

family and duplex housing, which offers multiple advantages as a beginning phase of regulation. These advantages include a clear framework for regulation using a fee-based incentive, a steady and predictable number of demolitions each year (up to 50% of all Victoria demolitions), and greater flexibility to accommodate the costs and time associated with material salvage. As capacity grows, experience is gained, and costs are reduced, regulation can expand to the majority of demolition projects across the community.

PURPOSE

The purpose of this report is to provide Council with options to motivate the salvage of reusable and recyclable materials from building demolitions to enhance the well-being of the community.

BACKGROUND

Between 10,000 and 20,000 tonnes of construction and demolition materials generated in Victoria are landfilled each year, representing up to 37%¹ of Victoria's waste. Wood products make up about two-thirds of landfilled material from the built environment².

Regulating building demolition material disposal through municipal authorities offers an opportunity for the City to make a significant impact towards reducing landfilled waste from the construction sector.

Council has previously directed staff to report back on considerations for sustainable building demolitions that maximize resource and material recovery, safeguard heritage value, and include affordability, community well-being, safety, economics, and other sustainability considerations.

On December 10, 2020 Council approved Zero Waste Victoria, the City's plan to reduce waste disposal across the community by 50% by 2040. The built environment was identified as a focus area with substantial waste reduction opportunities and Council directed staff to address demolition waste reduction as part of Zero Waste Victoria's short-term action plan (2021 – 2023).

This report outlines the current state of demolition activities in Victoria and opportunities to reduce the quantity of reusable and recyclable building materials sent to landfill. Focusing on the salvage of reusable building materials aligns with guiding principles of Zero Waste Victoria and supports the Circular Economy.

ISSUES & ANALYSIS

Opportunities for the City to encourage the diversion of construction materials from the landfill by salvaging and reusing materials from building demolitions is informed by local market conditions and considerations related to key enabling industry sectors. These include builders and developers, deconstruction service providers, and reusable and salvaged material resellers. A successful program depends not only on these conditions and actors but also on the industry's ability to navigate a range of City objectives and requirements that impact development. This section outlines the current policy context, economic costs and benefits, and readiness of the market to salvage reusable building materials from building deconstruction.

¹ Between 50 – 75% of construction waste is estimated to leave the region and therefore not included in the reporting of material at the Hartland landfill.

² CRD; December 2016; 2016 Solid Waste Stream Composition Study; <https://www.crd.bc.ca/docs/default-source/recycling-waste-pdf/WasteCompositionStudy2016.pdf>

Demolition Waste Impacts

Regionally, materials from construction activities make up approximately 20% of the waste sent to the Hartland Landfill². Up to 37% of Victoria's landfilled waste comes from the construction sector¹ and most of this material is wood. Additional construction materials landfilled in the region include asphalt shingles, roofing felt, insulation, and plastics².

In addition to taking up space in the landfill, construction waste represents a lost economic opportunity, as much of the material could be reused or recycled. Hazardous materials are also a concern. Asbestos-containing material must be separated and managed as a hazardous waste. Other potentially hazardous materials include lead-based paint, mercury, PCBs, and mold.

Recycling markets exist for concrete, asbestos-free drywall, and metals. Clean wood can be recovered for use as a fuel. However, the common practice of demolishing buildings with heavy machinery and disposing mixed waste discourages recycling and recovery of materials. It is also possible to avoid Hartland Landfill tipping fees by transporting waste to landfills not authorized under provincial legislation, including those outside the region. There is a lack of oversight of these activities.

Hartland Landfill has a hazardous materials programs for construction waste and disposal bans for concrete, metals, and drywall. Apart from these measures, few requirements have been developed to address the management of construction, renovation, and demolition waste in the region. The Capital Regional District's (CRD) draft Solid Waste Management Plan identifies this waste stream as a priority for short term action³. In official response to the draft plan, City of Victoria encouraged the CRD to support municipal salvage and diversion initiatives by:

- Implementing landfill bans and/or surcharges for reusable and recyclable construction waste.
- Developing a regional deconstruction guide.
- Facilitating compliance by licensing recycling and transfer facilities in the region.

Building Material Salvage and Reuse

Deconstruction is the systematic dismantling of a structure so that building materials can be salvaged and reused. Framing lumber, doors, windows, flooring, appliances, cabinets, and other architectural features have value in the resale market today. These materials can be salvaged when a building is deconstructed. Recent deconstruction of three houses in Vancouver showed 8 to 13 tonnes of lumber and flooring per building salvaged for reuse⁴. The recent deconstruction of a 24,000 square foot distillery from 1929 in the Lower Mainland yielded 80 tonnes of salvaged old growth fir and cedar⁵. Other materials, including concrete, drywall and wood that cannot be reused, can be separated for recycling.

The following figure illustrates the composition of a typical 2,000 square foot home^{4,6} expected to yield approximately 100 tonnes of reusable, recyclable, and waste materials.

³ CRD; March 31, 2021; Solid Waste Management Plan – Final Draft; <https://www.crd.bc.ca/project/management-plan>

⁴ City of Vancouver; Deconstruction: case studies for maximizing salvage; <https://vancouver.ca/home-property-development/demolition-permit-with-recycling-requirements.aspx>

⁵ Information provided by Unbuilders

⁶ Metro Vancouver; Demolition Waste Generation Rates Calculator; <http://www.metrovancouver.org/services/solid-waste/wte-and-disposal/construction-waste/Pages/Calculator.aspx>

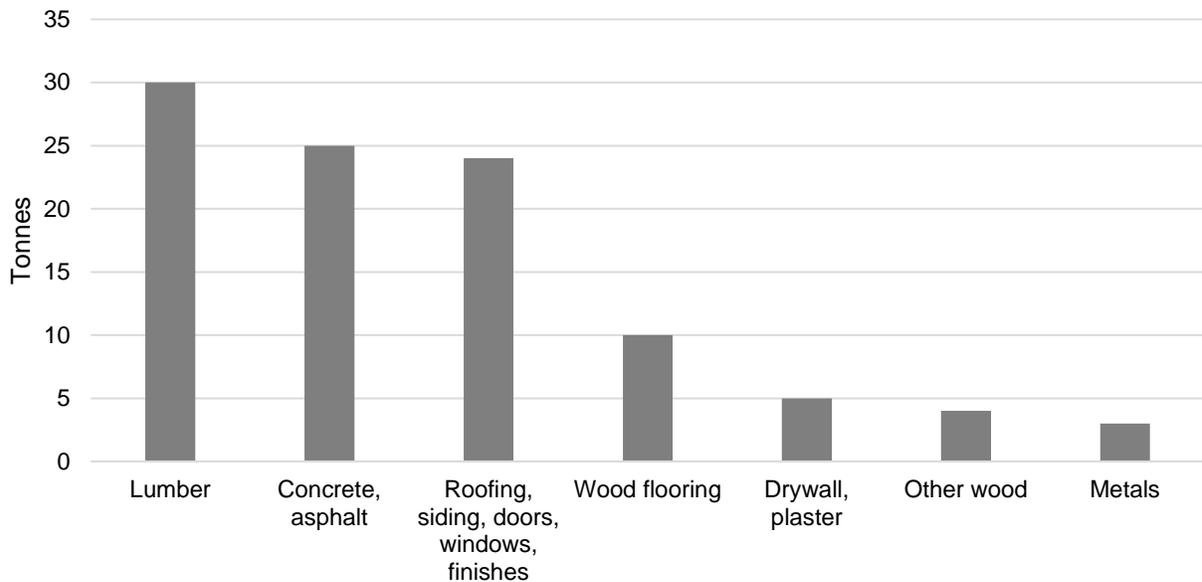


Figure 1. Material composition of a typical single-family house.

The wood salvaged from homes built before the 1960s is typically old growth timber. Older homes in Victoria were built using old growth wood for structural elements (e.g., posts, beams, joists, rafters, studs), flooring and design features. Old growth lumber is more dense, stronger and more resistant to rot and damage compared with common timber used in current construction. As a result, old growth material has significant economic and cultural heritage value.

The economic value of salvaged old growth wood can help to offset the additional cost of deconstruction. The material is highly valued for numerous design applications such as feature walls, countertops, mantels and furniture. Wood flooring can be refinished and used again as flooring.

Deconstruction Program Precedents

Recommendations in this report are drawn from the experience of other local governments that have taken action to reduce demolition waste by salvaging reusable and recyclable materials.

Numerous North American cities require deconstruction and salvage in place of conventional demolition using heavy machinery. Several cities require deconstruction of houses built before a certain decade. Others have deconstruction programs for civic buildings and infrastructure, or as part of heritage preservation. The City of Palo Alto, California is unique in requiring deconstruction for all ages and types of buildings, including residential and commercial buildings. The City of Portland, Oregon is also noteworthy for its mature network of deconstruction contractors and salvaged materials vendors. Victoria has the potential to develop a similar robust network of supportive industries and businesses.

The City of Vancouver requires reusable material salvage for houses built before 1910 and for certain heritage homes built before 1950. Five Lower Mainland municipalities (including Vancouver) have bylaws that require diversion and recycling of demolition waste. The regulations use a refundable fee to motivate performance and require documentation to demonstrate compliance.

In addition to waste reduction, other municipalities also note improved hazardous materials abatement and reduced nuisance to neighbours as benefits from deconstruction and material

salvage. Careful disassembly of a structure to separate materials for salvage and recycling, instead of conventional demolition and removal of mixed waste, has been reported to reduce noise and dust.

Development and Economic Considerations

Costs and Time: Deconstruction is labour-intensive and generally more expensive than conventional demolition. However, cost reduction opportunities exist through the sale of salvaged materials and from income tax credits for material donations. The recent documented costs to deconstruct three houses in Vancouver ranged from \$12,000 to \$30,000 after the sale of salvaged lumber⁴. Permit data indicates the median cost for demolition of a single-family house in Victoria is \$12,000.

Deconstruction takes several weeks to complete compared to conventional demolition that is often completed in several days. The dismantling process is done by hand, with possible machine assistance, to salvage and separate materials.

Economic Opportunity: The value of old growth timber and other salvaged building materials, and the labour required for deconstruction, present local economic and employment opportunities. Deconstruction is estimated to create six to eight jobs for every one job in conventional demolition⁷. Many of these jobs are entry level or low-barrier positions that enable transition to higher skilled employment in the construction sector.

The adoption of deconstruction as common practice in the region will also create new business opportunities for deconstruction contractors, salvaged material vendors and distributors, material refurbishers, and manufacturers specializing in creating products from reusable and recyclable material inputs. Charitable organizations that accept donated materials will also benefit.

Demolition in Victoria

Between 40 and 60 buildings are demolished each year across Victoria. Single-family homes represent most of the demolitions at 74%, with the remaining demolitions split between commercial (15%), multifamily (9%) and institutional (2%) buildings. Although select areas of the city are being redeveloped with new multifamily housing, roughly 70% of demolished single-family homes are replaced with new single-family or duplex housing. The following figure shows the vintage of demolished single-family homes between 2015 and 2019, indicating most residential demolitions in Victoria have considerable opportunity to salvage valuable reusable building materials.

⁷ Elliot, K., E. Locatelli and C. Xu; May 20, 2020; A Business Case for Deconstruction: The Economic and Environmental Impacts of a Demolition-Deconstruction Shift in Metro Vancouver; prepared for Unbuilders and Vancouver Economic Commission

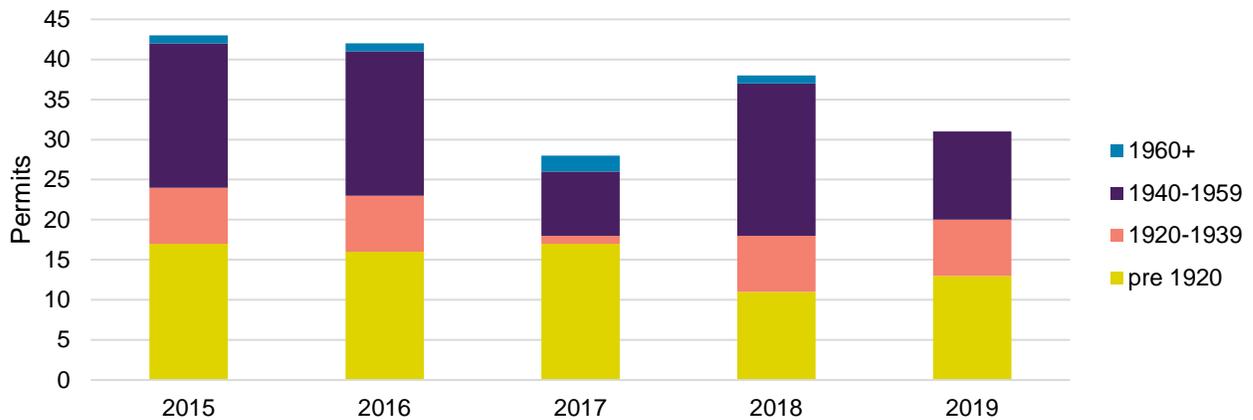


Figure 2. Number of single-family dwelling demolition permits by construction decade.

Staff estimate that the salvage of all reusable and recyclable material from demolished single-family homes alone could divert approximately 3,000 tonnes of waste per year from the landfill⁸. This represents roughly 15% of the Zero Waste Victoria waste reduction target. Materials salvaged from multi-family, industrial, commercial, and institutional buildings present future waste reduction opportunities.

There is existing market capacity to increase building material salvage in the region with currently one deconstruction service provider operating in Victoria and several salvaged material vendors on Vancouver Island and in the Lower Mainland.

Integration of Policy Objectives

A program to motivate the salvage of reusable material from building demolitions requires consideration of other City policy objectives. The following table summarizes key overlapping policy considerations.

Objective	Considerations for Demolition Waste
Housing and affordability	<p>The Victoria Housing Strategy addresses housing and affordability in the community, including encouraging new housing supply and a range of housing options.</p> <p>New regulations for demolition waste should consider impacts to the development of affordable non-market, market rental, or missing middle housing (e.g., duplexes, houseplexes and townhouses). A phased transition, applying new requirements initially to developments where a single-family home is demolished and replaced with a new single-family home, would avoid impacting missing middle and rental developments.</p> <p>The City's house conversion policy aligns with Zero Waste Victoria by supporting the adaptation of existing houses to create additional residential units, keeping existing buildings in use.</p>
Heritage	The City's Heritage Program seeks to preserve heritage value in community

⁸ Future demolition trends and improved construction sector waste data will enable refinement of this estimate.

preservation	<p>buildings. The program includes the Heritage Register, heritage designation, conservation areas, and incentives.</p> <p>Deconstruction is not a form of heritage conservation, since it dislocates physical features that contain interpretive information about the history of the site. However, the salvage and reuse of historic building materials is preferable to their destruction.</p>
Climate action	<p>The City’s Climate Leadership Plan includes a target to eliminate organic materials sent to the landfill by 2030. Landfilled wood is an organic material that generates methane, a greenhouse gas (GHG).</p> <p>Salvaging wood during building demolition diverts this material from the landfill. Further reduction of embodied emissions is possible through the reuse of salvaged building materials.</p>
Economic development	<p>The City’s economic action plan, Victoria 3.0, is a long-term plan and vision for a sustainable, influential city. The plan emphasizes innovation, resilience, and low-carbon prosperity.</p> <p>Deconstruction is an innovative approach to building demolition. Salvaging and reusing building materials creates new economic opportunities and jobs⁷, including low-barrier and entry level employment within the deconstruction, recycling, charitable reuse, and resale sectors. Innovations in advanced wood processing are also emerging that present potential future opportunities to reintegrate salvaged wood into construction materials.</p> <p>New requirements for demolition waste should consider impacts to the local business community and seek to support industry transition to new practices, including growth of the salvaged materials market.</p>
Urban forest enhancement	<p>The Urban Forest Master Plan includes goals to protect Victoria’s urban forest, encourage community support, and maximize community benefit.</p> <p>The presence of trees on boulevards or private property can prevent a house from being moved, which substantially avoids waste generation. Staff can look for options to balance the objectives of tree preservation and waste reduction.</p>

Opportunity for Phased Market Transition

While market capacity exists in the region for deconstruction services and salvaged material vendors, it is important that the City’s efforts to encourage the salvage of reusable materials align with the service providers’ ability to meet new demands while also ensuring materials continue to find their way to robust and legitimate resale markets.

Considering these current capacity limitations and the City’s housing and affordability goals, staff have identified an opportunity to phase-in a regulation for the salvage of reusable and recyclable materials over time. This approach considers the application of a fee-based regulation initially for a subset of demolition projects matched to existing capacity. A preferred initial subset of projects comprising situations where a demolished building is being replaced with a new single-family house or duplex provides the following advantages:

- Accounts for over 50% of all demolitions in Victoria, an ambitious but manageable amount.
- Presents steadiness and predictability for industry.
- Allows for the design of a clear and consistent municipal regulatory framework to incentivize performance using a refundable fee.
- Maintains fewer requirements compared to rezoning and development permit projects.
- Offers greater flexibility to accommodate costs and time.

Starting with an initial subset of building demolitions is expected to create demand that will encourage more local deconstruction service providers and competition that will lead to new innovations and reduced costs. It is anticipated that the City would expand the regulation over time to include additional building or development types, aligned with growth in the capacity of the market.

Engagement

In Summer 2020, staff led a construction industry focus group to review strategies and priority actions for Zero Waste Victoria. The discussion indicated opportunities for deconstruction in Victoria.

In February and March 2021, staff convened targeted industry stakeholders to review technical and economic considerations specific to policy options for reusable material salvage from building deconstruction. Participants included representatives from construction and development industry associations, as well as from businesses currently involved in deconstruction and material resale. A total of 12 virtual sessions were held involving 20 industry participants. Participants provided the following feedback:

Builders and Developers:

- Most participants supported a regulatory program with refundable fees for the salvage of reusable materials. One industry association representative opposed regulation and preferred a voluntary approach.
- Predictability, simplicity, and outcome-based rules are valued.
- Choosing deconstruction over demolition is a way of demonstrating environmental stewardship, which is important to many clients in Victoria.
- Most participants supported a phased transition, with the development scenario of a single-family home being taken down and replaced with another single-family home as an appropriate initial subset.
- Regional alignment would be beneficial.

Salvaged Materials Distributors and Vendors:

- There is strong demand for salvaged materials on Vancouver Island.
- The lack of physical space in the region to store and sell salvaged materials limits the resale market.
- Electronic platforms can support material resale, but physical space is still needed.
- The capacity of the resale market will be important for success, including knowledge about the value of different materials, and how to store and sell them.
- A phased approach will build resale market capacity.

The primary deconstruction company operating in the Lower Mainland and on Vancouver Island supports regulations for material salvage. They expect to complete 40 residential and 6 to 10 commercial projects in the Lower Mainland this year. They are also growing their operations on Vancouver Island and have capacity to manage additional projects in Victoria while innovating to reduce the time and cost for deconstruction.

OPTIONS & IMPACTS

Policy and program options for the City to encourage the salvage of reusable and recyclable building materials from demolitions are considered based on the industry's readiness to shift to deconstruction practices and the ability of the resale market to accommodate the salvaged material.

OPTION 1 – Support Voluntary Expansion

This option considers City supports to encourage the industry to take voluntary measures to reducing demolition waste through deconstruction. This option involves:

- Support and resources to encourage voluntary measures such as guidance, business/builder recognition, and exploring opportunities to promote reusable material salvage performance through rezoning negotiations.
- Leveraging existing industry recognition programs.
- Tracking adoption of deconstruction and material salvage practices across the City.

Outcomes and impacts under this option are uncertain and may limit the City's ability to meet the Zero Waste Victoria target.

Resource requirements:

- One-time funding of \$150,000 to develop program resources including communications, training, outreach, and guidance.

Existing staff resources would be able to provide modest support alongside third-party support for training and outreach as part of a voluntary program to encourage reusable material salvage.

OPTION 2 – Phased Regulation Beginning with New Single-Family and Duplex Housing (Recommended)

This option considers phasing-in a regulation for reusable material salvage over time for different development scenarios. Staff recommend initially applying the regulation to target replacement single-family and duplex housing based on market considerations and alignment with other City objectives presented in this report. This option involves:

- Analysis and stakeholder consultation to confirm details of the specific criteria to determine the initial scope of the regulation.
- Design of a performance-based refundable fee framework for regulated projects.
- Bringing forward a draft bylaw to regulate reusable material salvage for an initial subset of single-family and duplex housing projects.
- Reporting back with outcomes, lessons, and future options to expand the regulation to additional building/development types after review of initial implementation and further industry consultation.

This option provides for confidence in waste reduction outcomes through a measured approach that supports the industry by phasing-in a regulation for reusable material salvage across the community. The building and development industry, deconstruction service providers, and salvaged material vendors will be able to plan and innovate, with certainty about future performance expectations.

Resource requirements:

- One-time funding of \$90,000 to develop and configure the regulatory administrative system, prepare guidance materials, and support the industry with training and outreach.

The initial scope of the regulation can be administered using existing staff resources. Staff will review outcomes of the regulation after implementation and report back to Council on whether new staff resources are required to support industry compliance or future expansion of the regulation.

Accessibility Impact Statement

The recommendations in this report consider the City's objectives for access to affordable housing and a range of housing options. Deconstruction and material salvage provide economic opportunities for different types of businesses, as well as access to entry level or low-barrier employment. Salvaged materials are frequently donated to a charitable organization that supports housing access in the region.

2019 – 2022 Strategic Plan

The recommendations in this report address two actions under the Climate Leadership and Environmental Stewardship Strategic Objective: (#2) Implement the Climate Leadership Plan, and (#13) Implement a robust Zero Waste Strategy.

Impacts to Financial Plan

Should Council direct staff to move ahead with this initiative, a supplementary funding request would be brought to Council for consideration as part of the 2022 financial planning process for implementation starting in 2022.

Future resources may be considered after review of initial implementation and options for expansion of the regulation over time. Any additional resource requirements will be identified in future reports to Council.

Official Community Plan Consistency Statement

Waste reduction is consistent with Plan Goals related to Infrastructure and Climate Change and Energy in the City of Victoria's Official Community Plan (OCP No. 12-013). Specifically, the OCP states that the City is to "support steps for Victoria to move towards a zero net solid waste community in partnership with the Capital Regional District (CRD) and the private sector" and provides the broad objective that "solid waste [is] managed as [a] closed loop system with optimal levels of recovery and re-use" across different stakeholder groups.

Specific to demolition waste, the OCP states that that City is to (11.24) "Explore the feasibility of variable demolition fees as a mechanism to encourage the recovery of construction materials, and the reduction of solid waste in landfill."

CONCLUSIONS

This report presents the opportunity for the City to reduce landfilled waste from the construction sector by motivating the salvage of reusable materials from building deconstruction. A phased approach to regulation is recommended to grow market capacity for deconstruction services and salvaged material resale over time, beginning first with new single-family and duplex housing. Outcomes of an initial reusable and recyclable salvage regulation are anticipated to divert 3,000 tonnes of material from the landfill every year, achieving 15% of Zero Waste Victoria's 2040 target.

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Report accepted and recommended by the City Manager.