Nantucket Building Material Salvage Study

Phase 2 Report

Nantucket Preservation Trust

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EBP

Contents

Executive Summary

The Island of Nantucket has a long and proud history of repurposing buildings and building components, dating back to the 17th and 18th century, when reuse was common and disposing of building materials as 'waste' was unthinkable. Only in the 20th century did construction waste disposal become an 'economic' option. Now, every year on Nantucket more than 17,000 tons of construction and demolition (C&D) waste is transported off-Island, much of which is eventually disposed of in landfills in Ohio and Maine. Much of this 'waste' is a result of the demolition of houses on Nantucket, and a significant portion of these discarded materials has the potential to be salvaged and reused through deconstruction. As we face a changing climate and increasing pressure on finite natural resources, it is more important than ever that we use our existing resources thoughtfully and sustainably, and that we have policies in place to support this.

Nantucket Preservation Trust is leading Phase 2 of the Nantucket Building Material Salvage study to address this important challenge. This Existing Ordinance Research and New Ordinance Development phase of the study is intended to explore and report on the various issues and considerations surrounding potential building deconstruction and building material reuse policy on Nantucket.

The study is composed of eight (8) discrete explorations, including:

1. Research ordinances/regulations around the U.S. related to deconstruction, demolition, and C&D waste disposal.
2. Categorize the different models for salvaged materials collection and sale/distribution (e.g., non-profit, for-profit, municipal) and lessons learned.
3. Research ordinances/regulations around the U.S. related to affordable housing and identify ways to integrate deconstruction to support affordable housing.
4. Research and interview organizations in other communities that have building materials salvage and reuse programs and facilities.
5. Map existing properties and their age to determine how many properties could be impacted.
Speak with Nantucket residents about a possible ordinance.
6. Speak with Nantucket residents about a possible ordinance.
7. Build strategic partnerships with key Nantucket organizations to support a possible ordinance.
8. Recommend ordinance language, incentives, grant programs, and other support mechanisms, identifying partners, options for implementation, and next steps.

Goal and Recommendations

The goal of this study is to provide actionable insights into how to encourage better use of Nantucket's building and construction resources through a comprehensive deconstruction policy, while having a positive impact on the Island's long-term sustainability.

The study results indicate that there are multiple policy approaches to encourage or require deconstruction and building material reuse that have been employed by communities around the U.S. to support sustainability objectives. Beyond the clear environmental benefits, the other drivers to implementing deconstruction and reuse policy measures include: historic preservation, depletion of natural resources, declining landfill capacity, cost savings, and the affordable housing crisis.

The primary recommendations of the study include:

- Organize a meeting of Nantucket stakeholders, including key Town officials, to further build strategic support and to assist in building deconstruction and reuse ordinance design and implementation strategy.
- Propose a comprehensive deconstruction ordinance, for approval at Town Meeting, that combines waste diversion and recycling requirements, a demolition fee or refundable deposits, and restrictions related to banned materials, heavy machinery, and certified deconstruction and sustainable building practices.
- Consider baseline deconstruction or recycling minimums that apply to a broad category of structures, such as all residential buildings or all single-family residential buildings, with higher thresholds and/or additional requirements for historic structures (e.g., higher recycling minimum, requirement to salvage all wood for reuse, prohibition on machine demolition).
- Since Nantucket is only one of two towns in the Commonwealth to have a demolition delay period of less than three months, extend the delay period to at least six months, and preferably 12+ months to allow sufficient time to coordinate building reuse.
- Revise the demolition delay process so that it starts with seeking Historic District Commission approval and then proceeds to public notification (posting an ad). Ensure that the demo delay process and timeline are fixed and consistent for everyone so there will be no financial incentive to try and speed up the process.
- In addition to Massachusetts Historic Preservation Tax Credits, explore additional incentives for citizens who demonstrate a commitment to building deconstruction and material reuse, such as local tax credits or jumping to the front of the building permit, Historic District Commission, and/or Zoning board queue.
- Devote resources to training motivated tradespeople who want to make a business of building deconstruction.

- Establish an on-island salvaged materials facility where materials can be stored for sale and distribution. Explore the feasibility of expanding the 'Take It or Leave It' operation at the DPW to handle salvaged building materials, as well as the potential for a public-private partnership model to create and operate the facility. Also, put forward a proposal for a small public-facing space in the downtown area, showcasing high-end salvaged materials, including an online inventory of the materials available at the main facility. Develop a viable on-island distribution network of used building materials and offer deep discounts or free materials to affordable housing groups.
- As an interim approach until the ordinance and/or on-island salvaged materials facility can be established, partner with an existing building materials reuse operation off-island (e.g., EcoBuilding Bargains, Boston Building Resources) to store salvaged materials in transportation containers on island and have them periodically transported to the mainland for resale.
- Employ pilot concepts such as the Habitat Nantucket and Habitat Cape Cod proposal for a deconstruction pilot to send trained deconstruction specialists to Nantucket to perform targeted deconstruction on specific homes slated for demolition and then transport the materials back to the Cape Cod ReStores, with proceeds to be shared between the two Habitat chapters. Explore other deconstruction pilot concepts with the Nantucket Land Bank and/or Housing Nantucket as viable short-term solutions to demonstrate the viability of deconstruction practices while the ordinance is being developed and the on-island facility established.
- Use funds collected through deconstruction ordinance fees and fines, and salvaged building materials sold, to support affordable housing development on the island.
- Create and launch a public education and awareness effort to promote building reuse, deconstruction, material salvage and reuse, and historic preservation.
- Make the new deconstruction policy, process, and support mechanisms straightforward and easy to understand and navigate. As one of the interviewed stakeholders said, "People will do the right thing if it's not too difficult. You have to make it easy for them."

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Massachusetts), Matthew St. Onge (Boston Building Resources), Deb Beatty Mel (Boston Building Bargains), and all of the interviewees from Task 1.

Introduction

Nantucket Preservation Trust is leading this Existing Ordinance Research and New Ordinance Development phase of the Nantucket Building Material Salvage study to explore and report on the various issues and considerations surrounding potential building deconstruction and building material reuse policy on Nantucket. Building on previous studies that explored and quantified the benefits of reducing Nantucket construction and demolition (C&D) waste, the EBP team expanded the exploration to building deconstruction and material reuse policy options and best practices in communities around the U.S.

This report presents the study findings in four sections: Existing Ordinances (Section 2), Models for Building Materials Reuse Programs and Facilities – Perspectives from Other Communities (Section 3), Nantucket Perspectives (Section 4), and New Ordinance Development (Section 5).

The ultimate goal of Phase 2 of this study is to provide actionable insights into how to encourage better use of Nantucket's building and construction resources through comprehensive deconstruction policy, while having a positive impact on the Island's long-term sustainability.

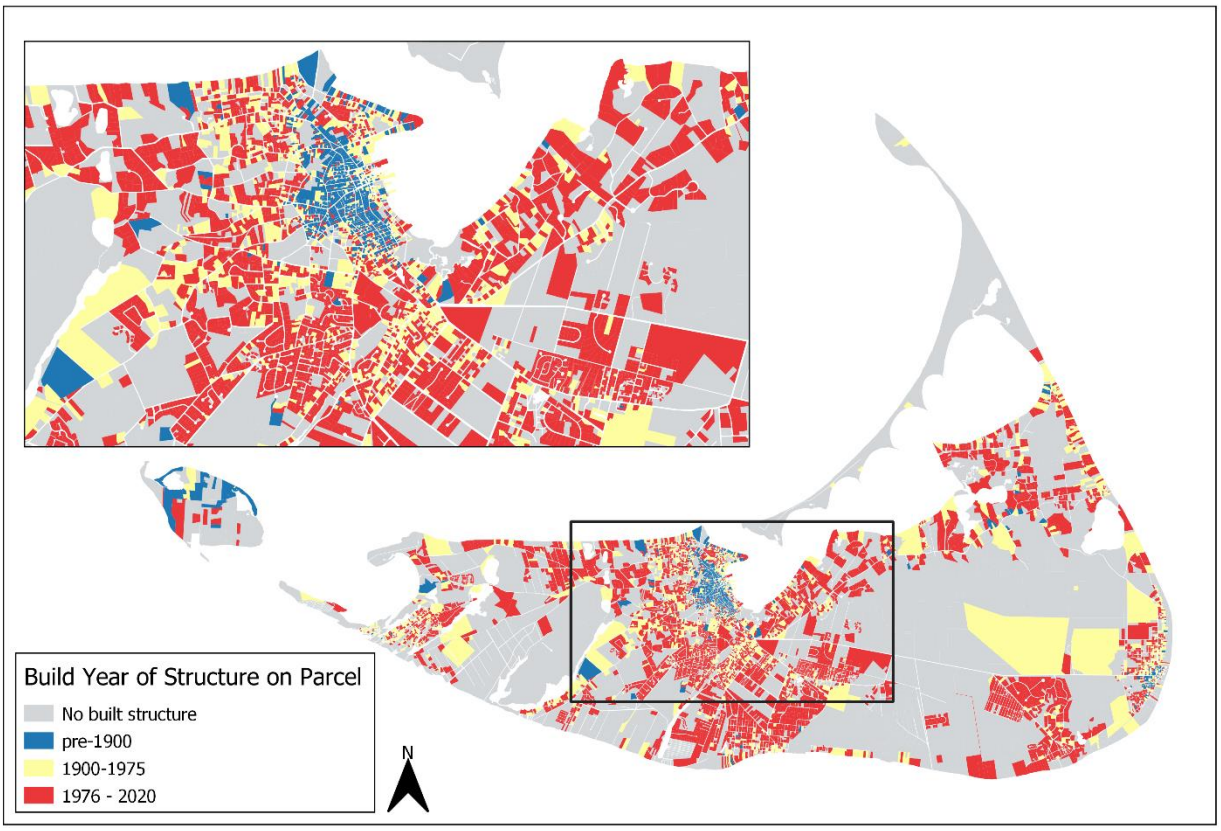
In this report, the terms 'Town' and 'Island' refer to the Town of Nantucket and the Island of Nantucket, respectively.

Property Mapping

The map below shows tax parcels on Nantucket by the year in which a structure on the parcel was built. Of the approximately 13,700 tax parcels on the island, about 9,600 parcels contain a built structure. Of parcels containing a built structure, approximately 1,200 structures (13 percent) were built prior to 1900, shown below in blue. An additional 2,200 structures (23 percent) were built between 1900 and 1975, shown in yellow, and over 6,100 structures (64 percent) have been built after 1975, shown in red.

National Park Service considers 1975 to be the end of the "period of significance" for historical buildings that contribute to Nantucket's National Historic Landmark. About 3,500 parcels, or 36 percent of all parcels with a built structure, contain a structure built in or before 1975, many of which are located in Town.

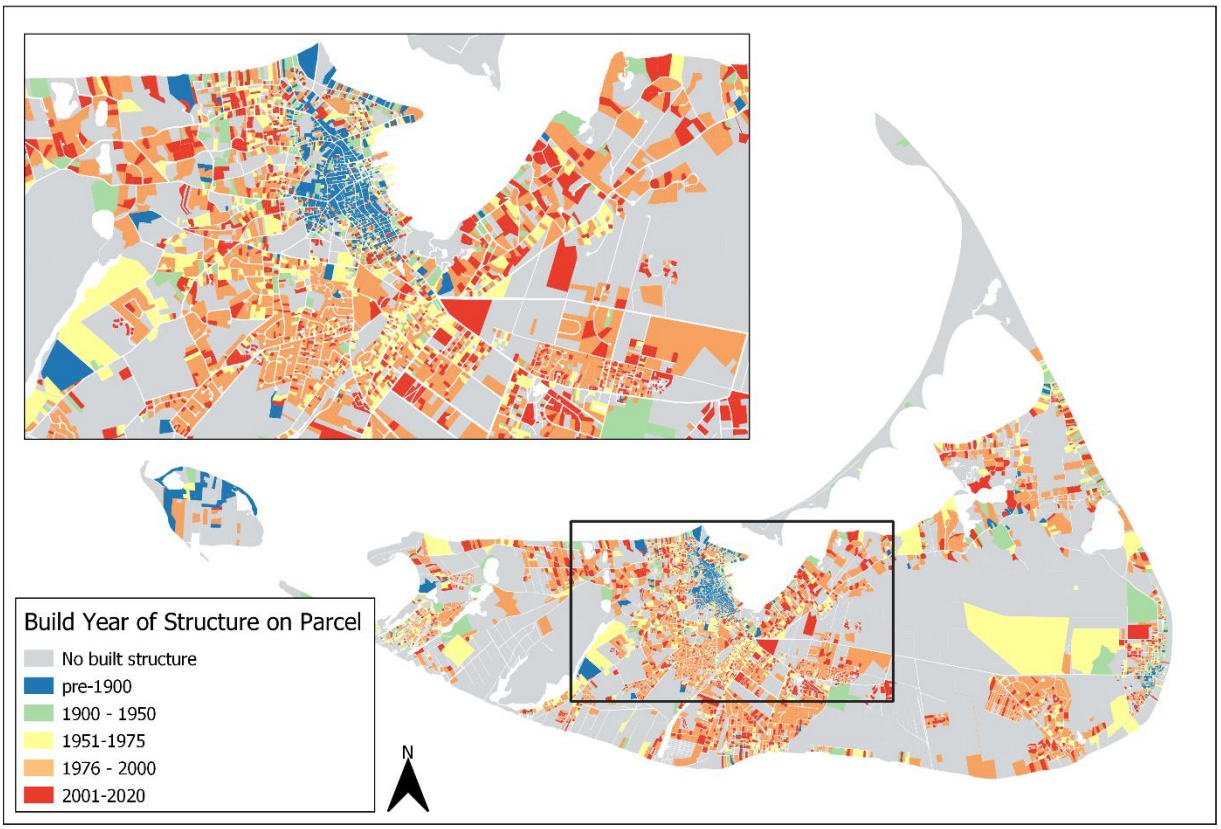
Map 1. Build Year of Structure on Parcel



Source: Town of Nantucket Assessor's Data, EBP Analysis.

Map 2 below shows in greater detail tax parcels on Nantucket by the year in which a structure on the parcel was built. Over 1,000 structures (11 percent) were built between 1900 and 1950, shown in green, and an additional 1,200 structures (12 percent) were built between 1951 and 1975, shown in yellow. In addition, between 1976 and 2000, 4,100 structures (43 percent) were built, shown in orange, and 2,000 structures (21 percent) have been built since 2001, shown in red.

Map 2. Build Year of Structure on Parcel (detailed years)



Source: Town of Nantucket Assessor's Data, EBP Analysis.

Existing Ordinances

Overview of Existing Ordinances that Require or Encourage Deconstruction

Over the last 20 years, municipalities across the country have adopted ordinances that either specifically require deconstruction, or encourage deconstruction through waste diversion minimums, source separation requirements, or sustainability "points" systems that reward salvage, reuse, source separation, and/or diversion of building materials. Some ordinances, such as many in California municipalities, were driven by the need to meet the standards of state-level environmental legislation. Others were established in recognition of the significant contribution construction and demolition (C&D) waste makes to landfills, and to reduce municipal waste costs and environmental burdens. Notably, the Portland, Oregon ordinance was in large part driven by citizen dissatisfaction with the amount of noise and dust being generated by the high number of demolition projects occurring in neighborhoods throughout the city.

The Appendix contains a table summarizing key characteristics of 15 ordinances including a summary of ordinance requirements, the type of buildings or demolition activity it applies to, reporting requirements, the municipal department or official responsible for program administration and enforcement, penalties for violations or non-compliance, along with links to each ordinance and relevant supporting documents and reporting forms.

Ordinances with Deconstruction & Reuse Requirements

Of the ordinances analyzed for this study, five specifically require deconstruction of applicable structures (see "Applicability" below). Two of the five (Portland, OR, and Boulder, CO) explicitly prohibit the use of heavy machinery in any way that would render salvageable materials unsalvageable.

Five additional ordinances strongly encourage deconstruction without explicitly requiring it, each in a different way. For example, Vancouver, B.C.'s Green Demolition By-Law credits re-use of materials at a rate of five times its actual weight. This encourages at least soft stripping[1] or partial deconstruction as reusable materials are difficult to obtain by machine demolition. San Mateo, CA requires site separation "to the maximum extent feasible" for certain materials, and site separation is both difficult to achieve using machine demolition and also increases the recyclability and reusability of building materials. Cook County, IL's Demolition Debris Diversion Ordinance requires that 5 percent of materials from residential demolition be reused. Evanston, IL and King County, WA both include deconstruction and materials reuse criteria as options among a broader range of sustainability measures that must be satisfied to comply with the terms of the building permit.

Ordinances with Diversion

Many ordinances, whether or not they require deconstruction, establish diversion minimums, meaning that a certain percentage of total C&D waste or of certain materials must be diverted from landfill disposal through recycling or reuse (either reuse onsite or sold or donated for offsite reuse). Some ordinances mandate or require that materials be sent to waste handling facilities capable of separating materials to determine weight by type. Higher diversion rates and source separation encourage deconstruction because the machine demolition process comingles waste, making it difficult to recycle, and damages materials so they cannot be reused.

Though most ordinances state diversion as a percentage by weight (and sometimes by weight or volume), Austin Texas's Construction and Demolition Recycling Ordinance gives applicants a choice to meet diversion minimums or disposal weight-per-square foot maximums. Another unique feature of Austin's ordinance is that the statute phases-in over 14 years. Originally established in 2016, diversion minimums increase, and weight maximums decrease in 2020 and

[1] Soft stripping is a selective deconstruction process to remove high-value materials that are simple to remove such as doors, lighting fixtures, cabinets, and vanities.

again in 2030. In 2020 and 2030, the City Manager is required to make a report to the City Council on the economic impact of disposal and diversion rates on household affordability and assess future markets for reuse of construction and demolition materials. This stipulation integrates an element of program evaluation which can be used to revise the ordinance if necessary.

Ordinances that use a "Scorecard"

A few ordinances that are more generally concerned with sustainability rather than specifically focused on deconstruction or C&D waste reduction employ a scorecard or points system. For example, under Evanston, Illinois's Green Building Ordinance, applicants are required to meet a certain number of "sustainability measures" depending on project type. Applicants indicate which measures they intend to meet, and materials reuse, materials salvage, and use of locally sourced materials are included among the choices. However, under this system, it is possible for projects to satisfy program requirements without selecting any measures related to deconstruction or materials reuse.

King County, Washington's Green Building and Sustainable Development Ordinance uses a Sustainable Development Scorecard developed by the County. The scorecard awards points for a wide range of sustainability measures including reuse of salvaged materials, use of on-site materials for construction, use of materials obtained within 500 miles of the jobsite. The ordinance establishes a threshold points value necessary to obtain a building permit and allows applicants to choose measures to meet that threshold. An innovative feature of the scorecard is that it awards points for projects designed for future disassembly, which scorecard instructions define as "a building design process that facilitates a longer life for a building and allows for the easy recovery of products, parts, and materials when a building is disassembled or undergoes renovation. The process is intended to maximize economic value and minimize environmental impacts through reuse, repair, remanufacture and recycling." This includes using materials that can be easily reused or recycled, designing connections that are accessible, using bolted, screwed, and nailed connections, and other design measures that facilitate interchangeability and safe deconstruction.

As with Evanston's ordinance, King County's scorecard can be satisfied without selecting any measures related to deconstruction or materials reuse. However, the King County ordinance also bans clean wood (untreated, unpainted), cardboard, metal, new scrap gypsum, and asphalt, bricks, and concrete from the landfill. Though this doesn't specifically require deconstruction, at a minimum builders will need to employ a certain degree of source separation to meet this requirement.

Applicability

The ordinances specify what type of activity or structures they apply to, and the ordinance may establish different requirements or thresholds for different activities and structures (and combinations of structures/activities) such as:

Specific construction activities, e.g., all demolition or all new construction.

Building types by use (residential, commercial, single family, multifamily) or construction (wood-frame, steel frame).

Building age (e.g., built before 1940, built before 1910) or historic designation (e.g., historic structures, structures in historic districts).

Building size (square feet).

Projects of a certain value (e.g., renovations of $100,000 or greater).

This approach can allow a municipality to place special emphasis on salvage and preservation of historic materials. For example, Vancouver, B.C.'s Green Demolition By-Law applies only to homes built before 1950, but applies a higher recycling minimum and an additional salvage requirement on homes built before 1910, as follows:

- 75% of materials by weight must be reused or recycled for houses built before 1950;
- 90% of materials by weight must be reused or recycled for houses built before 1950 and deemed as a character house by the building department;
- Minimum wood salvage requirement of 3 metric tons for houses listed on the Vancouver Heritage Register or built before 1910.[2]

Portland, OR's Deconstruction of Buildings Law initially applied to homes built before 1910, as this was the group of homes most frequently being demolished. This limited implementation gave the market a chance to attract and train certified deconstruction contractors and develop a distribution network for used building materials. The success of the ordinance led the City to expand the ordinance to all homes built before 1940, and it may ultimately be extended to homes of all ages.

Due to the high volume of structures of all ages being demolished on Nantucket, it may be advisable to have at least a minimum regulation that applies to a large number of structures, such as all residential buildings or all single-family residential buildings. Additional regulations, such as a higher recycling minimum, requirement to salvage all wood for reuse, or prohibition on machine demolition could then be applied to historic structures if desired.

Enforcement Models

Most ordinances are primarily enforced through penalties for non-compliance/violations. Penalties can include fines, civil charges, and/or delay or withholding of final occupancy permits.

[2] City of Vancouver Demolition Permit with Recycling and Deconstruction Requirements

Fines and penalties can range from hundreds to thousands of dollars, and they can be imposed per violation and/or per day that each violation continues.

Five of the featured ordinances are deposit-based, which means that applicants for demolition permits pay a deposit upfront which is refundable at the conclusion of the project if program requirements are met. Non-compliance results in proportional or complete forfeiture of a deposit and can also result in additional fines (as in Vancouver, B.C. and Concord, CA) or denial of final permits. Concord, CA's ordinance calls it a "Performance Security Fee," and it is calculated based on project valuation. This is in addition to a non-refundable application fee that covers program administrative costs. Under Boulder, CO's ordinance, applicants pay a small administrative fee of $212 and a refundable deposit equal to $1 per square foot of demolition or renovation area, with a minimum deposit of $1,500. For this type of ordinance, it is critical to determine a dollar amount that is significant enough to motivate homeowners to comply but not cost-prohibitive to lower-income homeowners.

Use of Approved Contractors, Haulers, or Disposal Facilities

Two of the deconstruction ordinances - Portland, OR's Deconstruction of Buildings Law and the similar Milwaukee, WI Deconstruction Ordinance - require the use of deconstruction contractors who are certified by the municipality. This requires each city to establish a certification process and to maintain a current list of certified contractors. A certification requirement has the disadvantage of creating an additional administrative layer to the process. However, it has the advantage of facilitating the creation of a group of professionals who can be expected to know ordinance requirements and who can be held accountable for meeting them under penalty of fine, removal of certification, or both. Portland's ordinance also requires the use of municipally approved waste haulers or disposal facilities, as do Concord, CA and Palo Alto, CA. In addition, San Jose, CA and Austin, TX recommend, but do not require, use of certain facilities/haulers.

Reporting Requirements

All of the ordinances surveyed require some level of reporting and documentation. Typically, a demolition plan, deconstruction plan, and/or recycling plan is required in conjunction with application for a construction or demolition permit. Applicants are typically required to estimate the amount of construction waste to be generated, usually by material category such as wood, concrete, metal, and other materials. Most ordinances leave this up to contractors. The City of Vancouver, B.C. created an online Demolition Waste Generation Rate Calculator to help homeowners estimate the minimum amount of waste they will be required to recycle, in total and by material (concrete asphalt, wood, metals, drywall, and "other") to meet municipal requirements. Palo Alto's ordinance requires that a Salvage Survey be completed by an approved reuse organization or other third party to itemize and estimate by weight materials eligible for salvage.

Pre-project reports also sometimes ask applicants to document how waste will be collected and how and where it will be transported for disposal.

All of the ordinances also require some type of post-project reporting that documents how requirements were met. Required documentation typically includes all disposal weight tickets, receipts for materials donated or sold, and photos of materials reused onsite or for which otherwise no receipt or ticket is available.

Some municipalities provide pre- and post-project reporting forms that can be submitted in hard copy or sometimes by email. Madison, WI gives applicants the option to use their online WasteCapTrace reporting system, as well as the ability to file hard copies or submit reports by email. Concord, CA and Cook County, IL both use online waste management reporting systems hosted by Green Halo.

Models for Building Materials Reuse Programs and Facilities – Perspectives from Other Communities

EBP researched building materials salvage and reuse programs and facilities across the country to determine the different operational models. Through our research, we identified examples operated by (1) non-profit organizations, (2) municipalities, (3) for-profit model, and (4) non-warehouse-based programs.

Non-Profit Model

The most common model for materials reuse distribution is the non-profit warehouse/store model. We analyzed the following non-profit building reuse programs to identify key operational details:

- Reuse Center at Boston Building Resources, Boston, MA
- EcoBuilding Bargains, Springfield, MA
- ReBuilding Center, Portland, OR
- Building Resources, San Francisco, CA
- The Great Exchange, Devens, MA
- The ReUse People (nationwide)

Reuse Center at Boston Building Resources (BBR), Boston, MA. The Boston Building Materials Co-op Charitable and Educational Fund operates a 9,000 square foot warehouse for collection and retail sale of used building materials. They primarily receive used building materials from homeowners and contractors, but also periodically receive batches of new materials from retail home improvement stores (e.g., surplus unsold merchandise) and wholesale distributors (e.g., discontinued products).

The BBR's primary goal is to sell materials to low-income buyers and non-profit organizations. These customers receive materials at a 50% discount from retail price paid by the general public. Most materials are sold to walk-in buyers, but materials are also sold over the phone or through the website. BBR advertises materials on Craigslist, which helps increase visibility of available items. Smaller, unique items are sometimes offered for sale on eBay.

To price materials, the BBR purchased a custom-designed pricing database. The database indicates the approximate value of an item, then experienced retail sales staff adjust the price up or down depending on age, appearance, and demand.

In 2020, the facility did $353,000 in sales on donated materials valued at $1.15 million. In 2019 and 2020, BBR had operating budgets of $1.3 million and $1.0 million, respectively. In 2020, grants, contributions, and membership dues comprised approximately 27% of operating budget, however in a typical year without an unexpected drop in sales due to COVID-19 lockdowns, grants and contributions comprise more like 15-20% of the budget.

BBR employs about 15 people, including executive management. Staff positions include retail sales representatives, materials receiving and processing, a database manager, donations managers, advertising/marketing, and interior and kitchen designers. BBR has a box truck, staffed by a driver and a material handler that collects materials from jobsites and homeowners throughout the Boston metro area, on a fee for service basis.

Of the 9,000 square foot warehouse space, 2,300 square feet is dedicated to materials receiving and processing. The facility also has a gas line and 220-volt electrical service to test donated appliances, however, testing is minimal. Staff typically verify that an appliance will power on, but, for example, they do not verify that an oven reaches the temperature it is set to. In 2020, BBR remodeled its warehouse to improve operations and achieve net zero carbon through all electric systems powered by a rooftop solar array.

Figure 1. Inventory of Doors at Boston Building Resources

Photo credit: Boston Building Resources.

EcoBuilding Bargains, Springfield, MA. The Center for EcoTechnology, a non-profit environmental organization, operates a building materials reuse warehouse and retail store in Springfield, MA. The facility was created from a former furniture warehouse that CET improved through a deep energy retrofit. The ground floor houses a 30,000 square foot retail store and 20,000 square foot building materials warehouse. The basement level, which is not served by a freight elevator, is used to store smaller items being sold by ecommerce. The facility is not located in a retail area and does not receive pass-by shoppers.

The facility is operated by 14 staff, including positions for retail sales, cashiers, warehouse, e-commerce, and shipping/receiving, and management. EcoBuilding Bargains offers pick-up service, which requires drivers and dispatch/logistics staff. The store also has two donations representatives who are part of the sales department and are dedicated to developing relationships with builders, lumber yards, manufacturers, and other potential donors.

The Center for EcoTechnology (CET) is a non-profit organization based in Springfield, MA. Established in 1976, the organization's mission is "to research, develop, demonstrate and promote those technologies which have the least disruptive impact on the natural ecology of the Earth". CET pursues this goal through innovative pilot programs and production scale services. CET operates the EcoBuilding Bargains used building materials store and warehouse, administers the Massachusetts Department of Environmental Protection (MassDEP)'s RecyclingWorks Massachusetts program. CET has resources to help businesses, households, and builders reduce energy use, reduce

In general, new materials are priced at 50% of retail price and used materials are priced at 30% of retail, subject to an adjustment for quality and condition. To price specialty items, EcoBuilding Bargain does research to determine the value, or uses information from the donor such as the original receipt. The store has projected sales of $1.5 million for 2022, an increase of 15% over the previous year. EcoBuilding Bargain does not keep track of the underlying value of goods sold.

The operation receives many doors, windows, lighting fixtures, and cabinets. New doors obtained through relationships with manufacturers and distributors typically sell very quickly, while individual used doors, including historic pieces, take much longer to sell. Similarly, sets of new wood windows sell quickly, while used vinyl or fiberglass windows take longer. EcoBuilding Bargains accepts newer appliances (up to 7 years old) in working condition. The facility does not test the appliances, and appliances are the only materials eligible for a cash refund (within 7 days of purchase). However, because many appliances are sourced from donors with whom donations representatives have developed relationships, non-functional appliances are rarely an issue.

Martha's Vineyard Pilot Project. CET completed a pilot project on Martha's Vineyard to collect materials for re-use on-island. The project encountered a mismatch between available materials and users. They found, for example, that someone remodeling a 1,000 square foot Cape style home is unable to use cabinets donated from the deconstruction of a 10,000 square foot mansion because although they are of very high quality, they are built to a much larger scale and simply don't fit in the smaller kitchen. Conversely, they found that homeowners building multi-million-dollar custom homes were uninterested in reusing materials, even high-quality materials from homes of similar value. EcoBuilding Bargains customer base is not limited to a single island and instead draws customers from a much larger trade area. As a result, the store is better able to match available materials to interested buyers.

As a result of lessons learned, CET is engaging with the Martha's Vineyard Builder's Association, the island's waste hauling service, and local contractors to determine the logistics of collecting materials on-island, determining what can be reused on-island, and transporting the rest to EcoBuilding Bargains for resale. CET currently provides a storage container on Martha's Vineyard for materials collected by Habitat for Humanity. When it is full, CET transports the container to EcoBuilding Bargains. The store values the materials and issues a check in that amount to the Martha's Vineyard Habitat for Humanity. This is currently the only materials donor that CET compensates in this way. (Typically, donors receive a donation receipt for tax purposes).

CET Technical Assistance for Deconstruction. CET administers the Massachusetts Department of Environmental Protection (MassDEP) RecyclingWorks in Massachusetts program. RecyclingWorks in Massachusetts is a state-funded recycling assistance program that helps businesses and institutions reduce waste and maximize recycling, reuse, and food recovery opportunities. Program services are provided to businesses (rather than consumers) and include virtual and in-person technical assistance to help increase recycling and reuse of a wide range of materials. The unofficial program motto is "we can help any business properly dispose of any material." The RecyclingWorks program is available state-wide, and CET holds a similar contract

with Connecticut's Department of Environmental Protection and is able to provide services throughout that state as well. CET can provide more limited forms of assistance to businesses nationwide.

The program has a C&D waste specialist on staff and specific services related to building materials reuse include creating waste management plans and project-specific cost comparisons of demolition versus deconstruction. Massaro gives presentations to contractors and builder's associations to demystify deconstruction. The program approach is to encourage contractors to begin by removing easier pieces such as bathroom vanities or perform a soft strip. This familiarizes contractors with the process which often motivates them to increase the amount of deconstruction they perform.

CET is currently providing technical assistance to the South Mountain Company, a large builder on Martha's Vineyard, to support the complete deconstruction of a residential home. As part of the project, CET is making a documentary film of the effort to be used to raise awareness of deconstruction.

ReBuilding Center, Portland, OR. The non-profit Our United Villages operates this 30,000 square foot used building materials warehouse. The organization's mission to support construction materials reuse and building repair for sustainability has recently been expanded to incorporate environmental justice. The Center's activities are supported by a six-person administrative team.

The store sells donated building materials at 40% to 90% off retail and offers free materials to public service organizations and projects through an application process. The store employs 11 staff, including two managers and an assistant manager, five salvage specialists, and four drivers/materials handlers that together make over 1,000 pickups per year. In 2019, the Center accepted donated materials valued at approximately $1.4 million.

The Center also offers classes in woodworking, carpentry, electrical, and plumbing, as well as a deconstruction service. The educational program is staffed by four instructors, a program manager and program coordinator and generates approximately $125,000 in annual revenue. The deconstruction service generates approximately $150,000 in annual revenue.

The store and education program have an annual budget of $2 million,[3] and receives $1.5 million in grants and donations.

Building Resources, San Francisco, CA. This non-profit store is unique among those summarized here because in addition to used building materials, they sell a wide variety of used landscaping materials. Materials are sold to the public from a 1-acre site with 3,300 square foot warehouse[4] and multiple storage outbuildings. Materials pick-up can be arranged. The organization also

[3] Revenue, budget, and donation figures are from the organization's 2019 IRS 990 form.
[4] Building size estimated based on building footprint visible from Google Maps.

offers workshops and classes on repair and reusing materials for landscaping and furniture building.

The Great Exchange, Devens, MA. The Great Exchange accepts operating supplies, furniture, and small fixtures for sale to community organizations, daycare facilities, schools, libraries, municipal departments, nonprofits, and small businesses. Though this reuse store does not collect and distribute used building materials, and is not open to the public, it is an interesting model for consideration.

Items are priced at 50% of retail value. The website explains the operation as follows:

> "The Great Exchange provides establishments with an alternative solution for items that cannot be used internally with the added benefits of avoided disposal cost, community stewardship and environmental protection. Inventory is sourced from manufacturers with reusable by-products, firms with new processes and facilities that are remodeling or closing. Accepted items include new or like new materials that could be used in a classroom, library, town office, non-profit or business setting."[5]

In 2021, the Great Exchange collected materials from six businesses, four retailers, three schools, three non-profits, and a college. Materials were sold to 130 small businesses, municipalities, non-profits, schools, and libraries from more than 50 towns. The Great Exchange also donates materials to public service programs. For example, 100 trays no longer needed by a local food manufacturer were given to a program that supports immigrant farmers and nearly 100 potable water jerry cans and several cases of writing pads were donated to a school in the Republic of Congo.

The Reuse People, multiple locations in CA, CT, ID, IL, TX, UT, WA, and WI. Established in San Diego, CA in 1993, The Reuse People now operates multiple facilities throughout California and several other states. Headquartered in Oakland, CA, they operate retail warehouses in Oakland, North Haven, CT, Maywood, IL, and Salt Lake City, UT. Other locations offer a range of deconstruction and materials reuse services including deconstruction contracting (arranging independent IRS appraisal, soliciting deconstruction bids, and collecting salvaged materials). They also operate The ReUse Institute (TRI), located in Oakland, which provides deconstruction training and certification as well as workshops on deconstruction and retail-warehouse operations.

[5] The Great Exchange - The alternative solution for excess resources – (tgedevens.com)

Figure 2. The ReUse People Retail-Warehouse, Oakland, CA

Photo credit The ReUse People website.

Municipal Model

Houston Building Materials Reuse Warehouse, Houston, TX. This facility was established through a grant from the Houston-Galveston Area Council of Governments to store salvaged building materials until they can be used by community groups. The facility is not open to the public and materials are not for sale, they are only available free to non-profit organizations. Materials are housed in a 12,000 square foot warehouse[6] and due to staff limitations, pick up service is not available and people donating materials are asked to assist with the unloading. Donors are given donation receipts for tax purposes. Non-profit shoppers select desired items, then weigh them on the facility's floor scale to help the Public Works Department keep track of the amount of material diverted from the landfill.

TIPS Warehouse, Huntsville, TX. TIPS stands for "Trash Into Plowshares." This facility was established in 2002 "to reintroduce construction and deconstruction materials into economic mainstream with a creative infrastructure[7]". As with Houston's Reuse Warehouse, this operation was established by a grant from the Houston-Galveston Area Council of Governments. The operation recruits donors and "shoppers" (explained below) through ongoing community outreach through flyers, referrals from non-profit organizations, newspaper articles and other media

[6] Building size estimated from building footprint visible on GoogleMaps.
[7] City of Huntsville Solid Waste Services presentation.

features, and by "word of mouth." Donors are motivated by the opportunity to avoid paying disposal fees by donating materials to the TIPS warehouse.

Usable building materials, excluding appliances, are brought to the City's transfer station, weighed, then stored in a dedicated warehouse. Similar to Houston's Reuse Warehouse, materials are not for sale but instead are offered free to low-income homeowners and non-profit organizations. Upon entering the facility, these qualified "shoppers" obtain a voucher and weigh their transport vehicle to determine its empty weight. Once they have selected desired materials and loaded them into their vehicle, the vehicle is weighed again to document the amount of material being diverted from the municipal landfill.

Figure 3. TIPS Warehouse, Huntsville, TX

Photo credit: City of Huntsville Solid Waste Services presentation.

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For-Profit Model

Ballard Reuse, Seattle, WA. This for-profit reuse retail store was established on the site of a former Habitat for Humanity Re-Store. The business offers materials pick-up and salvage services and sells salvaged materials to the public. Ballard offers cash or store credit for materials picked up but does not pay cash for materials dropped off at the store. They also accept donations on behalf of the non-profit Seattle ReCreative who receives a percentage of the sale of those materials. Materials donated to Seattle ReCreative are eligible for tax benefits. A

representative from the store indicated that they pay for the majority of their stock and that the model works well for them.

Ballard Reuse is a member of the Northwest Building Salvage Network, a collaborative effort of Puget Sound businesses committed to promoting the salvage and reuse of building materials. Two other for-profit reuse stores - Second Use and Earthwise Architectural Salvage - are also members and all three are certified by the City of Seattle to perform Salvage Assessments. While the City of Seattle does not require deconstruction, it is strongly encouraged and the City waste management website guides builders and homeowners to Network resources.

Non-Warehouse Based Deconstruction and Reuse Programs

The Deconstruction & ReUse Network (DNR), Long Beach, CA. This company, established in 2007, combines a deconstruction network with a reuse network. The organization describes itself like a bicycle. The front wheel is a deconstruction network comprised of project managers, facilities managers, deconstruction contractors, sustainability managers and other professionals who advocate for, and provide their clients with, cost effective alternatives to traditional demolition and waste disposal. The back wheel distributes salvaged items and surplus property to a network of local and international non-profit organizations for reuse.

DNR offers residential and commercial complete deconstruction and selective salvage services including on-site project review and solicitation of deconstruction bids. DNR also offers commercial surplus property waste diversion to connect donors' oversupplies with local and international non-profits in need of the items slated for disposal. DNR also coordinates delivery logistics.

Recipient organizations make use of donated materials in a range of ways. For example:

The non-profit housing organization Corazón incorporates donated materials directly into home building;
San Francisco Unified School District and Oakland Zoo use donated items for operations; and
Habitat for Humanity ReStores sell discounted materials to the public and use the proceeds to fund the organization's civic mission.

Models for Integrating Materials Reuse with Affordable Housing

While none of the deconstruction and C&D ordinances reviewed for this project contained language specifically tying them to affordable housing, existing building materials reuse programs and facilities support affordable housing both directly and indirectly.

The building materials reuse facilities featured in Section 0 that re-sell materials, even for-profit operations such as Ballard Reuse, typically price them below their retail price as new materials. This practice indirectly supports affordable housing development by providing a source of lower

cost materials. Moreover, many of the programs (Table 1) also provide more direct support for affordable housing through special discounts and/or free materials to non-profit community groups, including affordable housing non-profits, and sometimes to low-income homeowners.

Table 1. Building Materials Reuse Operations that Provide Discounted Pricing to Non-Profit Organizations and/or Low-income Individuals

Organization	Discount
Reuse Center at Boston Building Resources	50% discount to low-income homeowners and non-profit organizations
ReBuilding Center (Portland, OR)	Free materials to public service organizations/projects through application process
The Great Exchange (Devens, MA)	Materials not for sale, available free only to community organizations, daycare facilities, schools, libraries, municipal departments, nonprofits, and small businesses
Houston Building Materials Reuse Warehouse	Materials not for sale, available free to non-profits only
TIPS Warehouse (Huntsville, TX)	Materials not for sale, available free to non-profits only
Deconstruction & ReUse Network (Long Beach, CA)	Some materials are donated to domestic and international civic/relief organizations

Alternatively, some operations sell materials to the public and use the proceeds to fund affordable housing. Perhaps the most well-known organization to follow this model is Habitat for Humanity. Local Habitat for Humanity organizations operate ReStores. Each ReStore is independently owned by the operating organization. ReStores sell discounted building materials, furniture, and appliances to the public, generating revenues that support Habitat's mission of providing shelter and affordable housing. The two building materials reuse operations surveyed for this report that follow this model – The CET's Martha Vineyard partnership and the Deconstruction & ReUse Network - are both affiliated with Habitat for Humanity.

Implications for the Sale and Distribution of Nantucket's Salvaged Building Materials

The municipal models featured above do not have the staff or organizational capacity to inventory and sell materials. However, a non-profit organization that does sell materials may not

be able to obtain a site on Nantucket due to cost and scarcity of space. If the Town has a suitable site, there may be an opportunity for a partnership with a non-profit operator.

Nantucket may find, as Martha's Vineyard did, that many materials cannot be re-used on-island. Instead of establishing a distribution facility on the island, Nantucket may consider pursuing a partnership with an off island building materials salvage and re-use program like CET's partnership with Habitat for Humanity on Martha's Vineyard. Though this approach would forgo some of the greenhouse gas savings, as materials would still be shipped off-island, and new materials shipped on-island for new construction, at least materials would largely stay in New England for re-use, rather than being shipped to landfills in Maine and the Midwest. This type of partnership has the advantage of not requiring costly retail warehouse space on Nantucket, but instead only requires a space to store materials until they can be transported off-island. Such an arrangement would only require enough space for one or more TEU-type containers. Moreover, the need for retail and warehousing staff on Nantucket would be avoided, which is a significant advantage in terms of operational cost savings. It limits opportunities to workforce training for retail and warehousing on Nantucket but deconstruction activities, however, would still present workforce training opportunities and support living-wage jobs.

The for-profit model is generally used by businesses that also offer deconstruction and salvage services, as the businesses are highly complementary (i.e., the business receives revenues from both deconstruction and resale of salvaged items). Instead of accepting materials donations for which the donor receives a receipt for a tax write-off, they purchase materials from deconstruction projects they perform, and sell them in their retail store. In the case of Ballard Reuse, materials brought in through the salvage business are supplemented by materials donated to the affiliated non-profit partner (for which those donors receive an IRS receipt rather than cash compensation). Nantucket does not currently support a strong enough salvage market to support this model.

However, it is possible that under a deconstruction ordinance, demand for deconstruction services would be sufficient to support a private building materials reuse store operated by a local deconstruction business. As with a non-profit, this business would face the challenge of finding a site that is not cost prohibitive. To avoid high rent for storage space on Nantucket, for-profit building materials salvage businesses may ultimately end up transporting materials off-island for resale.

Nantucket Perspectives

Nantucket Resident Perspectives

We expanded on our Phase 1 interviews by asking several residents what they thought specifically about a deconstruction ordinance on Nantucket. General impressions of deconstruction were again very positive. Interviewees feel that incentives could encourage deconstruction, but only if they are paired with education and engagement efforts. Some

homeowners and builders are not very cost-sensitive, so financial incentives may not have a significant effect. One interviewee suggested that homeowners might even pay builders an extra amount to compensate for having to pay the deposits.

If the Town were to implement meaningful financial incentives, the residents we interviewed would support an ordinance that collects deposits from builders that are refunded based on the amount of demolition waste diverted. At least one person would also support an ordinance that would fine builders for not diverting demolition waste. There were also no objections to ordinances that ban certain materials from the landfill or require contractors to be certified in deconstruction.

One person we interviewed felt it is imperative that builders are involved in developing new ordinances. This would first require educating builders on the benefits of deconstruction, and then working with them to devise effective strategies for encouraging it. Otherwise, there would likely be resistance to an ordinance that impacts builders.

Interviewees feel that most Nantucket residents would be receptive to ordinances that promote sustainability on the island. There is a sense that preservation is an important aspect of Nantucket's history that many residents appreciate and want to support. One person we interviewed believes now is an opportune time to encourage deconstruction and reuse because the cost of materials and transportation has increased significantly in recent months.

Building Strategic Partnerships with Key Organizations

EBP performed outreach to contacts at key stakeholder organizations on Nantucket. See Table 2 for interviewee list, developed in coordination with Nantucket Preservation Trust.

These outreach efforts were used to build support for a possible building deconstruction ordinance and to gather feedback and thoughts on the approaches to deconstruction and reuse. The discussions centered on what stakeholders think will be most effective on the island. Our outreach consisted of email invitations and 30-minute video interviews with eleven (11) key Nantucket stakeholders/organizations. The conversations consisted of input on the four general categories of deconstruction ordinances we've found among U.S. municipalities through our research, as detailed in Section 2, the ordinances' compatibility with Nantucket, and the interviewee's thoughts on how best to approach deconstruction and encourage building material reuse on the Island.

Table 2. Strategic Partnership Interviewee List

Stakeholder	Title	Organization
Holly Backus	Town Preservation Planner	Town of Nantucket
Bill Kline	Former Nantucket Town Planner	Retired
Elizabeth Blair	Marketing & Development Director	Housing Nantucket
Frank Daily	President	Nantucket Builders Association
Hillary Hedges Rayport	Former Chair	Nantucket Historical Commission
Gennifer Costanzo	Executive Director	Habitat Nantucket
Jesse Bell	Executive Director	Nantucket Land Bank
Lauren Sinatra	Energy Coordinator	Town of Nantucket
Paul Murphy	Building Coordinator	Town of Nantucket
Tucker Holland	Director, Affordable Housing Trust	Town of Nantucket
Abby Camp	Vice-Chair	Historic District Commission

Note: Additional interview invitations were sent to eight (8) other stakeholders, however we did not receive responses and/or were unable to schedule interviews with them.

The overall message that came through clearly in all of the interviews was that each of these stakeholders cares deeply about preserving the architectural heritage of Nantucket and they are committed to exploring pathways to increasing building reuse, deconstruction, and materials reuse. The primary question then is defining the best pathway.

Assessing the Current State

Each of the stakeholders provided an assessment of the current state of building deconstruction and material reuse from their vantage point in the Nantucket building ecosystem. Their observations and insights collectively provide an informative, composite picture of the current landscape, including challenges that could be addressed through an ordinance and/or other market interventions.

The following are specific stakeholder observations, opinions, and insights from the interviews, organized into the primary topic categories: History of Sustainability, Current Standard Practice, Financial Considerations, and Other Considerations, Thoughts, and Observations.

History of Sustainability

- Nantucket has always had to be sustainable; it came from necessity.
- For long-time Nantucket residents, sustainability is more of a standard practice.
- Islanders have been reusing and recycling structures for over 300 years.
- Nantucket has one of the busiest Historic District Commissions in the U.S. and building demolitions move-offs are often on the agenda.
- The greenest building is the building that is already built.

Current Standard Practice

- Reuse is big on the island. Entire structures are commonly moved – people want them. The timing needs to work between availability and demand.
- If a building can't be moved, for whatever reason, it is usually not deconstructed.
- Housing Nantucket has a successful house recycling program, allowing a homeowner to donate a house instead of demoing it. Housing Nantucket moves it to their land, if available, and turns it into affordable rental housing, or sells to a 3rd party.
- The Nantucket Land Bank acquires and offers structures to the town and affordable housing organizations. With a lot of structures they acquire, there is strong interest in turning the property "back to natural" so the structure must be moved or demoed/deconstructed.
- The Land Bank reaches out to Habitat Nantucket and Housing Nantucket on available appliances. Residents often reach out to the Land Bank and are allowed to "take what they need."
- Often houses can't be moved because a representative of National Grid, the electric utility, says the neighborhood would lose electricity for 2 days if power lines are temporarily removed for the house move.
- Some of the buildings being destroyed are not very old.
- A lot of historic materials with inherent value are currently ending up in the waste stream.
- The current demo delay period (60 days) is too short to be effective.
- Currently a demo can be advertised, starting the 60-day demo delay period, before the project goes before the Historic District Commission.
- There is an informal building materials reuse system on Nantucket, including the Cape Cod and Islands Craig's List and the Nantucket REuse eXchange. They have limited use for building materials, however, because there's a limit on who needs what at any given time.

Financial Considerations

- Money and easy access to everything has changed the island.
- Access to money can put sustainability on the back burner.
- People love Nantucket and want to live and work here, but many people can't find even a small, affordable place to live.
- When ranch houses built in the 1950s and 1960s are demolished, the new owner takes relatively affordable housing out of the community and reduces the supply of housing for older adults looking to downsize and live on one accessible floor.
- Making a building available for salvage could present a town liability issue.

Other Considerations, Thoughts, and Observations

- The biggest issues on the island are coastal resiliency and affordable housing.
- More people have been talking recently about how to reuse building fixtures (e.g., faucets, sinks, toilets).
- The reclaimed materials that contractors would more likely reuse are interior trim, doors, cabinets, flooring, and plumbing fixtures. Older windows often can't be reused because they don't meet current building energy code.
- It's all about education.
- Nantucket preservation classes are being offered for realtors.
- As we go into a recession people are going to want smaller houses.
- The best outcomes will come from reducing, reusing, and recycling.
- Lots of people can't afford new materials and would benefit from the availability of salvaged materials.
- Some of the new developments are so un-Nantucket and so insensitive to the character of the island.
- Our parents brought us up to be frugal. Demolition goes against everything I was taught.
- It makes me physically ill allowing demolition of perfectly good buildings.
- There's a national housing crisis – don't throw away usable materials.

Thoughts on Ordinance Types

With a few exceptions, the stakeholders feel that a town ordinance would be a positive tool to encourage building deconstruction and material reuse. Those who disagreed with this position cited their impression that Nantucket residents' dislike regulation.

Specifically, most stakeholders were in support of ordinance types 2, 3, and 4 (see below) and some were concerned that ordinance type 1 would be challenging to measure and monitor due to different age homes having different percentages of reusable materials.

1) Requirements to divert a certain amount of construction waste from landfills through reuse, recycling, and composting, or landfill maximums (Palo Alto, CA, San Mateo, CA, Los Angeles, CA, Concord, CA, Madison, WI, Boulder, CO, Cook County, IL, Austin, TX, Milwaukee, WI)
2) Deposits that are refundable based on meeting certain diversion levels (San Jose, CA, Vancouver, BC, Boulder, CO)
3) If deconstruction happens, requirement that work be performed by certified deconstruction contractors and that heavy machinery doesn't render materials unusable (Portland, OR, Milwaukee, WI)
4) A certain number of sustainable building practices must be employed, one of which is deconstruction (Evanston, IL, King County, WA).

The following are specific stakeholder thoughts on ordinances and other approaches to encourage building deconstruction and material reuse.

- Get the right mix of 'sticks and carrots' (regulations and incentives).
- Lengthen the 'demo delay' to at least 6 months, and ideally 12+ months, similar to other communities in Massachusetts.
- Make the 'demo delay' process and timeline fixed and consistent for everyone so there will be no financial incentive to try and speed up the process.
- Less bureaucracy is better; free market is better.
- Increase the percentage of Historic Tax Credits with the state.
- People have a strong feeling that things should be 'fair.' The Nantucket community values transparency and the consistent application of rules and processes to everyone.
- Institute penalties for illegal demos, such as a hefty fee, and contractor can't apply for another building permit for X months.
- Institute a system of rewards for citizens who do the right thing, such as a local tax credit or jumping to the front of the building permit queue.
- Devote some resources to helping/training (incentivize) motivated trades people who want to make a business of deconstruction.
- Involve the realtor community in the development of solutions.
- Having a 'home base' to bring salvaged materials is important.
- Place a fee on house demos, since they contribute to the waste stream problem and disposal costs, and often take an 'affordable' home out of the Nantucket housing market. Charge 1% of sales price if the home is to be demolished, to go into an affordable housing account, with a fee waiver or partial refund if the home is repurposed or substantially deconstructed.
- Encourage the town to purchase chunks of land near town water/sewer and utilities. Once procured, make small developments with the houses that are saved, providing places to live for people who can't afford to live on-island anymore.
- An incremental approach could first address the low-hanging fruit and then be expanded.
- It's tricky politically. Town meeting can be quite a challenge. If you do your homework and build support you can usually win the day, but not always.
- People will do the right thing if it's not too difficult. You have to make it easy for them.

Most stakeholders agreed that passing a deconstruction ordinance would effectively decrease the problem of demolition of perfectly habitable buildings and building materials going into the waste stream.

Other Ideas and Takeaways

The overall takeaway from the stakeholder interviews is that this is a multi-faceted problem requiring a holistic integrated multi-faceted solution. A successful strategy that will garner enough support from town residents and stakeholders will likely require:

- Passing an ordinance, with a lengthened demo delay period (6-12+ months like other Massachusetts communities), a demolition fee or deposit program, a revised process starting with the Historic District Commission and then advertising, and including incentives and other support
- Linking solutions to support of affordable housing
- Establishing an on-island salvaged materials facility
- Providing deconstruction training
- Town and stakeholder involvement in designing and implementing the strategy.

Almost all the stakeholders interviewed suggested finding a way to expand the 'Take It or Leave It' operation at DPW as an on-island salvaged building materials facility. Considering that land and retail space is "prohibitively expensive," and given that the town already owns the property, costs for a salvage facility would be reduced and help ensure that the operation generates positive cash flow. In addition, some stakeholders suggested a public-private partnership to fund the creation and operation of the facility to mitigate DPW's staffing and budget constraints. A further reason for locating at the DPW site is that DPW has a vested interest in limiting the waste stream to help extend the life of the landfill, reduce costs, and comply with the Massachusetts Department of Environmental Protection's new 2030 Solid Waste Master plan[8]. Some stakeholders suggested that the proceeds from salvaged material sales could go towards affordable housing. A further suggestion was to have a small public-facing space in the downtown area, showcasing high-end salvaged materials, with a binder showing the inventory of the materials stored off-site.

Gennifer Costanzo, Executive Director of Habitat Nantucket, and her colleagues at Habitat Cape Cod have proposed a deconstruction pilot that could serve as an interim solution until an on-island salvage facility can be established. The proposed 6-to 9-month pilot would involve sending trained Habitat Cape Cod deconstruction specialists to Nantucket to perform targeted deconstruction, primarily kitchens, on specific homes slated for demolition, and then transport the materials back to the two (2) Habitat ReStores on Cape Cod[9]. The materials would then be sold, with a percentage of the proceeds going to Habitat Nantucket to help support their affordable housing mission. Such a pilot would potentially require supplemental grant funding and would need to take place in fall or spring due to lack of summer ferry availability.

The Habitat Nantucket-Habitat Cape Cod deconstruction pilot could be a viable short-term solution to demonstrate the viability of deconstruction practices until an on-island facility can be established. While the pilot concept was supported by most interviewees, the stakeholders also believe that there is enough on-island demand to support a closed-loop Nantucket facility.

[8] MassDEP's 2030 Solid Waste Master Plan establishes goals to reduce disposal statewide by 30 percent (from 5.7 million tons in 2018 to 4 million tons in 2030) over the next decade. It sets a long-term goal of achieving a 90 percent reduction in disposal to 570,000 tons by 2050.

[9] The Habitat Cape Cod ReStores are located in South Yarmouth and Falmouth.

New Ordinance Development

This section presents model ordinance language for encouraging deconstruction on Nantucket. As shown in the preceding sections, there are several ways of encouraging deconstruction, each of which has its own advantages and disadvantages. For this reason, we present different options for Nantucket Preservation Trust and its partners to consider.

For ordinances that impose fees or fines, several people we interviewed suggested using the funds to support affordable housing development on Nantucket.

Note that the following language is modeled off ordinances in other municipalities and has not been reviewed by legal professionals. It is meant for informational purposes only. We provide additional commentary in bold below some of the ordinance language.

Ordinance: Diversion & Recycling Requirement

This ordinance shall be applicable to all residential and commercial projects that include a whole structure demolition requiring a demolition permit. All applicants and other persons who undertake a covered project shall complete a salvage survey provided by a reuse organization or other third party approved by the Town, prior to the issuance of a demolition permit. The survey shall itemize the materials and items eligible for salvage and reuse and the estimated weights.

Upon completion of the deconstruction and source separation of materials, the applicant or person responsible for the covered project shall ensure the items listed on the salvage survey are delivered to, collected by or received by, and certified by a reuse organization or other third party approved by the Town, and shall submit to the Town proof of delivery of salvage items in accordance with Town regulations.

All applicants and other persons who undertake a covered project where materials can be recycled or composted shall deconstruct buildings and structures in a manner to divert the maximum feasible amount of materials and debris from disposal in landfills. All construction and deconstruction materials shall be source separated. Materials to be source separated for recycling include, but are not limited to, steel, glass, brick, concrete, asphalt, roofing material, pipe, gypsum, sheetrock, lumber, wood, pallets, rocks, sand, soil, clean cardboard, paper, plastic, carpet, wood, and metal scraps. Materials to be composted include, but are not limited to, trees, shrubs, plant cuttings, food scraps, and other material as designated by the Town.

All persons undertaking a covered project shall submit proof of reuse, recycling and composting in accordance with Town regulations. The Town shall be authorized to inspect, upon reasonable notice, and audit individual waste streams generated at covered projects to determine compliance with this section.

In several municipalities we reviewed, waste diversion requirements range from 50% of non-hazardous construction materials to 95%. Some municipalities apply a minimum diversion requirement only to homes of a certain age, generally pre-1950. Some municipalities also require that 100% of soils, concrete, and asphalt must be recycled. Madison, Wisconsin, requires that 100% of untreated wood, non-toxic metals, drywall, cardboard, and shingles be reused or recycled.

Ordinance: Banned Materials

The following materials are banned from landfill disposal: clean wood (untreated, unpainted), cardboard, metal, new gypsum scrap, asphalt paving, bricks, and concrete.

An alternative approach is to put limits on landfill disposal. Austin, Texas, currently limits disposal of C&D waste to 1.5 pounds per square foot of a project's area. In 2030, the limit will be reduced to 0.5 pounds per square foot.

Ordinance: Refundable Deposits

Each person who applies for a demolition permit shall remit a diversion deposit in the amount set forth by resolution of the Town Select Board. The diversion deposit shall be remitted at the same time the permit application is filed. The Town may authorize the refund of a diversion deposit when at least fifty (50) percent of the waste generated by the project was diverted from landfill disposal. The Town may authorize a partial refund of a diversion deposit when less than fifty (50) percent by weight of the waste generated by the project was diverted from landfill disposal.

The Town shall not authorize the refund of any diversion deposit, or any portion thereof, unless the original building permit applicant files a written request for refund no later than twelve (12) months after the building permit is no longer active for any reason (including because the project has been completed, the permit has been withdrawn, or the permit has been revoked), and the applicant provides documentation satisfactory to the Town in support of the request.

Deposit amounts vary based on the municipality. Two municipalities we reviewed charge a minimum refundable deposit of between $1,000-1,500, plus an additional $1 per square foot of demolition area. Concord, California, charges a refundable deposit of between 1.5-2.0% of a project's value.

Ordinance: Certified Deconstruction

Deconstruction work must be performed by a Certified Deconstruction Contractor. A Certified Deconstruction Contractor shall be assigned to the project throughout the course of deconstruction. Certified Deconstruction Contractors must comply with the requirements of this Chapter and the administrative rules. The Planning department will maintain on file and available to the public a list of current Certified Deconstruction Contractors.

Alternatively, the Town could maintain a list of "preferred contractors" that prioritize deconstruction over demolition in their work.

Ordinance: Sustainable Building Practices

All construction projects that are LEED[10] eligible must achieve LEED certification. Projects not eligible for LEED certification must use the Sustainable Infrastructure Scorecard, a sustainable development scorecard developed by the Town. The scorecard includes points for reuse of salvaged materials, use of on-site materials for construction, use of materials obtained within 500 miles of the jobsite, and points for projects designed for future deconstruction.

Ordinance: Heavy Machinery Restrictions

Heavy machinery may be used in deconstruction to assist in the salvage of materials for reuse or to remove material not required to be salvaged for reuse. Heavy machinery may not be used in deconstruction to remove or dismantle components of buildings in ways that render building components unsuitable for salvage. Heavy machinery includes, but is not limited to, track hoes, excavators, skid steer loaders, or forklifts.

Ordinance: Demolition Delay

The Demolition Delay falls under the Town of Nantucket zoning bylaws.[11] Most people we interviewed favor a longer demolition delay period. The predominant sentiment is that the current 60-day waiting period is inadequate to provide builders and homeowners with enough time to find alternative uses for houses and building materials. The reasons cited included, 1) the required posting of the public notice often occurs prior to issuance of approval for the demo, shortening the available time to secure demo alternatives, and 2) there are many steps required to coordinate moving a structure (e.g., approvals from HDC, ZBA, National Grid) which often takes significantly longer than 60 days. According to the Massachusetts Historical Commission:

> "Over 150 cities and towns in Massachusetts have established a demolition delay bylaw or ordinance[12]. With a demolition delay bylaw or ordinance, a window of opportunity is provided to find an alternative to the demolition of a significant building. The delay is typically 6, 12 or 18 months. Most of the demolition delay bylaws and ordinances in Massachusetts are based on the age of the building, such as buildings that are older than 50 years or 75 years."[13]

[10] U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) certification.
[11] Town of Nantucket, Division 1: Bylaws / Part II: General Legislation / Zoning, Article V: Administration and Enforcement, Section 139-26, Issuance of building and use permits.
[12] Demolition Delay Bylaws and Ordinances in Massachusetts
[13] Preservation Massachusetts website

Of the over 150 communities in the Commonwealth with a demolition delay bylaw or ordinance, the Town of Nantucket is an outlier as only one of only two communities with a delay period of less than 3 months. Similar Massachusetts communities with historic districts, such as Provincetown, Concord, and Chatham, have demolition delay periods of 6 months, 12 months, and 18 months, respectively.

Other Mechanisms

There are other ways to encourage deconstruction on Nantucket. One is to increase landfill tipping fees so that disposing of construction materials (instead of reusing them) becomes more costly for builders and homeowners. Tipping fees should be raised gradually, however, since raising them too much or too quickly could cause people to dispose of waste illegally to avoid the fees.

Another mechanism is queue jumping or accelerated demolition/building permit review for builders that deconstruct rather than demolish buildings. This could encourage deconstruction among homeowners who are working on an accelerated timeline, which we heard during our Phase 1 research is often the case.

A third option is to provide grants directly to builders to offset the added costs of deconstruction. The Town could design such a program to target buildings that are most likely to yield significant reusable material.

Conclusions & Recommendations

Moving away from building demolition on Nantucket, towards a paradigm of thoughtful and sustainable deconstruction and building material reuse, is a worthy goal that will pay multiple dividends to the Island of Nantucket and its residents in the form of overall financial savings, carbon and pollution emission reductions, and workforce development opportunities. As has been shown from the Envision Resilience Nantucket Challenge 2022 Survey, Nantucket residents, in addition to their own efforts to reduce their contribution to climate change, are supportive of their fellow homeowners, businesses, government actors, and other community stakeholders in efforts to increase sustainability and resilience on the Island. Further, the Town of Nantucket's Strategic Plan is guided by principles of sustainability, with a major focus on historic preservation. Through a series of research tasks and Nantucket stakeholder interviews, the EBP team has identified, categorized, and analyzed key strategies and leverage points to support the goal of building deconstruction and material reuse.

With the goal of providing actionable policy insights into how to encourage the best use of Nantucket's building and construction resources to have a positive impact on the Island's long-term sustainability, we offer the following insights and recommendations:

- Organize a meeting of Nantucket stakeholders, including key Town officials, to further build strategic support and to assist in building deconstruction and reuse ordinance design and implementation strategy.
- Propose a comprehensive deconstruction ordinance, for approval at Town Meeting, that combines waste diversion and recycling requirements, a demolition fee or refundable deposits, and restrictions related to banned materials, heavy machinery, and certified deconstruction and sustainable building practices.
- Consider baseline deconstruction or recycling minimums that apply to a broad category of structures, such as all residential buildings or all single-family residential buildings, with higher thresholds and/or additional requirements for historic structures (e.g., higher recycling minimum, requirement to salvage all wood for reuse, prohibition on machine demolition).
- Since Nantucket is only one of two towns in the Commonwealth to have a demolition delay period of less than 3 months, extend the delay period to at least 6 months, and preferably 12+ months to allow sufficient time to coordinate building reuse.
- Revise the demolition delay process so that it starts with seeking Historic District Commission approval and then proceeds to public notification (posting an ad). Ensure that the demo delay process and timeline is fixed and consistent for everyone so there will be no financial incentive to try and speed up the process.
- In addition to Massachusetts Historic Preservation Tax Credits, explore additional incentives for citizens who demonstrate a commitment to building deconstruction and material reuse, such as local tax credits or jumping to the front of the building permit, Historic District Commission, and/or Zoning board queue.
- Devote resources to training motivated trades people who want to make a business of building deconstruction.
- Establish an on-island salvaged materials facility where materials can be stored for sale and distribution. Explore the feasibility of expanding the 'Take It or Leave It' operation at the DPW to handle salvaged building materials, as well as the potential for a public-private partnership model to create and operate the facility. Also, put forward a proposal for a small public-facing space in the downtown area, showcasing high-end salvaged materials, including an online inventory of the materials available at the main facility. Develop a viable on-island distribution network of used building materials and offer deep discounts or free materials to affordable housing groups.
- As an interim approach until the ordinance and/or on-island salvaged materials facility can be established, partner with an existing building materials reuse operation off-island (e.g., EcoBuilding Bargains, Boston Building Resources) to store salvaged materials in transportation containers on island and have them periodically transported to the mainland for resale.
- Employ pilot concepts such as the Habitat Nantucket and Habitat Cape Cod proposal for a deconstruction pilot to send trained deconstruction specialists to Nantucket to perform

targeted deconstruction on specific homes slated for demolition and then transport the materials back to the Cape Cod ReStores, with proceeds to be shared between the two Habitat chapters. Explore other deconstruction pilot concepts with the Nantucket Land Bank and/or Housing Nantucket as viable short-term solutions to demonstrate the viability of deconstruction practices while the ordinance is being developed and the on-island facility established.

- Use funds collected through deconstruction ordinance fees and fines, and salvaged building materials sold, to support affordable housing development on the island.
- Create and launch a public education and awareness effort to promote building reuse, deconstruction, material salvage and reuse, and historic preservation.
- Make the new deconstruction policy, process, and support mechanisms straightforward and easy to understand and navigate. As one of the interviewed stakeholders said, "People will do the right thing if it's not too difficult. You have to make it easy for them."

As expressed in the thoughtful guidance document, 'Building with Nantucket in Mind'[14], "On Nantucket, where historic architecture is not just the stuff of museums but of day-to-day life, its protection goes beyond merely preserving a sense of place and enters the realm of public trust." And thus, "tearing down a building, then, is not a casual affair on Nantucket. Rather it is an option of last resort."

The multiple policy approaches available to Nantucket to encourage or require deconstruction and building material reuse can substantially address the challenges of depletion of natural resources and declining landfill capacity, while supporting the goals of historic preservation, affordable housing, and the long-term sustainability of the island.

[14] Building with Nantucket in Mind: Guidelines for Protecting the Historic Architecture and Landscape of Nantucket Island, by J. Christopher Lang and Kate Stout, Nantucket Historic District Commission (1992).

Appendix

Comparison of Key Characteristics of Selected Ordinances that Require or Encourage Deconstruction

Location	Year Established / Modified	Name	Deconstruction (Encouraged/Required)	Restricts the use of heavy machinery (Y/N)	Salvage/Reuse Minimums (Encouraged/Required)	Diversion requirements (Y/N)	Source Separation (Encouraged/Required)	Applies only to structures of a certain age, size, value, or type (A/S/V/T)	Program Website Lists or Links to Reuse Resources	Uses a Scorecard or Points System	Requires a Refundable Deposit	Fines for Non-Compliance	Final Occupancy Permit May be Delayed or Withheld (Y/N)	Use Municipally Approved Waste Hauler, or Disposal Facilities	Use Municipally Approved Contractors	Online Tracking Available/Required	Primarily Administered by Planning or Building Dept	Primarily Administered by Public Works Department	Ordinance Requires Municipality to Report Program Results to Public/Legislative Body	Notable Feature
Palo Alto, CA	2020	Deconstruction and Materials Management Ordinance	R				R							Y				Y		n/a
San Jose, CA	2001	Construction Demolition Diversion Deposit Program			E	Y	E	V	Y		Y			E			Y			n/a
Portland, OR	2016, expanded in 2019 and 2020	Deconstruction of Buildings Law	R	Y				A						Y	Y		Y			Applies only to buildings built in 1940 or earlier and historic homes
Vancouver, BC, Canada	(2014, expanded 2016 and 2022)	Green Demolition By-Law	E		R	Y	R	A			Y	Y	Y				Y			Reused materials credited at 5x the rate of their actual weight
San Mateo, CA	2002	Recycling and Diversion of Debris from Construction and Demolition	E		R	Y	R	V			Y							Y	Y	Site separation required "to the maximum extent feasible" for certain materials
Los Angeles County, CA	2005	Construction and Demolition Ordinance			E	Y		V				Y						Y		n/a
Concord, CA	2007	C&D Materials Recycling Ordinance				Y		V			Y	Y		Y		R		Y		Must self-haul, use approved hauler, or request a waiver
Madison, WI	2010	Construction and Recycling Ordinance	E			Y		S, T	Y							A				Program website provides extensive resources for deconstruction and reuse

Location	Year Established / Modified	Name	Deconstruction (Encouraged/Required)	Restricts the use of heavy machinery (Y/N)	Salvage/Reuse Minimums (Encouraged/Required)	Diversion requirements (Y/N)	Source Separation (Encouraged/Required)	Applies only to structures of a certain age, size, value, or type (A/S/V/T)	Program Website Lists or Links to Reuse Resources	Uses a Scorecard or Points System	Requires a Refundable Deposit	Fines for Non-Compliance	Final Occupancy Permit May be Delayed or Withheld (Y/N)	Use Municipally Approved Waste Hauler, or Disposal Facilities	Use Municipally Approved Contractors	Online Tracking Available/Required	Primarily Administered by Planning or Building Dept	Primarily Administered by Public Works Department	Ordinance Requires Municipality to Report Program Results to Public/Legislative Body	Notable Feature
City of Boulder, CO	2008	Construction Waste and Deconstruction Management Ordinances	R		E	Y					Y							Y		Replaced Boulder Green Building Points Program in 2017
Boulder County, CO	2015	BuildSmart residential green building code	R		R		E	T									Y			Requires that cabinets, dimensional lumber, flooring, and solid core doors be donated, reused, or sold
Evanston, IL	2011	Green Building Ordinance	E		E			S, T		Y			Y				Y			Projects must meet a certain number of sustainability measures that include salvaging reusable materials and using recycled materials
Cook County, IL	2012	Cook County Demolition Debris Diversion Ordinance			R	Y		T				Y								In addition to salvage requirement, there is a 5% reuse requirement
King County, WA	2013	Green Building and Sustainable Development	E			Y			Y	Y		Y					Y			No specific diversion % but bans certain materials from landfill disposal (clean wood, cardboard, metal, new gypsum scrap)
Austin, TX	2016	Construction & Demolition Recycling Ordinance				Y		S,T						E				Y	Y	Diversion achieved through choice of diversion minimum % or disposal maximum weight; Diversion/Disposal Limits increase/decrease in 2020, 2030
Milwaukee, WI	2018	Deconstruction Ordinance	R	Y		Y		A,T	Y			Y			Y		Y			Appears modeled on Portland Ordinance

Summary Characteristics of Selected Ordinances that Require or Encourage Deconstruction

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Palo Alto, CA (2020)	Deconstruction and Materials Management Ordinance Palo Alto Municipal Code Title 5: Health and Sanitation Chapter 5.24	"All applicants and other persons who undertake a covered project where materials can be recycled or composted shall deconstruct buildings and structures in a manner to divert the maximum feasible amount of materials and debris from disposal in landfills." All construction and deconstruction materials shall be source separated for reuse, recycling, and composting, as designated by the City.	• All residential and commercial projects that include a whole structure demolition requiring a demolition permit (does not apply to those projects comprised solely of the demolition of an accessory dwelling unit) • Excludes dangerous structures ("structurally unsafe or otherwise hazardous to human life") and those with no suitable materials as determined by the Director of Public Works	• Salvage survey completed by a reuse organization or other third party approved by the city, prior to the issuance of a demolition permit. The survey shall itemize the materials and items eligible for salvage and reuse and the estimated weights. • Must submit proof of reuse, recycling, and composting • The City is authorized to inspect and audit individual waste streams generated at covered projects to determine compliance • Must use waste containers provided by the city's collector (no unauthorized collectors may place containers within the city)	Director of Public Works	• Violations are subject to the provisions and penalties set forth in Title 1 of the Municipal Code which includes: Fine of up to $250.00 for infractions; Fine of up to $1,000.00 or by imprisonment in the county jail for up to six months, or both, for violations; Multiple infractions within a preestablished time period can be upgraded to violations. Each person is guilty of a separate offense for each and every day during any portion of which any violation of any provision of this code is committed, continued or permitted

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
San Jose, CA (2001)	Construction Demolition Diversion Deposit Program San Jose Municipal Code section 9.10, part 15 (Section 9 governs Health and Safety)	Deposit charged based on building square footage, refundable upon documentation that a minimum of 50% of construction materials was recovered and diverted from landfill. Program recommends compliance through: (1) Source separating by material (e.g., cardboard, metal, wood, etc.) into individual bins to achieve higher recycling rates; (2) Commingle recyclable materials into one bin and deliver to a City-Certified C&D facility that specializes in sorting mixed C&D materials; or (3) Salvage and reused onsite.	• All residential alterations of $2,000 or more • All non-residential alterations of $5,000 or more • All residential and non-residential demolitions • Notable exclusions: Residential construction projects of less than $115,000 in value, and new nonresidential construction projects of less than $135,000 in value.	• Receipts documenting diversion deposits are collected and refunded upon verification; • Reuse and donation require documentation such as photos, estimated weight quantities, or receipts from donation centers listing materials and quantities. • For materials salvaged and reused onsite, must estimate the quantities, document the reuse with pictures, and keep records of all weight tickets and donation receipts. • The program website provides a map of local reuse and salvage businesses.	Director of Environmental Services and the Health Officer	• Issuance of building permit is subject to payment of deposit fees • Certificate of final occupancy is subject to compliance • Deposit forfeiture

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Portland, OR (2016, expanded in 2019 and 2020)	Deconstruction of Buildings Law (City Code Chapter 17.106) See also: Deconstruction ordinance Deconstruction resolution	• Work must be performed by a Certified Deconstruction Contractor (the agency provides a list of current Certified Deconstruction Contractors); • Deconstruction sites must have a posted sign visible to pedestrians and motorists that notifies that the structure is being deconstruction and provides city contact information for questions or concerns; • Heavy machinery may only be used to assist in the salvage of materials for reuse or to remove material not required to be salvaged for reuse, and may not be used in ways that render materials unsuitable for salvage	• Primary dwelling structures that were built in 1940 or earlier according to building permit records on file with the Bureau of Development Services (or County tax assessor information if no permit records exist) • Primary dwelling structures that have been designated as a historic resource subject to the demolition review or 120-day delay provisions of Title 33.	• Building permit applications require a completed Pre-Deconstruction Form • Certified Deconstruction Contractors must maintain receipts for donation, sale, recycling, and disposal of all materials for any deconstruction project. • Materials intended for reuse on site must be documented with photographs. • The Director may ask that a Certified Deconstruction Contractor produce the receipts or photographs for inspection any time until the demolition permit is approved to be finaled. • A completed Post-Deconstruction Form and all required documentation must be submitted to the Bureau of Planning and Sustainability before a demolition permit can be approved as finaled.	Director of the Bureau of Planning and Sustainability	Violations by any party: • Fine of up to $500 for the first violation, up to $1,000 for the second violation, and $up to $1,500 for the third and subsequent violations by the same person • Penalties may be imposed on a per month, per day, per incident, or such other basis at the Director's discretion Additional enforcement actions for Certified Deconstruction Contractors: • First violation: Removal from list of approved Certified Deconstruction Contractors for up to 6 months; • Second violation: Removal from list of approved Certified Deconstruction Contractors for up to 12 months; • Third and subsequent violations may result in revocation of certification whereby a contractor may not apply for recertification for a period of 18 months.

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Vancouver, BC, Canada (2014, expanded 2016 and 2022)	Green Demolition By-Law No. 11023	A $14,650 deposit (in addition to the permit application fee) is required as part of the application for a demolition permit. The deposit will be refunded if the following reuse, recycling, and salvage requirements are met: • 75% of materials by weight must be reused or recycled for houses built before 1950; • 90% of materials by weight must be reused or recycled for houses built before 1950 and deemed as a character house by the building department; • Minimum wood salvage requirement of 3 metric tons for houses listed on the Vancouver Heritage Register or built before 1910. • Any material that is reused rather than disposed of or recycled, can be credited towards compliance at a rate of 5 times its actual weight	• Minimum salvage (deconstruction) requirement applies to houses built before 1910 • Minimum reuse and recycling requirements apply for demolition of homes built before 1950 • Applies to non-hazardous materials only • Structures being moved may be exempted	• Recycling and reuse plan as part of the building or development permit application • Recycling and reuse compliance form when demolition is complete • A wood salvage report for demolition of heritage listed, or pre-1910 houses	Chief Building Official	• Suspend building permit issued • Fine of $250 to $10,000 for each offence • Offences of a continuing nature subject to fine of $250 to $10,000 for each day the offence is continued

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
San Mateo, CA (2002)	Construction and Demolition Debris Ordinance Chapter 7.33 Recycling and Salvaging of Construction and Demolition Debris	"It shall be the responsibility of the owner, the general contractor and all subcontractors to recover the maximum feasible amount of salvageable materials prior to demolition." Diversion requirements: 100% of inert solids such as soil, concrete, and asphalt must be recycled (but do not count toward diversion goals) 60% diversion for demolition and new construction, 50% for renovation/alteration Recovered or salvaged materials may be given or sold on the premises, or may be removed to a reuse warehouse or other reuse facility for storage or sale Site separation required "to the maximum extent feasible" for: • Scrap wood, clean green waste • Gypsum wallboard, dimensional lumber, cardboard (new construction) • Recyclable/reusable materials must be kept separate from non-recyclable/non-reusable materials Deposit requirements: • Minimum deposit $1,000 • Residential and commercial demolition: $1/square foot • New construction/renovation: 3% of project cost up to $10,000	All new construction or full demolition of all residential and commercial buildings of any value Alteration of any building where the value of the alteration is $50,000 or greater Exemption may be granted for projects where more than 40% of waste tonnage is non-recyclable/non-reusable	Construction & Demolition Recycling & Waste Reduction Plan Form An estimate of the tonnage of C&D debris generated How the material will be separated/ collected What machinery will be used for the work and transport of materials Within 60 days of project completion, contractor must submit documentation showing actual tonnage data for diverted and disposed materials, supported by receipts and weight tags or other records of measurement from recycling companies, deconstruction contractors and/or landfill and disposal companies. Director of Public Works must report annually the number and type of permits issued, the number and type of projects covered by diversion requirements, the total tonnage generated and the estimated diversion resulting from these projects.	• Director of Public Works	• Forfeiture of deposit

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Los Angeles County, CA (2005)	C&D Debris Recycling and Reuse Ordinance (Los Angeles County Code Chapter 20.87 Ordinance No. 2005-0004)	Minimum 50% of C&D materials generated, no more than two-thirds of which may be inert materials, must be reused or recycled. Minimum 50% of all inert materials must be reused or recycled. .	• Any work requiring one or more permits with a total value greater than $100,000 • Demolition of structures (regardless of the value of the demolition work)	• Construction and Demolition Debris Recycling and Reuse Plan • Monthly Progress Report (for County projects; all other projects require an initial progress report at 90 days and then annual progress reports • Final Compliance Report to be filed within 45 days of project completion	Director of the Department of Public Works	• Fine up to $100 for the first violation, $200 for the second violation, and $500 for each subsequent violation • Each day of a continuing violation constitutes a separate violation (unless corrected within 30 days) • $250 fine per ton or fraction of a ton not compliant with regulation • Fines are capped at 15% of total project value or $50,000 whichever is less • Fines are deposited into the County "Solid Waste Management Fund"
Concord, CA (2007)	C&D Materials Recycling Ordinance Concord Municipal Code Title 8 Article III Construction and Demolition Waste Recycling – Section 8.20.370	Minimum 65% of waste materials (and 75% of inert debris - waste that is neither biologically nor chemically reactive) generated from C&D projects must be diverted from landfill. Must self-haul, use a pre-designated Affiliate hauler, or submit a Request for Concord Disposal Hauling Services and/or Waiver Number Applicants pay a Performance Security Fee, refunded if program requirements are met, based on permit value: 1.5% of valuation for projects valued $10,000-49,999 (min. fee of $500) 2.0% of valuation for projects valued $50,000 or greater (max fee $25,000) Applicants also pay a non-refundable Program Fee of 0.3% of the permit value (e.g., $105 for a $35,000 project) that covers program administrative costs	All demolition projects Residential or commercial projects with total costs valued at $50,000 or greater, City-owned/City-sponsored project with total costs valued at $150,000 or greater. Certain roofing projects	Prior to demolition or hauling, applicants must create a Debris Recovery Plan online at http://concord.wastetracking.com, a platform hosted by Green Halo Waste Management Scan and upload all recycling facility receipts/tickets/reports to Green Halo Once all receipts are uploaded and the final building inspection is complete, Green Halo creates a report that is submitted to the City	Waste Management Compliance Official	Fines up to $10,000/day Suspension of demolition, permit rejection Civil action, misdemeanor prosecution

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance

Madison, WI (2010)	Recycling and Reuse of Construction and Demolition Debris	• Buildings projects of steel and concrete supports must recycle or reuse 70% of materials.
		• Wood supported structures and remodeling projects exceeding $20,000 must reuse or recycle 100% of the following materials:
		  ○ Untreated wood
		  ○ Non-toxic metals
		  ○ Scrap drywall
		  ○ Corrugated cardboard
		  ○ Shingles.
		• Demolition permit holders are referred to the Deconstruction Manager for Habitat for Humanity ReStore to determine if there are items such as wood flooring, cabinets, windows, doors, or other materials that the ReStore can remove for resale (contributions are tax deductible).
			• All demolitions
			• Construction and renovation of multifamily residential buildings of concrete and steel construction
			• Construction and renovation of commercial buildings of steel and concrete construction 1,000 square feet or larger;
			• Residential structures (single family and multifamily) of wood frame construction
				• Recycling & Reuse Plan
				• Compliance Report
				  ○ Must document recycled and landfilled materials with weight tickets/receipts supplied by the recyclers and landfill.
				  ○ Reuse documented with receipts of donation to Habitat for Humanity or other reuse organization.
				• Option to submit report using WasteCapTRACE online system or email written report and supporting documentation to the Recycling Coordinator (the City provides a sample form but individuals and companies may use their own form or other reporting system)
					• Street Superintendent, Streets & Recycling Department	• Fines ranging from $25 to $500 per percentage point under threshold
						• Fines ranging from $250 to $1,000 for submission certification with false representation

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Boulder, CO (2017)	Construction Waste Recycling and Deconstruction Management Ordinances (Ordinance 8366, repealed prior Boulder Green Building Points Program initiated in 2008)	Construction projects must demonstrate that all recyclable wood, metal, and cardboard materials will be donated, reused, or recycled. Demolition projects required to divert for reuse or recycling 75 percent of the existing building materials by weight from the deconstruction (including 100 percent of concrete and asphalt). Applicants pay a small administrative fee ($212) and a refundable deposit equal to $1 per square foot of demolition or renovation area (minimum deposit of $1,500)	• New construction • Full demolition • Level 4 Alterations	• Sustainable Deconstruction Plan proposing to divert at least three of the indicated material types (required for all full demolition and Level 4 Alteration projects) • Construction Waste Recycling Application (required for all new construction) • Construction & Demolition Waste Diversion Tracking spreadsheet and all hauler receipts, weight tickets and facility sign-offs/invoices • Submit final completed waste diversion report showing tonnage of materials salvaged for recycling and reuse, supported by original weight receipts or documentation that verifies that materials generated from the site have been accepted for recycling, reuse, or salvage.	• Planning & Development Services department	• Permit rejection • If the required diversion percentage is not fully complied with, the remainder of the deposit shall be forfeited to the city as a civil penalty
Boulder County, CO (2015)	BuildSmart residential green building code	Section N1101.15 makes deconstruction mandatory Requires that cabinets, dimensional lumber, flooring, and solid core doors be donated, reused, or sold Section N1101.16 requires that all construction jobsite waste be recycled including wood, scrap metal, cardboard, and concrete Source separated or mixed load sent to a recycling center that will verify weights by material	• All new residential construction and additions in unincorporated Boulder County, CO	• Deconstruction plan, written description of deconstruction work, or the County Deconstruction Checklist • Recycling plan • Verification of deconstruction including receipts or a written log, maintained by the homeowner or general contractor, which includes the volume or weight of materials and the destination where they were transported • Verification of recycling	• Building Division	• Buildings that are demolished or partially demolished rather than deconstructed will receive a stop work notice for up to 30 days

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Evanston, IL (2011)	Green Building Ordinance	• Requires that projects meet a specified number of Evanston Sustainable Building Measures for Interior Renovations (ESBMIR) or Evanston Sustainable Building Measures for New Construction (ESBMNC) – • ESBMIR requirements (for renovations): o 3 measures for projects <5,000 square feet; o 5 measures for projects 5,000-20,000 square feet; o 7 measures for projects >20,000 square feet o The 27 ESBMIR measures include (1) Sell, donate, or reuse 10% or more of existing project materials, (2) Use recycled content materials for no less than 10% of project materials, (3) Use recycled content materials for no less than 20% of project materials (counts as 2 measures). • ESBMNC requirements (for new construction/additions): o 8 measures from at least 5 ESBMNC categories o The Materials and Reuse Category includes a Construction Waste Management measure "Recycle and/or salvage at least 50% of non- hazardous construction and demolition materials and waste.	• New construction or additions to all City-owned or City-financed buildings • Commercial and multi family buildings of 10,000 square feet or more • Interior renovations	• ESBMIR Measure Summary • ESBMNC Measure Summary • Post-Construction documentation that measures were met submitted to building official before Final Certificate of Occupancy may be issued	• Building Inspection Services Department	• Final Occupancy Certificate withheld

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Cook County, IL (2012)	Cook County Demolition Debris Diversion Ordinance	5% re-use requirement for residential structures 70% diversion requirement for residential and commercial structures	All demolition activities affecting any structure except garages, sheds, utilities, and projects that do not demolish any load bearing walls.	Demolition Debris Diversion Plan estimating the amount of waste, means of transport, and destination of debris Demolition Debris Diversion Report within 45 days of project conclusion Both the Plan and Report are submitted online at www.greenhalosystems.com Permit holder must retain all receipts and weight tickets for materials reused, recycled, or landfilled for a 3-year period after completion	Cook County Department of Building and Zoning	$1,000 fine for demolition without a permit $1,000 fee for failing to complete and submit required documentation $5,000 fine for failing to divert demolition debris as required Fines ranging from $500-$3,000 for mishandling of debris
King County, WA (2013)	Green Building and Sustainable Development Ordinance	All construction projects that are LEED eligible must achieve LEED certification Projects not eligible for LEED certification must use the Sustainable Infrastructure Scorecard, a sustainable development scorecard developed by the County The scorecard includes points for reuse of salvaged materials, use of on-site materials for construction, use of materials obtained within 500 miles of the jobsite, and points for projects designed for future deconstruction (scorecard guidelines). Deconstruction is encouraged, though not required The following materials are banned from landfill disposal: Clean wood (untreated, unpainted) Cardboard Metal Gypsum scrap (new) Asphalt paving, bricks, concrete	All construction and demolition projects	At 30% design, must submit: King County Sustainable Infrastructure Scorecard, LEED checklist, or alternative rating system checklist Construction and Demolition Plan Annual reporting form (Appendix F) Construction and Demolition report (at project completion)	Green Building Team Division	Code citation Up to 60 days of civil penalties followed by legal prosecution

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Austin, TX (2016)	Construction & Demolition Recycling Ordinance	• Projects must meet either diversion minimums or disposal maximums • Disposal limits and diversion requirements initially imposed in 2016; disposal limits decrease, and diversion requirements increase in 2020, and 2030 • Diversion requirements: o 2016 = 50% minimum o 2020 = 75% minimum o 2030 = 95% minimum • Disposal limits: o 2016 = 2.5 pounds per square foot of project area max o 2020 = 1.5 pounds per square foot of project area max o 2030 = 0.5 pounds per square foot of project area max • Qualified processors are registered by the City for 2-year periods	Construction projects requiring permits for more than 5,000 square feet of new, added, or remodeled floor area Commercial and multifamily residential demolition projects of any size	Project disposal and diversion report must be submitted at the time final inspection is requested Report must include quantities of materials: Put to beneficial use onsite; Delivered to a qualified processor; Delivered to a processor or end-user and diverted for beneficial use; Delivered to a processor or end-user and disposed; Delivered directly to a disposal facility; City Manager is required to report the economic impact of disposal and diversion rates on household affordability and assessment of future markets for reuse of construction and demolition materials to the City Council in 2020 and 2030.	Austin Resource Recovery Department	Failure to comply with disposal limits or diversion minimums is a Class C misdemeanor punishable by up to $500 per day, per offense Qualified processors may be suspended for failure to comply

Location (Year estab.)	Ordinance Name	Summary	Applicability	Reporting	Administrative Responsibility	Penalty for Non-Compliance
Milwaukee, WI (2018)	Deconstruction Ordinance	Requires deconstruction Work must be performed by a certified Deconstruction Contractor listed on the building department's website Heavy machinery may only be used to assist in salvage materials for reuse or remove material not required to be salvaged; may not be used in ways that render building components unsuitable for salvage Salvaged material may be sold, donated, or reused on- or off-site Must document 85% diversion by weight	1-4 unit residential buildings built in 1929 or earlier, designated historic structures, and structures in historic districts. Exemptions for buildings to be moved, structures too unsafe for deconstruction, and buildings made primarily or substantially of materials not suitable for reuse	Completed post-deconstruction form Receipts for donation, sale, recycling, and disposal of all materials Photos of materials reused on site and those for which no disposal receipt is obtainable	Building Commissioner	Penalty of up to $100 for the first violation, up to $2,000 for the second violation, and up to $3,000 for the third and subsequent violations by the same person Penalty up to $20,000 for improper use of heavy machinery Penalties may be imposed on a per month, per day, per incident, or such other basis at the Director's discretion Removal of a contractor from the list of certified deconstruction contractors, or revocation of a contractor's certification as a certified deconstruction contractor.