Parklet Shared Waste Station
In DSNY’s 2018 BetterBin competition.

Caroline Slick is an independent product designer, currently interning at Smart Design. She created the design of the enclosure proposed below as well as the illustrations.

### Project Overview & Goals

#### System Description

This modular solution allows waste to be stored in containers within a waste station in the parking lane of a street, clearing the sidewalk for pedestrians, sidewalk cafes and other public uses. It uses 1 and/or 2 cubic yard rear loader containers, which can be emptied from the street side. Generators bring waste to the sidewalk side of the enclosure, and access can be controlled by either an individual code or a key fob. The doors can be operated with foot pedals, and openings are ADA accessible.

The waste station is modular and flexible – it can be a simple enclosure, or can incorporate planters, seating and bike racks, providing an attractive amenity on a block. Many uses are possible – some stations can be used for residential waste or public space waste, and others for commercial waste. It can incorporate containers for any combination of waste streams.

It is an especially valuable solution for medium density neighborhoods with ground floor commercial activity, and those with older tenement style buildings. These neighborhoods typically have insufficient space within buildings to store waste, and may have ad-hoc waste enclosures taking up valuable sidewalk space and detracting from the pedestrian experience and commercial activity. Residents with no other option typically deposit waste in sidewalk litter bins, or mix them in with commercial waste. Sometimes residents use exterior bins on the sidewalk, so it will not be much of a behavior change to take the waste to a central station on the block instead. The containers will be sealed so rats cannot enter the bins. Separate commercial waste stations could also be provided on commercial blocks for waste from retail and restaurants.

#### Capacity

The system is modular, and can accept any number of 2 cubic yard or 1 cubic yard containers, as well as a 2 cubic yard specially designed cardboard container. It is designed to accommodate the following waste streams: organic waste; metal glass plastic & cartons; paper; cardboard and trash. It can also accommodate textiles or e-waste.

The system can service a wide range of density conditions by varying the number of modules and the frequency of collection.

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1 The Center for Zero Waste Design is in the process of legal formation—a process that is expected to be completed within 90 days. Until such time as the Center is legally constituted, member ClosedLoops LLC shall serve as its legal representative.

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Submitted by:
The Center for Zero Waste Design\(^1\) with Caroline Slick and Peter Schon

Clare Miflin
Phone 718 306 9525
96 Sterling St, #1
Brooklyn NY 11225
clare@centerforzerowastedesign.org

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### Background and Experience:

The [Center for Zero Waste Design](http://www.centerforzerowastedesign.org) (CZWD) is a non-profit entity in formation. (Incorporation is expected to be complete within 90 days. In the meantime, for any relevant legal purposes, member ClosedLoops LLC will serve as the entity’s legal representative.) Its four founding members together have decades of complementary experience in designing sustainable buildings, planning waste-management systems, and developing low-impact logistical solutions for first- and last-mile discards and commodities. Clare Miflin, an architect with over 25 years experience. She led the development of the Zero Waste Design Guidelines is the founder of [ThinkWoven](http://www.thinkwoven.com), and co-chair of [AIA NY’s Committee on the Environment](http://www.aiany.org/cotta). Juliette Spertus was trained as an architect and is a co-founder of ClosedLoops, a planning firm devoted to developing sustainable urban logistics systems, which has conducted waste-management studies for a range of non-profit clients and government agencies. Benjamin Miller, the other co-founder of ClosedLoops, was the project manager and primary author of the City’s first comprehensive solid waste management plan and generic environmental impact statement, and has participated in or project-managed major studies of urban rail freight and first- and last-mile goods and discards movement for CUNY’s Urban Transportation Research Center. Chris Grace, the CEO and founder of [Foodprint Group](http://www.foodprintgroup.com), has led waste-reduction, recycling, and food-waste-processing projects for food, technology, and real-estate companies. Over the past several years, the principals of the CZWD’s member firms have worked together, in varying combinations, on projects that include the [Zero Waste Design Guidelines](http://www.centerforzerowastedesign.org), the [High Line Corridor Pneumatic Initiative](http://www.hightlinepneumatic.com), and the [Lower Manhattan Residential Sanitation Resource Guide](http://www.lmrsrg.org).

Peter Schon is a product designer who chairs the [Industrial Designers Society of America’s NYC chapter](http://www.idsoanyc.org) and teaches at the Parsons School of Design. Peter was on the advisory committee developing the Zero Waste Design Guidelines and has played a leading role in DSNY’s 2018 BetterBin competition.

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1. **Seating** built into bike station block
2. **Bike Corral** using NYC Bike Racks
3. **Larger Planting** for shade and protection
4. **Cardboard** is broken down and put in large slot
5. **Access** to all bins is controlled
6. **Signage** compatible with DSNY standard colors
7. **Foot Pedal** allows hands free opening of doors
8. **ADA Access** openings to dispose of waste

**Materials**
- 01. Wood Siding (Western Red Cedar)
- 02. Stainless Steel Frame
- 03. Powder-coated Stainless Steel (Optional color block)
- 04. Steel NYC Bike Racks
- 05. Powder-coated Steel (Matte)
- 06. Painted Rough Plastic
KIT OF PARTS
A modular waste storage solution for the city of New York.

This example is 2 modules wide and fits 3 2CY + 2 1CY Bins. Each module is 100 inches wide and can fit either 2 2CY or 4CY.

01. 1/4 Modular planter, 25” wide
02. Bench with color coordinated seat top
03. NYC bike rack
04. 1/8 Modular planter, 12.5” wide
05. Main waste container housing, sized to fit number and type of containers
06. 1/2 Modular planter, 50” wide
07. Full modular planter, 100” wide
08. Waste bins, in 1CY or 2CY units
09. Open bin cardboard bin, 2CY units
Servicing

For residential or public space waste the module can be serviced by a rear loader DSNY truck, with a slight modification to add a winch or platform to accommodate emptying of rear end loader containers. DSNY staff will have a fob or code to allow them to access the container doors, roll out the containers and connect to the winch to empty into the rear loader truck.

For commercial waste the module will be serviced by the typical private carter truck, which comes with a winch for rear end loader containers.

The containers can have sensors to determine the fill level and call for emptying, much like roll on roll off containers do.
Benefits

Streets with commercial storefronts on the ground floor or exterior waste bins often have poor diversion, due to limited space, confusion of residential and commercial waste set-out, open access to bins by pedestrians, and poorly designed enclosures that are often overflowing and in poor repair. Dozens of small-building owners with part-time supers will no longer have to maintain such ad hoc storage areas between collections. Residents will have 24/7 access to discard locations for all waste streams.

This attractive enclosure, with clear signage and controlled access will increase waste diversion and reduce contamination of recycling streams. It can also allow access to organic waste for many generators who do not currently have access, increasing diversion.

A great benefit will be that of giving public space back to the public. The sidewalk in some neighborhoods is filled with trash bins, waste enclosures and piles of bags of waste, and at night inhabited by increasing numbers of rats. Moving the waste out of bags into containers, and off the sidewalk onto the street allows the sidewalk to be enjoyed again whether just having space to walk down the street, or to accommodate seating and outdoor cafes.

When waste management facilities are located in the public realm, dropping off discards becomes a social experience—and because the activity takes place out in the open, in a pleasant environment, people are more likely to take the time to sort properly. Since most on-street litter bins are for trash only, the system is also an opportunity to create street furniture that showcases DSNY’s commitment to separate collection of organics and other recyclables.

Another key benefit: there are other ways to design drop-off points in the public realm, including submerged containers and surface containers emptied with a crane. There are real advantages to these options, but they require investments in infrastructure and equipment. The parklet system could be an option that blocks could apply for—similar to street seats or a bike corral—without changing the whole system. And an assessment of the benefits from piloting these shared waste stations could also be used as a proof of concept for submerged waste containers, which would have less impact on the public right of way.
**Precedents**

This system is made up of commonly used parts. Rear-end loader 2-cubic-yard and 1-cubic-yard containers are used throughout the city by private waste haulers. We are suggesting a slightly lower and wider container than typically manufactured to allow ADA and ergonomic access for disposing of waste, but this is easily accommodated and we have spoken to local manufacturers of steel containers who do not see an issue with the size suggested.

Parklets within the street incorporating seating, planters, bike racks and other amenities are common in cities including NYC. This system combines this concept with an attractive community waste station of benefit to residents and commercial businesses on the block.

Drop-off points for residential waste in the parking lane are the norm in many European cities. See case studies for the Hague and Trilib in the Zero Waste Design Guidelines. And waste-bin enclosures with planters incorporated on top are used in the front gardens of townhouses and small residential buildings.

**Siting**

**Location Types**

The system is to be installed in a parking spot in the street parking lane. Note that there are no subsurface components.
Target Neighborhoods

The system could be used in a wide range of situations, we will illustrate a few scenarios.

Location 1: Dense Retail Corridor in Medium Density Neighborhood: All Waste Streams

It is especially valuable solution for medium density neighborhoods with ground floor commercial activity, and older building stock with residential walkups, such as the East and West Village, Chinatown and the Lower East Side in Manhattan, and many of the commercial streets in the other boroughs, such as Broadway in Astoria, Fifth or Atlantic Avenue in Brooklyn and Fordham Road in the Bronx.

Medium density neighborhoods are shaded zones R6 and R7 (yellow) or commercial equivalent (red).

NYC DCP “Resilient Retail Report” flood mitigation for NYC main streets, Type A “dense pedestrian-oriented retail corridors”, Ave C shown. There is no space inside for waste storage when commercial properties occupying the ground floor.
Atlantic Avenue Example:

As an example, Atlantic Avenue has 97 dwelling units between Clinton and Court Street. If all the residents participated, and separated 90% of their organics and recyclable waste, then a single container for each stream could be used, as illustrated in the example module. This would take up 200" (16.7') which would easily fit in one parking space. Planters and bike racks could be added, requiring two parking spaces.

A second waste station could be used by commercial businesses on the block.

Block plan of Atlantic Avenue with a double module waste station within a single parking space for all residential waste. A second module could be located elsewhere on the block for commercial waste.

Medium Density R6 and R7 zoning
Typical Block Area (800x200) 160,000 SF

<table>
<thead>
<tr>
<th></th>
<th>FAR</th>
<th>Built Residential Area</th>
<th>Gross Area / Dwelling Unit</th>
<th>Number of Units</th>
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<tr>
<td>Medium Density Low</td>
<td>1</td>
<td>160,000</td>
<td>1200</td>
<td>193</td>
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<tr>
<td>Atlantic Avenue Example</td>
<td></td>
<td></td>
<td></td>
<td>154</td>
</tr>
<tr>
<td>St Marks Place Example</td>
<td></td>
<td></td>
<td></td>
<td>453</td>
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<tr>
<td>Medium Density High</td>
<td>4</td>
<td>640,000</td>
<td>1200</td>
<td>533</td>
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Residential units 97 per Atlantic Ave example as shown (both long sides of block)
Assumed Occupancy 2.63 people per dwelling unit (city average)
Participation Rate 100%

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<thead>
<tr>
<th></th>
<th>capture rate</th>
<th>dry tons per day</th>
<th>dry tons per day</th>
<th>dry container capacity</th>
<th># dry containers</th>
<th>pick up frequency (# days)</th>
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<tr>
<td>Refuse</td>
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<td>2.0</td>
<td>0.10</td>
<td>2</td>
<td>1</td>
<td>1.0</td>
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<tr>
<td>MGP</td>
<td>90%</td>
<td>1.2</td>
<td>0.05</td>
<td>2</td>
<td>1</td>
<td>1.6</td>
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<tr>
<td>Paper</td>
<td>90%</td>
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<td>0.03</td>
<td>1</td>
<td>1</td>
<td>5.3</td>
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<tr>
<td>Cardboard</td>
<td>90%</td>
<td>0.4</td>
<td>0.02</td>
<td>2</td>
<td>1</td>
<td>4.9</td>
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<tr>
<td>Organics</td>
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<td>0.05</td>
<td>1</td>
<td>1</td>
<td>1.3</td>
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</table>
Location 2 – High Density Neighborhood: Organics, E-waste and textiles.

High Density Neighborhoods include districts zoned R8, R9 and R10 and the commercial equivalents. They are mapped in much of Manhattan, Downtown Brooklyn and along Grand Concourse in the Bronx, see map. Typical floor area ratios in these districts range from 5 to 9, which results in around 650 to 1200 residential units per block (two long sides and two short sides).

The system could be used in high density neighborhoods for organic waste. Many of these neighborhoods do not currently have organic waste pickup, because the building management does not want to sign up for the service, or because it is not yet available. Providing a convenient drop-off for organic waste would result in higher diversion rates. It would also incentivize building management to encourage residents to use the organics dropoff, to reduce rats and odors of the black bags on the street (which currently average 42% organic waste).

Photos of high density districts from left to right: R8 Chelsea, R8 Downtown Brooklyn, R8 Upper West Side, R9 Tribeca, R10 Chelsea.
West 86th Street Example:

As an example, West 86th Street between Columbus and Amsterdam Avenues is in R10 zone and has 976 residential units within 32 buildings on the block. If 80% of the residents on the block used the waste station, and deposited 50% of their organic waste, two 2CY containers would need to be picked up every 1.2 days. This would be a single 100” (8’3”) module enclosure, and along with planters could easily fit in a single parking space. If textiles and e-waste were added, an additional 2 containers would be necessary, a double size module of 200” (16.7’) would be required, which would easily fit in one parking space. Planters and bike racks could be added, requiring two parking spaces.

<table>
<thead>
<tr>
<th>Residential units</th>
<th>976 per example</th>
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<tbody>
<tr>
<td>Assumed Occupancy</td>
<td>2.63 people per dwelling unit (city average)</td>
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<tr>
<td>Participation Rate</td>
<td>80%</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>capture rate</th>
<th>cy per day</th>
<th>tons / day</th>
<th>container capacity</th>
<th># containers</th>
<th>pick up frequency (# days)</th>
</tr>
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<tbody>
<tr>
<td>Organics</td>
<td>50%</td>
<td>3.4</td>
<td>0.52</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Textiles</td>
<td>50%</td>
<td>1.1</td>
<td>0.10</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>E-waste</td>
<td>100%</td>
<td>0.1</td>
<td>0.01</td>
<td>2</td>
<td>1</td>
<td>23.8</td>
</tr>
</tbody>
</table>
Location 3 – Public Space Waste from Parks: Organics, Trash and MGP

Bryant Park is an example of a park where this type of installation could offer significant advantages over current practice. We have spoken to the operations manager at Bryant Park who told us they would be very interested in piloting a solution to containerize their waste in the street within an attractive enclosure.

Location 4 – Schools

When located on public space adjacent to school property, or on school property, classes could “adopt” the installations and the students could maintain the planters.

Waste from schools is often set out during daytime obstructing sidewalk

Bryant Park currently stores waste in bags on street
Service and Management

Cleaning and Maintenance

The enclosure will need to be kept clean and well-maintained. This could be done in partnership with a local entity such as a block association or local business improvement district, or through a partnership with a district or citywide nonprofit entity, or by DSNY themselves. Since the enclosures may attract illegal dumping, as in the case of bike corral or street seats, where passersby often place shopping bags of take-out litter, daily visits from the caretaker entity will be required. But since individual buildings in the vicinity will no longer need to manage their own waste storage areas, there should be a communal interest in ensuring the parklet's success.

In addition to regular inspections and cleaning as required, the parklet's plants will also need to be watered and maintained. Again, local support from homeowners or a block association could be expected to ensure the ongoing attractiveness of this neighborhood amenity. And watering needs may be reduced to the extent that the planted area also serves a storm-water retention function.

The containers will have lids which will be designed to accommodate the waste inlets with less than a ¼” gap, so no rodents can enter the bins. The enclosure will be designed so doors overlap and clearances are small, but even so it will be difficult to ensure small enough gaps to keep out mice – but if the enclosure is well maintained and the bins are sealed there will not be food or smells attractive to rodents.

Planters and enclosure will be designed to be easily repairable with doors and moving parts, electronic locks and panels all able to be swapped out and replaced if necessary. At periodic intervals the containers will need to be replaced. Litter will need to be cleaned up by the maintenance entity, who will also clean the enclosure and maintain the planters and bins.

Modularity, flexibility and installation

The system is modular, and designed for easy assembly and installation. It sits on top of the street and curb with no subsurface components or permanent attachments. It is easily relocated and removed. The modular nature of the system allows flexibility – the bike racks and planters are all optional extras. Waste types and container sizes can be chosen for the density of the block and changed over time.
Security

The enclosure is heavy, as it has planters attached, so we don’t anticipate that vandals will try and relocate it, but if this did become a concern attachment to the street, similar to that for a bike rack, could be incorporated.

Since the deposit of waste requires digital identification of the user via an individual access code or key fob, it will reduce misuse. Likewise, access to the street side to remove the containers will also be controlled through use of a single code or fob by DSNY staff.

Performance Metrics

The individual access code system could automatically track number of users, rate of participation for each waste stream, and drop-off and pick-up times, to measure how the system is being used. DSNY could compare tons by material fraction collected per hour to assess efficiency relative to baseline curbside collection. This assessment, which would be directly linked to relative collection costs, since it would also be linked to truck-operating time, could also be used to impute savings in fuel and emissions of GHG and other pollutants, as well as benefits in congestion and crash reduction.

Residential Use:

This could be used for residents on a block, and emptied by DSNY. It would be compatible with SAYT, as the ID system links residents with door openings, so can keep track of the number of times an individual resident opened each waste door.

Business Improvement District / Park Use:

This could be used for litter bin waste, for example in a BID.

We also spoke with the administrators of Bryant Park, who would be interested in having enclosed waste storage in the public right of way for BID waste which is currently in bags and brown bins on the street, and picked up by DSNY.

Commercial Use:

An enclosure could be used for commercial waste on a block – from offices, retail and restaurants, and emptied by a private carter. It would be compatible with incentivized pricing, as the ID system keeps track of the number of times an individual business opened each waste door and they could be charged accordingly.

Sponsorship

The design is compatible with sponsorship opportunities, and could incorporate side panels with space for advertisements. It could also provide opportunities for adopting in a similar way that DSNY works with businesses to adopt a litter basket, or DOT requires applicants to agree to maintain a bike corral or DOT works with community organizations to create and maintain neighborhood plazas.

Useful Life

The useful life of the enclosure will depend on maintenance and final materials chosen. We would expect the planters and enclosure to last for 10-20 years and the containers for 10-15 years.

Intellectual Property

The system is not protected by patent or license. The modular enclosure concept was developed by Caroline Slick, in collaboration with Peter Schon and the Center for Zero Waste Design. It is offered on an open-system IP basis. Slick, Schon and the CZWD should be credited as the initial system designers.

Costs and Business Model Options

Estimated equipment and infrastructure costs:

Containers: $650 for 2 CY, $600 for 1 CY
Top Shallow Planters: $800-$1,500
Side Planters: $1,800-$2,300
Waste Container Enclosure: $15,000-$18,000 per unit (higher cost taking the pedal mechanisms into account)

These estimates include materials and labor and could be driven down with mass production. They do not include the electronic opening mechanism which would vary depending on system chosen.

Operating expenses:

Administrative labor for managing participants, interface, logistics issues
Maintenance/repair of enclosure and containers
Emptying of containers

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