Zero Waste

Design Guidelines

Design Strategies and Case Studies for a Zero Waste City
Designing buildings for circular resource flows
Where does organic waste fit in?
The Zero Waste Design Guidelines are a resource for architects, developers, building managers and urban designers

They include best practice design strategies to address the crucial role that design of the built environment plays in achieving zero waste goals, including:

- Global and NYC Context
- Strategies for Building Design
- Strategies for Construction & Demolition (Circular Building Materials)
- Strategies for Collection & Urban Design
- Case Studies
- NYC Policy & Implementation Recommendations
Best Practice Strategies for Operational Waste

- Waste reduction strategies
- Waste diversion strategies

- Planning for Waste as a Material Flow
- Volume reduction
Waste Reduction Strategies

- Reduce food waste
- Reusable dishware

2.15 PROVIDE SHARED EQUIPMENT AND SERVICES

In the circular economy, sharing is key, and it can be promoted through building programming. (See C&D BPS 2.26.) Consider providing shared equipment. Multifamily residences often offer equipment within shared spaces, such as weights in a gym, toys in a playroom and barbecue grills on a roof terrace. Consider further amenities, such as a shared goods library, which reduces the need for a vacuum cleaner, drill and air bed in every closet.

Design for service, to reduce the amount and frequency of items purchased. Provide maintenance services such as cleaning, laundry and repairs within the building so there are fewer—but higher quality and more efficient—appliances.

2.16 REDUCE MATERIALS CONSUMPTION.

Packaging composes a substantial percentage of waste, and food packaging accounts for about two-thirds of the total volume of packaging waste. Washing reusable containers leaves a much smaller environmental footprint than using disposable packaging does (see City of Portland study). When reusable containers aren't an option, choosing compostable materials can reduce the volume of waste and its environmental footprint. Paper accounts for 37% of NYC's commercial waste.
Waste Reduction Strategies

- Facilitate donation and reuse
- Incorporate financial incentives to reduce waste
Waste Diversion Strategies

- Clear visual cues and signage
- Opportunities for feedback
- Equal convenience disposal
- Design for occupancy
Simplifying diversion

What goes where?

Is the cup recyclable or compostable?

Does the bowl go in paper or organic waste?

Should I separate the lid from the sleeve from the cup?
All compostables

Everything is compostable!
All reusables

Much simpler with reusables!
Planning for Waste as a Material Flow

1. Plan for tenant disposal and separation
   - Waste stream types and quantities
   - Location of waste stations
   - Types of bins
   - Signage

2. Plan for movement of recyclables and waste to central storage
   - Responsibility
   - Frequency
   - Transport containers
   - Route

3. Plan for waste storage
   - Calculate area required
   - Volume reduction equipment
   - Location
   - Layout of storage space
   - Accessibility
   - Time restrictions

4. Plan for collection
   If bags on curb:
   - Designated area, size and location
   If set out containers:
   - Designated area, size and location
   - Staffing to return containers
   - Area to wash containers
   If compactor containers:
   - Collection vehicle access
   - Ceiling height
### Calculate waste volumes

zerowastedesign.org

#### Waste Calculator

Use this calculator to figure out the volume of waste that your building will generate. See how reducing waste generation, increasing waste diversion and using volume reduction equipment can reduce storage requirements.

1. Is your building commercial or residential?

   - [Commercial](#)  
   - [Residential](#)

2. Basic Building Information

   This calculator works for the listed occupancies below. Enter information for all that apply.

   - **Food Service**: 50
   - **Hotels**:  
   - **Retail—Grocery**:  
   - **Retail—Non-Food**:  
   - **Office**: 1000
4. Capture Rate Per Material Stream

Average capture rates per stream are shown below.
Adjust the sliders to reflect waste diversion strategies and goals.

Metal, Glass and Plastic

Paper

Cardboard

Organics

*For Buildings With Organics Separation
5. Volume Reduction Equipment

Recommended equipment to reduce waste volumes in your building is shown below. See Best Practice Strategy 2.21 for volume reduction equipment and 2.23 for organic pretreatment.

Select the equipment you plan to provide.

These are strongly recommended:

- VERTICAL TRASH COMPACTOR
- METAL, GLASS & PLASTIC COMPACTOR CONTAINER
- METAL & PLASTIC BALER
- CARDBOARD BALER
- ORGANICS PRETREATMENT TO SOLID

In addition, you might want to consider:

- CARDBOARD COMPACTOR CONTAINER

Other options:

- TRASH COMPACTOR CONTAINER
- ORGANICS PRETREATMENT TO LIQUID
- ORGANICS COMPACTOR CONTAINER

Storage requirements for the number of days stated are shown below. If needed, change the container types you plan to use to recalculate your total storage area.

- **Refuse:**
  - **DURATION:** 3 DAYS
  - **CONTAINER TYPE:**
    - 2 CUBIC YD CONTAINER

- **Metal, Glass, and Plastic:**
  - **DURATION:** 3 DAYS
  - **CONTAINER TYPE:**
    - 1 CUBIC YD CONTAINER

- **Paper and Cardboard:**
  - **DURATION:** 3 DAYS
  - **CONTAINER TYPE:**
    - 2 CUBIC YD CONTAINER

- **Organics:**
  - **DURATION:** 3 DAYS
  - **CONTAINER TYPE:**
    - 64 GALLON BIN
Reduce Waste Volume

- Provide balers and compactors
- Provide equipment to treat organic waste
Organics equipment

Grinder

Wheeled Bin

Organic waste slurry in pipes

3"-4' tubes

Dewaterer (in kitchen)

Heavy odorous organic waste

Organic waste

Dried organic waste, lighter and less odorous

Micro Anaerobic Digestion

Holding Tank

Dewaterer

Solids to 2-4 CY Container

Aerobic Digester - Liquifier (in kitchen or central)

Aerobic Digester - In-Vessel Composting

Watery, broken-down organic waste

Biogas or Heat and Electricity

Tank Truck

Front End Loader (FEL) Truck

Onsite Compost Use

Liquid output to drain

Biogas or Heat and Electricity

Tank Truck

Front End Loader (FEL) Truck

Onsite Compost Use

Liquid output to drain
Food Service Design Strategies

1. Refrigerator includes storage for food donations. Locate food donation storage for convenient collection. 2.18

2. Provide food waste tracking system with scale. 2.17

3. Organic waste collection in kitchen: replace refuse bins with small organics totes, and countertop organics caddies. 2.89

4. For volume reduction, consider food waste pretreatment equipment.

5. Provide dishwashers and consider path from dish room to dining area. For larger operations consider dish carousels. 2.16

6. Accommodate cooking oil collection and storage. 2.14

7. Delivery considerations: Where possible receive deliveries in reusable crates that the vendor collects. 2.86

8. Design customer recycling stations with clear visual cues and signage to accommodate all waste generated, including liquids. 2.18

9. Use smaller serving pans, especially for self-service buffets. 2.17

10. Consider providing reusable dishware and design for collection and dishwashing. 2.16

11. Consider providing fountain drinks with reusable cups. 2.16

12. Prioritize reusable dishware over compostable dishware (when both are offered) by placing compostables behind counter. Prioritize paper over bioplastic compostables and consider hauler practices. 2.16
Case Study: The Hague
The Hague, Netherlands

Type: Submerged container

Best Practice Strategies

3.06 Shared submerged containers in the public realm or on public agency property
3.09 Incorporate community into collection operations

Summary:
The Hague is the Netherlands' third-largest city. Until recently, door-to-door collection of refuse in bags or wheeled bins was the norm, with residents carrying recyclables to shared containers on certain "recycle streets." The city struggled to keep its narrow streets clean because seagulls pecked open bags left out for collection, strewing garbage and making a mess. In 2009, The Hague decided to address the issue by replacing bags on the curb with shared containers submerged under the sidewalk.

Although the city anticipated some operational efficiencies, its primary objectives in selecting a submerged container system were to improve public and health and hygiene, enhance public space aesthetics and provide an opportunity for residents to dispose of refuse 24/7 instead of having to store the material in their small apartments until pickup day. (Recycling is already collected at drop-off locations.)

The Hague began switching to submerged containers in 2010 with a plan to install more than 10,000 units in three phases over ten years. In 2017, there were 6,100 belowground units. Eventually, all collection in The Hague will be handled by submerged containers.
Strategies for Construction & Demolition Waste
Circular Building Materials

- Design for material optimization
- Material selection
- Construction and demolition waste management onsite
Zero Waste Design Guidelines - Bay Area

Designing for Zero Waste Food Service
October 21, 2020
Christina Grace, Founder, Foodprint Group
Erin Cooke, Sustainability and Environmental Policy, San Francisco Airport
Stefan Moedritzer, Sustainability Waste Program Manager, Real Estate & Workplace Services, Google

Designing for Circular Building Materials
Nov 19, 2020
James Slattery, C&D Debris Recovery, San Francisco Environment
Amanda Kaminsky, Founder, Building Product Ecosystems
Eden Brukman, Green Building Coordinator, San Francisco Environment
Frances Yang, Sustainability Specialist, Arup
Marcus Hopper, AIA, Senior Associate, Gensler

Zero Waste Multifamily Residences and Districts
Early 2021

Webinar recordings at AIANY.org, search videos
Next Steps

• Adapting to other cities
• Incorporating into green building standards
• Case Studies
• Pilots and Research
• Advocacy and Policies
• Consulting with cities, districts, developers

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