition study was developed based on the material categories identified in the DSNY 2013 Waste Characterization Study and altered to reflect the expected content in the bulk waste stream. The following eight major waste categories were selected to be used for visually sorting the collection container content:

1. Landfill Waste – characterized as items within black bags
2. Recyclables – characterized as Metal/Glass/Plastic or cardboard
3. Metal – characterized as metal frames and miscellaneous metal structures
4. Upholstered Furniture – characterized as couches, chairs, and rugs
5. Electronic Waste– characterized as televisions and computers
6. White Goods – characterized by fridges, stoves, and other household appliances
7. Yard waste – characterized as tree branches and other organic matter
8. Construction and Demolition (C&D) Waste – characterized as plaster, drywall, and other construction waste
9. Miscellaneous – characterized as undefined or indistinguishable waste

Results

The results of the recycling analysis suggest that **contamination is a substantial and primary barrier to increasing diversion rates**. The recycling sort found that 30-40% of the contents of recycling bins are improperly placed trash (Figure 1). This high proportion of observed contamination corresponds with anecdotal reports by NYCHA staff that they frequently set out bags of recycling for trash collection because of contamination. During waste pick-up, DSNY workers can refuse to collect recyclables that they believe are contaminated. NYCHA maintenance staff is trained to consider any recycling container with more than 5 improperly placed items as contaminated and unable to be recycled. Therefore, NYCHA maintenance staff reported that for bins with five or more improperly placed items, they sort through the bags themselves or re-bag the waste in a black bag for disposal as refuse. One development reported that the residents do not use the bins properly, so the staff adapted their policy and began using black bags (for refuse only) in recycling bins that are consistently contaminated.

The recycling sort also suggests that **single stream recycling may improve diversion outcomes**, if contamination by refuse is successfully managed. About 60-70% of the bin contents were recyclables, but a substantial portion (10-30%) were placed in the wrong bin, suggesting that the intent to recycle may be hampered by confusion about where to place each type of recycling. The 10-day averages of the visual recycling waste sort performed at the Ravenswood development (Figure 2) show, for example, that this bin would result in a recycling efficiency of 77-80% under a single stream scenario.

Figure 1 - Recycling analysis by photographic inventory: 10-day average composition

Characterization	Total	Jefferson	Mitchel	Ravenswood	Riis	Wagner
Metal/Glass/Plastic						
Properly Placed Metal / Glass / Plastic	41.8%	46.9%	49.5%	30.2%	31.8%	50.5%
Improperly Placed Recyclables	21.5%	11.9%	17.0%	27.6%	34.5%	16.5%
Improperly Placed Refuse	35.4%	39.3%	30.2%	41.3%	33.0%	33.1%
Improperly Placed Bulk	1.2%	1.6%	3.3%	0.6%	0.6%	0.0%
Paper/Cardboard						
Properly Placed Paper / Cardboard	57.1%	58.8%	54.3%	47.5%	60.6%	64.2%
Improperly Placed Recyclables	11.6%	8.3%	17.7%	12.3%	10.0%	9.7%
Improperly Placed Refuse	30.7%	31.1%	27.3%	39.8%	29.2%	26.1%
Improperly Placed Bulk	0.6%	1.9%	0.7%	0.4%	0.2%	0.0%

Figure 2 - Recycling analysis by on-location sort: 10-day average composition at Ravenswood

Characterization	Average
Metal/Glass/Plastic	
Properly Placed Metal / Glass / Plastic	55.0%
Improperly Placed Recyclables	22.5%
Improperly Placed Refuse	22.5%
Improperly Placed Bulk	0.0%
Paper/Cardboard	
Properly Placed Paper / Cardboard	62.5%
Improperly Placed Recyclables	18.3%
Improperly Placed Refuse	19.2%
Improperly Placed Bulk	0.0%

The bulk characterization suggests that **diverting cardboard and upholstered furniture would reduce land-fill bound bulk waste by up to 80%**. On average, more than 14% of bulk waste was identified as ‘recyclables’, primarily cardboard. At developments such as Riis Houses, where over 20% of bulk waste is recyclable, NYCHA can significantly reduce the amount of bulk waste by instituting cardboard recycling. Some 65% by volume of waste in the bulk containers consists of furniture. Much of this waste stream is composed of reclaimable fabrics, and some portion may be unwanted but reusable, if reuse were made convenient.

About **10% of the land fill-bound refuse in bulk containers is bagged household trash**, which is more cheaply disposed of in compactors for DSNY pick up.

E-waste comprises a small, but important, portion of bulk waste. On average, approximately 2% of NYCHA’s bulk is e-waste, often in the form of televisions, speakers, and fans. Electronic devices often contain toxic and hazardous materials, such as mercury and lead, which can contaminate our soil and water when those devices are improperly recycled.

During onsite interviews, NYCHA staff conveyed that they believe **open-top bulk containers attract non-resident drop-off of bulk waste**, especially white goods and e-waste. NYCHA staff believe that expanded availability of bulk crushers, which would replace open-top containers with sealed containers, would reduce non-resident generated bulk waste. NYCHA currently has four bulk compactors in operation, located at Washington, Linden, Coney Island 4 and 5, and Williams Houses. Staff at these developments reported a significant reduction in the number of bulk waste disposal trips, staff work time, and staff work effort.

Figure 3 - Bulk Waste: 10-day average percentage share by waste category

Characterization	Total Averages	Jefferson Average	Mitchel Average	Ravenswood Average	Riis Average	Wagner Average
Landfill Waste	9.8%	22.5%	5.2%	14.6%	1.1%	5.8%
Recyclables	14.7%	9.4%	19.2%	6.6%	20.3%	18.0%
Upholstered Furniture	64.5%	56.9%	62.9%	73.3%	61.9%	67.8%
White Goods	1.1%	0.0%	1.7%	0.0%	2.5%	1.1%
Electronic Waste	2.0%	2.5%	1.7%	2.9%	2.8%	0.0%
Metal	2.5%	3.8%	3.5%	0.8%	1.1%	3.3%
Construction and Demolition (C&D) Waste	3.85	4.4%	2.6%	0.6%	10.3%	0.8%
Special Waste	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tree Branches	1.5%	0.6%	2.7%	1.3%	0.0%	3.2%

Trash Talk: Findings from Resident Waste Management Outreach

Summary

To meet the needs and priorities of residents, NYCHA engaged Public Works Partners to design and implement an outreach strategy that would gather data on resident practices, challenges, and priorities as it relates to waste management. The findings from this outreach will be used to inform the implementation of the new waste management plan.

For the purposes of this engagement, the Public Works team created an outreach strategy which gathered quantitative resident data through a survey that was distributed online and in-person to NYCHA residents, and qualitative data gathered through resident interviews, group discussions and tabling sessions. At the end of the outreach effort, the Public Works team reached a total of 4,690 NYCHA residents, 4,531 of whom completed the survey.

Resident data and feedback were analyzed to uncover trends and insights related to waste management at the developments engaged for this outreach. The following themes emerged from the analysis.

Convenience and access to disposal locations are the key factors which influence resident waste management practices. Inefficiencies in the disposal process lead to the creation of informal waste disposal locations, increasing visible litter.

Resident conversations revealed that the waste disposal practices within the developments are inconsistent, and residents have varying levels of engagement and desire to adhere to established waste management policies. However, though the waste management infrastructure differs between developments, residents consistently cited inconvenience, or the location and inaccessibility of waste disposal areas, as the major factor that informs their waste management habits.

While some residents overcome challenges such as dirty trash chutes or long walks to disposal locations to correctly discard of their waste, data indicates that many residents do not see a value in making the additional effort. As a result, informal disposal locations in front of buildings and public trash cans near the developments become convenient alternatives for residents. Lack of knowledge of the NYCHA-sanctioned waste disposal process and individual desire to adhere to waste management policies also appeared as common factors in how residents manage their waste. These habits lead to increased visibility of litter, more pests, and a poorer quality of life at the developments, particularly in sites with higher population densities. However, sites with in-home waste disposal systems cited having fewer issues regarding visible litter and pests.

When waste disposal is inconvenient to residents, neither social pressures nor NYCHA's policies and enforcement practices are strong enough to influence collective resident behavior.

Residents who overcome challenges like walking long distances to trash drop-off areas or dealing with poor-functioning infrastructure cited being intrinsically motivated to not litter because it was the "right thing to do". However, residents expressed doubt of this being a trend amongst the general resident populace. Outreach data revealed that while individual responsibility drives some residents to adhere to the NYCHA waste management policies, there isn't a strong enough sense of social accountability within the developments for that to be a factor for all residents. When asked about how to potentially create social linkages to foster

resident-to-resident accountability regarding waste management, residents noted feelings of uncertainty and safety concerns. In sites where residents don't feel connected to a larger community, residents are less likely to throw away their trash in the designated areas when faced with inconveniences.

During conversations with the Public Works team, residents mentioned being appreciative of NYCHA's caretakers and their efforts but indicated they do not feel that NYCHA is currently positioned to effectively enforce proper waste management due to gaps in the infrastructure. Additionally, data indicated that living in developments that participate in NYCHA's waste management programs like Ecycle, the Mattress Recycling Program, and the Rat Reduction Program did not impact residents' perception of waste management issues. Residents also reflected that waste management issues at their developments have worsened over time.

While removal of inconveniences to waste management can serve as a catalyst for improvement in resident quality of life, sustainable improvements in waste management will require resident participation.

Residents consistently cited litter and pests as the major waste-related issues that affect them, indicating they are linked to inconveniences in the waste disposal process. However, residents were also clear that, to resolve these issues, a new culture of individual accountability and active participation by residents is essential to creating social accountability regarding waste management.

Residents believe that increased attention by NYCHA to the shortcomings of the waste management infrastructure like damaged trash chutes or overfilled disposal locations will provide quick wins in improving the quality of life for residents. Additionally, residents feel that NYCHA can better leverage the resident leadership to implement education and community events related to waste management.

Outreach Methodology

The Public Works team identified 20 NYCHA developments in which to conduct direct outreach (Figure 1). These sites were chosen based on criteria that identified common development infrastructure to ensure that direct resident engagement was done at sites that represent common qualities of NYCHA developments. Factors considered in site selection include: availability of an external compactor or waste disposal system in units, participation in NYCHA programs like the Rat Reduction Plan and Ecycle, and location. Resident feedback was



Figure 1: Map of NYCHA Developments Engaged in In-Person Outreach

gathered in-person through surveying,¹ tabling, facilitated group discussions, and remotely through phone interviews and an online survey. Though direct outreach was conducted at 21 sites,² a total of 217 developments were engaged through either in-person outreach, phone interviews, or the online survey (Exhibit A). In total, the Public Works team reached over 4,600 residents through the following outreach methods.

NYCHA Resident Survey

Public Works developed a 16-question Resident Survey (Exhibit B) that asked respondents about their individual waste management habits, current waste management conditions within their developments, the impact of the current waste management infrastructure, and potential solutions to waste management challenges. Surveys were distributed via door-to-door outreach at the 20 selected developments and an online survey that residents could access at any time. Residents spent similar amounts of time completing the survey in each form, spending an average of 4 minutes and 43 seconds answering the online survey and approximately 5 minutes completing it in-person. The survey was publicized through flyers posted at the 20 target developments and by NYCHA staff through email outreach and distribution of the paper resident surveys by property management staff.

Type of Engagement ³	Number of Attendees/Respondents
Survey	4,531
Tabling	83
Facilitated Group Discussions	64
Resident Interview	12
Total	4,690

The survey was open for 6 weeks between January 18 and March 1 and garnered 4,531 survey responses both in English and Spanish.⁴ The survey responses used for the analysis represent 217 developments in New York City (64% of NYCHA developments).

Qualitative Feedback

To supplement data gathered through the resident survey, the Public Works team engaged residents in seven facilitated group discussions, 13 one-on-one interviews, and tabling events at four NYCHA sites. These outreach activities allowed the Public Works team to gather qualitative feedback from residents. These three modes of engagement were structured to gather resident input regarding the waste management challenges and opportunities for improvement in each development within three core steps in the waste management process:

- “Making it”, or how waste is created inside and outside of resident units.
- “Throwing it Out”, or the preliminary waste disposal process, including in-home practices, recycling habits, and personal beliefs.
- “Taking it Out”, which included the structural and social factors that influence how and where residents throw out their waste.

¹ Door-to-door outreach was conducted by Green City Force, a nonprofit organization that engages young adults in national service related to the environment. Green City Force has a strong track record of engaging with NYCHA residents on issues related to waste management.

² Public Works added one more development – Lafayette Houses – for direct outreach mid-project.

³ Number of survey respondents for each question can be found in Exhibit C. Number of in-person engagements by development can be found in Exhibit D.

⁴ Number includes those who did not complete the full survey. The number of respondents for each question is included in the following section.

During tabling events and group discussions, residents were provided maps of their individual developments and asked to identify the trash problem areas and the recycling and general waste drop-off locations within their developments. These interactions served to gather feedback from residents on successful implementation strategies for changes in the waste management system. The discussions also provided resident insight into successful implementation strategies. Resident group discussions were conducted in both English and Spanish.

Key Findings

Residents know where to throw out waste at their developments. However, many report that there are not enough locations to do so.

Survey responses and in-person conversations indicate that residents are aware of trash disposal procedures and feel the process is straightforward. 86% percent of respondents indicated they know the location for trash disposal in their development,⁵ and 67% of respondents feel that it is easy to throw out the trash in their development.⁶ During interactive mapping activities, residents were readily able to identify their development's designated trash disposal locations.

When residents did cite lack of knowledge, they most frequently referenced other residents' behaviors. Several participants communicated that when residents aren't aware of where to place trash, they place it in common areas—both indoor and outdoor. Residents mentioned confusion with general trash as often as they did with recycling. Some points of confusion mentioned were where to throw away recycling and organics and when trash is scheduled to be picked up.

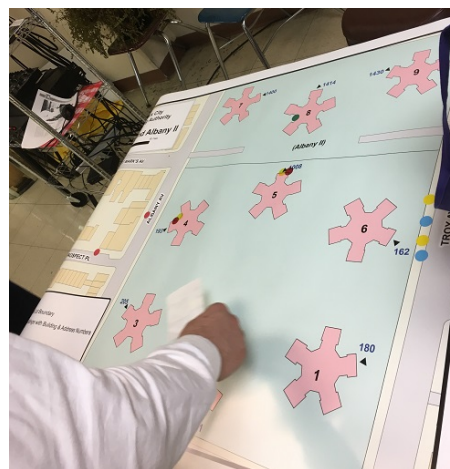


Figure 2: An Albany Houses resident identifies waste disposal locations

Only half of survey respondents indicated that there were enough places to throw out trash in their development.⁷ During in-person conversations, residents mentioned lack of trash disposal locations 40% more frequently than they mentioned lack of recycling locations. In developments where food waste disposals are present, survey respondents felt more strongly that there were enough places to throw out the trash.⁸

The in-home waste disposal process is not a primary concern for residents. However, concern about pests drives residents to remove garbage from their home quickly.

Most residents do not face issues when throwing away waste in their unit, whether they are searching for places to throw trash before it is taken to the chute or determining how to dispose of different items. During in-person discussions, residents mentioned concerns about indoor and outdoor common spaces 40 times

⁵ Survey Question 3

⁶ Survey Question 2

⁷ Survey Question 7

⁸ Respondents from developments with food waste disposals responding .30 points above the mean to survey question 7. Sample size of developments with food waste disposals was 48, sample size from developments without was 4,482.

as often as they did in-unit concerns. Zero residents identified their units as a problem area during mapping activities.

In-unit space for trash ranked relatively low as a factor in residents' waste management decisions. When ranking waste-related issues that affect them, residents ranked lack of space for waste bins in their unit second-to-last.⁹ Similarly, when ranking the factors that influence how they throw out their trash, 70% of survey respondents ranked "amount of space in my apartment for trash and recycling cans" last or second-to-last (Figure 3).¹⁰

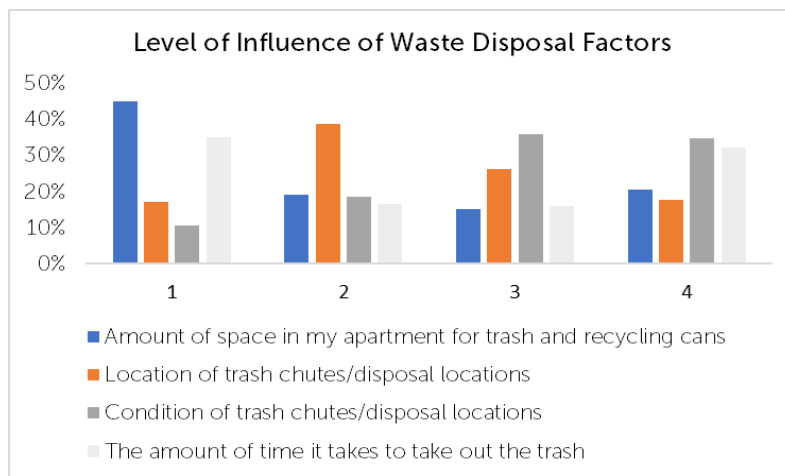


Figure 3: Responses to Survey Question 11, "Please rank the following factors according to how they influence how you currently throw out your trash" (1 being the least important and 4 being the most important).

Residents expressed frequency of waste disposal as key in keeping in-unit pests at bay. However, 60% of survey respondents felt that pests inside their units were an issue,¹¹ and residents noted that due to these issues, they remove waste from their units as quickly as possible. Residents tied this concern to food waste, indicating that when food waste is not removed from their unit or the building quickly, it attracts rodents. Sites with food disposal systems reported lower rates of concern with pests inside of apartments,¹² indicating that programs that make it easier to dispose of food waste in-home may alleviate this issue.

Residents report high levels of recycling participation and use of redemption centers. Participation depends on whether residents have a prior habit of recycling.

The majority of survey respondents indicated that they recycle, with 66% indicating they "agree" or "strongly agree" with the statement "I recycle my glass, metal, plastic, and paper."¹³ Additionally, 50% of respondents indicated that they have separate bins for recycling and trash in their home.¹⁴ Notably, youth survey respondents reported slightly lower recycling rates than older respondents.

Most resident comments regarding recycling were either concerns and complaints with the system or suggestions and requests for improvement. Most concerns raised were regarding overfilled bins. Suggestions for improvement included providing more recycling bins, creating incentive programs, and promoting recycling at development events.

⁹ Survey Question 9

¹⁰ Survey Question 11

¹¹ Survey Question 9

¹² Sites with food disposal systems report lower rates of concern with pests inside apartments (-12 percentage points less than average on survey question 9). Sample size of developments with food waste disposals was 48, sample size from developments without was 4,482.

¹³ Survey Question 4

¹⁴ Survey Question 6

Those who choose to recycle report they do so because of learned habits, created either in their home growing up or through programs at previous housing arrangements. One resident noted “for me, it’s just a way of life. It helps keep my home roach and rodent-free.”¹⁵ Others noted that fines and penalties instituted at other housing arrangements were instrumental in helping them adopt new recycling habits.

Residents who do not recycle reported not doing so because they were not required to, did not know how to, or that they have requested bins from NYCHA at their developments and had not received them. One resident noted, “I don’t know what to do with my recycling, so I put it outside of my unit.”¹⁶ Another noted, “I don’t recycle. We don’t have to. It [makes it] harder to separate the garbage.”¹⁷ Residents at several developments emphasized that they requested bins from NYCHA but hadn’t received them yet. Several residents felt that others do not recycle due to lack of incentive, particularly youth. One noted “[I don’t think that] many youth find true value in recycling...most don’t have an incentive to recycle.”¹⁸

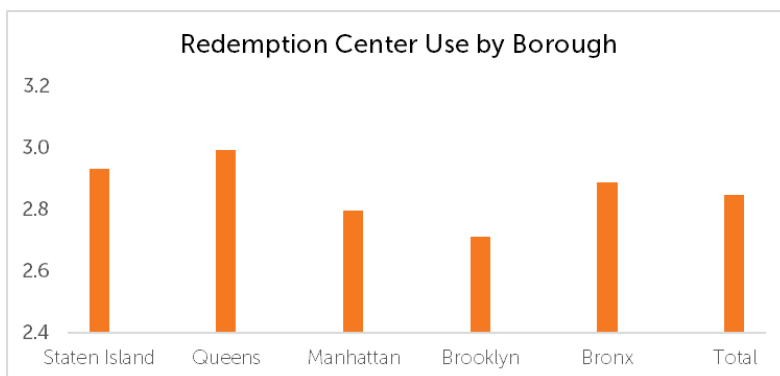


Figure 4: Responses to Survey Question 5, “When I throw away plastic and glass bottles, I take them to a redemption center.” (1 being “Strongly Disagree,” 5 being “Strongly Agree.”)

Forty-one percent of survey respondents report that they use recycling redemption centers.¹⁹ Survey respondents in the Bronx, Staten Island, and Queens utilize redemption centers more frequently than those in other boroughs (Figure 4). In addition, residents from six developments engaged during the qualitative outreach activities reported that community members enter NYCHA grounds to open bags and collect recyclable materials, which causes litter around the development. One resident reported, “I see them rip the bags open to take the bottles out,”²⁰ and another noted “people go through the bags for the bottles and leave trash all over the place.”²¹

Residents often encounter dirty, damaged, or overfilled chutes and compactors which affects their ability to dispose of waste.

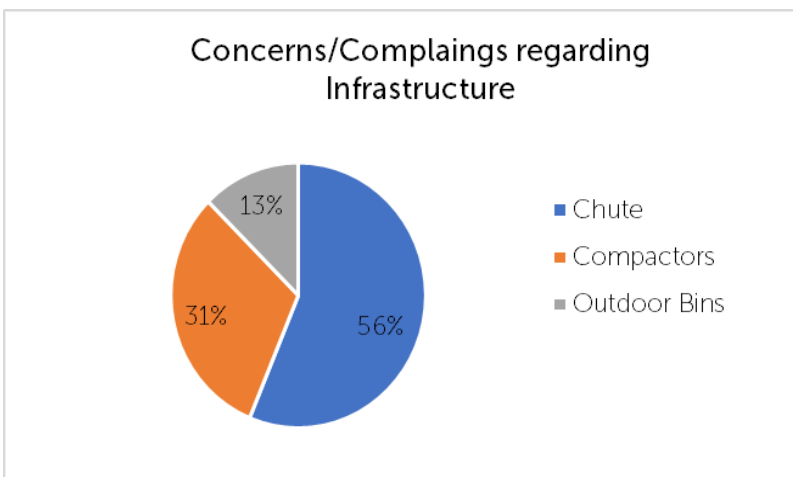


Figure 5: Distribution of qualitative comments: complaints/concerns regarding infrastructure

¹⁵ Quote from St. Mary’s Park
¹⁶ Quote from Ravenswood Houses.
¹⁷ Quote from Albany Houses
¹⁸ Quote from St. Mary’s Park Houses
¹⁹ Survey Question 5
²⁰ Quote from Washington Houses
²¹ Quote from Riis Houses

Chutes were the most frequently cited infrastructure among resident complaints (Figure 5). 56% of survey respondents noted that too small, damaged, or dirty trash chute doors are an issue for them.²² This is particularly true for respondents in developments with higher population densities. Residents noted that chute doors become locked and unusable when they are clogged or overfilled, and 46% of survey respondents feel that overflowing trash disposal locations are an issue²³ with residents indicating they “have to push the chute doors open because they get too full” and “ have to use full force to get [the chute] to close.”²⁴

Many residents also noted that chutes are too small to accommodate household-sized trash bags, indicating that “people use big bags and they hardly fit in the chute.”²⁵ While 35% percent of survey respondents ranked bigger doors on trash chutes as their first or second priority issue for NYCHA to resolve,²⁶ residents acknowledged during in-person conversations that modifying existing infrastructure would be resource-intensive.

Residents also reported that compactors are often non-functioning or are not large enough to handle the development’s volume of trash. Residents in multiple developments mentioned that staff lock the compactor doors when they become full, preventing residents from being able to dispose of their trash. One resident noted, “sometimes the compactors get too full and they shut the doors. Then residents prop the doors open and it causes rodents.”²⁷ In addition, several residents noted that non-residents and members of the surrounding community use NYCHA facilities to dispose of their trash, which contributes to overfilled bins. Bulk waste was also referenced frequently in misuse of chutes.

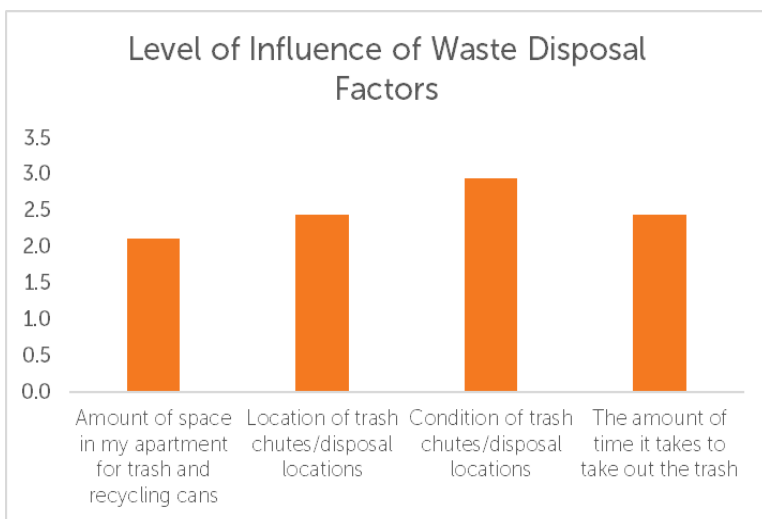


Figure 6: Responses to Survey Question 11: “Please rank the following factors according to how they influence how you currently throw out your trash (1 being the least important and 4 being the most important).”

These issues influence trash disposal habits. Respondents mentioned “condition of trash chutes and disposal locations” as the most influential factor in how they throw out their trash (Figure 6).²⁸

When disposal locations are not functioning, overfilled, or require residents to go out of their way, residents use bins in common spaces or leave trash in hallways or near chutes and compactors. As a result, informal disposal locations replace inconveniently-located official locations.

²² Survey Question 9

²³ Ibid

²⁴ Quote from Ravenswood Houses

²⁵ Quote from Marble Hill Houses

²⁶ Survey Question 12

²⁷ Quote from Washington Houses

²⁸ Survey Question 11

Forty-four percent of survey respondents indicated that their trash disposal habits are directly related to the location of trash chutes and disposal locations. Many residents indicated that informal disposal locations arise near chutes and compactors or in front of buildings, which may lead residents to utilize these spaces instead of the official trash drop-off locations when chutes and compactors are dirty, damaged, or overfilled.

When a disposal location requires residents to walk further than they are accustomed, residents are less likely to use it. One resident suggested, “coming out of the building, if they could put the [cans that are in] the back of the building in the front, people would be much more likely to take things out.”²⁹ When compactors are located on the side of the building opposite from the exits, informal disposal locations arise in front of buildings or in trash cans not designated for household trash. Mapping activities revealed these issues occur in front of buildings, near walkways, and by communal trash disposal locations (Figure 7). For example, one resident noted, “no dump sites have bins. Bags just get piled up and it has a gate around it. The other two [disposal locations] are where the compactors are emptied so they can coincide with the trucks driving by.”³⁰ Another noted “they see that [dumping] site there so they just start throwing things. One person and then another person.”³¹

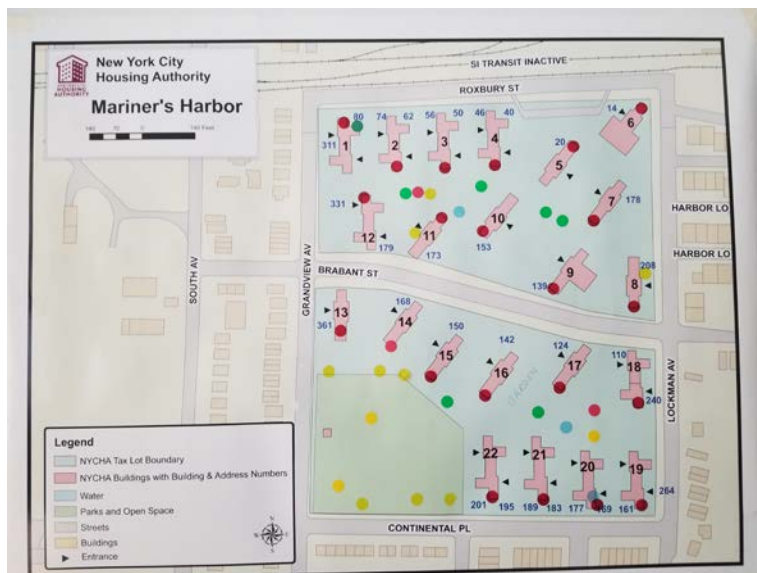


Figure 7: Results from a mapping activity at Mariner's Harbor. Red dots indicate issue areas, yellow dots indicate disposal locations, blue dots indicate bulk waste disposal locations, and green dots indicate recycling locations.

Residents also report dirty or damaged chutes cause them or other residents to place garbage in front of buildings, near development walkways, or in communal outdoor trash cans. This topic was raised frequently during discussions with residents, who indicated “people put trash in front of the building, some people don’t want to use the chutes”³² and that when the chutes are blocked, “people leave the garbage on the floor.”³³ Several residents noted that while NYCHA caretakers are effective, some residents place trash in the incorrect location under the assumption that the caretaker will remove it.

Residents feel that curbside disposal locations make it more difficult to take out the trash and are unsightly. Contained disposal may have a positive influence on a development’s waste management.

²⁹ Quote from Washington Houses

³⁰ Quote from Brownsville Houses

³¹ Quote from St. Mary’s Park Houses

³² Quote from Ravenswood Houses

³³ Quote from Marble Hill House

Survey respondents at developments with curbside disposal felt that it was more difficult to take out the trash than at those without.³⁴ These sites also show a higher rate of litter outside of buildings.³⁵ This may indicate that residents perceive curbside disposal locations as inconvenient and are less likely to take trash to these areas, or that it is harder for trash to be contained in the set spaces during pick-up. During in-person conversations, residents highlighted curbside disposals as unsightly, prone to use by the surrounding community, and quick to overfill. Many times, these curbside locations were referenced in conjunction with problems with bulk waste. One development with curbside pickup highlighted “all along Second Avenue we have lots of problems with...waste.”³⁶

Although survey sample size was small (12 survey respondents), residents from developments with contained disposal found it easier to take out the trash and were more likely to agree that they know the locations for trash disposal in their development. In addition, these residents report much higher recycling rates and are much more likely to agree that there are enough places to throw out trash in their development. Finally, these sites also show lower rates of litter outside the buildings and pests on the grounds.³⁷

Bulk waste is a common pain point for residents. When large items do not fit down the chute or when compactors or bulk disposal locations are far, residents often leave waste in front of buildings or in communal trash cans.

Residents frequently raised bulk waste in common spaces as an issue during in-person conversations. Bulk waste was the third-most mentioned waste stream during outreach, following general trash and recycling (Figure 8). Conversations with residents revealed that bulk waste contributes to a large proportion of litter and is varied in composition, which includes household furniture, cardboard, and toys. One resident noted, “I’ve seen mattresses, TVs, baby stuff, etc.”³⁸

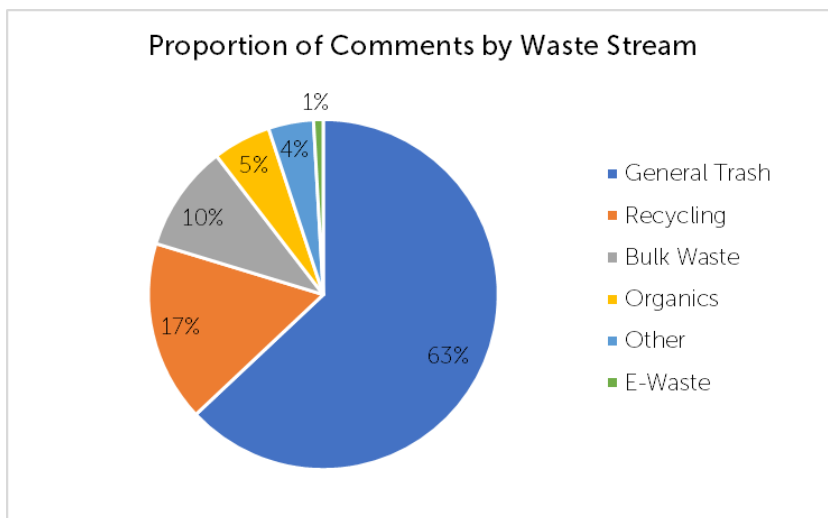


Figure 8: Distribution of qualitative comments by waste stream.

While residents were aware of bulk waste disposal locations in their developments, they cited these locations as inconvenient and, during the mapping activities, readily identified informal areas residents dispose

³⁴ Survey respondents from developments with curbside disposal responded .09 points lower than the mean on survey question 2. Sample size was 303 for respondents from sites with curbside pickup and 4216 without curbside pickup.

³⁵ Residents from developments with curbside pickup responded 4 percentage points higher than average on survey question 9 to the answer “overflowing trash disposal locations.”

³⁶ Quote from Washington Houses.

³⁷ Sample size for residents with contained disposal was 12, sample size without was 4216. Responses from developments with contained disposal found it easier to take out the trash (responding .99 points higher than average on survey question 2), residents were more likely to agree that they know the locations for trash disposal in their development (.76 points higher than average on question 3), and report much higher recycling rates (.99 higher than average on question 4, .97 higher on question 5, and .95 higher on question 6.) They were also more likely to agree that there are enough places to throw out trash in their development (1.08 than average higher on question 7). These sites also show lower rates of litter outside the buildings (33% percentage points lower on question 9, 36% points lower on question 10) but higher rates of problems with odor (+14% question 9 and +20% question 10). overall, there appear to be fewer problems with pests on the grounds of these developments (-26% question 9 and -20% question 10).

³⁸ Quote from Howard Houses

of bulk waste, such as hallways and the front of buildings. Particularly when items are heavy, residents are hesitant to take bulk waste to designated drop-off locations. One participant noted, “they expect residents to take their bulk waste very far....it’s inconvenient”,³⁹ while another noted, “when I have heavy trash I take it to the parking lot...where workers pick it up.”⁴⁰

Residents linked bulk waste to the larger issue of litter across developments. One noted, “tenants make their [bulk waste] dump sites in front of the buildings.”⁴¹

Overwhelmingly, litter and pests are the largest waste-related issues affecting resident quality of life.⁴² Residents emphasized that these issues are connected, and that litter attracts pests.

Litter and pests are the primary concerns of residents and were overwhelmingly the largest issues raised by survey respondents. As indicated in Figure 9, most respondents noted they were negatively affected by litter inside and outside of their buildings. Litter inside and outside of buildings was the second-most frequently discussed concern or complaint during in-person conversations. In addition to residents leaving waste in the hallways, participants mentioned other types of litter such as “cigarettes, crumbs, and tissues” left in the hallways.⁴³

Pests are also an issue across developments. 67% of survey respondents were negatively affected by pests on the grounds of their development, and 59% of survey respondents were affected by pests in their unit.⁴⁴ During in-person conversations, residents noted frequent sightings of rodents and cockroaches around grounds. “We see rats walking around in the daytime”⁴⁵ one resident noted.

³⁹ Quote from St. Mary’s Park Houses.

⁴⁰ Quote from Howard Houses

⁴¹ Quote from St. Mary’s Park Houses

⁴² For the purposes of this evaluation, litter refers to any waste not placed inside of a trash can or proper disposal location.

⁴³ Quote from Ravenswood Houses

⁴⁴ Survey Question 9

⁴⁵ Quote from St. Mary’s Park

Sites with rat reduction areas answered survey questions similarly to developments without rat reduction areas; questions regarding pests showed concern at the same rate as other developments. However, sites with food waste disposal reported lower rates of concern with pests both inside and outside of apartments. These sites also reported fewer issues with inside and outside litter.⁴⁶

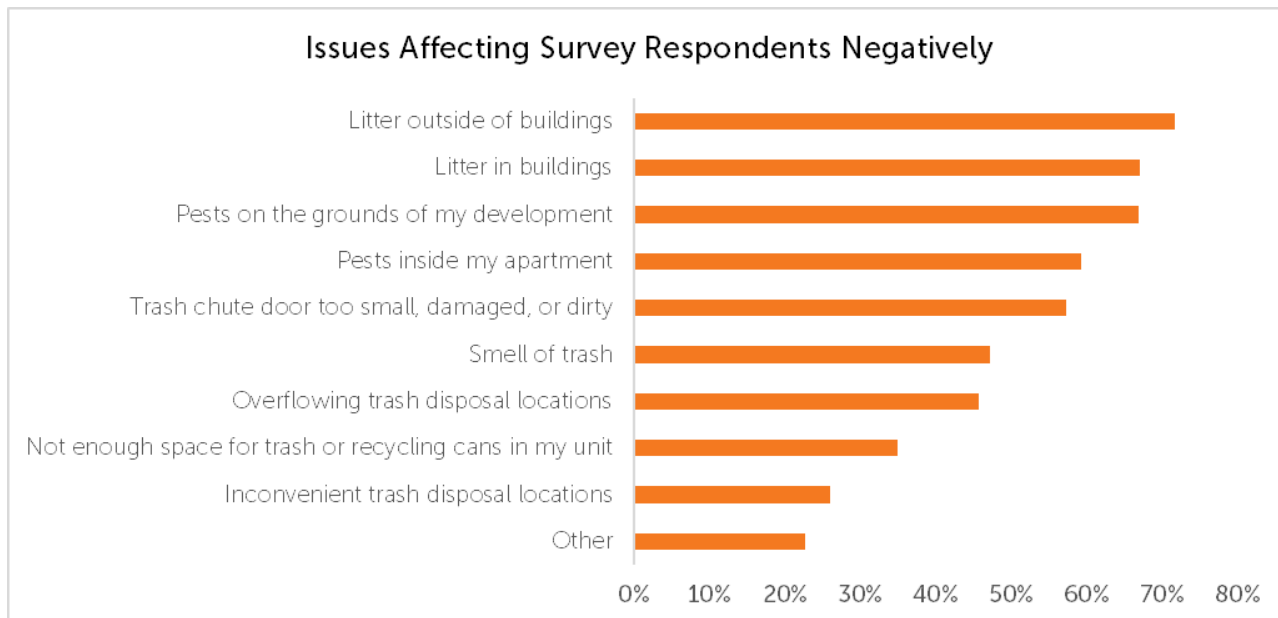


Figure 9: Responses to Survey Question 9: "Which of the following trash-related issues affect you negatively? (Check all that apply)"

Residents often noted that problems with litter and pests are compounded, and that exposed waste attracts rodents. One resident noted, "it brings in rats when people leave trash close to the entry."⁴⁷ Another reported that "the rodents are a major issue. The garbage outside creates additional rodents. We're feeding them."⁴⁸ As mentioned above, residents noted that they remove waste quickly from their units to avoid attracting pests.

Not surprisingly, survey respondents overwhelmingly feel that the dominant issues for NYCHA to resolve are litter--both inside and outside of buildings--and pests, with 76% of survey respondents indicating that pests were one of the three most important issues for NYCHA to resolve. Furthermore, 58% of respondents felt that litter outside of buildings was one of the top three issues to resolve, while 54% of survey respondents highlighted litter inside of their buildings as one of their top three.⁴⁹

Residents shared that NYCHA caretakers are effective in cleaning up waste from the development. However, many feel that residents as well as NYCHA are responsible for keeping the development clean. Residents felt that there was not a strong sense of shared responsibility to throw away trash properly.

⁴⁶ Sites with food disposal also report lower rates of concern with pests both inside and outside apartments (-12 & 15% respectively on survey question nine and -19% on question ten). overall, these sites report fewer issues with litter inside and outside as well (-20 & 28% below the mean on question nine and -24% & 30% on survey question ten). Sample size of developments with food waste disposals was 48, sample size from developments without was 4,482.

⁴⁷ Quote from Howard Houses

⁴⁸ Quote from Washington Houses

⁴⁹ Survey Question 10

Eighty-percent of positive comments from residents were regarding NYCHA caretakers or the role of NYCHA in keeping developments clean. Residents reported “the caretakers and staff are doing an excellent job” and that “I have to give the housing development some credit, they get the compactors empty and the trash to the site.”

However, residents felt that keeping the development clean is a two-way street. Many residents felt that while NYCHA caretakers were effective, residents must put their trash in the correct locations and not litter. One resident noted, “the [NYCHA] workers work very hard, but the people are lazy and throw stuff everywhere.”⁵⁰ Another reported, “the caretakers clean, and they do as well as they can with what they have but it’s a lot.”⁵¹

The most frequent concern or complaint mentioned by residents was other residents’ behavior, indicating a lack of community among residents, which affects their ability to collectively address waste disposal issues. Many residents felt that others were not incentivized to throw away their trash properly or didn’t care enough to do so. One resident association leader reported, “residents have raised concerns [about waste] all the time. But residents contribute to it as well.”⁵² Older residents reported this issue had gotten worse over time. One noted that “we used to have community events...that worked very well. But the young people don’t want to go to any events.”⁵³ Several residents felt that hiccups in the waste disposal process were not prohibitive, and that proper waste disposal is about taking responsibility for one’s actions. Others felt that residents didn’t care or didn’t feel like they had agency to change the situation in their development.

Several residents raised enforcement of proper disposal as an issue. Some residents, particularly older residents, felt that NYCHA didn’t enforce policies strictly enough. One resident said “Authority is important. NYCHA needs to step up.”⁵⁴ Multiple felt uncomfortable speaking to neighbors that cause problems about the issue because they do not have a relationship with their neighbors.

⁵⁰ Quote from Washington Houses

⁵¹ Quote from St. Mary’s Park Houses

⁵² Quote from Pomonok Houses

⁵³ Quote from Albany Houses

⁵⁴ Quote from Marble Hill Houses

Resident Recommendations

Residents responded positively to Public Works' outreach and often provided opinions on specific changes that NYCHA can make to improve waste management conditions in their developments. Data from the outreach indicated that waste management is a key priority for residents and a leading factor in quality of life at NYCHA developments. Resident feedback points to a need for improved infrastructure. While collective resident morale is low regarding waste management, improving the condition and availability of waste infrastructure in the developments will directly decrease the amount of visible litter and pests, and signal to residents a commitment by the agency to improve resident quality of life. Results of the outreach indicate that, in some cases, the presence of NYCHA programs may alleviate residents' concerns. For example, sites with food disposal systems generally had fewer complaints regarding litter. However, other interventions, like the Rat Reduction Plan, did not appear to impact residents' responses.

As waste infrastructure changes are implemented, outreach results indicate that leveraging existing resident programming resources like the Tenants Associations, community centers, and partner organizations to provide residents opportunities to be involved in waste management through either education campaigns or community trash pick-up days will improve waste conditions in the developments. Lastly, resident feedback indicated that improving the waste management conditions will lead residents to feel a stronger sense of community.

Infrastructure and Cleanliness:

- Ensure chutes don't become clogged or dirty and give residents chute-sized bags
- Increase number of disposal facilities and place them close to resident pathways.
- Empty overfilled outdoor disposal facilities more consistently and increase the frequency of pickup.
- Communicate alternatives to waste disposal when chutes/compactors don't work.
- Respond to resident requests for trash bins.

Stronger Enforcement:

- Install cameras near disposal locations to encourage residents to better handle their waste.
- Institute fines or other measures of accountability so residents adhere to policies.
- Create a hotline for complaints regarding waste issues in the developments.

Education and Social Cohesion:

- Create more educational opportunities to promote waste management.
- Leverage existing resident groups like the Environmental Ambassadors and/or youth groups to promote resident participation.
- Provide new residents information on the waste disposal procedures.
- Leverage Tenant Associations to implement programming and promote resident partici-

Exhibit A: List of NYCHA Sites that Completed Survey

572 Warren Street	Gowanus	Queensbridge North
Adams	Grampion	Queensbridge South
Albany I	Grant	Ralph Avenue Rehab
Amsterdam	Gravesend	Randall Avenue-Balcom Avenue
Armstrong I	Gun Hill	Rangel
Astoria	Haber	Ravenswood
Atlantic Terminal Site 4b	Hammel	Red Hook East
Audubon	Harborview Terrace	Red Hook West
Bailey Avenue-West 193rd Street	Harlem River	Redfern
Baisley Park	Hernandez	Reid Apartments
Baruch	Highbridge Gardens	Richmond Terrace
Bay View	Holmes Towers	Riis
Baychester	Hope Gardens	Robbins Plaza
Beach 41st Street-Beach Channel Drive	Howard	Robinson
Bedford-Stuyvesant Rehab	Hughes Apartments	Roosevelt I
Belmont-Sutter Area	Hylan	Roosevelt II
Berry	Independence	Rutgers
Betances I	Ingersoll	Sack Wern
Bethune Gardens	International Tower	Saint Mary's Park
Bland	Isaacs	Saint Nicholas
Borinquen Plaza I	Jackson	Samuel (City)
Borinquen Plaza II	Jefferson	Sedgwick
Boston Secor	Johnson	Seward Park Extension
Boulevard	King Towers	Sheepshead Bay
Boynnton Avenue Rehab	Kingsborough	Shelton House
Bracetti Plaza	La Guardia	Smith
Breukelen	Lafayette	Sotomayor Houses
Brevoort	Latimer Gardens	Soundview
Bronx River	Lehman Village	South Beach
Brown	Lexington	South Bronx Area (Site 402)
Brownsville	Lincoln	South Jamaica I
Bushwick	Linden	South Jamaica II
Bushwick II (Groups B & D)	Long Island Baptist Houses	Stapleton
Butler	Low Houses	Stebbins Avenue-Hewitt Place
Campos Plaza II	Lower East Side I Infill	Sterling Place Rehabs (Sterling-Buffalo)
Carey Gardens	Lower East Side II	Straus

Carleton Manor	Lower East Side II	Stuyvesant Gardens I
Carver	Lower East Side Rehab (Group 5)	Sumner
Cassidy-Lafayette	Manhattanville	Surfside Gardens
Castle Hill	Manhattanville Rehab (Group 2)	Sutter Avenue-Union Street
Chelsea	Marble Hill	Taft
Claremont Parkway-Franklin Avenue	Marcy	Taylor Street-Wythe Avenue
Claremont Rehab (Group 3)	Mariner's Harbor	Thomas Apartments
Clason Point Gardens	Marlboro	Throggs Neck
Clinton	Marshall Plaza	Tilden
Coney Island	Mckinley	Todt Hill
Coney Island I (Sites 4 & 5)	Melrose	Tompkins
Cooper Park	Meltzer Tower	Twin Parks East (Site 9)
Crown Heights	Metro North Plaza	Twin Parks West (Sites 1 & 2)
Cypress Hills	Mill Brook	Two Bridges Ura (Site 7)
Davidson	Mitchel	Union Avenue-East 163rd Street
De Hostos Apartments	Monroe	Unity Plaza (Sites 4-27)
Douglass	Moore	University Avenue Rehab
Drew-Hamilton	Morris I	Van Dyke I
Dyckman	Morrisania	Vladeck
Eagle Avenue-East 163rd Street	Mott Haven	Wagner
East New York City Line	Murphy	Wald
East River	New Lane Area	Washington
Eastchester Gardens	Nostrand	Washington Heights Rehab (Groups 1&2)
Edenwald	Ocean Bay Apartments (Bay-side)	Webster
Elliott	Ocean Hill Apartments	Weeksville Gardens
Farragut	O'dwyer Gardens	West Brighton I
First Houses	Palmetto Gardens	White
Forest	Park Avenue-East 122nd, 123rd Streets	Whitman
Forest Hills Coop (108th Street-62nd Drive)	Park Rock Rehab	Williams Plaza
Fort Independence Street-Heath Avenue	Parkside	Williamsburg
Fort Washington Avenue Rehab	Patterson	Wilson
Franklin Avenue I Conventional	Pelham Parkway	Wise Towers
Fulton	Pennsylvania Avenue-Wortman Avenue	Woodside
Garvey (Group A)	Pink	Woodson
Glenmore Plaza	Polo Grounds Towers	Wyckoff Gardens
Glenwood	Pomonok	

Exhibit B: Resident Survey



Resident Survey on Waste Management

The New York City Housing Authority (NYCHA) is working to improve how trash is managed and collected at our developments. We want to learn more about your experiences dealing with trash at your development. Please respond to the following questions. Your feedback will inform plans to improve trash management at all NYCHA developments. **All information gathered in this survey will remain anonymous.** Thank you!

Background Survey					
Name of your development:	Date of completion:				
Number of years living at your development:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	0-4	5-9	10+		
Age:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	14-17	18-20	21-49	50-61	62+
1. My development is free of litter most of the time.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
2. It is easy to take out the trash in my development.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
3. I know the locations for trash disposal at my development.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
4. When I am throwing away metal, glass, plastic, or paper, I recycle it.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
5. When I throw away plastic and glass bottles, I take them to a redemption center.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
6. I have separate bins for recyclable (metal, glass, plastic, or paper) and nonrecyclable trash in my home.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
7. There are enough places to throw out trash in my development.					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

8. Please rank the following possible changes to trash management in your development based on how much they would help make trash disposal more convenient for you (1 being the least helpful and 5 being the most helpful).

- _____ Bigger doors on trash chutes
- _____ A disposal system in your kitchen sink that allows excess food waste to be washed down the drain
- _____ Trash disposal areas that are closer to my apartment
- _____ More trash cans in common areas (lobby, hallways, and other central areas)
- _____ More bulk waste drop-off sites or places to throw away large items (couches, mattresses, etc.)

9. Which of the following trash-related issues affect you negatively? (Check all that apply.)

- Inconvenient trash disposal locations
- Overflowing trash disposal locations
- Not enough space for trash or recycling cans in my apartment
- Trash chute door too small, damaged, or dirty
- Litter in buildings
- Litter outside of buildings
- Smell of trash
- Pests (mice, rats, cockroaches) inside my apartment
- Pests (mice, rats, cockroaches) on the grounds of my development
- Other _____

10. Please select a maximum of three issues that you feel are most important for NYCHA to resolve.

- Inconvenient trash disposal locations
- Overflowing trash disposal locations
- Not enough space for trash or recycling cans in my unit
- Trash chute door too small, damaged, or dirty
- Litter in buildings
- Litter outside of buildings
- Smell of trash
- Mice, rats, and cockroaches

11. Please rank the following factors according to how they influence how you currently throw out your trash (1 being the least important and 4 being the most important).

- _____ Amount of space in my apartment for trash and recycling cans
- _____ Location of trash chutes/disposal locations
- _____ Condition of trash chutes/disposal locations
- _____ The amount of time it takes to take out the trash

12. Are you interested in receiving updates on NYCHA's plans to improve how trash is managed? (Your contact information will not be connected to your survey responses.)

- Yes No

If yes, please see a survey administrator to write your email address on a sign-up sheet.

Exhibit C: Number of Resident Responses by Question

Q1. Please select a preferred language:		Q9. When I throw away plastic and glass bottles, I take them to a redemption center.	
Answered	6614	Answered	4199
Skipped	21	Skipped	2436
Q2. Development where you live:		Q10. I have separate bins for recyclable (metal, glass, plastic, or paper) and nonrecyclable trash in my home.	
Answered	5147	Answered	4199
Skipped	1488	Skipped	2436
Q3. Number of years living at current development:		Q11. There are enough places to throw out trash in my development.	
Answered	5084	Answered	4197
Skipped	1551	Skipped	2438
Q4. Age:		Q12. Please rank the following possible changes to trash management in your development based on how much they would help make trash disposal more convenient for you (1 being the least helpful and 5 being the most helpful).	
Answered	5090	Answered	4153
Skipped	1545	Skipped	2444
Q5. My development is free of litter most of the time.		Q13. Which of the following trash-related issues affect you negatively?	
Answered	4197	Answered	4172
Skipped	2438	Skipped	2463
Q6. It is easy to take out the trash in my development.		Q14. Please select a maximum of three issues that you feel are most important for NYCHA to resolve.	
Answered	4202	Answered	4155
Skipped	2433	Skipped	2480
Q7. I know the locations for trash disposal at my development		Q15. Please rank the following factors according to how they influence how you currently throw out your trash (1 being the least important and 4 being the most important).	
Answered	4204	Answered	4096
Skipped	2431	Skipped	2501
Q8. When I am throwing away metal, glass, plastic, or paper, I recycle it.		Q16. Are you interested in receiving updates on NYCHA's plans to improve how trash is managed? (Your contact information will not be connected to your survey responses.)	
Answered	4200	Answered	4190
Skipped	2435	Skipped	2445

Exhibit D: Number of In-Person Engagements by Development

Name of Development	Door-to-door Outreach	Facilitated Group Discussions	Resident Interview	TA Lead Interview	Tabling
Albany	1				1
Astoria	1				
Baruch	1				
Bay View	1				
Brownsville	1		1		
Davidson	1				
Farragut	1				
Forest	1				
Harlem River	1			1	1
Howard	1	1	3		
Lafayette					1
Lexington			1		
Marble Hill	1	1	1		
Mariner's Harbor	1	1			
Pomonok	1		1		
Ravenswood	1		1		1
Red Hook East	1				
Riis/Wald	1				1
Saint Mary's Park	1	1	1		1
Wagner	1				
Washington	1	1	1		
Williamsburg	1		1		1
Grand Total	20	5	11	1	7



Public Works Partners is a planning and consulting firm whose work strengthens the organizations that strengthen communities. We help clients to launch and administer complex new programs; improve operations and increase impact; and promote organizational excellence. Clients come to us because our team’s hands-on experience and expertise allow us to design and implement customized solutions to complex problems that make the most sense for each organization we serve.

Our team understands the importance of engaging local communities to create strategies that fit the neighborhood and are sustainable over time. We help government agencies strategize and execute stakeholder engagement that leads to actionable plans and policies. We engage stakeholders at every level – residents, businesses, advocates, leaders – to understand opportunities and create effective action steps. Our outreach approach fosters buy-in to ensure a seamless transition from planning to execution.

Public Works Partners is a certified WBE with the City and State of New York and the Port Authority of New York/New Jersey; and a certified DBE with the U.S. Department of Transportation. To learn more about Public Works, visit www.publicworkspartners.com

Abbreviations

DEP	New York City Department of Environmental Protection
DOB	New York City Department of Buildings
DOHMH	New York City Department of Health and Mental Hygiene
DSNY	New York City Department of Sanitation
EPA	United States Environmental Protection Agency
FDNY	New York City Fire Department
HUD	United States Department of Housing and Urban Development
MGP	Metal, Glass, and Plastic
MOS	New York City Mayor’s Office of Sustainability
MOCTO	New York City Mayor’s Office of the Chief Technology Officer
REES	NYCHA Office of Resident Economic Empowerment & Sustainability

Acknowledgments

The NYCHA 2.0 Waste Management Plan was made possible by the insights of NYCHA residents and staff and key contributions from many people at sister agencies and private partners. We deeply appreciate their time, advice, and passionate support of public housing and sustainability, and look forward to working together to realize the goals of the this plan.

New York City Housing Authority

Kathryn Garcia, Interim Chair and Chief Executive Officer

Vito Mustaciuolo, General Manager

Board

Derrick Cephas, Vice Chair

Zaire Dinzey-Flores, Board Member

Victor A. González, Resident Board Member

Maria Torres-Springer, Board Member

Jacqueline Young, Resident Board Member

Executive Committee

Plachikkat V. Anantharam, Executive Vice President for Finance and Chief Financial Officer

Deborah Goddard, Executive Vice President for Capital Projects

Vilma Huertas, Executive Vice President & Chief Compliance Officer

Kerri Jew, Executive Vice President & Chief Administrative Officer

Kelly D. MacNeal, Executive Vice President of Legal Affairs and General Counsel

Robert Marano, Executive Vice President & Chief Information Officer

Lakesha Miller, Executive Vice President for Leased Housing

Cathy Pennington, Executive Vice President for Operations

David Pristin, Executive Vice President for External Affairs

Sideya Sherman, Executive Vice President for Community Engagement & Partnerships

Arden Sokolow, Chief of Staff and Executive Vice President for Real Estate and Special Projects

NYCHA Community Engagement Participants

Residents of Albany Houses, Harlem River Houses, Howard Houses, Lafayette Gardens, Marble Hill Houses, Mariner's Harbor Houses, Ravenswood Houses, Riis Houses, Saint Mary's Park Houses, Wald Houses, Washington Houses and Williamsburg Houses

More than 4,500 NYCHA residents responded to the on-line waste management survey. The community engagement sessions and survey were facilitated by Public Works Partners.

Waste Management Plan Advisory Committee

Bridget Anderson, Deputy Commissioner, Recycling & Sustainability, DSNY

Carolyn Bragdon, Director, Neighborhood Interventions, DOHMH

Jared Cole, Senior Manager, Recycling Outreach, DSNY

Sara Currie-Halpern, President, Think Zero Inc.

Tom Duffy, Chief of CCTV/PSA Unit, Office of Safety and Security, NYCHA

Pamela Elardo, Deputy Commissioner, Bureau of Wastewater Treatment, DEP

Alfred J. Ferguson, Chief of Collection / Recycling Operations, DSNY

Marlon Forbes, Senior Operations Project Manager, Office of Mold Assessment and Remediation, NYCHA

Kate Gouin, Chief of Staff, NYC MOS

Jennifer Hiser, Assistant Urban Designer, Real Estate Development, NYCHA

David Hurd, Director, GrowNYC

Ray Levan, Resident Buildings Superintendent, Maintenance, Repair & Skilled Trades, NYCHA

Jose Lopez and Joseph Marano (Ret.), Citywide Containerization Supervisor, DSNY

Samantha MacBride, Director of Research and Sustainability, Bureau of Recycling and Sustainability, DSNY

James Ortiz, Administrative Community Relations Specialist, Resident Engagement Department, NYCHA

Kevin O'Sullivan, Deputy Director, Agencies, Institutions, & Businesses, DSNY

Hector L. Ramos, Deputy Director, Operating Expense, Financial Planning and Analysis, NYCHA

John Rettagliata, Deputy Director, Department of Real Estate Services, NYCHA

Christina Salvi, Assistant Director, GrowNYC

Jose Serrano-McClain, Program Director, NYC MOCTO

Debbie Sheintoch, Director, Strategic Partnerships and Outreach, DSNY

Elena Tenchikova, Director, Department of Prevention and Intervention Strategies, NYCHA

Monika Wysocki, Assistant to the Chair, DSNY

Contributing NYCHA Staff

Leon Agard, Deputy Director, Brooklyn Property Management

David Aron, Chief of Real Estate and Economic Development, Law Department

Polina Bakhteiartov, Director, Real Estate Development

Josephine Bartlett, Special Initiatives Program Manager, Prevention & Intervention Strategies

Jasmine Blake, Deputy Chief Communications Officer

Victor Brenner, Senior Project Manager, Project Management Team 3

Matthew Charney, Director, Real Estate Development

Yuet Sim Cheung, Chief of GIS & Analytics, Department of Performance Tracking & Analysis

Adham Choucri, Deputy Director, Revenue & Receivables

Bruce Eisenberg, Deputy Director, Architecture, Design Department

Meddy Ghabaee, Construction Project Manager, Procurement Department

Scott Groom, Deputy Director, Standards & Codes, Design Department

Yianice Hernandez, Director, Capital Planning

Jenelle Hudson, Director, Resident Engagement Department

Michael Jones, Associate Housing Development Specialist, Real Estate Department

Johnson Kaduthodil, Cost Estimating Manager, Capital Planning Department

Vlada Kenniff, Senior Director, Mold Assessment and Remediation

Sara Kobocow, Associate General Counsel, Law Department

Joey Koch, Senior VP for Support Services

Robert Kumbatovic, Assistant General Counsel, Law Department

Joseph LaMarca, Director, General Services

Robert Mallamo, Deputy Director, Maintenance, Repair & Skilled Trades

Roger Marin, Senior Financial Planning Analyst, Capital Planning

Keith Marshall, Studio Leader, Design Department

Kate McCabe, Senior Analyst, Office of the EVP for Operations

Claudette Morris, Director, Capital Projects Analysis & Reporting

Georgiana Okoroji, Director, Financial Planning & Analysis

Delma Palma, Design Innovation Fellow, Design Department

Jaclyn Sullivan, Senior Advisor to the General Manager

Remya Thomas, Digital Communications Manager

Peter Trifoli, Acting Director, Maintenance, Repair & Skilled Trades

David Valadez, Technical Advisor, Maintenance, Repair & Skilled Trades

Carl Walton, Deputy Director, Office of the Public Housing Operations

Laurence Wilensky, Deputy Director, Department of Performance Tracking & Analysis

Mariam Youssef, Senior Physical Needs Assessment Manager, Capital Planning

Sustainability Programs Department

Adam Benditsky, Program Manager

Katy Burgio, Program Associate

Maria Lisa Cuzzo, Program Manager

Che Flowers, Program Associate

Lidia German, Secretary to the Vice President

Valerie Pepe, Associate Staff Analyst

Alexis Schulman, Consultant

Christopher White, Program Associate

Special Thanks

To the pilot project implementers and facilitators:

Mara Cerezo and **Lisbeth Shepard**, Green City Force

Manish Desai, ECORich, LLC

John Frustaci, Premier Compaction Systems, LLC

Michael Hawksby and **Christine Kiourtsis**,

Renewable Recycling, Inc.

Scott Kubiszyn, Emerson Electric Co.

Brigitte Vicenty, Mothers on the Move

To the students and advisors of the Spring 2017 Urban Policy Lab of Graduate Program in Urban Policy Analysis and Management at The New School's Milano School of International Affairs, Management, and Urban Policy:

Judy Ho, **Miranda Nelson**, **Zahra Qarni** and

Michael Shank

To **Avanti Chaphekar** and **Lindsey Frey**, Sustainability Programs Department 2018 interns, for their contributions

And to **Ceasar Gentile**, Administrative Assistant Director of Maintenance, Repair & Skilled Trades, who retired in 2018 after tirelessly advocating for improvements in waste management and sustainability over his 42 years at NYCHA

NYCHA's Waste Management Plan is informed by and supports the work of the following mayoral initiatives:

NYCx Challenge: Zero Waste in Shared Space, facilitated by Oscar Romero and Paul Rothman, MOCTO

Neighborhood Rat Reduction Working Group, facilitated by Alex Merchant, Advisor for Administration and Operations, Office of the Deputy Mayor for Operations

Zero Waste Steering Committee, facilitated by Farah Albani, Policy Advisor, MOS

NYCHA Quality of Life Working Group, facilitated by Jeremy Cherson, Director of Operations and Tamara Greenfield, Deputy Executive Director, Mayor's Action Plan for Neighborhood Safety

The NYCHA 2.0 Waste Management Plan was authored on behalf of the Authority by Bomee Jung and Vlada Kenniff, with research support by Hazel Remo, Shayla Allen and Peter Glus of Arcadis, copy editing by Tom Sahagian and Alexis Schulman, and graphic design by Wire Media. Matthew Darling, Vice President of Ideas42 and Clare Mifflin, Principal of ThinkWoven provided additional external peer review.

<http://on.nyc.gov/nextgeneration>