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Photo by Steve Gadomski

CITY OF CHICAGO WASTE STRATEGY

MATERIALS MANAGEMENT STRATEGIES

JULY 2021

CHICAGO

CONTENTS

STRATEGY OVERVIEW

The City of Chicago has an exciting opportunity to implement strategies to tackle the issues of waste and materials management that impact its economy, environment, and citizens every day. The strategies listed in this document offer opportunities to reduce waste; increase diversion through reuse, recycling, and composting; reduce costs; and increase economic and environmental justice opportunities.

Strategies were developed through:

- Review of current waste and recycling data, programs, policies, and infrastructure;
- Analysis of best practices and programs in peer cities; and
- Engagement with stakeholders in the City, the private sector, and Chicago communities.

Redesigning how the City manages waste and recycling and addresses long-standing environmental justice issues requires a long-term commitment on behalf of many of the City's stakeholders. This holistic strategy represents the first step in that process. This first phase is intended to provide guidance that accounts for the many perspectives in the city regarding waste, addresses the budgetary realities, and incorporates other systemic challenges to prioritize actionable strategies to achieve ambitious goals.

In transitioning to implementation, this document includes several approaches to address the multifaceted issue of materials management. These approaches can be prioritized or deprioritized by the City, and many can be addressed simultaneously. This menu of strategies is intended to allow the City to deliberately allocate limited resources and maximize impact.

NOTE: *The complete City of Chicago Waste Strategy is comprised of the Materials Management Strategies, Existing Conditions Report, Peer City Analysis, and the UIC Waste Characterization and Generation Update report.*

GUIDING PRINCIPLES

These guiding principles serve as a compass upon which the City of Chicago can rely as it works to advance the strategies presented in this report. These guiding principles provide not only direction and accountability in action, but also ensure that these priorities are kept in focus over time. Specifically, these guiding principles are to be practically incorporated as essential elements in every strategy described in this report. Some strategies will more closely reflect these guiding principles than others. Therefore, it is important to note that these principles address a diversity of priorities and elements of the waste system. For example, the first principle addresses the need to change societal perceptions and a material shift in policy and practice.

Reframe Chicago's materials as resources, instead of waste.

Include sustainable materials management practices in Chicago's overall climate mitigation and adaptation strategies.

Change existing perceptions using tailored educational programs to reframe waste materials as valuable resources that are not being utilized and reconfigure Chicago's materials management system away from disposal.

Shift materials interventions upstream to capture value and materials before they enter any waste stream (e.g. procurement changes, reuse, repair)

Center equity and environmental justice in program design

Consider neighborhood-specific impacts (both positive and negative) based on current and historical land use, and projected climate change impacts.

Analyze strategies for potential unintended consequences.

Avoid creating additional burdens (financial or otherwise) for low- to moderate-income (LMI) Chicagoans.

As the City, identify opportunities for establishing internal and external partnerships.

Clarify and document the role of the Mayor's Office, legislative body, and City departments and agencies to determine how coordination can improve.

Partner with early adopters (institutions, corporations, and organizations) already pushing innovation in waste reduction in Chicago.

Identify how the City can create the conditions to sustain impactful partnerships and a more participatory materials management system.

Prioritize initiatives with revenue potential, no/low cost, or a positive return on investment when applied at scale.

Identify opportunities for economic benefit, revenue generation, and additional cost savings through materials management.

Consider budgetary realities to develop realistic strategies.

Prioritize most critical investment needs to meet identified City goals.

Identify opportunities to include goal setting, metrics, and data sharing to demonstrate progress and increase transparency.

Develop opportunities to share data and resources with the community.

Prioritize routine, equitable stakeholder engagement.

Establish goals and metrics for success and determine how those metrics will be realistically evaluated.

Equip consumers with the education and tools needed to drive innovation in evolving waste systems.

Consider necessary investments to support initial and continuous public education.

Prioritize routine, equitable stakeholder engagement.

Highlight opportunities for Chicago to act as a national leader in sustainability.

STRATEGY ORGANIZATION & ASSESSMENT FRAMEWORK

The strategy organization described in this section will help frame the strategies presented in the following section. Materials management is a highly complex system, and there are many ways to segment and address the issues present within it.

STRATEGY CATEGORIZATION

Materials management strategies are organized into seven categories, each of which addresses a different component of the system. These categories include:

Municipal Management and Data Tracking

Opportunities for improved municipal management of waste and materials to lead by example, strengthen capacity for citywide programs and initiatives, and improve data collection and management to enforce policies, improve how trends are identified, increase transparency in the process, and build trust among Chicago's residents more efficiently.

Source Reduction, Reuse and Repair

Highlighting impactful, upstream strategies related to source reduction, extending the useful life of materials, and reuse. Preventing materials from entering the waste (or recycling) stream reduces pressure on existing systems and infrastructure maximizes climate benefits, shifts the cultural norms towards circularity and away from traditional disposal models, unlocking potential for economic benefit and improved sustainability.

Residential Waste Reduction

This section offers strategies to reduce the waste volume and increase diversion rates in recycling, yard waste, and compost programs for Chicagoans in both low-density (single family homes and multifamily buildings with four or fewer units) and high-density (multifamily buildings with five or more units) residences.

ICI (Industrial, Commercial, and Institutional) Waste Reduction

Opportunities for reduction and diversion of waste generated by Chicago's ICI (industrial, commercial, and institutional) sector, which includes businesses, like restaurants and office buildings; institutions including government, cultural, and educational; and manufacturing and other industrial processes.

Organics and Wasted Food

Highlights opportunities to reduce organics and food currently sent to landfills in the residential and ICI sectors and bolster markets for finished compost.

Specialty Materials

Addressing materials in Chicago's waste stream that cannot or should not be managed through traditional curbside recycling or composting initiatives including household hazardous waste (HHW), bulk items, electronic waste, pharmaceuticals, textiles, and plastic film.

Construction & Demolition Debris

This section provides strategies for diverting materials generated from construction, renovation, demolition, or deconstruction projects through recycling and reuse.

STRATEGY TYPE FRAMEWORK

Each topic section includes a menu of strategies for the City of Chicago to consider according to available funding, partners, and administration prioritization. It is important to note that one should consider how the strategies presented in this document might interact with each other. More specifically, care should be taken to anticipate any potential conflicts or unintended consequences related to the goals and implementation requirements of each strategy when implemented jointly.

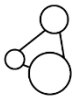
This framework provides a tiered model for assessing key factors that impact each strategy's overall feasibility and readiness for implementation. Specifically, the framework focuses on the overall complexity and ease of implementation of each strategy, the expected timeline for implementation, and the expected cost and financial impact of each strategy. Ultimately, strategies will be categorized as a *Pilot*, *Practical*, or *Optimal* strategy based on the projected impact of the relevant factors as identified by the project team.

Optimal strategies are those that are relatively complex and more demanding in terms of the coordination and resources required to implement. These will have the greatest relative diversion potential among the menu of strategies and may be suitable to implement in concert with other strategies in the same materials category. And, though they represent the most ambitious of the proposed strategies, they have been developed to reflect the realities of the current system.

Practical strategies are those that can be readily implemented at full scale; they represent less ambitious, attainable progress toward long-standing materials management goals with modest diversion potential. These strategies are characterized by a relatively high degree of feasibility with fewer complexities related to coordination and mobilization of resources required for implementation.

Pilot strategies are those that are ready for site-specific implementation and are characterized by a high degree of feasibility and relatively low demand for additional coordination and resources. These strategies represent opportunities to both evaluate program performance within a defined geography and to support additional efforts undertaken through other selected materials management strategies.

PILOT ASSESSMENT FRAMEWORK

Planning Timeline & Complexity	
 LOW END	• Limited intergovernmental coordination required; primarily operational initiatives
 MID RANGE	• Moderate intergovernmental coordination required (e.g. permitting)
 HIGH END	• High degree of coordination required among internal stakeholders • Significant commitment by private and public sector stakeholders required to support implementation, education and outreach

Cost	
$ | LOW END	• Limited intergovernmental coordination required; primarily operational initiatives
$$ | MID RANGE	• Moderate intergovernmental coordination required (e.g. permitting)
$$$ | HIGH END	• High degree of coordination required among internal stakeholders • Significant commitment by private and public sector stakeholders required to support implementation, education and outreach

MATERIALS MANAGEMENT STRATEGIES

MUNICIPAL MANAGEMENT & DATA TRACKING

Municipal management of waste and materials can include providing leadership and guidance through City of Chicago offices and facilities, as well as strengthening capacity for citywide programs and initiatives through interdepartmental collaboration and communication. Additionally, improving data collection and management within the network of partners in Chicago's waste system can provide opportunities to enforce policies, improve how trends are identified, increase transparency in the process, and build trust among Chicago's residents more efficiently.

Identifying Opportunities to Lead by Example

Practical: Update procedures for municipal offices and facilities to minimize waste generation.

The City of Chicago is an expansive organization with more 30,000 employees comprising more than 30 departments.[1] Municipal buildings can demonstrate leadership in improving management of office and consumable waste through effectively developing and implementing materials management goals and policies.

Policies around source reduction (e.g. providing reusable serviceware for coffee and meals), increasing recycling (e.g. placing additional paper recycling bins near printers), preventing food waste (e.g. reducing excess food ordered in catered meetings), improving access for specialty material disposal (e.g. hosting annual e-waste collection events for employees), or procurement (e.g. purchasing supplies and materials with high levels of recycled content) are a great place to start for municipal facilities. Though these initiatives may not have an overwhelming impact on the City's overall waste generation and diversion tonnage, they are important steps to provide models for other entities and shift the cultural norms around waste.

Practical: Update vendor guidelines to minimize waste generation

Establishing vendor guidelines for municipal facilities and events can support internal policies to minimize waste generation. Coordinating with the Department of Procurement Services to establish appropriate waste minimization requirements for City vendors and contractors can help to amplify policies and procedures implemented for municipal offices.

The Chicago Department of Aviation (CDA) has developed extensive sustainability guidelines for airport terminal vendors through the Sustainable Airport Manual. The Manual includes guidance on single-use plastic reduction, surplus food donation, waste stream audits, and other materials management strategies.[2] These requirements can provide a framework for broader municipal implementation.

In December 2020, the State of California passed new legislation requiring any food service concessionaires operating on state-owned property or for a state agency to exclusively use packaging that is reusable, recyclable, or compostable.

Source: CalRecycle

Optimal: Continuously highlight Chicago successes and initiatives in sustainable materials management

Regular external communication highlighting new and existing materials management initiatives in Chicago can help to increase community awareness and participation in programs, build momentum for future momentum, increase accountability for goals and metrics, and highlight Chicago as a leader in the sustainability field nationwide.

Improving Data Tracking & Sharing

Practical: Update or add additional calculations for waste metrics

The City of Chicago often cites diversion rate, particularly the diversion rate for the Blue Cart program, when evaluating waste streams and the success of waste management programs. Reassessing municipal waste metrics can provide a more holistic and accurate picture of Chicago's materials management system, while also highlighting opportunities for improvement.

Calculating diversion rates that encompass different waste streams like ICI, high density residential, and C&D can provide more insight to overall materials management in the city. Considering what waste streams are captured in diversion numbers can also generate more valid comparisons when looking at peer cities.

Using capture rates - the percentage of recyclable materials actually being recycled - indicates how well a program is recovering materials. This information can inform how successful a program is while also indicating areas where a more targeted approach can improve outcomes.[3]

Though Chicago's Blue Cart low-density residential diversion rate has hovered near eight to 10 percent for several years, this is only a small portion of the waste generated and diverted in Chicago overall. In the most recent comprehensive generation and diversion studies conducted in 2010, CDM Smith calculated diversion rates for DSS-collected residential (8%), private collected (19%), and C&D (65%) resulting in an ***overall diversion rate of 45 percent.*** *While there is still room for significant improvement, it is important to base comparisons against peer cities on comparable diversion metrics.*

Source: Chicago Waste Diversion Study, 2010

Additionally, updating waste metrics can allow for more accurate goal setting and progress tracking for Chicago's materials management system.

Practical: Streamline permitting, reporting, and enforcement standards and responsibilities between City departments.

As described in the Chicago Waste Strategy Existing Conditions report, responsibility for permitting, reporting, and enforcement for components of the waste system are spread across several City departments.

The Department of Streets and Sanitation (DSS) is responsible for enforcement of private hauler reporting requirements, though the Department of Business Affairs and Consumer Protection

(BACP) have authority to withhold business license renewal.[4] The Chicago Department of Public Health (CDPH) is responsible for permitting waste processing, disposal facilities and collecting data around C&D debris generation and diversion; but, recyclers often send reports to DSS.[5] The City's commercial dumpster database for containers in Chicago Department of Transportation (CDOT) permitted alleys is managed by the Department of Assets, Information, and Services (AIS) and DSS is responsible for enforcement.[6] Though a complex materials management system requires significant coordination and expertise, these examples highlight potential communication and accountability issues for ensuring effective data collection and enforcement of City policy.

Once roles are clarified, data collection and reporting requirements can also be strengthened. For Chicago's low-density residential Blue Cart program, the Department of Streets and Sanitation developed updated requirements for private haulers serving one or more zones starting in 2021. New bid requirements include daily reporting of route completion, weekly reporting of collection refusals and cart tagging due to severe contamination (and photo documentation of contamination), monthly reporting of collection tonnage, and annual reporting of composition and capture rate data by service area.[7] Building requirements and capacity for data collection across materials management programs is essential for addressing issues, developing responsive solutions, and improving overall diversion.

Optimal: Transition the City's waste reporting system to a dynamic, digital platform

Data collection and reporting is required for several actors in Chicago's materials management system but reporting enforcement and data analysis is often labor-intensive and results in an incomplete or outdated understanding of waste generation and diversion.

Shifting to a responsive, digital platform can allow data to be shared and analyzed real-time. Private waste haulers are required to report collection tonnage and diversion data and strengthening and reinforcing requirements for haulers while streamlining platforms can help to maintain an accurate and up-to-date picture of Chicago's materials management landscape. Real-time data collection and analysis can also provide opportunities for more frequent and transparent public engagement around waste data and potential solutions.

Re-TRAC Connect is an example of a software system designed for municipalities and other public entities to collect, analyze, and share waste and recycling data. Waste system actors like haulers, transfer stations, and recycling facilities report information directly into the Re-TRAC Connect system, which provides real-time updates for analytical reports including tonnage, diversion, GHG equivalencies, and others. These reports are then ready to share with the Chicago community to increase transparency in the materials management system.

Source: Re-TRAC Connect

Building Municipal Capacity

Transforming and improving Chicago's materials management system is a complex problem that requires coordination between many actors, both internal and external to the municipal government. In addition to streamlining responsibilities for data collection, permitting, and

enforcement, there are several opportunities to build the City's capacity to lead materials management strategies and engage external partners.

Practical: Invest additional staff and resources to materials management initiatives across departments

Although streamlining roles and responsibilities can ease workloads for Chicago employees, any department leading a new materials management initiative will be required to invest in staff and other resources to be successful. Limited time and staff capacity were cited by several internal City stakeholders as barriers to implementing or scaling programs and enforcing policies. Improving the efficiency of materials collection and reducing the tonnage of materials sent to landfills will reduce costs, but major improvements will likely also require targeted investment and dedicated staff.

Optimal: Re-establish the Department of Environment to centrally manage sustainability initiatives, including materials management.

Following the dissolution of Chicago's Department of Environment in 2012, several initiatives related to waste reduction and sustainable materials management were distributed to other departments. Reestablishing the Department of Environment with an additional emphasis on environmental justice can improve coordination and the prioritization of materials management strategies that provide equitable benefits for all Chicago residents.

In the interim, establishing an interdepartmental group of internal City stakeholders can support communication and coordination in moving materials management initiatives forward.

Low-density residential garbage and recycling collected by DSS/Blue Cart costs Chicago residents $9.50 per household per month. This fee generated over $64 million in 2020, but only covers about a quarter of the cost of recycling and waste collection/disposal for residences served by DSS.

Chicago's waste fee is lower than peer cities. For example, monthly fees for low-density residential service are $36.32 in Los Angeles, $25.08 in Minneapolis, and $14 in St. Louis.

Sources: Chicago OBM, RecycLA, Minneapolis Public Works, City of St. Louis

SOURCE REDUCTION, REUSE, AND REPAIR

The most impactful strategies for improving materials management in the City of Chicago are related to source reduction, extending the useful life of materials, and reuse. Preventing materials from entering the waste (or recycling) stream reduces pressure on existing systems and infrastructure and captures additional climate benefits through reduced landfilling, transport, and processing, and a reduced need for the extraction of virgin materials. Additionally, shifting cultural norms towards circularity and away from traditional disposal models unlocks potential for economic benefits, jobs, and sustainability.

Note: this section focuses on opportunities for source reduction, reuse, and repair generally - material specific strategies for organics and building materials can be found in later sections.

Supporting Material Reuse

Practical: Develop a comprehensive directory for reuse options in Chicago across several material types.

Establishing a directory of businesses and organizations in the reuse and secondhand market can encourage material reuse and highlight opportunities outside of disposal and purchasing new items. There is already a strong network of reuse, thrift, consignment, repair, and share entities in Chicago that can grow with increased awareness and participation.

A City-supported, reliable directory with information about accepted and available material types and services can increase the convenience of reuse efforts and highlight existing gaps for future reuse endeavors.

The Hennepin County, MN Choose to Reuse website provides a directory of hundreds of organizations and businesses in the Twin Cities area that offer opportunities for buying, selling, and donating used items, repairing items, and renting and sharing items including furniture, apparel, electronics, pet supplies, medical and fitness equipment, musical instruments, office supplies, and more. Choose to Reuse also provides resources for residents interested in learning more about waste reduction and reuse.

Source: Hennepin County Choose to Reuse

Pilot Opportunity: Support existing and new material exchange initiatives in Chicago and the region through creating tax and financial incentives.

Connecting waste, surplus, and byproduct materials from businesses and institutions to other Chicago-area entities that can use those materials as inputs can significantly reduce waste. However, the incentives for doing so are often absent or involve significant startup and operating costs. There is no silver bullet to developing tax incentives to solve systemic problems, and they must be designed and tested carefully.

The City can play a significant role in encouraging private enterprises to change their approach to waste management through the creation of subsidies, tax incentives, and taxes on certain goods and services. Examples of incentives for environmentally friendly products and services are numerous; so too are examples of programs that failed to achieve their intended

environmental effect. Chicago has piloted entrepreneurial waste initiatives in the past with some success, but few initiatives have been developed beyond the pilot phase.

To meet this challenge, the City could facilitate a roundtable discussion among key stakeholders to engage on specific issues and develop working groups to tackle specific issues. The roundtable should encourage open dialogue on nuanced issues that affects stakeholders and their constituencies. The goals of this group should include discussion of implementation strategies for a certain waste stream, constituency, or initiative to guide the development of legislation or other policy initiatives. An example of a similar effort delivering actionable recommendations was the NextGrid initiative, led by the State of Illinois, convened electric utility stakeholders to discuss and develop solutions to complex issues in the energy sector.[8]

Rheaply, a Chicago-based technology company, has developed an Asset Exchange Manager (AxM) platform that allows organizations and institutions to track, share, rent, donate, and sell physical assets. Resource tracking reduces unnecessary purchases and waste and increases reuse opportunities within an organization or throughout a network.

Rheaply has been deployed in Chicago to support equitable distribution of personal protective equipment (PPE) during the COVID-19 pandemic. Rheaply is also used by several Chicago-area businesses and institutions including the University of Illinois at Chicago's Great Stuff Exchange (GSX) where surplus office supplies and materials are available to students, faculty, and staff free of charge.

Source: Rheaply, UIC Sustainability

Opportunities for Source Reduction

Optimal: Enact the Plastic Free Waters Ordinance

To reduce the estimated 11.6 million pounds of plastic entering Lake Michigan each year,[9] Chicago's City Council proposed the Plastic Free Wasters Ordinance in January 2020. This legislation, if passed, would limit the use of disposable serviceware in restaurants and bars, including prohibiting polystyrene in food service. The ordinance would also encourage the increased use of reusable items and requirements around education and signage for waste, recycling, and composting.[10]

Some Chicago businesses are already providing leadership in reducing plastic packaging and waste. Several grocery stores provide bulk shopping options and allow patrons to bring their own containers to fill. Eco & The Flamingo in Lincoln Square is a "zero waste general store" that offers bulk options for customers to fill their own containers of food, household cleaning products, personal care items, and more.

Source: Eco & The Flamingo

The ordinance remains under review, on hold due to the COVID-19 pandemic, which has impacted the restaurant industry and has increased consumer reliance on carry out and delivery services. Once restaurants and bars in Chicago can safely operate at full capacity and recover economic losses, this ordinance can provide an opportunity to reduce waste and contamination from the food service sector.[11]

Pilot Opportunity: Establish a partnership program with unwanted mail services for Chicago residents to reduce junk mail.

The United States Postal Service (USPS) handled over 75 billion pieces of advertising mail in 2019.[12] Individuals can reduce their unwanted advertising mail through services like PaperKarma,[13] CatalogChoice,[14] and DMAchoice,[15] which allow users to opt out of physical junk mail. Providing a central location for Chicago residents to opt-out of unwanted mail can help to increase awareness of these services and reduce the volume of paper in Chicago's mail.

GreeNYC has established a partnership with CatalogChoice to support New York City residents looking to reduce their unwanted mail. This partnership has resulted in over 100,000 residents opting out of physical junk mail.

Source: GreeNYC

Repair & Share

Practical: Develop partnerships to expand existing community repair event initiatives in Chicago

Working bikes is a nonprofit organization in Chicago that repairs and refurbishes bikes for sale and donation in Chicago and across the globe. Since 1999, Working Bikes has provided a new life for 100,000 bicycles.

Source: Working Bikes 2020 Annual Report

Though repair was historically a common practice for broken or damaged items, it has become commonplace to dispose and replace household items like appliances, electronics, clothing, and more. Volunteer-led repair initiatives, many inspired by The Repair Cafe model in Amsterdam, provide opportunities for skill building, community engagement, cost savings, and waste reduction. Though several items may require referral to professional repair services, community events expose residents to repair possibilities and help shift cultural norms away from disposal.[16]

Municipal support for existing community efforts like Community Glue at the Edgewater Workbench,[17] pop-up Repair Cafes,[18] and pop-up Fixit Clinics,[19] can help to increase awareness and volunteer participation for such events. Repair Cafe and Fixit Clinic also provide materials and resources for any individuals or organizations seeking to host a repair event.

City support for initiatives such as Right to Repair at the state level can encourage manufacturers to allow their products to be maintained by independent businesses and interested individuals.[20]

Optimal: Establish a regular Repair Cafe event series through the Chicago Public Library

The Chicago Public Library has hosted one-day Repair Cafe events in recent years at branch locations including Austin[21] and Sulzer Regional.[22] Establishing a regular, rotating Repair Cafe at Chicago Public Library branch locations across the city can engage Chicago residents in all neighborhoods and provide opportunities for repair services and awareness across the city. Increased access to Repair Cafes can help keep items like bulk appliances, e-waste, and textiles out of the curbside recycling and waste streams. Repair Cafes can also provide opportunities for skill building and workforce development for volunteers and participants.

Practical: Support material "share" or rental models in Chicago

Options for renting or sharing materials can also provide environmental benefit by reducing the need for the manufacturing of new items. High profile examples of the "sharing economy" include ride sharing like Uber and Lyft and home sharing through Airbnb and VRBO, but there are also opportunities to increase sharing and renting of materials like tools (e.g. Chicago Tool Library[23]), toys (e.g. Minneapolis Toy Library[24]), and other equipment for municipal operations and Chicago residents.

The Chicago Tool Library, established in 2019, provides access to tools and equipment for activities including woodworking, home repairs, camping, gardening, cooking, cleaning, automotive repair, jewelry making, and more. The organization seeks to provide equitable tool and equipment access to all Chicago residents, and annual membership pricing is based on a sliding scale.

Source: Chicago Tool Library

RESIDENTIAL WASTE REDUCTION

Waste generated in Chicago residences accounted for nearly 40 percent of the City's overall waste stream in 2020.[25] This section offers strategies to reduce the waste volume and improve diversion in recycling, yard waste, and compost programs for Chicagoans in both low-density (single-family homes and multifamily buildings with four or fewer units) and high-density (multifamily buildings with five or more units) residences.

Improving Low-Density Residential Waste Diversion & Reducing Contamination

Practical: Maintain clear and consistent messaging around recycling contamination

Contamination, the inclusion of non-recyclable materials in recycling streams, is a significant issue for recycling processing and resale. Current recycling technology and equipment cannot appropriately process materials like plastic bags and can halt operations and result in damage to processing facilities when included in curbside recycling streams. Additionally, soiled materials (e.g., greasy pizza boxes, food containers that have not been emptied) can lessen the quality of the entire recycling stream, making it difficult to sell the materials for remanufacturing.[26]

> *Individuals often add items to recycling bins that they want to be recycled, even if they are not recyclable, leading to contamination in a process called **aspirational or wishful recycling**. This slows the recycling process, makes recycling more costly, and affects global recycling markets. Typical items added that cannot be recycled are disposable cups, pizza boxes, greasy or dirty food containers, plastic bags, other non-recyclable plastics, yard waste, fabric, food scraps, items like hoses and cords that get tangled in recycling machinery.*
>
> *Source: Livia Albeck-Ripka, The New York Times*

For recycling to remain economically viable, particularly with increasingly rigorous international acceptance standards, contamination must be kept as low as possible. The Recycling Partnership developed recommendations for Chicago's Blue Cart program in their "It's All You, Chicago" report (2018) which included a particular focus on addressing contamination. A primary recommendation from the report was to invest in consistent, long-term communications through several channels to promote clear guidance, based on persistent issues at Chicago's recycling facilities.[27]

The Recycling Partnership also sampled Blue Carts across Chicago and found that the most frequent items contaminating recycling bins were food and paper contaminants when measured by weight; and plastic film, paper contaminants, and rigid plastic contaminants when measured by frequency of occurrence.[28] These findings highlight the need to focus education and diversion efforts on organics and plastic film to have the biggest impact on contamination.

Based on this report, DSS and the Recycling Partnership launched new recycling signage and guides (Figure 1) that provide clear, picture-based direction on how to successfully recycle in the Blue Cart program.

Figure 1: City of Chicago Household Recycling Guide, Source: Recycle By City

Optimal: Introduce additional recycling streams to improve curbside recycling quality.

Ten states in the U.S. have implemented container deposit programs to increase recovery of beverage containers for recycling. Michigan's Bottle Deposit Law, enacted in 1976, established a 10-cent deposit on beverage containers. The deposit is refunded upon returning the empty container to a participating retailer for recycling. Over $338 million dollars in refunds were processed in 2019, representing an 88.7 percent refund rate.

Source: State of Michigan Treasury

While single-stream recycling (the system currently used in the Blue Cart program) is convenient for residents and haulers and can increase the tonnage of material collected for recycling, processing costs and contamination rates are often higher than in multi-stream separated recycling.[29]

Some municipalities across the country have started limiting the type of items accepted in single-stream recycling or increasing recycling streams to improve the quality of recycled material for reprocessing. For example, Flagstaff, Arizona collects only metal cans and pans, paper, cardboard, and plastic bottles, jugs, and jars. All other plastics and glass are not accepted in curbside collection.[30] In Emmet County, Michigan, residents are offered dual-stream recycling options with two separate bins, one for paper, cardboard, and plastic bags; and one for plastic, metal, and glass containers.[31]

Engaging in regular dialogue with Chicago-area materials recovery facilities (MRFs) can identify common issues and determine if an increase in recycling streams or decrease in accepted materials can improve the quality and marketability of Blue Cart materials.

Optimal: Identify appropriate Blue Cart to black cart distribution and bin size options.

One strategy to increase the capture of recyclable materials from low-density residences in Chicago is to ensure that containers are available to manage the volume of recycling (and potentially organics) for a targeted diversion rate.

Most haulers and processors use weight as a metric for waste. However, typical recyclable and landfillable materials have different densities and this needs to be considered when designing an optimal recycling program. The U.S. Environmental Protection Agency (EPA) has reported that mixed recycling has roughly half the density (pounds per cubic yard) as household refuse on average.[32] Consequently, when comparing recycling and refuse collection in tons, the mixed recycling occupies around twice the volume (or bin space). This ratio can be further exacerbated by cardboard boxes that are not broken down and flattened which means limited space for additional recyclables in the Blue Cart.

As recycling rates improve, waste generation is reduced and organics diversion is introduced on a broader scale, it may be appropriate to increase pickup frequency or the available volume for recycling and provide options for black garbage cart downsizing.

San Antonio, Texas has introduced a brown cart downsizing program, allowing residents to select a large (96-gallon), medium (64-gallon), or small (48-gallon) garbage cart with lower collection fees for smaller volume options. In FY2019, over 6,500 residents downsized to the medium cart size and over 10,000 downsized to the small cart.

Source: City of San Antonio Solid Waste Management Department FY2019 Annual Report

Optimal: Continue improving low-density residential waste and recycling route optimization to reduce GHG emissions associated with hauling.

Implementation of the DSS grid garbage collection for low density residences in 2013 had a major efficiency impact, reducing the number of daily garbage trucks from 360 to 320 and saving $18 million annually in collection costs.[33] Regular review and optimization of collection routes for DSS and private waste haulers can reduce materials collection costs while supporting emissions reduction and climate goals.

High Density Residential Waste Diversion

Practical: Improve high density residential recycling ordinance compliance based on 2020 Chicago Office of the Inspector General report findings

In December 2020, the City of Chicago Office of the Inspector General published findings and recommendations from an audit of DSS enforcement of high-density (five or more units) residential buildings.[34] The Chicago Recycling Ordinance requires high-density residential

building managers or owners to contract with a private hauler to provide recycling services for building occupants.[35]

The audit found that recycling violations were not adequately enforced due to DSS capacity and information constraints, as well as technical barriers within the DSS electronic citation system. The OIG recommended updating the electronic citation system and conducting inspections both in response to complaints and proactively based on random selection or risk assessment.[36]

DSS has coordinated with the Law Department to address the electronic ticketing issue and is planning a March 2021 rollout and training session. Successfully implementing the ordinance will require a significant increase in dedicated staff and resources, as well as interdepartmental coordination within the City.[37]

Optimal: Increase outreach and education for high density residential buildings

Beyond ordinance enforcement, increasing education and engagement with high density residential building managers and owners can identify common issues and solutions, as well as reach a broad audience of Chicago residents.

Public Education & Engagement

In addition to messaging that focuses on proper recycling and reducing contamination, broader public engagement and education is a critical component of the entire materials management system. Increasing awareness and support for programs can support increased diversion, safe disposal when needed, and a shift in cultural norms around materials management.

Practical: Leverage existing public education and communication channels to increase awareness and use of Chicago's materials management resources.

The City already has access to powerful communication tools to share information about sustainability initiatives. The Recycle by City[38] website (www.recyclebycity.com/chicago) hosts updated and interactive resources for Blue Cart recycling guidance and other waste and recycling services specific to Chicago. Additionally, the City's Sustain Chicago website[39] (sustainchicago.cityofchicago.org) was created in 2018 through a series of public engagement meetings and surveys to host resources and opportunities to get involved with environmental efforts.

The City's general website (http://www.chicago.gov/city/) is also often cited as a source of materials management information, but stakeholders reported frustration with outdated and missing information.[40] Maintaining or streamlining web-based information from the City can help to avoid confusion for Chicago residents.

Outside of web-based resources, regular engagement (e.g., meeting participation and presentations) with existing community stakeholder groups working towards waste reduction, environmental sustainability, and equity can help to build support for City initiatives and reach more Chicagoans.

Optimal: Establish creative programs to further engage Chicago's community around sustainable materials management

Identifying opportunities for non-traditional engagement around waste diversion can also help to build excitement for materials management programs and engage additional stakeholder groups.

Potential ideas for engagement include connecting with artists to commission works made from items found in Chicago's waste stream and partnering with Chicago chefs and restaurants to provide guidance on minimizing food waste.

Recology, a West Coast waste collection and processing company, established an Artist in Residence program in four cities that supports artists who create work from materials recovered from the waste stream by Recology's operations. Artwork from over 200 artists who have participated in the program are exhibited as part of Recology's permanent collection.

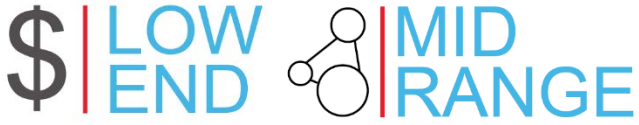
Source: Recology Artist in Residence

Pilot Opportunity: Engage with existing sustainability volunteer programs to support materials management pilots and strategy implementation.

Volunteer cohorts like the Chicago Conservation Corps (through the Chicago Academy of Sciences and Peggy Notebaert Nature Museum)[41] and the Greenest Region Corps (through the Metropolitan Mayors Caucus)[42] can provide support for new materials management programs and pilots while developing a new generation of Chicago sustainability leaders. Programs like the Greenest Region Corps are supported by AmeriCorps and Serve Illinois and rely on a strong network of local host communities and organizations.

The Minnesota GreenCorps program, coordinated by the Minnesota Pollution Control Agency, provides training opportunities for new professionals interested in environmental work. Programs include waste reducing and recycling through placements with cities, counties, tribal nations, public schools, universities, watershed districts, and nonprofit organizations.

Source: Minnesota GreenCorps

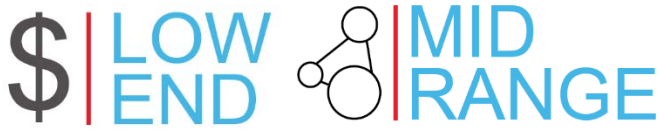


Preventing Illegal Fly Dumping

"Fly" dumping refers to the discarding or dumping of any waste materials on private or public property without a CDPH permit. Materials discarded in this way typically have a greater likelihood of toxicity or nuisance and often include materials like tires, furniture and other bulk items, hazardous waste, and construction debris.[43] Cleaning up illegally dumped items is a strain on City resources and dumping sites can pose public health and safety concerns.

Pilot Opportunity: Standardize data collection to identify location-based trends for specific fly dumped materials to prioritize education and infrastructure investment.

Through the 311-request system, residents can report fly dumping at specific sites throughout the City. The request system provides a series of prompts about the material location and any awareness of the perpetrator, as well as an open text field for material description.[44] Providing multiple choice options based on commonly dumped material types can help to identify trends for material recovery infrastructure gaps. For example, if tires are repeatedly dumped in a certain ward, CDPH and DSS can work with the Alderman and other stakeholders to identify tire-specific education and collection opportunities to reduce problematic dumping and promote safe disposal.



Practical: Increase public education efforts around fly dumping prevention

Equipped with location and material data from 311 reports and other sources, the City can develop targeted fly dumping campaigns in issue areas. Highlighting the public health and safety issues, cost to taxpayers for cleanup, and alternative disposal options can strengthen messaging to reduce and prevent fly dumping in Chicago.

ICI (INDUSTRIAL, COMMERCIAL, INSTITUTIONAL) WASTE REDUCTION

Beyond residential waste generation, a significant proportion of Chicago's waste is generated by the ICI (industrial, commercial, and institutional) sector. This sector includes businesses like restaurants and office buildings; institutions including government, cultural, and educational; and, manufacturing and other industrial processes.

Commercial Waste Generation and Hauling

Optimal: Implement waste hauling zones for commercial waste

Several of Chicago's materials management services are organized through a zone system. The Department of Streets and Sanitation (DSS) implemented grid garbage collection for low density residences in 2013, reducing the number of daily garbage trucks from 360 to 320 and saving $18 million annually in collection costs.[45] The Blue Cart recycling program for low-density residences is also organized through a grid system in which DSS services two service areas and the remaining four are exclusively franchised through municipal procurement.[46]

Implementing commercial waste hauling zones is not a new idea for Chicago. The former Chicago Department of Environmental (DOE) proposed an exclusive franchising model for privately collected waste and recycling in 2008. At that time, the DOE estimated that a commercial franchise model would result in reduced collection costs for 80 percent of customers, six percent fewer scavenger trucks traveling 19 percent fewer miles, a 23 percent reduction in greenhouse gas emissions, 500 additional jobs, and 18 percent increased diversion.[47]

New York City passed legislation establishing commercial waste zones (CWZ) in 2019, following a private hauler industry study in 2016 and CWZ implementation plan in 2018.

Though rollout of the commercial waste zones was delayed by the COVID-19 pandemic, the NY Dept. of Sanitation released an RFP in late 2020. The CWZ program will establish 20 zones for commercial waste collection and is expected to reduce applicable truck traffic by 50 percent.

Source: New York Department of Sanitation

The recommended next step to explore commercial waste zone implementation is engaging with private waste hauling organizations and commercial customers to gather feedback on if and how the program should be structured. One potential approach to address the anticipated feedback regarding the overall lack of options for customers is to establish non-exclusive franchises, where each zone is serviced by more than one hauler.[48]

Practical: Update the 2013 Chicago Energy Benchmarking Ordinance to add waste tracking requirements for large commercial buildings.

Chicago is home to nearly 3,000 buildings over 50,000 square feet, each of which is required to track energy consumption in EnergyStar Portfolio Manager and report annually to the Department of Business Affairs and Consumer Protection.[49] [50] The same system can be used to track waste, providing buildings with an additional tool to manage and improve their diversion and understand their impact. Portfolio Manager allows buildings to track waste as a commingled stream (Trash,

Mixed Recyclables, or Compostable) or as many as 27 additional, specific material streams (e.g., Cardboard/Corrugated Containers). This may include continuous tracking of streams (e.g., weekly pickups of Compostable waste) or spot reads (e.g., periodic Electronics recycling). Energy Benchmarking has been shown to reduce energy use by two percent on average for buildings.[51] Tracking and reporting waste data will encourage buildings to develop more efficient and sophisticated waste management programs when comparing their waste management to peer buildings.

Institutional Partnership Opportunities

Practical: Engage with academic institutions to conduct research, pilot initiatives, and refine public education and engagement strategies

The Chicago area is home to several world-class academic institutions that are leading sustainability and climate research and initiatives including waste reduction and diversion. Chicago's academic institutions offer opportunities to not only divert large quantities of waste from campuses and facilities, but also conduct research and develop resources to support materials management opportunities for the broader community.

Initiatives by Chicago's academic institutions which can support the City's goals are already active. The University of Illinois at Chicago received $300,000 from EPA in 2020 to provide technical assistance for potential anaerobic digestion development.[52] The Illinois Sustainable Technology Center leads research on utilizing waste plastics and wood waste, waste minimization, and more.[53] Loyola University is home to the Searle Biodiesel Program, which leads production, research, and outreach for zero-waste biodiesel production.[54] The University of Chicago recently launched the Environmental Frontiers program focused on identifying sustainability projects to test on campus and developing recommendations based on findings.[55] This is not an exhaustive list but is meant to highlight the available resources for the City's sustainable materials management implementation.

Additionally, supporting curricula around sustainable materials management provides a natural engagement point for Chicago's students and alumni to participate in City programs.

The Shedd Aquarium has incorporated single-use plastic pollution prevention as part of its mission to promote conservation. The aquarium has developed significant education and advocacy resources to support businesses and community members in reducing plastic waste.

Source: Shedd Aquarium

Practical: Engage with cultural institutions to increase material diversion and public engagement

Chicago's cultural institutions and facilities can also provide opportunities for significant waste diversion, as well as engagement and education with broad groups of residents and visitors. Organizations like the Chicago Sustainability Task Force and Green Sports Alliance bring together major facility managers to share best practices and successes in environmental initiatives including waste diversion. Coordinating City initiatives with these institutions and organizations can help to reinforce educational messaging and reach City diversion goals.

Waste System Infrastructure & Industrial Operations

Although industrial waste-permitting and producer-responsibility legislation is typically managed at the state level, there are opportunities for the City of Chicago to engage with existing and historical waste infrastructure and the manufacturing sector to support materials management goals.

Optimal: Support ambitious statewide extended producer responsibility (EPR) legislation

Extended producer responsibility (EPR) legislation requires manufacturers to take financial responsibility for the end-of-life recovery or safe disposal of their products. There are currently active EPR laws in Illinois for electronics, mercury thermostats, and auto switches.[56] Products with high toxicity and environmental or human health concerns are typically good candidates for EPR legislation.

Recently, several states have proposed EPR legislation for manufacturers of product packaging, to manage and discourage single-use and difficult to recycle plastics. In 2021, a group of lawmakers representing California, Colorado, Hawaii, Maryland, New Hampshire, New York, Oregon, Vermont, and Washington proposed a series of proposals to address growing issues with plastic packaging.[57] Stronger EPR legislation in Illinois has the potential to shift the financial burden of collecting and processing these materials from taxpayers and municipalities to manufacturers, allowing the City flexibility to fund other materials management initiatives.[58]

Pilot Opportunity: Establish a grant program for development of secondary markets

Establishing a grant program for development of new secondary markets for materials in Chicago's waste stream can spur innovation while also reducing materials sent to landfills. Development of new technology and markets to reclaim wasted materials locally can also have significant economic growth and disposal cost saving impacts.

Practical: Deprioritize waste incineration and Waste to Energy (W2E) operations until further research and technology development.

Waste to Energy (W2E) has a harmful history in the Chicago region and has disproportionately impacted black, Indigenous and people of color (BIPOC) communities in the past. This makes incorporation of W2E infeasible as a near-term next step for Chicago, but conducting more research and education is an important next step.

W2E technologies have been evolving rapidly to reduce their and environmental impact over the past several years and innovation continues to make this technology more viable as a part of a holistic materials management approach. However, with current permitting, siting, and infrastructure, this technology is not recommended at this time for the City of Chicago, a recommendation that is supported by organizations like the Illinois Environmental Council.[59]

Prior to exploring this option, the City should prioritize the other reuse, repair, reclamation, and recycling options presented in this report. Without significant investment in infrastructure and changes in zoning to ensure a reduction in environmental justice impacts, W2E would not meet overall City objectives and commitments.

Practical: Update zoning of waste operations facilities to reduce negative environmental impacts in nearby communities and prevent concentration of environmental burdens.

To address historic and current environmental justice issues around the concentration of waste infrastructure, the City should review and update zoning of waste operations facilities to improve environmental impacts in nearby communities including adding more buffering (including planting vegetative and tree buffers) and invest in ordinance enforcement capacity around noise, odor, and air quality infractions. This approach could include prioritizing siting new waste infrastructure in existing Planned Manufacturing Districts and incorporating recommendations from the PMD modernization process currently being done by the City's Department of Planning and Development.[60]

Optimal: Remediate and redevelop Chicago's closed landfill sites for community benefit

Though there are no open landfill sites in the City of Chicago or surrounding Cook County, closed landfill sites are largely concentrated in the Southeast side of the City (Figure 2). Closed landfill sites require long-term site maintenance and are difficult to redevelop, creating a lasting burden for the surrounding community. Several landfills and dump sites have been remediated and redeveloped as conservation and habitat restoration sites;[61] wind and solar energy generation;[62] and, golf courses, including Chicago's Harborside Golf Course at the Illinois International Port District.[63]

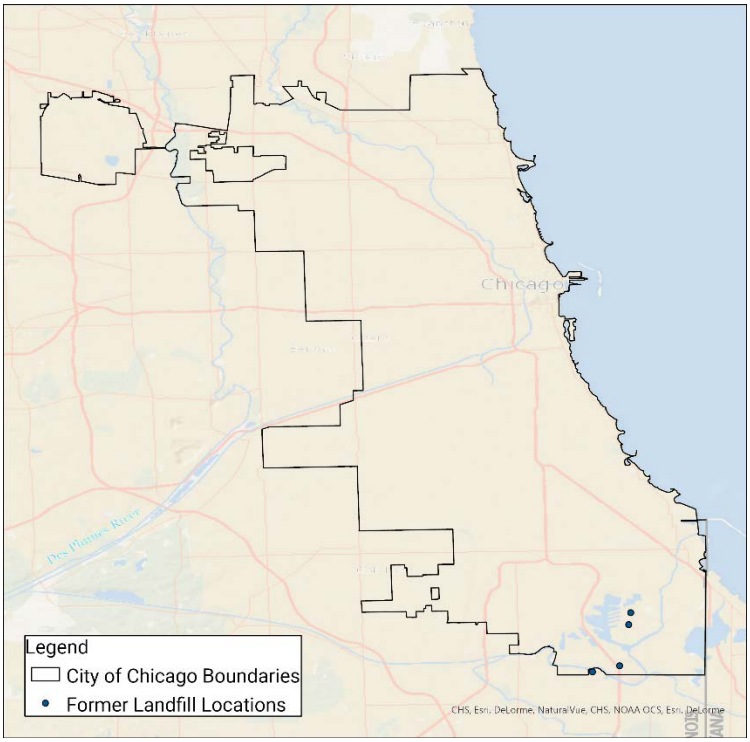


Figure 2: Former landfill locations within or directly adjacent to Chicago (Source: City of Chicago)

Engaging community organizations like the Southeast Environmental Task Force to identify community priorities and opportunities for community benefit in redevelopment can help to address one of the lingering issues of concentrated waste management infrastructure.[64]

ORGANICS & WASTED FOOD

Organic material, including yard and forestry waste, food scraps, and food-soiled or shredded paper products, comprises a significant portion of Chicago's waste stream across all generator types. Organic material not only generates greenhouse gas emissions when landfilled but also presents opportunities for critical benefit when captured including feeding hungry people and animals and improving soil health through compost amendment.

Citywide Food Waste Prevention & Food Rescue

Practical: Leverage the National Resources Defense Council (NRDC) Food Matters Great Lakes Regional Cohort participation to conduct a food rescue assessment of existing infrastructure and gaps

Food insecurity and hunger are persistent problems in Chicago which have been worsened by the COVID-19 pandemic. Feeding America estimates that there are over 520,000 people in Cook County experiencing food insecurity,[65] and Northwestern University's Institute for Policy Research estimated that the Chicago Metropolitan Area reached food insecurity rates as high as 24 percent in April 2020.[66] Organizations like the Greater Chicago Food Depository and other local food banks provide essential services for Chicagoans that can be supported and complemented by food rescue initiatives.

The NRDC Food Matters Regional Initiative develops cohorts of municipal governments and other representatives to leverage opportunities, provide technical and network support, and create goals and programs to reduce food waste on a regional scale. Chicago was selected to join the Great Lakes cohort, along with the City of Cincinnati, OH, the City of Madison, WI, Make Food Not Waste in Detroit, MI, and the Solid Waste Authority of Central Ohio. NRDC has also launched cohorts in the mid-Atlantic and Southeast regions.

Source: NRDC Food Matters

Conducting a food rescue assessment with input from food donors, food banks, and recipients of food assistance can help to determine current gaps and opportunities for food rescue to expand impact.[67]

412 Food Rescue in Pittsburgh, PA uses Food Rescue Hero technology to activate volunteers to tackle the "last mile" of food access. Between March 2015 and February 2019, 412 Food Rescue worked with 508 food donors and 542 nonprofit distribution partners to rescue over 5.6 million pounds of food in the Pittsburgh area.

Source: 402 Food Rescue

Optimal: Launch a citywide food rescue program for the City of Chicago

Food rescue supports traditional food bank infrastructure by adding capacity to capture food from the retail sector including very perishable food that needs to be eaten quickly, smaller size donations, and donations with unpredictable frequency.[68]

A potential pathway to citywide food rescue expansion is by establishing a partnership with

Food Rescue Hero. Food Rescue Hero offers a technology platform to support food rescue logistics, currently in use in 10 cities including Pittsburgh, Cleveland, Los Angeles, and Vancouver, BC.[69]

Organics & Food Scrap Collection for Chicago Residents

Composting, although less impactful than preventing or rescuing wasted food, is a preferred alternative to landfills for organic waste. Composting facilities and anaerobic digesters can process significant amounts of organic material but require infrastructure and investment to develop. Illinois EPA, in conversations with Waste Management, identified the lack of guaranteed feedstock as a barrier to more composting infrastructure in Illinois. City programs that increase high-quality, non-contaminated organics collection can support additional infrastructure and capacity in the state.[70]

Practical: Establish permanent drop off sites for residents at the Sanitary District or Ward level.

Supervised drop off locations throughout the City for Chicago residents to bring yard waste and food scraps can provide significant diversion potential with limited infrastructure costs and lowered contamination risk compared to a full launch of a curbside residential collection program.

A drop off model could provide opportunities for Chicagoans throughout the City to learn about and divert organic waste, increase the volume of feedstock for anaerobic digesters and compost facilities, and complement the existing network of businesses providing subscription-based curbside organics collection.

The Department of Public Works in Washington, D.C. has implemented eight food scrap drop off locations collocated with farmers market sites. Three of the eight sites are open year-round, and all drop offs are free for residents. Food scraps collected are composted locally in Washington, D.C. at community composting sites and the Prince George's County Organics Compost facility.

Source: Washington DC Dept. of Public Works

Pilot Opportunity: Introduce drop off locations through "pumpkin smash" events.

The City of Chicago, in partnership with the Chicago Parks District, already successfully manages several seasonal organics drop off locations through the Christmas tree recycling program.[71] SCARCE, a nonprofit organization in DuPage County, provides guidance (including Illinois EPA regulations[72]) and materials for pumpkin collection events after Halloween. In 2020, over 40 pumpkin smash events were hosted in Illinois, four of which were hosted in Chicago, resulting in over 150 tons of pumpkin diverted from landfills for composting.[73] Implementing single-day events pumpkin collection events at the ward or Sanitary District in Chicago can provide opportunities for significant diversion and education.

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Practical: Improve Chicago's existing yard waste collection program and incorporate food scrap "ride along"

Chicago residents must currently submit a 311-request to receive yard waste collection services. DSS collected over 1,000 tons of yard waste in 2019,[74] but several Chicago stakeholders expressed frustration with the program's capacity or were not aware the program was available. Increased investment and education to expand the yard waste program and resident awareness offer an opportunity to divert valuable organic material and prevent methane generation in landfills. Strengthening the yard waste collection program with resources and staff to allow for regular seasonal pickups (as opposed to the 311-request model) can provide an opportunity to include food scraps as a "ride along" without added rodent or nuisance concerns.

Optimal: Provide opt-in curbside organics collection for all Chicago residents served by DSS

With significant education and infrastructure investment, curbside collection for all interested Chicagoans could significantly reduce the volume of material sent to landfills and help to curb contamination in recycling streams.

In 2017, the City of Evanston entered an exclusive hauling agreement with Collective Resource Compost to provide food scrap collection to residents and businesses. Due to the resulting route density, Collective Resource Compost can offer Evanston customers a reduced rate for collection.

Source: City of Evanston, Collective Resource Compost

Options for implementation include a managed competition system, as is currently in place for Blue Cart recycling, through which existing or new organics haulers can offer bids to become a service provider for low-density residences in one or more areas of the City. This approach can support existing collection businesses by concentrating route density, though would require significant outreach and engagement to ensure an inclusive network. DSS could provide organics collection to residences served by the zone garbage collection system. However, this approach would require major investment in DSS staff, equipment, education, and infrastructure. For any City-wide organics collection program, processing capacity will need to be evaluated and grown as feedstock volume increases.

Providing residents with the opportunity to "opt-in" to a curbside organics collection program can allow for iterative public education and reduced contamination. Based on initial adoption rates, contamination rates, and local processing capacity, shifting to a required or "opt-out" system may be possible in the future.

Practical: Provide information about current organics hauling services to high density residential buildings

Providing information about the current organics collection services available to high-density residential building managers can help to encourage food scrap and organics diversion from these buildings. Organics collection, like garbage and recycling services, would be contracted by individual buildings in the current ICI waste management system in Chicago.

ICI Food Waste Prevention & Food Scrap Diversion

Practical: Identify partnership and support opportunities for industrial, commercial, and institutional entities implementing food waste diversion programs

Industrial, commercial, and institutional (ICI) generators provide significant potential for food scrap prevention and diversion, and several ICI entities in Chicago are already taking steps to prevent food waste from entering landfills.

Chicago agencies including Chicago Public Schools (CPS) and Chicago Park District (CPD) have launched food scrap prevention and diversion programs through school cafeterias and summer camp food service, respectively. Beyond CPS and CPD, the We Compost program through the Illinois Food Scrap Coalition (IFSC) provides resources and recognition for Illinois restaurants, religious and cultural institutions, grocery stores, farmers markets, educational institutions, and municipalities that divert food waste through on- or off-site composting.[75] Identifying opportunities to connect ICI waste generators with We Compost or other resources and encouraging expanded participation can increase food scrap diversion and provide public education and awareness for organic waste prevention initiatives citywide.

The average cost of a 32-gallon tote, with a compostable liner and collected using a pickup service, ranges from $30 to $50 per week. The City could encourage voluntary adoption of these services by sponsoring a competition for reduction, partnering with large businesses to underwrite costs for institutions, or using grant funds to fund focused pilot programs to demonstrate the cost savings on the landfill segment of a typical waste budget.

New York City's Commercial Organic Waste Law went into effect in 2015, and since then has been gradually adding additional establishments to the group covered by this requirement based on square footage, guest capacity, and number of locations in the City (e.g. chain restaurants). The first covered group included food service establishments in hotels with 150 or more rooms, stadiums with capacity of 15,000 or more people, and food manufacturers and wholesalers with floor areas of more than 25,000 and 20,000 square feet, respectively.

More recent groups covered by the ordinance include chain food service and retail food establishments with combined floor area of 8,000 and 10,000 square feet, respectively, food service establishments in hotels with between 100 and 149 rooms, and on-site events at catering establishments with over 100 attendees.

Source: New York City Department of Sanitation

Optimal: Require the largest food waste generators to divert food waste through donation or composting

Beyond voluntary and recognition programs, the City of Chicago could use legislation to require some or all food waste generating businesses and institutions to divert organics. Any organic waste legislation should be phased in to allow for significant public and stakeholder education and to build local compost processing capacity to handle increasing feedstock.

Several major food waste generating businesses like grocery stores (including Mariano's,[76] Trader Joe's,[77] and

Whole Foods[78]) are already incorporating food donation and composting into their operations, providing a model for other businesses. Targeting initial legislation to the largest food scrap generators can provide significant diversion impact while avoiding disproportionate burdens on small restaurants and businesses.

Pilot Opportunity: Incorporate food donation and food scrap composting into City events to reduce organic waste and provide high-profile educational opportunities.

Chicago is home to countless special events and street festivals at every scale and in every neighborhood. The Department of Cultural Affairs and Special Events produces and promotes major festivals including Taste of Chicago, Chicago Blues Festival, Chicago Jazz Festival, and more.[79] Requiring or incentivizing food vendors to divert organic waste, as well as providing organic collection and education for attendees can prevent significant tonnage from entering landfills, provide educational opportunities, and highlight Chicago as a sustainability leader for tourists and sponsors.

The Chicago Marathon, one of the world's largest marathons, has incorporated several sustainability initiatives, including food waste reduction and composting. Food and water unused by the 45,000 marathon participants are donated to the Greater Chicago Food Depository. The marathon has shifted procurement requirements to include compostable serviceware, including water cups, which are composted and donated to the Chicago Park District for use as soil amendment.

Source: Chicago Marathon

Compost Market Development

Practical: Incorporate additional finished compost into existing City landscaping maintenance.

Finished compost, when used as a soil amendment, offers several environmental and economic benefits, including chemical fertilizer reduction, higher crop yields, soil remediation, carbon sequestration, and increased water retention in soil.[80] Incorporating finished compost into existing City activities, including tree planting and landscaping, can increase the demand for compost locally and support broader organics recycling markets.

The Illinois Food Scrap Coalition (IFSC) is an organization dedicated to diversion and posting of organics in the state. IFSC has developed robust materials for municipalities, counties, and other stakeholders, including guidance for public procurement and use of finished compost.

Source: Illinois Food Scrap Coalition

There are several opportunities to increase the procurement and use of finished compost across city

departments and agencies. The DSS Bureau of Forestry is responsible for planting trees in the public right-of way across Chicago;[81] the Department of Transportation oversees the Streetscape and Sustainable Design Program, which includes green infrastructure planting and installation to manage stormwater;[82] and the Chicago Park Department (CPD) owns and maintains over 8,800 acres of public green space in the City.[83]

Practical: Support increased adoption of backyard composting and composting at community garden sites

Decentralized composting at community garden sites and homes is a potent solution for diverting food scraps with a low carbon footprint due to a reduced need for the transportation of materials. Though not all types of organic waste (e.g. bones, dairy) are appropriate for non-industrial composting, items like landscape waste, fruit and vegetable scraps, and eggshells can be successfully composted in backyards and community gardens.[84]

In 2015, the City of Chicago amended the Municipal Code to allow for small-scale collection of off-site food scraps and landscape waste for in-vessel composting (in a container, as opposed to an open compost pile) at community garden sites.[85] Community composting sites are required to obtain a permit (at a much lower cost than industrial composting sites) and register annually with the Chicago Urban Agriculture Mapping Project (CUAMP).[86]

As of 2020, 109 of the 890 community gardens were registered through CUAMP as composting sites throughout the city.[87] Additional City-sponsored promotion and education for residents about this program can support small-scale composting in addition to food scrap collection for industrial composting.

The Pritzker Traubert Foundation awarded a $10 million "Chicago Prize" grant to the Always Growing, Auburn Gresham project. This initiative includes development of an urban farm in the Auburn Gresham neighborhood collocated with an anaerobic digester that will process food waste into compost (to support on-site farming) and natural gas.

Source: The Pritzker Traubert Foundation

SPECIALTY MATERIALS

The term "specialty materials" is meant to include materials in Chicago's waste stream that cannot or should not be managed through traditional curbside recycling or composting initiatives. This includes household hazardous waste (HHW), electronics (e-waste), bulk items like furniture, appliances, and mattresses that often end up in Chicago alleys, electronic waste, pharmaceuticals, textiles, and plastic film. These materials are important to address as they can either require special handling for safety reasons or cause operational issues for waste haulers and processors when included in typical waste and recycling streams.

Permanent Collection Facilities

Practical: Expand material types available for collection and diversion through the HCCRF and rebrand the facility as a Chicago Recycling Center

The Household Chemical and Computer Recycling Facility (HCCRF) is a 24,000 sq. ft., permanent facility that provides a proper disposal and recycling option for HHW (e.g., cleaning products, lawn chemicals, pharmaceuticals, auto fluids) and some e-waste (e.g., computers and related equipment, TVs, cell phones). However, there are several categories of HHW and e-waste that the HCCRF does not accept including calculators, smoke detectors, latex paint, household appliances, air conditioners, digital cameras, print cartridges, and more.

Identifying additional vendors to expand safe disposal and recycling options for more materials at the HCCRF can help to build awareness and use of the facility as a potent and versatile recycling center. Offering additional collection services can encourage residents to take advantage of this service and potentially increase proper disposal of dangerous items through increasing convenience.

Kane County, Illinois has established three permanent recycling centers accepting e-waste, books, textiles, holiday string lights, and scrap metal for residents. These recycling centers are supplemented by several single day events throughout the year with targeted focus including document shredding, hazardous waste, paint, bikes, pumpkin composting, and more.

Source: Kane County Recycles

Potential services and material streams to consider adding to the HCCRF to develop a holistic "recycling center" include: paper shredding for sensitive personal documents; textiles; holiday string lights; plastic film; polystyrene foam; latex paint; and refrigerants.

Optimal: Increase access options for HHW disposal for Chicago residents

The improper storage and disposal of HHW can have serious human health and environmental implications. If disposed of with conventional curbside MSW, hazardous material can contaminate groundwater through landfill leachate. HHW can also pollute surface water when poured down drains or into sewers.[88] Stockpiling flammable HHW materials can pose a fire risk to residents[89] and increase risk of accidental exposure or ingestion in homes, especially for children. Of 2.1 million cases handled by the American Association of Poison Control Centers in 2019, household cleaning substances are the second most common exposure substances.

Approximately half of those incidents involved children under 12, and 92 percent of exposures occurred at home.[90]

There are currently three permanent HHW collection facilities in the Chicago Metropolitan Region (Chicago, Naperville, and Gurnee). The HCCRF serves thousands of Chicago residents each year, and the Chicago Department of Public Health reported collection of over 125,000 pounds of HHW, nearly 8,000 pounds of pharmaceuticals, and over 350,000 pounds of electronics in 2020.[91] However, the HCCRF has limited operating hours and may not be easily accessible for much of Chicago's population. In 2015, a survey of over 800 Cook County residents found that the majority are not willing to travel more than 10 miles to properly dispose of HHW, creating an access gap in the southern portion of Chicago.[92]

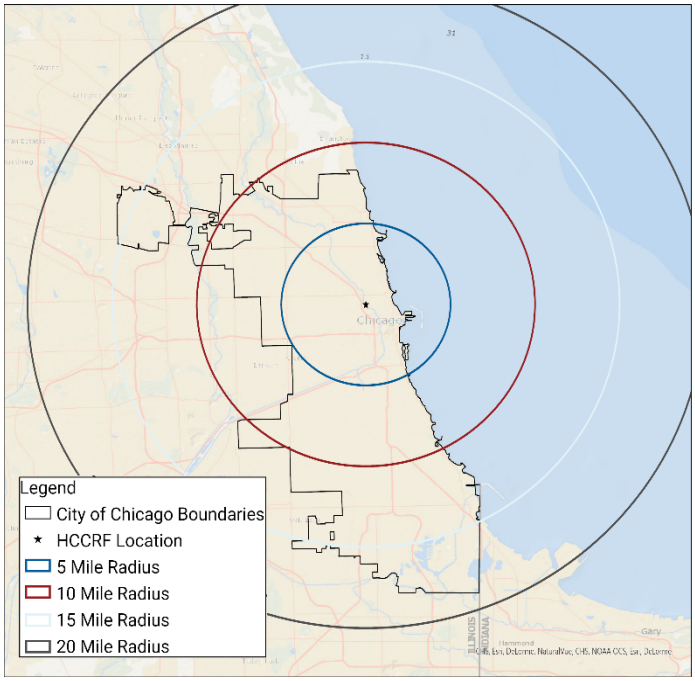

Figure 3: HHW Disposal Access Map

Improving access to safe HHW disposal could be managed through the development of an additional permanent facility, curbside collection services, or rotating collection sites across the City. Construction and operation of a new permanent facility would require significant investment in staff and capital expenses. The HCCRF facility site conversion cost $3.8 million of state and municipal funds in 2005.[93] Appointment-based curbside HHW collection is offered by several private waste haulers (including Lakeshore Recycling Systems[94] and Waste Management[95]) through a municipal contract for several Chicago-area suburbs. The Chicago Department of Public Health, in partnership with DSS, offered rotating collection sites for e-waste at District Sanitation Offices in 2020. Accepting HHW in those collections would require additional safety precautions and disposal costs but may improve safe disposal of HHW for currently underserved areas.

Pilot Opportunity: Develop directory of participating retail take-back options for e-waste and HHW in Chicago

Some electronics stores and other retailers offer take-back programs to ensure proper end-of-life disposal of their products. Chicago's Recycle by City online resource offers suggestions for potential electronics trade-in options[96] but does not provide a comprehensive list of available e-waste and HHW take-back. Developing a directory and map of options across the city for safe recycling of electronics (e.g., participating Best Buy locations[97]), compact fluorescent light bulbs (e.g., participating Home Depot locations[98]), motor oil (e.g., participating Jiffy Lube locations[99]) and other materials can offer Chicago residents awareness of more convenient safe disposal options in addition to the HCCRF.

High Priority Safe Disposal

Practical: Develop a partnership with private door-to-door recycling services of appliances with refrigerants and provide a referral through 311 city services

Project Drawdown cites a 58 gigaton effect of properly managing refrigerant containing equipment end of life disposal, roughly equal to 18 months of total current human caused emissions.

Source: Project Drawdown

Refrigerants have been commonly used since the 1920s to assist modern cooling systems in controlling temperature and humidity for human comfort, cold storage, and industrial operations.[100] Chemical and physical properties of refrigerants allow them to be customized for different cooling requirements. These same properties also make them potent greenhouse gases that must be properly disposed of to prevent their harmful impact on the climate.

Refrigerants in heating, ventilation, and air conditioning (HVAC), and fire suppression systems are usually recovered when systems are maintained or replaced. Refrigerant leakage problems may arise with improper recycling of household appliances. These appliances may be picked up when a new one is purchased, but they are sometimes left for pickup by alley scrap recyclers. Both room air conditioners and refrigerators contain easily recyclable aluminum and copper in their heat exchangers. While secondary markets for refrigerants do exist, they may not always be used. If recovery is not completed, the refrigerant may be improperly removed to facilitate metal recycling as components cannot be under pressure when crushed. A one-ton capacity (12,000BTU) room air conditioner contains two to four pounds of refrigerant, making each small unit outgassing equivalent to releasing one ton of carbon dioxide.[101]

Practical: Expand pharmaceutical drop off through partnerships with additional retail pharmacies.

Pharmaceuticals can present a problem in landfills by leaching into water supplies or through water treatment systems when they enter stormwater drainage systems. Entities like the Metropolitan Water Reclamation District of Greater Chicago (MWRD)[102] and the Chicago Department of Public Health (CDPH) in partnership with the Chicago Police Department[103] collaborate to provide secure drop off locations for over the counter and prescription medications.

New EPA regulations require healthcare facilities including pharmacies to come into compliance with the Resource Recovery & Conservation Act (RCRA).[104] As Chicago residents are much more likely to remember to properly dispose of old expired pharmaceuticals when obtaining new ones, a marketing and public education partnership with additional retail pharmacies and medical institutions can help to expand access for Chicagoans to properly dispose of pharmaceuticals.

High Volume Specialty Materials Diversion Opportunities

Pilot Opportunity: Establish a revenue-sharing partnership with a textile recycling company for collection of clothes, shoes, and other textiles otherwise ending up in landfills

Textile waste is the fastest growing category of waste generation in the United States.[105] Chicago's ICI sector is estimated to have generated over 50,000 tons of textiles in 2020 alone,[106] in addition to significant generation from the residential sector. Capturing and diverting textiles can reduce landfill tonnage, improve recycling contamination, and provide revenue sharing opportunities for the City.

Several organizations have established municipal partnership models to collect textile waste from residents and businesses. Two organizations active in the Chicago area include Simple Recycling, which offers curbside collection; and, Chicago Textile Recycling, which offers drop off bins.

The pickup model deployed by Simple Recycling uses uniquely colored and labeled bags which are requested by residents. Simple Recycling trucks follow the City's existing trash or recycling collection schedule, meaning no extra collection day for residents. Additionally, the company handles all aspects of the program launch, education, collection, processing, and management. All materials are graded and sorted locally and/or regionally based on quality and condition. The top-quality materials will be resold to local thrift outlets, mid-grade is exported to international markets, and "unusable" items are processed for raw materials.

All Simple Recycling programs are offered free of cost to cities, residents, and participants. Additionally, the partner municipality is compensated per-pound basis for the material collected by Simple Recycling. For example, in East Lansing, Michigan, the City receives $0.01 for each pound of material collected by Simple Recycling. The average collection volume is 4,000 to 5,000 pounds per month, bringing in $40 to $50 per month to the City to be used for recycling education materials.[107] The city of Elgin, Illinois diverted more than 500,000 pounds of material with Simply Recycling between 2017 and 2020.[108] As such, Chicago's current textile waste generation scale provides an opportunity to generate significant revenue to reinvest in materials management programs.

Organizations like Chicago Textile Recycling (CTR) also offer revenue sharing opportunities for municipalities for textile drop-off bins, as opposed to curbside collection. CTR creates custom City-branded bins for textile drop off and manages all bin placement, regular collection, and reporting. Depending on market fluctuations, CTR provides approximately $0.06 per pound for all goods collected with the potential for increased revenue sharing (up to $0.45 per pound) for high-value items like shoes.[109] The Solid Waste Agency of Lake County, Illinois (SWALCO) has partnered with CTR, resulting in over $45,000 of additional revenue as of 2020.[110]

Practical: Identify partnership opportunities to divert frequent and problematic bulk items

Bulk items left in Chicago alleys cause issues for DSS during collection. Large items like mattresses, tires, and furniture are picked up during garbage collection to keep alleyways clear, which contributes to disproportionate landfill tonnage. Additionally, some items may prematurely fill a garbage truck, resulting in additional trips and potential delays. Residents can submit a 311 request for on-demand bulk pick up but providing information to residents on other available services may reduce strain on DSS pickups and increase material diversion and recovery.

Mattresses are particularly good candidates for recycling, and companies like A Bedder World[111] currently provide pickups in the Chicago area for a fee.

California, Connecticut, and Rhode Island have all passed statewide mattress recycling requirements. In those states, the Mattress Recycling Council offers no-cost mattress collection for recycling. Since 2015, the programs have recycled more than six million mattresses, resulting in 214 million pounds of material diverted and 7.4 million cubic yards of landfill space saved.

Source: Mattress Recycling Council

Practical: Increase public education about proper recycling or disposal of flexible plastic film

In 2017, Chicago's $0.07 plastic bag tax (replacing an initial plastic bag ban) went into effect. In 2018, the City of Chicago commissioned an impact assessment study which found that the plastic bag tax resulted in a 42 percent reduction in the number of disposable bags used per grocery trip. Additionally, the proportion of customers using reusable bags jumped from 12 percent to 33 percent after the tax was implemented.

Source: University of Chicago Energy & Environment Lab, New York University, Ideas42

The Recycling Partnership estimates 75 pounds of plastic film and flexible packaging are generated annually per household across the country.[112] Though low-density polyethylene (LDPE) can be recovered and remanufactured into composite lumber and other durable plastic items,[113] it should not be commingled with other recyclables and is not acceptable in current curbside recycling programs in Chicago. Several grocery stores and businesses in Chicago host drop-off sites for plastic film, but Closed Loop estimates that only four percent of residential plastic film generation is recycled through these sites. The rest are either landfilled or incorrectly recycled (and eventually landfilled).[114]

As some major online retailers shift to lightweight plastic packaging and shipping material, additional public education and engagement will be critical to prevent contamination and increase diversion.

CONSTRUCTION & DEMOLITION DEBRIS

Construction and demolition (C&D) debris refers to materials generated from construction, renovation, demolition, or deconstruction projects including lumber, bricks, concrete, drywall, and other building materials. C&D debris comprises a significant portion of Chicago's waste stream, particularly when generation estimates include material generated from road construction and repair projects.

RE-USE Consulting in Washington has calculated that the waste material generated in a single residential demolition (based on average square footage and material weights) equals the average MSW generation for a single person over a 75-year lifetime (based on EPA per capita generation rates).[115] This data highlights the scale of the diversion opportunities for C&D debris. The University of Illinois at Chicago (UIC) estimates over one million tons of C&D debris was generated from Chicago buildings in 2020, not including materials from roadway construction.[116]

C&D Debris Diversion

Practical: Assess C&D Recycling Ordinance compliance and identify opportunities for increased contractor education.

Chicago's Construction and Demolition Site Waste Recycling Ordinance, which has been in effect since 2007, requires contractors to track C&D debris generation at construction and demolition sites and recycle at least 50 percent of the recyclable material. After completion of a construction or demolition project, the contractor must submit a Recycling Compliance form along with a waste hauler or recycler affidavit to the Chicago Department of Public Health (CDPH).[117]

The most recent publicly available data from CDPH reports 258,208 tons of recyclable C&D material generated, 236,907 tons of which were recycled, reaching nearly a 90 percent diversion rate.[118] UIC's Waste Generation and Characterization Update calculations estimate over 1.3 million total tons of C&D debris generation from buildings (not including any roadway construction waste) in 2013.[119] While some of this waste is likely from structures not covered by the ordinance or includes non-recyclable material, there were potentially over one million tons of unreported C&D material generated in 2013.

Assessing C&D debris generation, recycling, and ordinance compliance can highlight gaps and opportunities to improve contractor and homeowner education and diversion and capture of C&D materials.

The Sustainable Building Group convened by the Minnesota Pollution Control Agency (MPCA) has proposed an ordinance framework for municipalities that include requirements to recycle 80 percent of all concrete and asphalt and divert 85 percent of remaining materials, including 10 percent reclaimed for reuse.

Source: MPCA Sustainable Building Group

Optimal: Adjust the C&D Recycling Ordinance to specify targeted material types and include parameters for reuse.

Through the evaluation of the existing C&D recycling ordinance, the City can identify opportunities and capacity required to include parameters for reuse. Under an

ordinance that requires a percentage of recycling by weight, contractors may meet requirements by recycling exclusively very heavy materials like concrete and steel. Identifying a portion of overall tonnage required for reuse may provide growth in C&D recycling markets outside of recycled concrete aggregates and metals. Additionally, specifying an end use that qualifies for diversion requires more definition. For example, the use of demolished drywall as alternative daily cover for landfill qualifies as diversion, though it may be put to better use as a recycled gypsum product. As data becomes more available, more granular tracking and identification of opportunities for improvement can lead to better use cases for certain materials.

Developing Opportunities for Building Material Reuse

Deconstruction, an alternative to demolition, is the process of dismantling structures in a way that enables building materials to be salvaged. Deconstruction, in addition to other salvage and preservation efforts, can create conditions for an increased supply of high-value reclaimed materials for reuse. While not all buildings currently demolished are good candidates for deconstruction, there is a significant opportunity in Chicago to divert valuable lumber, bricks, and other materials currently ending up in landfills.

Practical: Host one or multiple deconstruction trainings for Chicago contractors

There are currently a few active deconstruction contractors in the Chicago area, including the Evanston Rebuilding Warehouse[120] and Blue Earth Deconstruction,[121] but there is significant room for growth in the industry. Reducing the volume of C&D debris from buildings sent to landfills requires a local workforce capable of deconstructing appropriate structures.

Build Reuse (formerly BMRA) is a national nonprofit organization encouraging the recovery, reuse, and recycling of building materials. Build Reuse is currently developing deconstruction training curricula and accreditation standards.

Source: Build Reuse

In 2013, the Cook County Sheriff's Office launched the Restoring Neighborhoods Workforce (RENEW) program, which provides training for Cook County inmates in deconstruction practices and provides OSHA certification for participants. The program works in neighborhoods experiencing issues of vacancy and blight to safely remove the blighted properties and provide valuable training to participants to prepare for similar work once they return to their communities. Since 2013, the program has resulted in the deconstruction of over 300 structures in 22 south suburbs in the Chicagoland region.

Source: Chicago Tribune Daily Southtown, Ted Slowik

Deconstruction is increasingly seen as an opportunity for "triple-bottom line positive impact,"[122] where the economic and environmental benefits are paired with social benefits, such as workforce development.

Deconstruction programs can provide a valuable opportunity for job training and skill development for existing contractors as well as individuals with barriers to employment. Additionally, deconstruction training can often be paired with other training and certification, such as OSHA safety training, which can help participants gain access to a variety of jobs in the

construction industry. Additional training could include use of reclaimed materials in new construction and renovation projects to strengthen demand for building materials once salvaged through deconstruction.[123]

Optimal: Explore the potential for deconstruction policy initiatives in Chicago

In the past two decades, municipalities and counties have passed several ordinances to increase C&D debris recycling and building material reuse requirements. Based on existing housing stock and market conditions, some municipalities are also finding success with legislation based on requiring some level of deconstruction in structure removal. Ordinance mechanisms vary, and each policy type has strengths and challenges. The City of Chicago should carefully consider if, and which type, of legislation is most appropriate for the City. The first recommended step to developing a deconstruction-based ordinance is to convene a local advisory committee to consider factors including feasibility, possible incentives, enforcement, available and desired materials, typical structure age and historic significance, among others. Based on the findings of this committee, Chicago's City Council can consider proposing deconstruction guidance or requirements for the city.

The Deconstruction Policy in Portland, Oregon requires that select residential structures be removed through deconstruction instead of demolished. The first iteration of the ordinance, enacted in 2016, covered houses and duplexes constructed in 1916 or earlier and designated historic structures of any age. Due to the success of the program, the coverage was expanded to include houses and duplexes constructed in 1940 or earlier.

From 2016 to 2019, the deconstruction ordinance resulted in more than two million pounds of building materials diverted from landfills for reuse.

Source: Portland Bureau of Planning and Sustainability

Pilot Opportunity: Establish a deconstruction grant program for homeowners.

Deconstruction requires more time and labor than demolition and is often a more costly option for homeowners and contractors. Although material sales or tax benefits of donating materials can help to offset additional costs, providing grants for residential deconstruction can help to increase awareness and build the demand for deconstruction services in Chicago.

Hennepin County, Minnesota has established a small grant program for residential structure removal and renovation projects that incorporate deconstruction techniques and material salvage. Grants are available at $2 per square foot, up to $5,000 and must meet criteria for material reuse and disposal.[124] The grant program in Hennepin County launched as a pilot in 2020, awarding 17 projects and making funds available for the program again in 2021.[125]

$$$ HIGH END | MID RANGE

Pilot Opportunity: Launch a deconstruction pilot program for publicly owned structures.

The Chicago Department of Public Health (CDPH) requires a Demolition Notice of Intent (NOI) form submitted before any non-emergency demolition within the city.[126] Since 2010, nearly 6,000 NOIs have been filed for buildings recorded as owned by the City of Chicago or a City department or agency.[127] While some buildings slated for demolition are not appropriate for deconstruction (e.g., structurally unsafe, fire or water damage, low-quality building materials), there may be potential for incorporating deconstruction in these publicly owned structures slated for demolition.

Identifying structures for a deconstruction pilot should include consideration of the structure safety and condition, as well as the year constructed. Commercial and residential buildings built prior to 1950 typically contain higher quality lumber and may include more unique and distinctive elements for architectural salvage.[128]

Refab, a nonprofit deconstruction and building material salvage organization in St. Louis, MO, was funded by the St. Louis Development Corporation to deconstruct a vacant brick warehouse built in 1884. The project increased public awareness for planned deconstruction initiatives and salvaged an estimated $250,000 worth of building materials from landfills.

Source: St. Louis Public Radio, Eli Chen

Developing a deconstruction pilot program can help generate public awareness and support for a larger program and test the availability and scale of physical and labor infrastructure in Chicago (e.g., deconstruction contractors, building material reuse facilities).

Practical: Support existing historic preservation efforts to increase awareness and education around building material waste prevention

Historical preservation groups can be a powerful partner in improving sustainable materials management. Restoration and repurposing is the ideal treatment of vacant historic buildings. However, in many cases this may be not possible or practical. Costs of renovation may exceed the cost of new construction, structures may not be compatible with the local community's needs, or the building could be in such a deteriorated state that it is no longer structurally sound. Cities like Chicago have faced these challenging decisions when dealing with the renovation or demolition of historic and cherished structures. When restoration is not desired or feasible, deconstruction and building material reuse can preserve built history while managing blight and responding to development needs.

Partnering with the City's Historical Preservation Division, as well as organizations like Preservation Chicago,[129] Logan Square Preservation,[130] Chicago Bungalow Association,[131] and others can help to prioritize architecturally and historically significant materials and features to recover from structure removals.

Built in 1896, the Madison/Wabash Chicago Transit Authority (CTA) station was the last remaining original CTA "L" train station in Chicago. The station was historically and architecturally significant, but in need of modernization to bring it up to par with the other stations in the Loop. In 2015, demolition of the station began, which included a partial deconstruction. The station façade was kept by Preservation Chicago for display to the public and an auction was held at the Rebuilding Exchange, where customers could bid on reclaimed items like station decking, signage, decorative tin ceiling tiles, and other historic features.

Source: Preservation Chicago, Rebuilding Exchange

Optimal: Establish a City-Managed Reuse Warehouse

Creating and funding a City-managed material reuse warehouse to add to and partner with the existing nonprofit and commercial reuse and salvage establishments could have a significant impact on diversion and grow the reuse community in Chicago.

The City of Houston has established a building material reuse warehouse in 2009, supported by the City's general fund, which accepts materials from residents, businesses, and other organizations free of charge. All materials collected at the warehouse are available to public organizations including nonprofits, schools and universities, and government entities. Materials move in and out of the warehouse very quickly (sometimes in a single day) and the facility can divert 500 to 600 tons of materials from landfills per year.[132]

The Houston warehouse has a beneficial relationship with surrounding building material reuse organizations like Habitat for Humanity ReStore, which is one of the largest material donors. The warehouse can act as a "catchall" for materials to provide an additional opportunity for diversion.[133]

Materials for the Arts in New York City is another example of a municipally supported reuse center that focuses on creative and arts items including musical instruments, audio/visual equipment, theater equipment, arts and crafts supplies, fabric, and more. Donated materials are available free of charge for New York organizations including nonprofits, public schools, and government agencies. Materials for the Arts collected 1.7 million pounds of reusable materials in 2018.[134]

IMPLEMENTATION NEXT STEPS

There are several activities that the City of Chicago can implement immediately to build momentum and begin processes as it launches longer-term planning, partnership development, and capacity building for major initiatives. The City is already working to reduce waste and improve recycling through initiatives including participating in the NRDC Food Matters Great Lakes cohort to reduce wasted food and implementing a new contract for the Blue Cart recycling program to improve low density residential recycling services and reporting requirements.

SHORT-TERM PRIORITIES FOR 2021 AND 2022

Policy Review and Exploration

The City of Chicago seeks to review existing materials management ordinances to identify opportunities to increase impact and conduct initial research for new potential legislation.

- Researching potential for implementing waste hauling zones for commercial waste
- Supporting ambitious statewide extended producer responsibility (EPR) legislation
- Assessing Construction & Demolition Debris (C&D) Recycling Ordinance compliance and identifying opportunities for increased contractor education
- Adjusting the C&D Recycling Ordinance to specify targeted material types and parameters for reuse

Increasing Opportunities for Community Interventions

The City of Chicago seeks to provide new programs and educational opportunities for Chicago's residents to engage with the materials management system and improve residential diversion.

- Leveraging the National Resources Defense Council (NRDC) Food Matters Great Lakes Regional Cohort participation to pilot food waste prevention and composting programs
- Maintaining clear and consistent messaging around recycling contamination
- Introducing organics drop off locations through seasonal "pumpkin smash" events
- Developing a directory of participating retail take-back options for e-waste and HHW in Chicago
- Establishing a revenue-sharing partnership with a textile recycling company for collection of clothes, shoes, and other textiles otherwise ending up in landfills

Strengthening Internal Operations

The City of Chicago seeks to improve internal operations related to materials management to increase efficiency across departments and improve waste diversion in the City.

- Identifying appropriate Blue Cart to black cart distribution and bin size options
- Improving high density residential recycling ordinance compliance based on 2020 Chicago Office of the Inspector General report findings
- Improving Chicago's existing yard waste collection program and incorporating potential food scrap "ride along" options

REFERENCES

[1] City of Chicago. Human Resources. https://www.chicago.gov/city/en/depts/dhr/dataset/current_employeenamessalariesandpositiontitles.html
[2] Chicago Department of Aviation. Sustainable Airport Manual. https://www.flychicago.com/SiteCollectionDocuments/Community/Environment/SAM/Full_SAM_v4.0.pdf
[3] The Recycling Partnership. Start at the cart. 2018. https://recyclingpartnership.org/start-at-the-cart-2/
[4] City of Chicago Office of the Inspector General. Department of Streets and Sanitation commercial and high-density residential recycling enforcement audit. 2020. https://igchicago.org/wp-content/uploads/2020/12/DSS-Commercial-and-High-Density-Recycling-Audit.pdf
[5] Delta Institute interview with CDPH, August 2020
[6] Delta Institute interview with CDOT, September 2020
[7] City of Chicago Recycling Collection Service Work Service Solicitation, 2020-2021
[8] St. John, Jeff. Green Tech Media. Breaking down Illinois' NextGrid Roadmap to a grid edge future. 2019. https://www.greentechmedia.com/squared/dispatches-from-the-grid-edge/breaking-down-illinios-nextgrid-the-states-roadmap-to-a-grid-edge-future
[9] Briscoe, Tony. Chicago Tribune. 22 million pounds of plastics enter the Great Lakes each year. Most of the pollution pours into Lake Michigan. 2019. https://www.chicagotribune.com/news/environment/ct-met-lake-michigan-plastic-pollution-20190904-2xf3qogqv5bpfco2plndapak2q-story.html
[10] City of Chicago Office of the City Clerk. https://chicago.legistar.com/LegislationDetail.aspx?ID=4305284&GUID=3845EA0D-B7DB-4575-BE69-9F475FF46D24&Options=Advanced&Search=&FullText=1
[11] Zimmermann, Stephanie. Chicago Sun-Times. Plastic waste problem 'amplified' by the pandemic. 2020. https://chicago.suntimes.com/2020/11/11/21558733/styrofoam-plastic-waste-takeout-delivery-restaurants-coronavirus-pandemic-covid-chicago-recycling
[12] United States Postal Service. Postal Facts. https://facts.usps.com/table-facts/
[13] PaperKarma. https://www.paperkarma.com/
[14] CatalogChoice. https://www.catalogchoice.org/
[15] Data & Marketing Association. https://thedma.org/accountability/dma-choice/
[16] Repair Café. https://www.repaircafe.org/en/about/
[17] Community Glue Workshop. https://communityglueworkshop.wordpress.com/about/
[18] Repair Café. Start your own. https://www.repaircafe.org/en/start/
[19] Fix-It Clinic. https://fixitclinic.blogspot.com/p/start-one_13.html
[20] Illinois Right to Repair. https://states.repair.org/states/illinois/
[21] Chicago Public Library. Repair Café. https://chipublib.bibliocommons.com/events/5cc71010f711882e00c238e8
[22] Chicago Public Library. Repair Café. https://chipublib.bibliocommons.com/events/5a5e81c979ffd52700d01fd3
[23] Chicago Tool Library. https://www.chicagotoollibrary.org/
[24] Minneapolis Toy Library. https://mplstoylibrary.org/
[25] UIC Waste Generation and Characterization Update, 2021
[26] Staley, Bryan. Waste 360. 2014. https://www.waste360.com/blog/recycling-s-challenge-plastic-bags
[27] The Recycling Partnership, "It's All You, Chicago" report, 2018.
[28] The Recycling Partnership, "It's All You, Chicago" report, 2018.
[29] Koerth, Maggie. FiveThirtyEight. The era of easy recycling may be coming to an end. 2019. https://fivethirtyeight.com/features/the-era-of-easy-recycling-may-be-coming-to-an-end/
[30] Recycle by City. Flagstaff. https://www.recyclebycity.com/flagstaff/guide
[31] Emmet County Recycling. Curbside recycling service. https://www.emmetrecycling.org/services-facilities/curbside-recycling-service/
[32] EPA. Volume-to-waste conversion factors. 2016. https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf
[33] City of Chicago. Grid garbage collection. https://www.chicago.gov/city/en/depts/streets/provdrs/streets_san/svcs/grid-garbage-collection.html
[34] City of Chicago Office of the Inspector General. Department of Streets and Sanitation commercial and high-density residential recycling enforcement audit. 2020. https://igchicago.org/wp-content/uploads/2020/12/DSS-Commercial-and-High-Density-Recycling-Audit.pdf

[35] City of Chicago Office of the City Clerk. Chicago Recycling Ordinance. 2016. https://www.recyclebycity.com/downloads/2016_RecyclingOrdinance.pdf
[36] City of Chicago Office of the Inspector General. Department of Streets and Sanitation commercial and high-density residential recycling enforcement audit. 2020. https://igchicago.org/wp-content/uploads/2020/12/DSS-Commercial-and-High-Density-Recycling-Audit.pdf
[37] Chicago Department of Streets in Sanitation
[38] Recycle by City Chicago. https://www.recyclebycity.com/chicago
[39] City of Chicago. Sustain Chicago. https://sustainchicago.cityofchicago.org/
[40] Delta Institute interview with Edgewater Environmental Council, October 2020.
[41] Chicago Conservation Corps. https://chicagoconservationcorps.org/
[42] Metropolitan Mayors Caucus. Greenest Region Corps. https://mayorscaucus.org/greenest-region-corps/
[43] City of Chicago. Illegal ('fly') dumping. https://www.chicago.gov/city/en/depts/streets/provdrs/street/svcs/illegal_fly_dumping.html
[44] CHI311. https://311.chicago.gov/s/?language=en_US
[45] City of Chicago. Grid garbage collection. https://www.chicago.gov/city/en/depts/streets/provdrs/streets_san/svcs/grid-garbage-collection.html
[46] City of Chicago. Blue Cart schedule and maps. https://www.chicago.gov/city/en/depts/streets/supp_info/recycling1/blue_cart_schedulesandmaps.html
[47] Chicago Department of Environment Presentation, "Waste & Recycling in Chicago," 2008.
[48] Delta Institute interview with NY Dept of Sanitation, November 2020
[49] City of Chicago. Chicago Energy Benchmarking Homepage. http://chicago.gov/city/en/progs/env/building-energy-benchmarking---transparency.html
[50] Energy Star Portfolio Manager. https://portfoliomanager.energystar.gov/pm/login.html
[51] Energy Star. DataTrends: Benchmarking and energy savings. 2016. https://www.energystar.gov/buildings/tools-and-resources/datatrends-benchmarking-and-energy-savings
[52] University of Illinois Chicago. Technical education and analysis for community hauling and anaerobic digesters (TEACH AD). https://erc.uic.edu/bioenergy/teachad/
[53] Illinois Sustainable Technology Center. Waste utilization. https://www.istc.illinois.edu/research/waste_utilization
[54] Loyola School of Environmental Sustainability. Zero waste process. https://www.luc.edu/sustainability/initiatives/biodiesel/biodieselproduction/zerowasteprocess/
[55] University of Chicago. Mansueto Institute for Urban Innovation. Environmental Frontiers. https://miurban.uchicago.edu/basic-page/environmental-frontiers/
[56] ILPSC. Legislation in Illinois. https://illinoispsc.org/solutions/product-stewardship/legislation
[57] National Caucus of Environmental Legislators. Extended producer responsibility (EPR) for packaging legislation and sponsors. https://www.ncel.net/wp-content/uploads/2021/02/Extended-Producer-Responsibility-EPR-For-Packaging-Legislation-and-Sponsors.pdf
[58] Quinn, Megan. Waste Dive. 2021 could be year for packaging EPR, nearly a dozen state bills in play. 2021. https://www.wastedive.com/news/2021-state-extended-producer-responsibility-recycling/594873/
[59] Illinois Environmental Council. 2021 IEC Policy Platform. 2021. https://ilenviro.org/2021-policy-platform/
[60] City of Chicago. Industrial corridor modernization initiative. https://www.chicago.gov/city/en/depts/dcd/supp_info/repositioning-chicago-s-industrial-corridors-for-today-s-economy.html
[61] Indiana Department of Natural Resources, Indiana Lake Michigan Coastal Program. Restoration on Trail Creek at Karwick Nature Park. https://www.in.gov/dnr/lakemich/files/LMPC-sheets/City-of-Michigan-City-Restoration-on-Trail-Creek.pdf
[62] EPA. Brick Township goes solar: Redevelopment of a Superfund site. https://semspub.epa.gov/work/02/372924.pdf
[63] Glanton, Dahleen. Chicago Tribune. Changing course of landfills. https://www.chicagotribune.com/news/ct-xpm-2003-07-06-0307060360-story.html
[64] Delta Institute interview with SETF, November 2020.
[65] Feeding America. Food insecurity in Cook County. https://map.feedingamerica.org/county/2018/overall/illinois/county/cook
[66] Northwestern University Institute for Policy Research. Food insecurity and food pantry interactions. 2020. https://www.ipr.northwestern.edu/news/2020/food-insecurity-and-food-pantry-interactions-state-and-metropolitan-area.html

[67] NRDC Food Matters, Great Lakes Regional Cohort Strategies
[68] 412 Food Rescue. Impact report: Innovation to impact. 2018. https://412foodrescue.org/wp-content/uploads/2019/06/412-Impact-Report-2019-Digital-Web-Quality-V3.pdf
[69] Food Rescue Hero. https://broccoli-tarpon-xbbe.squarespace.com/
[70] Delta Institute conversation with IEPA, October 2020
[71] Rumore, Kori. Chicago Tribune. Where and how to recycle your Christmas tree in Chicago and the suburbs. 2020. https://www.chicagotribune.com/data/ct-christmas-tree-lights-recycling-collection-chicago-suburbs-htmlstory.html
[72] Illinois EPA. One-day collection events. https://www2.illinois.gov/epa/topics/waste-management/waste-disposal/compostable-waste-collections/Pages/one-day-collection-events.aspx
[73] SCARCE. Pumpkin smash. https://www.scarce.org/pumpkins/
[74] City of Chicago Department of Streets and Sanitation
[75] Illinois Food Scrap Coalition. We Compost recognition program. http://illinoiscomposts.org/we-compost/
[76] Kroger Zero Hunger Zero Waste. A sustainable future. 2019. http://sustainability.kroger.com/Kroger-2019-ESG-Report.pdf
[77] Trader Joe's. 2019 sustainability progress. https://www.traderjoes.com/announcement/2019-sustainability-progress#:~:text=2019%20Sustainability%20Progress&text=We%20donated%20nearly%20%24384%20million,but%20are%20safe%20for%20consumption
[78] Whole Foods Market. Environmental stewardship: Our green mission. https://www.wholefoodsmarket.com/mission-values/environmental-stewardship
[79] City of Chicago Cultural Affairs and Special Events. Chicago festivals. https://www.chicago.gov/city/en/depts/dca/provdrs/chicago_festivals.html
[80] U.S. EPA. "Reducing the Impact of Wasted Food by Feeding the Soil and Composting." 2017. https://www.epa.gov/sustainable-management-food/reducing-impact-wasted-food-feeding-soil-andcomposting#benefits
[81] City of Chicago. Tree planting. https://www.chicago.gov/city/en/depts/streets/provdrs/forestry/svcs/tree_planting.html
[82] City of Chicago. Streetscapes and sustainable design. https://www.chicago.gov/city/en/depts/cdot/supp_info/streetscapes_andsustainabledesign.html
[83] Chicago Park District. https://www.chicagoparkdistrict.com/
[84] ReFED. Community composting. https://insights-engine.refed.com/solution-database/community-composting
[85] City of Chicago Office of the City Clerk. https://chicago.legistar.com/LegislationDetail.aspx?ID=2320948&GUID=994EF1DA-3981-4D77-882E-63E168C901DA&Options=Advanced&Search=
[86] Advocates for Urban Agriculture. Urban farm & community garden composters. https://auachicago.org/2018/06/08/urban-farm-community-garden-composters-register-today-to-keep-your-site-in-compliance/
[87] Chicago Urban Agriculture Mapping Project. https://cuamp.org/
[88] United States Environmental Protection Agency, Household Hazardous Waste, 2014, http://www.epa.gov/region9/waste/solid/house.html.
[89] U.S EPA, "Household Hazardous Waste (HHW)", 2017, https://www.epa.gov/hw/householdhazardous-waste-hhw
[90] American Association of Poison Control Centers, National Poison Data System. https://aapcc.org/national-poison-data-system.
[91] Data from Chicago Department of Public Health
[92] Survey Conducted by Delta Institute on Behalf of Cook County in 2015
[93] City of Chicago. About the Household Chemicals & Computer Recycling Facility. https://www.chicago.gov/city/en/depts/cdph/supp_info/inspections---permitting/about_the_householdchemicalscomputerrecyclingfacility.html
[94] Lakeshore Recycling Systems. Household hazardous waste. https://www.lrsrecycles.com/household-hazardous-waste/
[95] Waste Management. At your door special collection. https://wmatyourdoor.com/
[96] Recycle by City Chicago. Household chemicals & computer recycling. https://www.recyclebycity.com/chicago/brief/household-chemicals-computer-recycling-facility
[97] Best Buy. Electronics, appliances, and fitness equipment recycling at Best Buy. https://www.bestbuy.com/site/services/recycling/pcmcat149900050025.c?id=pcmcat149900050025

[98] The Home Depot. LED vs. Flourescent. https://www.homedepot.com/c/ab/led-vs-fluorescent/9ba683603be9fa5395fab907883f8f3
[99] Jiffy Lube. A second life for used motor oil. https://www.jiffylube.com/resource-center/a-second-life-for-your-used-motor-oil
[100] Department of Energy. History of air conditioning. 2015. https://www.energy.gov/articles/history-air-conditioning
[101] Rocky Mountain Institute. Solving the global cooling challenge. 2018. https://rmi.org/wp-content/uploads/2018/11/Global_Cooling_Challenge_Report_2018.pdf
[102] MWRD. Unwanted medicine. https://mwrd.org/medication-disposal
[103] City of Chicago. Pharmaceuticals drop-off locations. https://www.chicago.gov/city/en/depts/cdph/supp_info/healthy-communities/pharmaceuticals_dropofflocations.html
[104] EPA. Final rule: Management standards for hazardous waste pharmaceuticals. https://www.epa.gov/hwgenerators/final-rule-management-standards-hazardous-waste-pharmaceuticals-and-amendment-p075
[105] Resource Recycling Systems. Textile recovery in the U.S. 2020. https://recycle.com/white-paper-textile-recovery-in-the-us/
[106] UIC Waste Generation & Characterization Update, 2021
[107] Hall, Kalea. Capital News Service. Most clothes end up in the trash. This company wants to change that. 2019. https://simplerecycling.com/most-clothes-end-up-in-the-trash-this-company-wants-to-change-that/
[108] Casas, Gloria. Elgin Courier-News. After residents give it good reviews, Elgin decides to renew contract for curbside textile recycling. 2020. https://www.chicagotribune.com/suburbs/elgin-courier-news/ct-ecn-elgin-free-textile-recycling-st-0228-20200227-hqvuazryzbfutfgz3aexwfsc7e-story.html
[109] Delta Institute interview with Chicago Textile Recycling, November 2020
[110] Delta Institute interview with SWALCO, November 2020
[111] Bed'r World. Chicago mattress disposal. https://www.abedderworld.com/mattress-disposal-chicago/
[112] The Recycling Partnership. State of Curbside Recycling Report. 2020. https://recyclingpartnership.org/wp-content/uploads/dlm_uploads/2020/02/2020-State-of-Curbside-Recycling.pdf
[113] More Recycling. 2017 national post-consumer plastic bag and film recycling report. 2019. https://plastics.americanchemistry.com/2017-National-Post-Consumer-Plastic-Bag-and-Film-Recycling-Report.pdf
[114] Millares Young, Kristen. Washington Post. Amazon's plastic mailers are gumming up recycling operations. 2019. https://www.chicagotribune.com/business/ct-biz-amazon-recycling-packaging-20190211-story.html
[115] RE-USE Consulting. http://www.reuseconsulting.com/Home_Page.php
[116] UIC Waste Generation and Characterization Update, 2021
[117] Chicago Municipal Code. Construction or demolition site waste recycling. https://codelibrary.amlegal.com/codes/chicago/latest/chicago_il/0-0-0-2496766#JD_11-4-1905
[118] City of Chicago. 2013 C&D recycling program compliance history. https://www.chicago.gov/content/dam/city/depts/cdph/food_env/2013C&DRecyclingComplianceHistory.pdf
[119] UIC Waste Generation and Characterization Update, 2021
[120] Evanston Rebuilding Warehouse. Deconstruction. https://www.evanstonrebuildingwarehouse.org/deconstruction
[121] Blue Earth Deconstruction. https://blueearthdeconstruction.com/
[122] Luke Telander. Center for Community Progress. Breaking down deconstruction: what Detroit gained from dismantling instead of destroying. 2014.
[123] Delta Institute interview with Rebuilding Exchange, November 2020
[124] Hennepin County, Minnesota. Deconstruction grants. https://www.hennepin.us/deconstruction#:~:text=Homeowners%20and%20developers%20can%20receive,projects%20that%20use%20deconstruction%20techniques.
[125] Hennepin County, Minnesota. Hennepin County deconstruction grant funds available for 2021. https://content.govdelivery.com/accounts/MNHENNE/bulletins/2bde590
[126] City of Chicago. Asbestos and lead hazards in demolition and renovation projects. https://www.chicago.gov/city/en/depts/cdph/supp_info/healthy-communities/asbestos_demolitionorrenovationsandblastinggrindingandchemicalw.html
[127] Chicago Data Portal. CDPH asbestos and demolition notification. Updated 2021. https://data.cityofchicago.org/Environment-Sustainable-Development/CDPH-Asbestos-and-Demolition-Notification/qhb4-qx8k

[128] Delta Institute. Deconstruction and building materials reuse: A tool for local governments & economic development practitioners. 2018. https://delta-institute.org/wp-content/uploads/2018/05/Deconstruction-Go-Guide-6-13-18-.pdf
[129] Preservation Chicago. https://preservationchicago.org/
[130] Logan Square Preservation. http://www.logansquarepreservation.org/
[131] Chicago Bungalow Association. https://www.chicagobungalow.org/
[132] Delta Institute interview with Houston Building Materials Reuse Warehouse staff, November 2020
[133] Delta Institute interview with Houston Building Materials Reuse Warehouse staff, November 2020
[134] NYC.gov. Materials for the Arts. https://www1.nyc.gov/content/mfta/pages/about-our-mission